NASA

Management
A Continuing
Bibliography
with Indexes

NASA SP-7500 (12)
March 1978

National Aeronautics and
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NASA SP-7500 (12)

MANAGEMENT

A CONTINUING LITERATURE SURVEY

– With Indexes –

A selection of annotated references to unclassfied reports and journal articles that were introduced into the NASA Scientific and Technical Information System during 1977.

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INTRODUCTION

COVERAGE

Management is a compilation of references to selected reports, journal articles, and other documents on the subject of management. This publication lists 782 documents originally announced in the 1977 issues of *Scientific and Technical Aerospace Reports (STAR)* or *International Aerospace Abstracts (IAA).*

SCOPE

This publication series includes references on the management of: research and development, contracts, production, logistics, personnel, safety, reliability and quality control. It also includes references on: program, project and systems management; management policy, philosophy, tools, and techniques; decisionmaking processes for managers; technology assessment; management of urban problems; and information for managers on Federal resources, expenditures, financing, and budgeting.

ORGANIZATION

Each entry in this bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two sections: *IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* and *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

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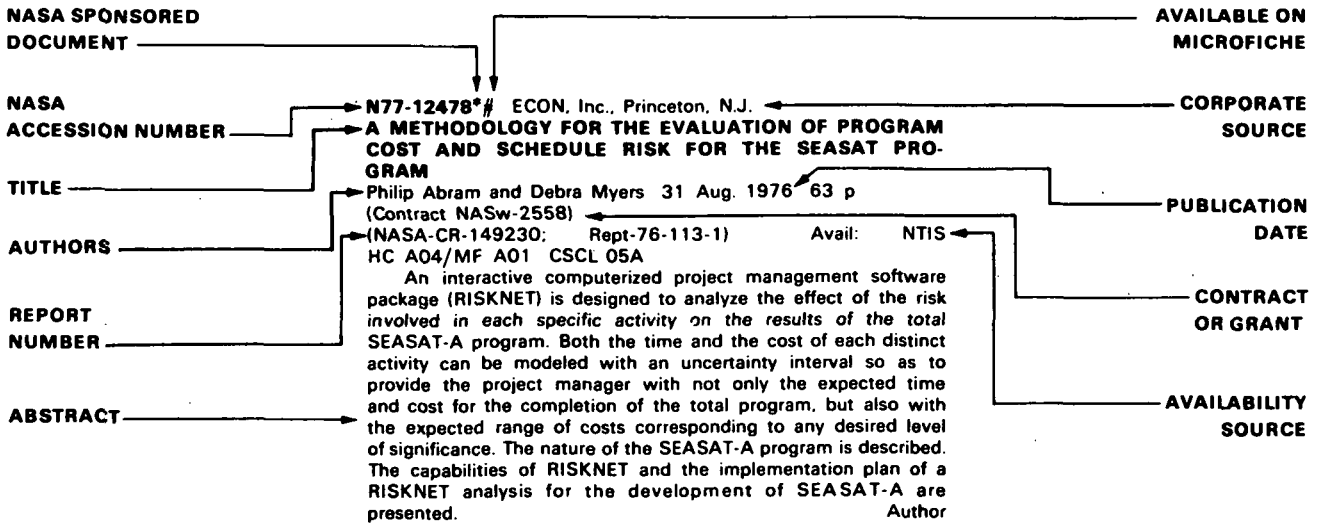

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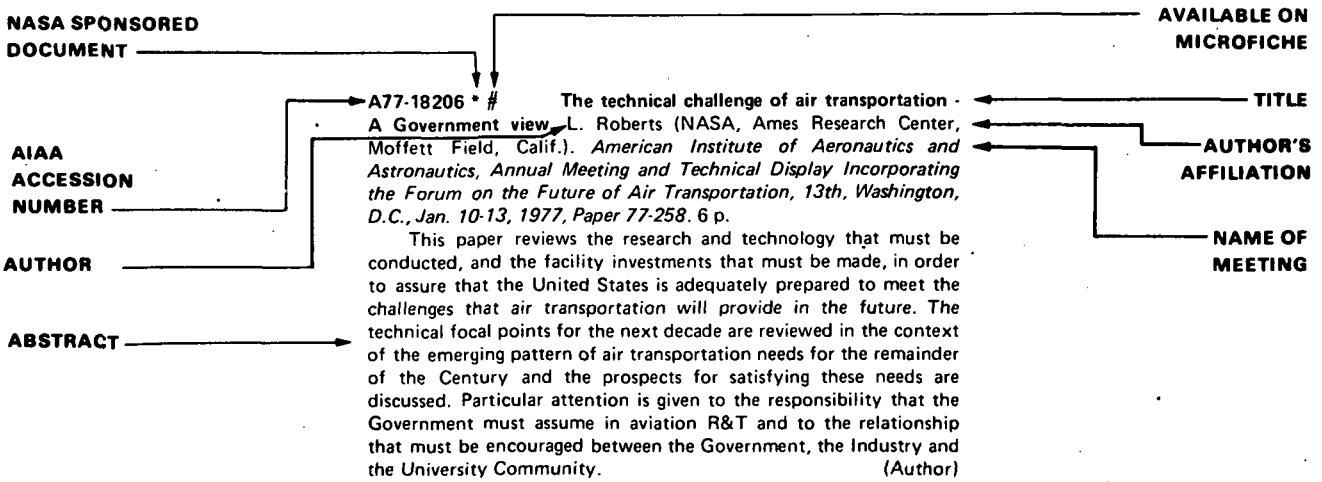

MANAGEMENT

a continuing bibliography

MARCH 1978

IAA ENTRIES

A77-10192 * # **Evaluation of a cost-effective loads approach.** J. A. Garba, B. K. Wada, R. Bamford, and M. R. Trubert (California Institute of Technology, Jet Propulsion Laboratory, Applied Mechanics Div., Pasadena, Calif.). *Journal of Spacecraft and Rockets*, vol. 13, Nov. 1976, p. 675-683. 11 refs. Contract No. NAS7-100.

A shock spectra/impedance method for loads predictions is used to estimate member loads for the Viking Orbiter, a 7800-lb interplanetary spacecraft that has been designed using transient loads analysis techniques. The transient loads analysis approach leads to a lightweight structure but requires complex and costly analyses. To reduce complexity and cost, a shock spectra/impedance method is currently being used to design the Mariner Jupiter Saturn spacecraft. This method has the advantage of using low-cost in-house loads analysis techniques and typically results in more conservative structural loads. The method is evaluated by comparing the increase in Viking member loads to the loads obtained by the transient loads analysis approach. An estimate of the weight penalty incurred by using this method is presented. The paper also compares the calculated flight loads from the transient loads analyses and the shock spectra/impedance method to measured flight data. (Author)

A77-10435 **Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings.** Symposium sponsored by IEEE, AIIE, ASQC, IES, SOLE, AIAA, and ASME. New York, Institute of Electrical and Electronics Engineers, Inc., 1976. 525 p. $18.

The topics considered are related to human performance reliability, assurance sciences models, problem solving using a government-industry data exchange program, consumer product safety, biomedical reliability and maintainability, aerospace reliability, hazard analysis and product liability, practical maintainability, microcircuit reliability, an analysis for mechanical reliability, and life cycle cost and design to cost. Attention is given to the reliability of transportation systems, reliability demonstration and test, warranties, aspects of contracting and management, nuclear system reliability, software reliability and maintainability, and part reliability and failure mechanisms.

G.R.

A77-10436 **Allocation of man-machine reliability.** K. P. LaSala (U.S. Navy, Naval Sea Systems Command, Washington, D.C.), A. I. Siegel (Applied Psychological Services, Inc., Wayne, Pa.), and C. Sontz (Tracor, Inc., Arlington, Va.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 4-10.

The two methods of reliability allocation commonly used are the basic allocation method and the AGREE allocation method. The basic concepts governing the allocation are examined, taking into account the characteristics of suitable man-machine simulation models and the constraints imposed by a restrictive environment. The formulation of the allocation problem is considered. It is found that the allocation problem can actually be written as an optimization problem. The implementation of the described approaches is illustrated with the aid of a sample allocation problem. G.R.

A77-10437 **System reliability estimation from several data sets.** J. L. Tomsky (Lockheed Research Laboratories, Palo Alto, Calif.), T. R. Chow, and L. D. Schiller (Lockheed Missiles and Space Co., Inc., Sunnyvale, Calif.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 18-24.

A statistical model is presented for the estimation of a system reliability when there are two or more sets of component data. The estimates are in the form of point estimates and confidence bounds. A Monte-Carlo simulation analysis evaluates the accuracy of the confidence levels. (Author)

A77-10440 **Condemnation rates from failure data.** M. Lipow and E. L. Welker (TRW, Inc., Redondo Beach, Calif.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 36-41.

Two models and associated procedures for predicting condemnation rate of a repairable item are presented. An investigation is conducted of the case in which ages or numbers of repairs accumulated on condemned items have not been recorded, or are unavailable. Attention is given to the determination of the age distribution, the determination of the repair frequency distribution, and considerations of uncertainty in the predictions. G.R.

A77-10443 * **Failure rate analysis of Goddard Space Flight Center spacecraft performance during orbital life.** H. P. Norris and A. R. Timmins (NASA, Goddard Space Flight Center, Greenbelt, Md.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 120-125. 8 refs.

The reported study presents the results of analyses conducted with the aid of both Duane and Weibull growth models. The failure rate values provided may be useful for estimating future space performance, and comparing past, present, and future space performance. Failure rate data from thermal-vacuum system tests are examined and related to the space values. Attention is given to the data base, the time distribution of space malfunctions, limitations on data, and average component reliability for three years in space. G.R.

A77-10447 **Reliability analysis of structures A new approach.** C. W. Johnson and R. E. Maxwell (Hercules, Inc., Bacchus Works, Magna, Utah). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 213-217. 5 refs.

A reliability assessment technique has been developed which contains a number of relatively new methods. These methods, when used together, provide a powerful and practical reliability analysis tool to generate realistic reliability predictions and to develop efficient (maximum effectiveness and minimum cost) test plans, inspection plans, and manufacturing procedures. In the paper, the various methods are used to analyze an aluminum structure to illustrate the use of the reliability assessment technique. The assessment technique consists of the Monte Carlo Simulation and Sensitivity (MCSS) analysis method and the Interpolation Function (IF) method. (Author)

A77-10448 Reliability growth management of SATCOM terminals. T. D. Cox (U.S. Army, Materiel Command, Alexandria, Va.) and J. Keely (U.S. Army, Satellite Communications Agency, Fort Monmouth, N.J.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 218-223. 7 refs.

This paper provides reliability growth, cost, and failure information gained from the development of a family of super high frequency transportable satellite communication terminals. The Duane and Weibull reliability growth models were used to constructively make reliability management decisions. Differences are noted between the Duane and Weibull models in their use for estimating growth rates, predicting future reliability, and fitting the test data. (Author)

A77-10449 Implementation of the design to cost concept. T. E. Dixon and R. H. Anderson (USAF, Air Force Special Weapons Center, Kirtland AFB, N. Mex.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 224-229.

This paper describes various management tools which can aid the Program Manager in meeting Design to Cost (DTC) objectives. These management tools provide a system Program Manager with the means to do the following on a day-by-day basis: (1) evaluate current progress of system development; (2) identify problem areas associated with various subsystems where corrective actions or additional subsystem reliability or effectiveness options are required; (3) identify subsystems which have performance (reliability) levels more than adequate to meet mission requirements and investigate if these subsystems can be replaced by lower cost subsystems (which generally implies lower performance) with the cost savings invested more effectively in the improvement of other more critical subsystems, i.e., optimal allocation of resources; (4) select the combination of subsystem reliability and effectiveness options yielding the maximum total system capability achievable at the DTC goal; and, (5) evaluate the effect of any proposed change in system design and its impact on DTC goals. (Author)

A77-10450 R & M management using risk analysis. V. O. Muglia (International Harvester Co., Solar Div., San Diego, Calif.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 230-233.

A description is presented of a useful risk analysis method, taking into account the practical use of the method for reliability and maintainability management. It is pointed out that risk analysis can be an effective tool for the manager to examine new, high loss potential, or marginal old programs for areas sensitive to input controls relative to profit maximization and life cycle costs minimization. G.R.

A77-10451 * Risk management of liquefied natural gas installations. O. H. Fedor (NASA, Kennedy Space Center, Cocoa Beach, Fla.), W. N. Parsons (Boeing Co., Cocoa Beach, Fla.), and J. Coutinho (U.S. Army, Materiel Systems Analysis Activity, Aberdeen Proving Ground, Md.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 245-250. 7 refs.

In connection with the construction of four major liquefied natural gas (LNG) facilities in New York City, the New York City Fire Commissioner has asked NASA for assistance. It was decided that the Kennedy Space Center should develop a risk management system (RMS) for the use of the New York Fire Department (NYFD). The RMS provides for a published set of safety regulations by the NYFD. A description of the RMS is presented as an example of an application of aerospace technology to a civilian sector, namely LNG facilities. G.R.

A77-10452 Hazard analysis - Space applications to mass transit. G. B. Mumma and W. R. O'Halloran (Martin Marietta Aerospace, Denver, Colo.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 251-256. 9 refs.

This paper describes an aerospace hazard analysis method practiced by Martin Marietta for National Aeronautics and Space Administration (NASA)/United States Air Force (USAF) Shuttle programs and presents an example of how this method is directly applicable to a mass transit system. Emphasis is given to the incorporation of an active and methodical hazard analysis program from the earliest possible design phase of a new system through the initial revenue years of the operational system, including maintenance activities. The hazard analysis program must cover not only system components, such as the vehicles or the automatic train control system, but it must consider the entire system as a whole. It must involve all facets of the program from individual system component suppliers to the operating and maintenance personnel of the transit system authority. (Author)

A77-10453 Effective reliability planning and implementation. W. W. Provett, Jr. and R. S. Ullman (ITT, Avionics Dept., Clifton, N.J.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 257-262.

Aspects of reliability planning in connection with the production of ECM equipment are considered, taking into account the prototype phase of the reliability program, the reproduction phase, production and deployment phases, and the reliability improvement warranty. Attention is given to internal controls, subcontractor control, internal design reviews, aspects of system developments, component screening, semiconductor and integrated circuit screening, subcontractor device screening, and equipment burn-in requirements. G.R.

A77-10454 Nomograms for the design of reliability acceptance plans. A. L. Goel (Syracuse University, Syracuse, N.Y.) and A. M. Joglekar (Pillsbury Co., Research and Development Laboratories, Minneapolis, Minn.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 263-268. Contract No. F30602-71-C-0312.

This paper presents nomograms for the design and evaluation of single sample reliability acceptance tests for exponential distribution. The nomograms permit an exploration of the design region and facilitate the examination of alternative solutions and their implications. The nomograms constitute a useful tool for the practicing engineer to weigh the trade-offs between design and test criteria. Several examples are presented to illustrate the use of the nomograms toward plan design, exploration of design region, effect of

changes in design criteria on the designed plans, design with engineering constraints and design with partial information. (Author)

A77-10456 Effects on LCC of test equipment standardization. H. Rosenberg (ARINC Research Corp., Santa Ana, Calif.) and J. H. Witt (ARINC Research Corp., Annapolis, Md.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 287-292. 5 refs.

The principle of standardization is being given considerable attention by the Department of Defense because standardization represents one approach to reduce life cycle costs. The units of test, measurement, and diagnostic equipment (TMDE) used to support the operations and maintenance activities at the sites of the U.S. Army Communications Command have been identified as potential candidates for standardization. An analysis of the benefits of TMDE standardization is discussed. It is found that standardization could produce significant cost savings. G.R.

A77-10457 The economic implications of unreliability. J. S. Greenberg (Princeton University, Princeton, N.J.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 293-299.

The evaluation and comparison of alternatives which are based upon technologies in various stages of research, development, design, and use should take into account not only expected cash flows and present values but should also take into account the associated levels of risk. This paper describes a methodology which allows taking into consideration the effects of unreliability and cost uncertainties. The methodology allows an economic value to be established for subsystem reliability improvements. (Author)

A77-10459 An approach to safety and system assurance in urban mass transportation. R. Field (U.S. Department of Transportation, Urban Mass Transportation Administration, Washington, D.C.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 306-308.

In the development of new transit systems a safety and system assurance program helps increase reliability levels, service levels, and availability while decreasing maintenance costs. Objectives for system assurance are considered and a description is presented of a program plan outline for some essential elements of reliability and maintainability. It is pointed out that a demonstration of the specified reliability and maintainability values through acceptance testing is necessary. A properly constituted warranty program can yield benefits, but it cannot replace the system assurance program. G.R.

A77-10460 Reliability and availability assessment criteria, data inputs and analysis methods for mass transit systems. E. L. Welker (TRW, Inc., Oakland, Calif.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 309-313.

A77-10462 *Improved reliability through formal field tests.* J. H. Jones (Litton Systems, Inc., Data Systems Div., Van Nuys, Calif.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 331-335.

A recommendation is made regarding the conduction of a comprehensive evaluation test during the initial phase of a major electronic system's first field test series. The principal objective of the test is the evaluation of the system's reliability and maintainability elements. An accurate assessment of reliability during the initial field test period can have a significant impact on the system's ability to achieve reliability and maintainability requirements during its life cycle. G.R.

A77-10463 System burn-in for reliability enhancement. H. D. Rue (Hughes Aircraft Co., Culver City, Calif.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 336-341.

The system burn-in test discussed involves the 'preconditioning' of assemblies and the accelerated power-on tests performed on electrical and electronic equipments subjected to temperature, vibration, voltage, and humidity cycling in an environmental chamber. An approach which permits prediction, assessment, and control of equipment reliability levels during manufacturing operations are examined, along with methods of determining optimum screening factors to achieve the desired level of equipment reliability. V.P.

A77-10464 A contractor view of warranty contracting. W. J. Bonner (Litton Systems, Inc., Guidance and Control Systems Div., Woodland Hills, Calif.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 351-356.

Warranty contracting is a viable contract form, the use of which should increase substantially over the coming years, but which has numerous pitfalls for the unwary. In the present paper, a number of typical warranty contract provisions are examined, and the challenges offered to the contractor by these provisions are discussed. The challenges include such that are associated with the commitment to repair all failures over a specified period of time at a fixed price negotiated at the time of contract award, and such that are associated with requirements for contractor assumption of transportation charges, guaranteed turn-around-time for repair units, length of the warranty period, reliability measurement and growth, and the necessity of providing contingency spares. V.P.

A77-10465 Aviation supply office FFW/RIW case history 2, Abex pump. O. Markowitz (U.S. Department of Defense, Aviation Supply Office, Philadelphia, Pa.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 357-362. 6 refs.

To the satisfaction of both buyer and seller, the FFW/RIW contract between the Navy and Abex Corporation has met and exceeded all the primary objectives. The Navy has attained substantial direct and indirect cost savings, while Abex has earned a large profit by vigorous pursuit of changes aimed at improving reliability and service life of their pump in fleet operations. The contract experience has shown the potential of FFW/RIW contracting on a sole source basis for nonelectronic (mechanical) equipment. Such a contract, properly structured, makes it possible to achieve common buyer-seller goals without the usual adversary relationships. V.P.

A77-10466 Factors in balancing government and contractors risk with warranties. R. R. Shorey (U.S. Department of Defense, Washington, D.C.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 366-368.

Historically, the Department of Defense has placed uneven emphasis, in the acquisition process, on equipment reliability as compared to performance and schedule. The net effect, particularly in complex tactical weapons, has been a field reliability considerably less than that specified. Warranties planned in conjunction with the acquisition process offer the potential to impart new ideas to the design and production of equipment which is more reliable in the

field than has resulted from conventional acquisition approaches. For the incentive to be widely applicable, the risks and gains must be satisfactory to both parties. Some carefully directed efforts will be needed to achieve a balance between the price and the uncertainties plus risk. V.P.

A77-10467 **Pitfalls in reliability program management.** E. F. Thomas (General Dynamics Corp., Fort Worth, Tex.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 369-373.

Potential pitfalls in reliability program management, which could be avoided if given proper attention during the reliability program planning phase, are discussed. The pitfalls considered are: transition of contract requirements into working paper; weak correction of deficiencies language for nonconformance; the accomplishment of reliability risk assessments; 'subcontracting' within the company; establishing program priorities during design, manufacture, test, and delivery; relevance of reliability predictions as related to product life phases; and the interface between reliability engineering and manufacturing/quality assurance. V.P.

A77-10468 **Report on reliability design and acquisition management.** T. D. Hill and T. A. Musson (USAF, Systems Command, Andrews AFB, Washington, D.C.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 374-377.

This paper is a report of the findings, recommendations, and pending implementing actions in the areas of Reliability Design Techniques and Acquisition Reliability Management, resulting from the Joint Logistics Commanders (JLC) Tri-Service Electronics Reliability Workshop held at the Airlie House, Warrenton, Virginia, during the period May 5-9, 1975. (Author)

A77-10469 **Management of electronic equipment reliability.** B. Reich and S. Grubman (U.S. Army, Electronics Command, Fort Monmouth, N.J.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 378-382.

The electronics system reliability workshop discussed resulted in short- and long-term recommendations for an ambitious wide-ranging program which may have a significant impact on the country's defense posture. The objective of the workshop was to identify problem areas and develop recommendations to improve electronic equipment reliability. The recommendations include such immediately implementable actions as: revising reliability test programs to yield 'real world' results; the development of a real-time field reliability reporting system to permit corrections, rather than merely the repair of design differences; and the publishing of revised and new reliability guidance documentation to allow for proper and enforceable contrast provisions. V.P.

A77-10470 **Integrated analysis of the assurance technologies.** H. W. Wynholds (Lockheed Missiles and Space Co., Inc., Sunnyvale, Calif.) and L. Bass (ECON, Inc., San Jose, Calif.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 394-398.

Described is a methodology that enables the Program Manager, through a systematic approach, to appropriately fund and monitor the various product development and mission support activities which support his program. This paper discusses specific considerations and capabilities of the analysis methodology. Included is a tutorial example which illustrates the essential characteristics of Integrated Program Allocation (IPA). (Author)

A77-10471 **The pay-off of R & M trade-off.** P. M. Stafford (Syracuse University, Syracuse, N.Y.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 399-404. USAF-supported research.

The objectives of the present paper are: to identify individual tasks which represent the program elements of an R & M (Reliability and Maintainability) management plan; to evaluate the relative importance of each of the program elements in securing anticipated reliability and maintainability levels; and to make trade-off recommendations between R & M program elements while recognizing the inherent risk of such compromise. The trade-off opportunities for the various program elements are summarized in diagrams and tables. It appears from the discussion that these opportunities vary to a great extent with the development life cycle phase of the system. The tabulations presented may be used as a guide in determining where compromises might safely be attempted and where shortcuts may have catastrophic results. V.P.

A77-10472 **Bayesian reliability assessment from test data.** J. E. Wolf (TRW Systems Group, Redondo Beach, Calif.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 411-419.

The general problem of making an assessment of reliability from test data is addressed. The exact calculation of Bayesian confidence limits for any type of system (serial, parallel, bridge, etc.) for test data of any assumed nature (binomial, exponential, etc.) is described for data obtained at the component level and/or system level. (Author)

A77-10473 **Estimating the reliability of complex systems.** J. N. Irwin (Hunting Engineers, Ltd., Ampthill, Beds., England). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 420-425.

The principles of a technique developed to predict the reliability of complex weapon systems are outlined by applying the technique to an example which employs an over-simplification of a few of the necessary systems to enable a manned spacecraft to carry out a reentry and soft landing. The procedures described are admittedly tedious, but have proved to provide very satisfactory reliability assessments for very complex weapon systems. The advantages of the approach include: the network itself is very useful as a medium for communication and for promoting an understanding of a complex system; the initial runs often reveal unexpected features, leading to system design changes; the combined sampling procedure not only highlights the weaker parts of the design (from the reliability point of view), but also assists in planning adequate component trials. V.P.

A77-10474 **On optimization of SCRAM systems.** I. Bazovsky, Jr. (Igor Bazovsky and Associates, Inc., Tarzana, Calif.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 426-429.

A SCRAM system may be defined as a device which is designed to avert accidents by either shutting down or disarming the primary system as soon as a hazard occurs. Examples of SCRAM systems are the shutdown system of a nuclear reactor and a proximity warning device on an airplane. In the present paper, it is proposed that SCRAM systems be evaluated by the value of their inherent effectiveness which is defined as the conditional probability that the protective device will safe a hazard occurring at a time t, given that neither hazards nor any serious SCRAMs have occurred in the interval (0,t). The inherent effectiveness of a SCRAM system is shown to be composed of the eight design characteristics. An

optimization methodology is developed for determining the optimal value of each of these characteristics so that they combine together to yield a maximal value of inherent effectiveness for minimum cost. V.P.

A77-10476 A new assurance technology for computer software. D. J. Reifer (Aerospace Corp., Los Angeles, Calif.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 446-451. 28 refs.

An advanced development project aimed at improving the reliability of computer software (computer programs and associated data) is discussed, and the methodology developed to attack the problem is described. The first steps are aimed at introducing sound management and engineering practices to the art of computer programming and to develop a new assurance technology for computer software. The assurance technology is explained by first examining the techniques of verification, validation, and certification as they are applied to the test and evaluation of computer software; next, it is shown how these techniques provide technical management with the information required to determine whether the computer program products that evolve during the software development process are correct with respect to their specifications. Application of these techniques to several projects is reviewed, and the current status of the technology is assessed. V.P.

A77-10477 I.C. screening, reliability or ripoff. J. T. Henderson (Gulton Industries, Inc., Albuquerque, N. Mex.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 452-455.

The need for Specification Control Drawings (SCD's) on Integrated Circuits (IC's) is akin to the need for SCD's on semiconductors or any other part. The part must be completely defined, and continuous control of it must be maintained. Failure to do so may lead to calamities. A nondefined parameter shift or a noncontrolled parameter change may cause problems. Another need for SCD's is product improvement by weeding out potentially defective units (screening) and by selective tightening or restricting parameter limits (guard-banding). In the present paper the merits of SCD's are outlined. Some potential pitfalls of test methods for semiconductor devices are examined, using the MIL-STD-883A system as an example. The general aspects of obtaining a reliable integrated circuit are discussed. V.P.

A77-10478 Comparison of DPA results on electronic components. S. L. Parker and L. A. Lawson (SCI Systems, Inc., Huntsville, Ala.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 456-460.

The application of Destruct Physical Analysis (DPA) to diodes, transistors, and integrated circuits of the type currently used in aerospace equipment is discussed. Particular attention is given to the methods of evaluation and to the sample plans. The results, in terms of quantity accepted and rejected, are given for each method of procurement of parts for each type of part. The data presented may prove to be beneficial to both equipment manufacturers and customers for electronic hardware when deciding what type of parts program to specify during the design and development portions of a program. V.P.

A77-10479 A Data Base Management /DBMP/ Program for Integrated Logistics Support /ILS/. A. Christensen and R. S. J. Voytek (Litton Systems /Canada/, Ltd., Rexdale, Ontario, Canada). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 467-475. 5 refs.

The Integrated Logistics Support function and its interdependent disciplines such as life cycle costing, reliability and maintainability engineering, spares determination and sparing philosophies is discussed in this paper. This inter-relationship is pursued from a Data Base Management Program (DBMP) viewpoint. The (DBMP) can be applied directly to the optimum design and selection of a system of equipment for a sailing vessel, an aircraft, a computer complex or a large orbiting space station. (Author)

A77-10480 Maintainability analysis versus maintenance analysis - Interfaces and discrimination. W. R. Downs (McDonnell Douglas Astronautics Co., Huntington Beach, Calif.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 476-481. 19 refs.

To clarify the present confusion regarding maintainability engineering and maintenance engineering analyses, the difference between the two is delineated as follows: maintainability engineering is directed at assuring a design performance capability that will permit attaining a required operational capability, while maintenance engineering is directed at assuring a proper integration of the system into the use environment in a manner which assures achieving the predicted system utilization. Both are concerned with minimizing required resources/costs. The differences are identified which must be recognized in order to achieve the objectives of the maintainability engineering program and the interchange of data between the two analyses, which is conducive to reduce program costs. V.P.

A77-10482 R&M - Today's' heating and cooling vs. solar energy. C. H. Karr (Westinghouse Research and Development Center, Pittsburgh, Pa.) and G. L. Wagner (Westinghouse Electric Corp., Astronuclear Div., Pittsburgh, Pa.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 491-499. 10 refs.

The performance data on conventional heating and cooling components discussed include service-call rates, service-call costs, and failure mode types and frequencies which relate to electric and gas air-conditioners, gas and oil furnaces, and heat pumps. This current reliability performance is then extrapolated to a higher-potential future capability. It is shown that certain known failure modes are capable of significant improvement within the present state of the art. By assuming that these obvious problems have been attended to and greatly reduced, an estimate is obtained of how good conventional systems could be in the near future. The study reveals some interesting comparisons, observations, and conclusions concerning reliability and maintenance costs of present conventional systems, improved conventional systems, and candidate solar energy systems. V.P.

A77-10483 Interface between maintainability and commercial aircraft spares support. J. E. Losee (Douglas Aircraft Co., Long Beach, Calif.). In: Annual Reliability and Maintainability Symposium, Las Vegas, Nev., January 20-22, 1976, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 500-503.

A review of all aspects of the DC-10 program revealed that a new approach to spares support is imperative if an aircraft and a support system that would be financially attractive in the market place were to be produced. The general methodology currently used by Douglas Aircraft to develop the spare support program for the D-10 is described. V.P.

A77-10916 * # Economic benefits of improved meteorological forecasts - The construction industry. R. K. Bhattacharyya and J. S. Greenberg (ECON, Inc., Princeton, N.J.). *International Astronautical Federation, International Astronautical Congress, 27th, Anaheim, Calif., Oct. 10-16, 1976, Paper 76-128.* 12 p. 10 refs. Research supported by the Environmental Research Institute of Michigan; Contract No. NAS5-20021.

Estimates are made of the potential economic benefits accruing to particular industries from timely utilization of satellite-derived six-hour weather forecasts, and of economic penalties resulting from failure to utilize such forecasts in day-to-day planning. The cost estimate study is centered on the U.S. construction industry, with results simplified to yes/no 6-hr forecasts on thunderstorm activity and work/no work decisions. Effects of weather elements (thunderstorms, snow and sleet) on various construction operations are indicated. Potential dollar benefits for other industries, including air transportation and other forms of transportation, are diagrammed for comparison. Geosynchronous satellites such as STORMSAT, SEOS, and SMS/GOES are considered as sources of the forecast data. R.D.V.

A77-10920 # Policies for pricing commercially-useful space systems resulting from government programs. J. P. Stein and C. Wolf, Jr. (Rand Corp., Santa Monica, Calif.). *International Astronautical Federation, International Astronautical Congress, 27th, Anaheim, Calif., Oct 10-16, 1976, Paper 76-132.* 8 p.

Policies for pricing commercially-useful systems resulting from government programs include four principal options: (1) marginal cost pricing; (2) average cost pricing; (3) profit-maximizing pricing; and (4) multipart pricing. For efficient resource allocation in the short run, options (1) and (4) are optimal, whereas (2) and (3) are not. This conclusion requires an assumption that externalities and implementation costs are not so different for the several alternatives as to alter the result. Choosing among alternative policies on the basis of long-run efficiency is more complicated and less conclusive, entailing such elusive considerations as public and congressional reactions to operating deficits and shuttle revenues, stimulating technological advance, etc. Finally, the alternatives can be evaluated in terms of distributional criteria: how they affect costs and benefits paid or received by taxpayers, industry, and potential domestic and foreign users of space shuttle services. (Author)

A77-10954 * # Methods utilized in evaluating the profitability of commercial space processing. H. L. Bloom and P. T. Schmitt (General Electric Co., Valley Forge, Pa.). *International Astronautical Federation, International Astronautical Congress, 27th, Anaheim, Calif., Oct. 10-16, 1976, Paper 76-261.* 10 p. NASA-supported research.

Profitability analysis is applied to commercial space processing on the basis of business concept definition and assessment and the relationship between ground and space functions. Throughput analysis is demonstrated by analysis of the space manufacturing of surface acoustic wave devices. The paper describes a financial analysis model for space processing and provides key profitability measures for space processed isoenzymes. B.J.

A77-10968 # Legal and economic prerequisites to space industrialization. A. M. Dula (Butler, Binion, Rice, Cook, and Knapp, Houston, Tex.). *International Astronautical Federation, International Astronautical Congress, 27th, Anaheim, Calif., Oct. 10-16, 1976, Paper ISL-76-29.* 10 p. 10 refs.

A survey is conducted regarding the areas of investment which are presently of interest to private industry in connection with space-based manufacturing and research activities. An investigation is carried out concerning the effects of legal regulations, especially tax and intellectual property law, on industry's willingness to invest in space research and manufacturing. It is found that the intellectual property law dramatically affects the willingness of the respondent industries to participate in space industrialization. G.R.

A77-11305 # Use of computational models in long-term cost planning (Szamitasi modellek hasznalata hosszu idotavu terveze-seknel). L. Kocsvay (Nehezipari Miniszterium, Budapest, Hungary). *Energia es Atomtechnika,* vol. 29, May 1976, p. 211-213. In Hungarian.

Broad computational models are devised for long-term cost effectiveness planning of power equipment procurement. A stable unchanging price level is entertained in a first approximation, and models with increasing, decreasing, and time-constant cost-level curves are also constructed. A long-term stationary slow rise in price level on a background of market equilibrium, and with conjunctural transient fluctuations abstracted, is considered for inflationary trends. Problems with imports, foreign exchange and currency, and rise in equipment prices because of inflation and lead time in realization of projects are touched upon. A tool-tiedown factor and a cost-rise index are defined. It is claimed that the models lead to great savings in computational labor in working out cost estimates. R.D.V.

A77-11307 # Computational techniques applied to power investments /practical programming/ (Az energetikai beruhazasoknal alkalmazott szamitasi modszerek /gyakorlati programozas/). L. Kocsvay. *Energia es Atomtechnika,* vol. 29, June 1976, p. 261-272. In Hungarian.

A variety of computer-oriented techniques for project control, sequencing and scheduling of operations, and cost optimization, applicable to investment programs for power plants and power equipment, are reviewed. The milestone system, cyclogram system, harmonogram system (process elapsed time and overlapping bands for scheduled operations), and scheduling based on power sources are discussed. Network techniques such as the critical path method, program evaluation and review techniques, and mesh point methods are compared. Difficulties in gaining acceptance for network techniques are mentioned. R.D.V.

A77-11311 Co-operation in the European aircraft manufacturing industry and among the scheduled airlines /Brancker Memorial Lecture/. K. Hagrup (Scandinavian Airlines System, Bromma, Sweden; International Chamber of Commerce, Paris, France). *Chartered Institute of Transport Journal,* vol. 37, May 1976, p. 93-104.

Cooperation (rather than competition) as the aviation industry has achieved it in AECMA (European Association of Aerospace Manufacturers), in AEA (Association of European Airlines), in ECAC (European Civil Aviation Conference), in KSSU (KLM, SAS, SWR, UTA) and in ATLAS (Air France, Alitalia, Iberia, Lufthansa, Sabena) and other cooperating groups in Europe is discussed. Particular emphasis is on the EEC commission's proposal regarding extended cooperation and centralization of the aerospace manufacturers and airlines of the EEC. Modifications of the EEC commission's proposal are suggested. B.J.

A77-11344 * Are accidents scheduled. C. Childs (NASA, Washington, D.C.). *Hazard Prevention,* vol. 13, Sept.-Oct. 1976, p. 3-5.

Two major sets of safety problems associated with project scheduling are examined. The first set involves problems resulting from the improper scheduling of the safety tasks. The second involves problems which result from inadequate attention to scheduling of those project tasks which lead to tests and operations and includes condensed schedules, modified schedules, schedule work-arounds, eliminated portions of the schedules and strung out schedules. B.J.

A77-11584 # Spacelab - A new era in communications R & D Project Management. C. E. Cheeseman (General Electric Co., Space Div., Philadelphia, Pa.). *(European Industrial Space Study Group, U.S.-European Conference, 6th, Monte Carlo, Monaco, Oct. 13-16, 1975.) British Interplanetary Society, Journal,* vol. 29, Nov. 1976, p. 695-708.

The technical, managerial, and sponsorship aspects of some Spacelab communications payloads are discussed. It is seen that, as with all revolutionary new capabilities, major reconstructing of techniques and methods will be necessary to capitalize on the opportunities provides by Spacelab. The transition must begin several years before the first Spacelab flight. Government and industry must

begin immediately to develop their joint programs and individual projects. The charges for experimenting must be defined to allow R & D choices to be made by the private sector, and the involved questions of government and industry must be addressed. In addition, hardware guidelines and constraints must be established to ensure the safety of the Orbiter, Spacelab, and crew and to reduce to a minimum the associated preparation costs to a potential use of Spacelab. V.P.

A77-11587 # **The potential of Spacelab for space applications missions and the organisation for its use.** A. Lebeau, D. J. Shapland, and J. Collet (ESA, Neuilly-sur-Seine, Hauts-de-Seine, France). *(European Industrial Space Study Group, U.S.-European Conference, 6th, Monte Carlo, Monaco, Oct. 13-16, 1975.) British Interplanetary Society, Journal,* vol. 29, Nov. 1976, p. 729-742.

Some characteristic features of Spacelab design are examined, with particular reference to the pressurized module that provides a working laboratory environment, and the unpressurized pallet that permits direct exposure to the space environment. The ways in which mission flexibility and adaptability to a range of configurational and mission requirements were achieved are outlined, and the modular approach adopted in the design is illustrated. Spacelab missions, applications, and the respective payloads are discussed, and the mode of Spacelab usage and control is described. The part played by the European Space Agency in the Spacelab project is emphasized. V.P.

A77-12248 # **How construction times of power stations affect investment costs (Eromuvi beruhazasok atfutasidejenek koltsegkihatasa).** L. Kocsvay (Nehezipari Miniszterium, Budapest, Hungary). *Energia es Atomtechnika,* vol. 29, Oct. 1976, p. 468-471. In Hungarian.

A worldwide trend of increasing power station investment costs is noted, and the effect of lengthening of construction times and construction delays on investment costs is assessed. The combined effect of price increases and of funding over a 6-8 year construction period is investigated as an example. Additional labor costs and labor overtime costs, inflationary rises in labor costs and materials costs, accumulations in interest payments, and price-moderating trends connected with increases in labor and machine productivity, intensified mechanization of construction work, and improvements in project planning are dealt with. R.D.V.

A77-12455 **R. & D. project cost and schedule realism - A risk analysis approach.** D. C. Borgman (U.S. Army, Air Mobility Research and Development Laboratory, St. Louis, Mo.) and J. D. Hwang (U.S. Army, Air Mobility Research and Development Laboratory, Moffett Field, Calif.). In: Conference on Decision and Control, 6th, and Symposium on Adaptive Processes, 14th, Houston, Tex., December 10-12, 1975, Proceedings. New York, Institute of Electrical and Electronics Engineers, Inc., 1975, p. 731-733. 5 refs.

All project managers strive for cost and schedule realism. The Department of the Army has established a novel concept called the 'Total Risk Assessing Cost Estimate (TRACE)' to develop a new program cost-estimation procedure for research, development, test and evaluation cost realism. Such a procedure properly accommodates program uncertainties/risks inherent to specific work elements, and the high-risk work elements are budgeted accordingly. The purpose of this paper is to propose such a procedure which subscribes to a risk analysis approach and satisfies the essential elements of the TRACE concept. The procedure consists of two models: a cost impact model and a schedule variance model. Applications of the procedure to the NASA/Army Tilt Rotor Research Aircraft Project are also presented for illustration. (Author)

A77-13330 **Managing by exception in space systems operation.** G. J. Winchell (USAF, Offutt AFB, Neb.). *Defense Management Journal,* vol. 12, Oct. 1976, p. 64-68.

The Defense Meteorological Satellite Program (DMSP) has been one of the more successful U.S. space programs. The 4000th Aerospace Applications Group of the U.S. Air Force's Strategic Air Command, nicknamed the Four Grand, maintains command and control of the DMSP's on-orbit satellites. The group has combined the functions of operational control, technical manual preparation, system training, limited procurement, and design and development engineering of both hardware and software into a relatively small organization of approximately 200 people. Attention is given to aspects of data flow, the organizational structure of the Four Grand, and lessons provided by the experience of the Four Grand with the DMSP. G.R.

A77-13364 **The role of the airport consultant.** A. H. Stratford. *Airport Forum,* vol. 6, Oct. 1976, p. 47-52. In English and German.

Attention is extended from focus on civil engineering, mechanical engineering, and electrical engineering aspects of airport consultants' work to concern with risk capital financing, resources deployment, road vehicle traffic projections in the vicinity of airports, environmental problems, noise levels, expediting of passenger traffic (including: luggage searches, mobile lounges, etc.), and cost studies. The volume and nature of airport consultancy business in Britain are discussed. Construction supervision, the local social and political setting, and the international setting are also viewed as major concerns. R.D.V.

A77-13777 # **Planning and installation of an information center on fatigue and associated aspects at the LBF.** O. Buxbaum (Fraunhofer Gesellschaft, Laboratorium für Betriebsfestigkeit, Darmstadt, West Germany). In: Problems with fatigue in aircraft; Proceedings of the Eighth Symposium and Colloquium, Lausanne, Switzerland, June 2-5, 1975. Emmen, Switzerland, Eidgenössisches Flugzeugwerk, 1975, p. 5.1/1-5.1/5.

The considered information center is to serve the needs of industry and research in providing up-to-date and critically analyzed technical information related to fatigue phenomena and the fatigue behavior of materials. In 1974 a predesign study concerning the information center was conducted, taking into account the group of potential users, the type of information expected, the scope of the literature of fatigue, organizational aspects, and financial questions. The results of the study are briefly discussed. G.R.

A77-14550 # **The future of safety in general aviation.** B. W. Silver. *AIAA Student Journal,* vol. 14, Fall 1976, p. 12-15.

The point is made that the level of safety in general aviation is not good, and that a good deal of the problem lies in the FAA certification process itself. It is argued that this process is not conducive to technically oriented, impartial engineering evaluation of the safety of small aircraft designs. The 'Delegation Option Authorization', whereby the FAA assigns the responsibility for type certification of new aircraft designs to the directors of the nine regional FAA offices, who in turn can pass the responsibility on to the manufacturer, has a built-in conflict of interest, since it essentially permits the manufacturer to certify his own products. It is unfortunate that lawsuits arising from aircraft accidents are becoming a greater enforcer of safety, in some respects, than design regulations. P.T.H.

A77-14600 # **Operations research model for investments scheduling in the transportation industry (Modele economico matematice de etapiaare a investitulor in transporturi).** I. Cuncev (Institutul de Cercetari si Proiectari Tehnologice in Transporturi, Bucharest, Rumania). *Revista Transporturilor si Telecomunicatiilor,* vol. 3, no. 5, 1976, p. 412-417. 5 refs. In Rumanian.

Mathematical cost estimate and investment planning models for transportation, particularly maritime and river transportation, are worked out, with fleet and harbor capacities as parameters and investments as inputs. The waterways fleets and harbor facilities are treated as an automatic system acted upon by input signals (investments). Convolution integrals for the relationship between input and system response are derived, and simplex matrix algorithms are developed. Docking facilities, materials handling equipment, communications equipment, auxiliary harbor vessels, cargo fleet, storage depot areas, and waterways maintenance are treated as (automatic) subsystems. Optimazation of cargo/traffic flow under conditions of expanding traffic volume, with various constraints, is aimed at. Some numerical examples are worked out. R.D.V.

A77-15224 The commercial airline industry: Managerial practices and regulatory policies. N. K. Taneja (MIT, Cambridge, Mass.). Lexington, Mass., D.C. Heath and Co., 1976. 350 p. 368 refs. $21.95.

An introduction to managerial practices and regulatory policies in the commercial airline industry is presented. Operation of airlines and short- and long-term decision making procedures are discussed after a brief review of historical developments in the industry. Industry structure, airline economics, profitability analysis, marketing of air transport services, fleet planning and selection of aircraft, airline scheduling, labor relations, passenger traffic forecasting, and airline subsidies and mergers are discussed. Passenger fare and freight rate policy decisions are covered and the status of airline regulation and development is considered on a national and on an international basis. The book ends with a discussion of policy issues in air transportation (deregulation, supersonic transport, V/STOL, fuel costs, airport access and congestion, air cargo). R.D.V.

A77-16375 A new air transport policy for the North Atlantic. J. J. Friedman. New York, Atheneum, 1976. 151 p. 97 refs. $5.95.

An investigation is conducted concerning the requisites of a sound regulatory policy with regard to the great North Atlantic air transport system. A basic change in the regulatory policy under which the industry now operates is required to solve the deep-lying economic problems which have plagued the North Atlantic service for years. Approaches for achieving improved efficiency are considered, taking into account the control of scheduled capacity, the integration of scheduled and charter capacity, and the control of charter capacity. Questions related to an achievement of economic fares are also discussed, giving attention to fares for scheduled services, the relation of scheduled to charter fares, charter rates, and a standard of reasonableness of profits. G.R.

A77-16449 Public international air transportation law in a new era: Economic regulation of international air carrier operations. H. A. Wassenbergh (KLM-Royal Dutch Airlines, Amstelveen, Netherlands). Deventer, Netherlands, Kluwer, 1976. 174 p. 313 refs. $25.10.

Problems related to aspects of international and national control of the international air traffic market are explored, questions concerning the exchange of traffic rights for scheduled services are investigated, and the historical background of the charter development is examined. Attention is also given to the nonaffinity concept, the separation of charter service from scheduled service, the exchange of charter rights by international agreement, developments in the direction of a new freedom of the air, advantages of inter-airline cooperation, and the characteristics of a new U.S. international civil aviation policy. G.R.

A77-16687 Discussion of the reliability of measuring devices (Messgeräte-Zuverlässigkeit diskutiert). E. Templ and P. Dollmetsch (Standard Elektrik Lorenz AG, Stuttgart, West Germany). *Elektronik,* vol. 25, Nov. 1976, p. 103-105. In German.

Costs related to the use, purchase, and maintenance of devices for measurement, test, and control applications depend to a large degree on aspects of device reliability. The use of devices of low reliability is connected with high service costs. An employment of devices with a high reliability, on the other hand, may be uneconomical. Problems of device selection are related to the requirement to select a device with a reliability for which the total cost, which includes the cost of the device and the service and maintenance costs, is a minimum for the intended application. G.R.

A77-16735 # System safety and the Utility Tactical Transport Aircraft System. J. C. Henderson (U.S. Army, Agency for Aviation Safety, Fort Rucker, Ala.). In: International System Safety Conference, 2nd, San Diego, Calif., July 21-25, 1975, Proceedings. Newport Beach, Calif., System Safety Society, 1976, p. 455-460.

After a general description of the UTTAS (Utility Tactical Transport Aircraft System) helicopter, attention is directed to integration of system safety during concept formulation and specific system safety tasks which included hazard analyses, the establishment of positive system safety evaluation procedures for proposed system modifications, and the identification of qualitative and quantitative safety requirements for the system and all subsystems. System safety criteria, hazard identification and control (including preliminary hazard analysis, and operating and maintenance hazard analyses), reliability, vulnerability and crashworthiness are examined. B.J.

A77-16738 # Tasks and method of operation of the government aviation inspection. III (Aufgaben und Arbeitsweise der Staatlichen Luftfahrtinspektion. III). K. Zindel (Staatliche Luftfahrtinspektion, Berlin, East Germany). *Technisch-ökonomische Information der zivilen Luftfahrt,* vol. 12, no. 4, 1976, p. 198-200. In German.

Human error, deficiencies in the design of aviation devices, defective material, and unavoidable occurrences can produce aircraft accidents, material damage, or disturbances in air traffic operations. The study of such extraordinary events in civil aviation is considered, taking into account the regulations concerning such events in the German Democratic Republic. Investigations are conducted regarding the aircraft and its equipment, the preparation of the aircraft for the flight, the flight operations, the control and guidance of the aircraft, aspects of flight safety, the ground characteristics, the weather, the duties and responsibilities of the involved persons, the characteristics of the extraordinary event, and the consequences of the event. G.R.

A77-17020 # What options for European aviation. E. G. Friberg and R. S. Attiyeh (McKinsey and Co., Inc., Amsterdam, Netherlands). *Astronautics and Aeronautics,* vol. 15, Jan. 1977, p. 50-56.

Back in 1970, with the U.S. aerospace industry hobbled by severe financial and structural weaknesses, the time seemed ripe for European aerospace companies to challenge American dominance of the free-world market. This has not happened, if anything, the Europeans have lost ground. The present article reviews the earlier forseen opportunity, and shows how the European challenge was blunted by a combination of unforeseen economic events, internal difficulties, and competitive U.S. moves. Steps which the European industry might take to become a more significant factor in the aerospace market are examined. V.P.

A77-17022 # Planning a general-aviation product. J. N. Lew (Beech Aircraft Corp., Wichita, Kan.). *Astronautics and Aeronautics,* vol. 15, Jan. 1977, p. 76-82.

The cost-estimating technique described illustrates most of the typical factors which a general-aviation company must consider to

decide whether it should commit itself to the production of a proposed new airplane. It is shown how financial risk can be exposed by predicting profit and return in investment prior to any initial investment. V.P.

A77-17228 A new development concept for gas turbine engine optimize life cycle costs. W. D. Cowie, E. E. Abell, and E. W. Horn (USAF, Aeronautical Systems Div., Wright-Patterson AFB, Ohio). In: International Symposium on Air Breathing Engines, 3rd, Munich, West Germany, March 7-12, 1976, Proceedings. Cologne, Deutsche Gesellschaft für Luft- und Raumfahrt, 1976, p. 27-38. 12 refs.

The life cycle development and management process for turbine engines is being revised to provide more durable, reliable, and lower life cycle cost engines to the military services. Greater attention is being given earlier in the life cycle to the cost trades between performance, producibility, and operability/supportability; i.e., during the technology, conceptual and validation phases of the development process. The full-scale development phase has been restructured to emphasize structural durability and to provide formal demonstrations of useful engine life limits; operational and logistic characteristics; and validation of the engine life management process to provide economic management rationale for the production hardware acquisition, operational usage, and logistic support phases. (Author)

A77-17422 Cost reliability trade off in an electronic module. K. Surendran and K. R. Chandra (Indian Space Research Organization, Vikram Sarabhai Space Centre, Trivandrum, India). *Microelectronics and Reliability*, vol. 15, no. 5, 1976, p. 493-496.

A cost reliability trade off study for an electronic subsystem is considered. A practical method is suggested for selecting the components, available in different grades, of a subsystem where its cost is minimized for the required reliability and performance. Based on the method, a flow diagram is presented for computer implementation. An example is provided to illustrate the method. (Author)

A77-18202 # The airlines - A financial overview. D. J. Lloyd-Jones (American Airlines, Inc., New York, N.Y.). *American Institute of Aeronautics and Astronautics, Annual Meeting and Technical Display Incorporating the Forum on the Future of Air Transportation, 13th, Washington, D.C., Jan. 10-13, 1977, Paper 77-253.* 7 p.

The paper shows that the capital requirements of the airline industry over the next eight years total approximately $39 billion, with $34 billion attributable to replacement and growth and another $5 billion attributable to the noise regulation. The $34 billion requirement alone would represent a very substantial challenge for almost any U.S. industry. However, the U.S. airlines have coped with re-equipment programs of comparable size relative to their asset base in the past. Future ability of the airline industry to maintain a viable U.S. air transportation system should rely upon adequate earnings and a stable regulatory environment. In particular, the government must permit the airline industry to utilize user charges to finance the $5 billion impact of the retroactive imposition of the new noise regulation, and there should be reliable regulations that must remain unchanged for a period of time to promote a viable safe industry. S.D.

A77-18203 # AIAA Forum on the Future of Air Transportation - Regulatory overview. S. D. Browne. *American Institute of Aeronautics and Astronautics, Annual Meeting and Technical Display Incorporating the Forum on the Future of Air Transportation, 13th, Washington, D.C., Jan. 10-13, 1977, Paper 77-254.* 11 p.

The five civil aviation regulatory reform bills introduced into the last Congress are briefly considered and questions related to a regulatory reform are discussed. Comments concerning the proposals of the Cannon Bill, introduced on Sept. 20, 1976, are presented. A brief comparison of aviation reform proposals is also conducted. G.R.

A77-18205 # The future of air transportation - Airline considerations. R. C. Collins (United Air Lines, Inc., San Francisco, Calif.). *American Institute of Aeronautics and Astronautics, Annual Meeting and Technical Display Incorporating the Forum on the Future of Air Transportation, 13th, Washington, D.C., Jan. 10-13, 1977, Paper 77-257.* 5 p.

Technological breakthrough is discussed as the basic item that can ensure the resistance of the air transportation industry to economic 'strangulation' by government regulation. Considering the industry as a communications and a leisure business, it is argued that the future of air transportation will depend on the industry's ability to keep the price of air travel competitive in an environment conducive to regulatory strangulation. The likelihood of technological breakthrough is evaluated, emphasizing electronics system design based on digital technology and micro integrated circuits. Systems considered for simplification and rational design aimed at eliminating nonessential components include VHF communications, VH navigation, ATC transponders, electrical power units, and fuel assemblies. F.G.M.

A77-18206 * # The technical challenge of air transportation - A Government view. L. Roberts (NASA, Ames Research Center, Moffett Field, Calif.). *American Institute of Aeronautics and Astronautics, Annual Meeting and Technical Display Incorporating the Forum on the Future of Air Transportation, 13th, Washington, D.C., Jan. 10-13, 1977, Paper 77-258.* 6 p.

This paper reviews the research and technology that must be conducted, and the facility investments that must be made, in order to assure that the United States is adequately prepared to meet the challenges that air transportation will provide in the future. The technical focal points for the next decade are reviewed in the context of the emerging pattern of air transportation needs for the remainder of the Century and the prospects for satisfying these needs are discussed. Particular attention is given to the responsibility that the Government must assume in aviation R&T and to the relationship that must be encouraged between the Government, the Industry and the University Community. (Author)

A77-18207 # Financing the future fleet. A. M. de Voursney (United Air Lines, Inc., Chicago, Ill.). *American Institute of Aeronautics and Astronautics, Annual Meeting and Technical Display Incorporating the Forum on the Future of Air Transportation, 13th, Washington, D.C., Jan. 10-13, 1977, Paper 77-261.* 4 p.

If the airlines of the United States are to finance replacement of existing fleets as they become economically obsolete and also acquire added aircraft to accommodate growth, the investment climate for airline securities must be sharply improved. It is important both to air transportation users and our economy that the carriers have access to private financing of capital needs which will total almost $65 billion by 1990. (Author)

A77-18216 # Efforts to stimulate aeronautical engineering research could ease the regulatory atmosphere in which the aviation community operates. J. L. McLucas (FAA, Washington, D.C.). *American Institute of Aeronautics and Astronautics, Annual Meeting and Technical Display Incorporating the Forum on the Future of Air Transportation, 13th, Washington, D.C., Jan. 10-13, 1977, Paper 77-277.* 5 p.

The U.S. aviation regulation history is examined. It is found that the government's role in the management of the national aviation system has undergone considerable change in the past half-century. The trend toward regulation has increased steadily as technological improvement has permitted man to fly faster, higher, and farther. Attention is given to the question of whether this trend will continue or whether the regulatory climate can be eased through advances in technology. Advantages and limitations of radar are considered along with the development of an automatic separation assurance system, the desirability to reduce the workload on the pilot, and aspects of flight safety. G.R.

A77-18221 # **The future economic opportunities for air transport.** M. A. Brenner (Trans World Airlines, Inc., New York, N.Y.). *American Institute of Aeronautics and Astronautics, Annual Meeting and Technical Display Incorporating the Forum on the Future of Air Transportation, 13th, Washington, D.C., Jan. 10-13, 1977, Paper 77-284.* 11 p.

An evaluation of long term economic and demographic trends related to the future growth potential of the air transport industry is conducted. It is found that the outlook for future air travel growth is in the range from 6 to 8 per cent per year. The realization of this potential, however, will depend on the economic attractiveness of an investment in the air transport industry. It is pointed out that, over the years, this industry has had a grossly inadequate earnings record. A primary reason has been the amount of already-existing competition which has led to a limitation of the attainable load factor. G.R.

A77-18222 # **The future of air transportation - Economic association considerations.** F. J. H. Johnston (International Air Transport Association, Montreal, Canada). *American Institute of Aeronautics and Astronautics, Annual Meeting and Technical Display Incorporating the Forum on the Future of Air Transportation, 13th, Washington, D.C., Jan. 10-13, 1977, Paper 77-286.* 19 p.

The International Air Transport Association is responsible for providing the necessary machinery whereby international airlines can negotiate tariff agreements on international services subject to governmental approval. The essence of the future problem of international air transport is how to rationalize the desire of the peoples of the world for air transport services at the lowest possible price levels in face of the inexorable rising cost trends. The political and regulatory environment in which the industry is operating and the changes which may occur in the next ten years are outlined. The prospects for future traffic growth in the industry will be closely related to the economic health of the principal traffic generating countries. However, the economic climate is likely to be not conducive to large-scale or long-range planning by international air transport. Ways in which future prospects can be improved are pointed out. S.D.

A77-18258 * # **The economic viability of pursuing a space power system concept.** G. A. Hazelrigg, Jr. (ECON, Inc., Princeton, N.J.). *American Institute of Aeronautics and Astronautics, Annual Meeting and Technical Display Incorporating the Forum on the Future of Air Transportation, 13th, Washington, D.C., Jan. 10-13, 1977, Paper 77-353.* 10 p. NASA-supported research.

The development of a space power system requires no fundamental technological breakthroughs. There are, however, uncertainties regarding the degree to which necessary developments can be achieved or exceeded. An analysis is conducted concerning the implementation of a 5000 MW space-based solar power system based on photovoltaic conversion of solar energy to electrical energy. The solar array is about 13 km long and 5 km wide. Placed in geosynchronous orbit, it provides power to the earth for 30 years. Attention is given to the economic feasibility of a space power system, a risk analysis for space power systems, and the use of the presented methodology for comparing alternative technology development programs. G.R.

A77-19014 **Airline managerial efficiency.** R. J. Pearson (Central London, Polytechnic, London, England). *Aeronautical Journal,* vol. 80, Nov. 1976, p. 475-482.

Measurement, parametrization, comparative analysis, and objective characterization of airline managerial efficiency are attempted. Marketing efficiency, handling of aircraft productivity, labor productivity, and cost efficiency, are approached as factors subject to manipulation by airline managerial ability/efficiency. Regression analysis and rank correlations are applied in studies of the productivity or labor categories and of efficiency in the control of costs (by categories), and in comparing productivity vs cost performance. Efficiency aspects subjected to regression analysis are discussed. Profit performance is singled out as the best single raw indicator of managerial efficiency. R.D.V.

A77-19175 **The seat belt light is on.** H. E. Tolle (United Air Lines, Inc., Chicago, Ill.). *Exxon Air World,* vol. 29, no. 1, 1976, p. 5-9.

Future trends affecting growth and revenues of the airline industry are projected with consideration of factors governing passenger travel demand, the profit picture, competition, political constraints, and fuel costs. Success in fuel conservation, the fuel fraction of operating costs, effects of U.S. (FEA, EPA, FAA, CAB, DOT) government regulations, trends in passenger fares and freight rates, impact of inflation, expected slow and modest technological advances, forecasts of the potential passenger market, demographic trends affecting future passenger travel demand, and the capital investment picture are surveyed, along with European competition. Population growth, smaller families, higher incomes, increased leisure time, and increased foreign travel are foreseen as pluses, while higher fares and costs, increased consumer savings, and electronic substitutes for business travel are seen as minuses. R.D.V.

A77-19488 # **Urban solid waste processing - An approach developed by Continental Can Company, Inc.** M. L. Smith (Continental Can Co., Inc., Chicago, Ill.). *American Society of Mechanical Engineers, Intersociety Conference on Environmental Systems, San Diego, Calif., July 12-15, 1976, Paper 76-ENAs-41.* 11 p. 6 refs. Members, $1.50; nonmembers, $3.00.

The paper describes a method of municipal solid waste resource recovery, developed by Continental Can Company. In this new method, the solid waste is separated into combustible and noncombustible portions. The combustible portion is further processed into CSF (Continental specification fuel), to meet a set of requirements like low ash content, small particle size, low glass content, high heat value and surge storage, which have an important bearing on product marketability. Ferrous metals are magnetically separated from the non-combustible portion and shredded into smaller sizes by the primary shredder. The boiler efficiency conditions and a field study of the boiler tube corrosion mechanism associated with CSF combustion are also presented. Design and process flow details are explained with the help of diagrams and photographs. In a plant of the above type the total construction cost per daily ton of installed capacity will be 1/3 or less than the conventional incinators. It will also create 25 new jobs/plant and reduce the sanitary landfill requirements by 70%. A.Y.

A77-19489 # **Forecasting impacts on solid waste resource recovery systems.** C. F. Ketterling and C. C. Kemper (Metropolitan Service District, Portland, Ore.). *American Society of Mechanical Engineers, Intersociety Conference on Environmental Systems, San Diego, Calif., July 12-15, 1976, Paper 76-ENAs-46.* 8 p. Members, $1.50; nonmembers, $3.00.

The prospect of effective solids waste recovery systems (SWRS) is examined with attention given to industrial engineering problems. Parameters of waste recovery systems and relationships between the parameters are examined broadly. A description is attempted of the environment of SWRS (with attention given to social and political attitudes, quantities of waste generated, cost factors, incentives), a scenario is developed to aid evaluation of SWRS effectiveness and acceptance, and scanning techniques for monitoring unforeseen changes and trends are considered. Counterarguments invoking rapid technological obsolescence of SWRS, counterposition of materials recovery and energy recovery, and waste-generating commitments to keep quantities of waste material flowing to SWRS are assessed. R.D.V.

A77-19493 * # **Planning for life sciences research in space.** K. M. Mallory, Jr. (Kenneth Mallory and Associates, Inc., Alexandria, Va.) and S. Deutsch (NASA, Washington, D.C.). *American Society of Mechanical Engineers, Intersociety Conference on Environmental Systems, San Diego, Calif., July 12-15, 1976, Paper 76-ENAs-52.* 8 p. Members, $1.50; nonmembers, $3.00.

Invitations to participate in planning the NASA Life Sciences Program in Space were mailed to members of the Life Sciences community at large during April 1975. The invitation is related to current planning for Life Sciences research in space during the 1980's, taking into account a use of the Space Shuttle, Spacelab, and the unmanned Biological Experiments Scientific Satellite (BESS). A response form to be completed and returned to NASA by the scientists included questions requesting suggestions on topics-for-research, laboratory equipment, and test specimens. A description of the invitation results is presented, taking into account general response, respondent specialties, laboratory equipment, test specimens, and research objectives. Attention is also given to an Announcement of Opportunities (AO) for the Space Transportation System. The AO was issued by the Office of Space Science in March 1976. G.R.

A77-19508 # **Planning for biomedical research in space - The visiting research scientist.** A. A. Kelton (McDonnell Douglas Astronautics Co., Life Sciences Div., Huntington Beach, Calif.). *American Society of Mechanical Engineers, Intersociety Conference on Environmental Systems, San Diego, Calif., July 12-15, 1976, Paper 76-ENAs-67.* 14 p. 21 refs. Members, $1.50; nonmembers, $3.00.

Recurrent difficulties in interfacing between spacecraft experimental accommodations and constraints and organizers of research experiments (specifically biomedical) with varying levels of familiarity with spacecraft constraints are outlined and recommendations are presented. Conduct of a mail questionnaire and a list of institutions visited are discussed, along with other problems common to participating institutions (including: funding, publications and patents, unique facilities or location). Recommendations deal with interchanges of information, proprietary rights to data, organizational structure of the visiting scientist program, development of interfacing experiment engineers, experiment simulation, and the common operational research equipment (CORE) concept, among others. R.D.V.

A77-19912 # **Characteristics of space processing operations.** G. H. Stine. *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 15th, Los Angeles, Calif., Jan. 24-26, 1977, Paper 77-229.* 9 p. 7 refs.

Commercial-scale industrial activities are defined, systematized, and contrasted in relation to terrestrial and extraterrestrial conditions. Characteristics common to, or distinguishing, industrial activities pursued by private corporations or by governments, on the earth or in space, are formalized, and a list of space industrial processes (with classification breakdown) is presented. Energy sources, heat sinks, siting, environment, wastes disposal, warehousing and storage, transportation, and process control and process management problems are sketched. Attention is given to marketing and marketing systems, including the likely situation where the product fabricated in space is unique and has no competition in terrestrial industry or markets. R.D.V.

A77-19996 **Transport to outer space by private enterprises - Aspects of air and space law (Transporte in den Weltraum durch Privatunternehmen - Luft- und weltraumrechtliche Aspekte).** D.-H. Böckstiegel. *(Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, Munich, West Germany, Sept. 14-16, 1976.) Zeitschrift für Luft- und Weltraumrecht,* vol. 25, Dec. 1976, p. 285-303. 89 refs. In German.

A company in West Germany has developed launching vehicles for the commercial transport of civil payloads, including research and communications satellites, into outer space. It is intended to use the rockets for the launching of payloads from ships on the high seas or from the territory of a large African state. An investigation is, therefore, conducted concerning the legal status of space activities conducted by private firms. It is concluded that the existing regulations of air and space law do not contain any clauses which can be interpreted as prohibiting private space activities. Such activities require, however, the authorization of the appropriate state party to the Space Treaty. Attention is also given to limitations concerning the utilization of outer space by private firms, the necessity for a supervision of private space activities, questions of international consultation, aspects of registration, regulations concerning liability, and aspects of German and international air law. G.R.

A77-19997 **Transport of outer space by private enterprises - Aspects of air- and space law.** K.-H. Böckstiegel. *Zeitschrift für Luft- und Weltraumrecht,* vol. 25, Dec. 1976, p. 304-314. 60 refs.

Aspects of space law related to the transport to outer space by private enterprises are considered, taking into account the admissibility of private space activities, the admissibility of private commercial space activities, the conditions for private space activities, and questions of liability. According to the Space Treaty, an authorization and supervision of the activities of nongovernmental entities in outer space by the 'appropriate' State Party to the treaty is required. The 'appropriate state' is defined as the state whose nationality the private enterprise has. Aspects of German and international air law which are relevant to the considered problems are also examined. G.R.

A77-20068 **Canadian air cargo concepts.** M. Momberger. *Airport Forum,* vol. 6, Dec. 1976, p. 47, 48, 50, 52-54. In English and German.

Hybrid sea/air containerized cargo shipments and the Canadian ACCESS (Air Canada cargo enquiry and service system) computerized real-time cargo travel report updating system are described at length, along with an account of the TDM (transfer, distribution, manufacturing) concept for flexible air cargo handling. Travel time and prices for combined sea/air cargo service are intermediate between the slow low-cost seaborne containerized freight service and the fast high-cost airborne freight service, and the compromise is optimum for some high-value densely packed merchandise (electronic and photographic equipment, small machine parts or vehicle spares, some luxury foodstuffs and luxury furniture) over distances from the Far East to the Americas, or Americas to Nigeria. R.D.V.

A77-21535 # **Reducing airline regulation - The need and financial implications.** P. J. Bakes, Jr. (U.S. Senate, Subcommittee on Administrative Practice and Procedure, Washington, D.C.). *American Institute of Aeronautics and Astronautics, Annual Meeting and Technical Display Incorporating the Forum on the Future of Air Transportation, 13th, Washington, D.C., Jan. 10-13, 1977, Paper 77-264.* 24 p.

Problems with Civil Aeronautics Board (CAB) regulations are considered, taking into account the results of hearings held by the Congressional Administrative Practice and Procedure Subcommittee. It was found that CAB regulation leads to air fares that are too high, despite the fact that industry profits are low. Questions concerning the justifications for current regulation are examined and suitable approaches for a solution of the problems are discussed. Attention is given to the financial implications of the competitive solution. G.R.

A77-21593 **Regulation of the air traffic control system (La régulation dans le système de controle du trafic aérien).** J.-F. Vivier. *Navigation* (Paris), vol. 25, Jan. 1977, p. 82-97. In French.

Major tasks of an air traffic control (ATC) system are reviewed, and charts are provided of decision loops and system control loops.

Demand and capacity, local or global, of ATC systems are discussed along with hierarchy of priorities, rate of arrivals, and conditions of arrivals (presence of prior arrivals on runway) are discussed. Conditions uprange and downrange of approach markers and their effect on ATC system performance are dealt with. R.D.V.

A77-22186 # **Aerospace policy and energy planning.** R. C. Seamans, Jr. (ERDA, Washington, D.C.). *American Institute of Aeronautics and Astronautics, Annual Meeting and Technical Display Incorporating the Forum on the Future of Air Transportation, 13th, Washington, D.C., Jan. 10-13, 1977, Paper 77-341.* 5 p.

A review is given of ERDA's role in planning and executing national energy research, development and demonstration programs. The agency's mandate to establish broad energy production and conservation goals and to encourage activities designed to achieve them is stressed. Programs structured to conserve fuel in the aviation sector are considered, with particular emphasis on propulsion, aerodynamics, and structures. (Author)

A77-22751 **Symposium on Equipment and System Design for Minimum Cost of Ownership, London, England, March 16, 1976, Proceedings.** Royal Aeronautical Society, 1976. 98 p. $6.00.

The present collection of papers is concerned mainly with indispensable measures for reducing ownership costs of avionic systems at the design stage. Particular attention is given to cost savings from improved reliability and maintainability of aircraft. Topics of interest include cost of ownership in civil and military aircraft design, analysis of cost of ownership, and reliability and costs of RAF avionic equipment. S.D.

A77-22752 # **The reliability and costs of RAF avionic equipment.** P. A. Douty (RAF, London, England). In: Symposium on Equipment and Systems Design for Minimum Cost of Ownership, London, England, March 16, 1976, Proceedings.
London, Royal Aeronautical Society, 1976. 13 p.; Discussion, p. A1-A10.

Reliability and maintainability requirements as related to the ownership costs of RAF avionic equipment are discussed. Particular attention is given to cost savings from improved reliability of aircraft, to savings from improved reliability in avionic systems, and to maintainability actions to reduce cost. It is suggested to reduce the increasing dominance of maintenance costs, which would result in freeing funds for the continued purchase of new equipment. S.D.

A77-22753 # **An analysis of cost of ownership.** R. de Barros (SABENA Belgian World Airlines, Brussels, Belgium). In: Symposium on Equipment and Systems Design for Minimum Cost of Ownership, London, England, March 16, 1976, Proceedings.
London, Royal Aeronautical Society, 1976. 12 p.; Discussion, p. A1-A10.

Life cycle costing is proposed as a suitable approach to make decisions about system acquisition since it is based on the total projected cost of the system over its useful life. Three main phases are relevant in the whole projected period: development, production, and operating. The airline is concerned primarily with the operating phase. The paper analyzes the operating costs of a typical avionic system projected over a period of twenty years regarded as a normal duration of a jet fleet. It is assumed that the evaluation period starts with the first airplane and terminates when the last unit of the fleet is sold or scrapped. Results are presented for a simulation analysis of a typical case to find the influence of the various parameters on the operating costs and to point out the possible areas of improvement. S.D.

A77-22754 # **Cost of ownership in practice.** C. J. Gibson (British Airways, Overseas Div., Hounslow, Middx., England). In: Symposium on Equipment and Systems Design for Minimum Cost of Ownership, London, England, March 16, 1976, Proceedings.
London, Royal Aeronautical Society, 1976. 10 p.; Discussion, p. B1-B3.

The paper shows how complexity, performance, and reliability of an avionic system can influence ownership costs. Two systems are discussed, but primarily the inertial navigation system is analyzed since it possesses all the necessary parameters for analysis. The other system discussed is the fuel quantity system which is included for comparison purposes only. A study of the accounts for ownership costs of the inertial navigation system reveals that 81.15% of the total annual maintenance costs is that of subcontract, with gyro overhauls accounting for 56.99% of the total. From the viewpoint of ownership cost, the accuracy of the inertial navigation system is shown to have a potential cost saving of 351,000 pounds sterling a year. S.D.

A77-22755 # **Cost of ownership in civil aircraft design.** D. V. M. Moore (British Aircraft Corp., Ltd., Filton, Bristol, England). In: Symposium on Equipment and Systems Design for Minimum Cost of Ownership, London, England, March 16, 1976, Proceedings.
London, Royal Aeronautical Society, 1976. 10 p.; Discussion, p. C1-C6.

The achievement of low direct operating costs is the overall aim in civil aircraft design. Systems requirements (functional, operational, regulatory, and safety) together with evolutionary considerations such as interdependence with future and existing systems, interface standards, ability to retrofit, and fleet mix requirements are normally derived directly from engineering specifications. Future systems architecture is discussed along with new installation concepts. The effect on total ownership cost is greatest in the initial cost area and hence may be indicative of where design emphasis should be placed. S.D.

A77-22756 # **Design of military aircraft for minimum cost of ownership.** A. S. Delahunty (British Aircraft Corp., Ltd. Preston, Lancs., England). In: Symposium on Equipment and Systems Design for Minimum Cost of Ownership, London, England, March 16, 1976, Proceedings. London, Royal Aeronautical Society, 1976. 11 p.; Discussion, p. C1-C6.

Problems that confront the military aircraft designer as opposed to the civil aircraft designer are identified. The discussion covers reduction of unit design costs, reduction of maintainability costs, reduction of training costs, and aircraft effectivity with respect to kill probability. Unit cost reduction should not be achieved at the expense of increased cost of aircraft maintenance. Design for reduced maintenance and training costs can best be attained by user/designer consultations at a very early stage of design. S.D.

A77-22757 # **Getting it right the first time.** W. H. Alexander (Marconi-Elliott Avionic Systems, Ltd., Rochester, Kent, England). In: Symposium on Equipment and Systems Design for Minimum Cost of Ownership, London, England, March 16, 1976, Proceedings.
London, Royal Aeronautical Society, 1976. 11 p.; Discussion, p. D1-D7.

The paper is concerned with the problem of reducing the cost of ownership of avionic equipment by means of actions taken at the design stage. Cost of ownership is discussed in terms of procurement cost and cost of maintenance and support. Experience on reliability programs has revealed the need for a closed loop approach to reliability, the need for dedication for both customer and supplier to the reliability objectives, the need to quantify these objectives, the benefits of compulsion-inducement type contracts, and the importance of putting emphasis on the design phase. For most avionic systems there is a level of reliability which will give a minimum cost of ownership. Development of proper standards and a design review procedure are indispensable. S.D.

A77-23269 # **Direct and indirect subsidies in the air mode in comparison with other modes of transportation.** J. Gibberd (Canadian Transport Commission, Ottawa, Canada). *Canadian Aeronautics and Space Journal*, vol. 23, Jan.-Feb. 1977, p. 52-58. 17 refs.

A comparison is presented between direct and indirect public (government) subsidies provided to air transportation and subsidies given to other modes of transportation. It is shown that either on an expenditure or on a cost basis, the subsidy per passenger-mile is largest for rail at 8.11 cents, followed by air in the 1.4 to 2.5 cents range, and road at less than 1 cent. On an expenditure basis, it is seen that the largest total subsidy, both freight and passenger, goes to road, followed by air, marine, and rail. The order on a cost basis changes in that air receives the smallest subsidy. B.J.

A77-23454 # **Methods of scientific-industrial forecasting in the management of scientific research and development (Metody nauchno-tekhnicheskogo prognozirovaniia v upravlenii nauchnymi issledovaniiami i razrabotkami).** S. V. Emel'ianov and V. B. Ezerov. *Itogi Nauki i Tekhniki, Seriia Tekhnicheskaia Kibernetika*, vol. 6, no. 2, 1975, p. 77-164. 105 refs. In Russian.

This survey article examines two groups of methods of scientific-industrial forecasting: the methods of expert estimates, and extrapolation methods used in forecasting scientific research and development. Attention is given to the Delphi method and some of its modifications, methods of trend extrapolation and correlation, the method of envelope curves, methods of forecasting industrial efficiency indices, and parametric methods. The basic features of these methods are described and their fundamental formulas and computational problems are set forth. P.T.H.

A77-23825 **Negligence of Federal Aviation Administration delegates under the Federal Tort Claims Act.** A. J. Dilk (FAA, Litigation Div., Washington, D.C.). *Journal of Air Law and Commerce*, vol. 42, Summer 1976, p. 575-602. 114 refs.

The FAA has been authorized by statute to delegate various responsibilities to private individuals who are either designated representatives or are certificated. No desire is indicated to have these individuals categorized as 'employees' within the meaning of the Federal Tort Claims Act or to assume Federal responsibility for their acts. Until Congress includes these persons within the coverage of this act as employees, the traditional concept of the independent contractor doctrine should block governmental liability for their negligent acts or omissions. B.J.

A77-24277 **Incentives for managing the environment.** B. T. Bower (Resources for the Future, Washington, D.C.), C. N. Ehler (U.S. Environmental Protection Agency, Office of Air, Land and Water, Washington, D.C.), and A. V. Kneese (New Mexico, University, Albuquerque, N. Mex.). *Environmental Science and Technology*, vol. 11, Mar. 1977, p. 250-254.

Some basic issues of identifying and selecting positive and negative incentives as integral components of environmental quality management plans are discussed. The actions desired are the installation of some physical method or technological option and the continuous operation of these physical methods at design levels over time. Particular attention is given to alternative locations for the imposition of incentives in a physical system whose diagram indicates the flows of materials and energy into, through, and from the physical system that generates and discharges pollutants and wastes as residuals. Also discussed are the classification and characteristics of physical methods for improving environmental quality and of implementation incentives whose choice in a particular management context must be matched to the particular situation under consideration. Suggested criteria for evaluating strategies include physical effects, economic effects, flexibility and simplicity in administration, political considerations, and intermedia effects. S.D.

A77-24421 **Nondestructive testing as a basis for the acceptance inspection (Zerstörungsfreie Prüfung als Grundlage der Abnahme).** K. Lorenz and H. Ternes (Mannesmannröhren-Werke AG, Düsseldorf, West Germany). *(Deutsche Gesellschaft für zerstörungsfreie Prüfung, Tagung über zerstörungsfreie Materialprüfung, Lahnstein, West Germany, May 24, 1976.) Materialprüfung*, vol. 19, Feb. 1977, p. 46-53. In German.

In connection with the transfer of ownership in the case of products and materials, the acceptance of the article by the receiving party depends frequently upon the results of an inspection concerning the condition and the characteristics of the article. The employment of nondestructive testing for such an inspection is discussed, taking into account the regulations concerning such inspections in West Germany, questions regarding the conduction of the tests, the training and the qualification of the persons conducting the tests, details with respect to the test installations, and trends regarding a further development of the test procedures. G.R.

A77-24450 # **Forum on the future of air transportation.** F. W. Bradley, Jr. (CITIBANK, New York, N.Y.). *American Institute of Aeronautics and Astronautics, Annual Meeting and Technical Display Incorporating the Forum on the Future of Air Transportation, 13th, Washington, D.C., Jan. 10-13, 1977, Paper 77-263.* 16 p.

A commercial banker's view is given of the airline industry and the prospects for financing its future capital needs. The total capital requirements of the domestic trunks for the period from 1976 through 1984 are estimated to be in the neighborhood of $33 billion, of which $5 to 9 billion will have to be borrowed from commercial banks. Sources for these funds are considered, and arguments are advanced in favor of keeping capital costs down while making very substantial productivity gains, primarily by not retrofitting aircraft to meet FAR Part 36 requirements. The present attitude of bankers toward the airline industry is assessed, the historic sources of capital for the industry are identified, and the financial community's objections to current deregulation proposals are outlined. It is concluded that these proposals will accentuate the financial community's distaste for airline investments and make the industry's impending reequipment program very difficult. Increased fares are suggested along with a dedication to profitability on the part of both management and regulators. F.G.M.

A77-24593 **A long-run model for energy policy analysis.** E. Hnyilicza (MIT, Cambridge, Mass.). In: Summer Computer Simulation Conference, Washington, D.C., July 12-14, 1976, Proceedings. Montvale, N.J., AFIPS Press, 1976, p. 758-763.

The paper outlines the theoretical foundations and empirical specification of a policy-oriented macroeconometric energy model designed to reveal the long-run dynamic interactions between the U.S. energy sector and the aggregate determinants of economic growth, which makes it possible to determine the link between current capital formation and future productive capacity. Several features of the Hudson-Jorgenson model are taken as a point of departure in developing this macroeconometric model. A key novelty is the complete integration of the sectoral capital accumulation dynamics and the sectoral production structure into the growth process itself. The model formulation is neoclassical since it is postulated that the behavioral characteristics of the basic decision units can be described in terms of maximizing behavior in the presence of appropriate constraints. Discussion of production structure, household behavior, and capital accumulation is highlighted. S.D.

A77-24774 **Airports and the environment.** Paris, Organization for Economic Co-operation and Development, 1975. 291 p. 68 refs. $10.00. Translation.

Reduction and abatement of aircraft noise, economic/political/social aspects of urban airport noise problems, management of airport planning, airport siting, and airport land area and facilities

expansion are discussed. Experiences with particular airport siting and noise problems are recounted (Osaka, Frankfurt, Paris, Stockholm-Arlanda, Copenhagen, Oslo). Transportation facilities and road access for passengers and work personnel to and from airport areas are discussed. Attention is given to histories of legal claims by owners of real estate against airports for impairment of property values, wildlife in the vicinity of airports, noiseproofing of structures at or near airports. Airport area use problems at London-Maplin, New York, and Zurich are also discussed. R.D.V.

A77-25138 # **How economists judge R&D benefits.** P. Stevenson (Columbia University, New York, N.Y.). *Astronautics and Aeronautics,* vol. 15, Mar. 1977, p. 30-36. 14 refs.

The article gives an introduction to the basic concepts and techniques with which economists work in order to assess the benefits of R&D investment. The theory and measure of productivity and its determinants, one of which is R&D investment, is outlined. The basic characteristics of several fundamental techniques for measuring R&D effectiveness are examined. These techniques are the measurement of aggregate productivity, input-output analysis, the sector production function, and the consumer's surplus function. P.T.H.

A77-25139 # **What's been happening to R&D.** J. V. Weeden (Aerospace Industries Association, Washington, D.C.). *Astronautics and Aeronautics,* vol. 15, Mar. 1977, p. 37-41.

The paper examines critically the declining role of R&D in the overall U.S. economic picture, and calls for renewed effort in formulating a clear national science policy with greater participation on the part of nongovernment programs. Data on the amount of R&D as a percent of net sales or profits, and also on the percent of R&D funded by the company and the government, are cited for a number of aerospace and other manufacturing companies. The fact that aerospace is investing more in R&D than in new plant and equipment is also brought out. A strengthening of private industry's role in decision-making is seen as necessary. P.T.H.

A77-25140 # **R&D expenditures - A good national investment.** A. N. Doherty (St. John's University, New York, N.Y.) and M. K. Evans (Chase Econometric Associates, Inc., New York, N.Y.). *Astronautics and Aeronautics,* vol. 15, Mar. 1977, p. 42-51. 25 refs.

The paper reviews the economist's conception of technical progress or innovations, economic theory underlying the various specifications of technology within the production function, and the advantages and limitations of the macroeconomic approach to the measurement of technical progress. An outline of a macroeconomic model designed specifically to evaluate the economic impact of NASA R&D expenditures is given. This model contains some 125 stochastic equations and 200 endogenous variables organized in four blocks. Regression analysis on the dependent variable gamma, specified in terms of the rate of increase in technology, shows two peaks of technological growth in the 1960-1962 and 1970-1972 time periods. Results of the regression analysis were fed into the entire macro model to show the effect of NASA R&D spending on eight key general economic indicators. The main conclusions are that NASA R&D programs expand the production arm of society by increasing the rate of technical progress and lower the rate of inflation while increasing output and employment. P.T.H.

A77-25141 # **Investing in technology during inflation.** H. A. Kimbriel (Colin, Hochstin Co.). *Astronautics and Aeronautics,* vol. 15, Mar. 1977, p. 52-54.

The paper outlines some of the chief effects of inflation on companies that are planning to expand, make capital investments, and develop and commercialize new technology. The airline industry is taken as an example of how inflation can cut so deeply into a new product's expected productivity, that potential buyers could not invest in it because it was unclear whether it would meet their rate-of-return objectives. P.T.H.

A77-25209 **Has NASA already solved your next design problem.** R. Aronson. *Machine Design,* vol. 49, Mar. 10, 1977, p. 18-20, 22, 23.

By law NASA is required to make available as much of its research information to the U.S. economy as possible. It is estimated that U.S. business and industry will obtain benefits of more than $7 billion from just four of the space programs. Informative reports sent at no charge by NASA's Technology Utilization office are discussed. Attention is given to the Patent Abstract Bibliography, available data banks, the conduction of searches, the computer programs developed by NASA and other government agencies, and questions concerning the granting of licenses for NASA patents. G.R.

A77-26497 * # **The ABC's required for establishing a practical computerized plant engineering management data base system.** F. R. Maiocco and J. P. Hume (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.). *American Society of Mechanical Engineers, Winter Annual Meeting, New York, N.Y., Dec. 5-10, 1976, Paper 76-WA/PEM-1.* 5 p. Members, $1.50; nonmembers, $3.00. Contract No. NAS7-100.

A system's approach is outlined in the paper to assist facility and Plant Engineers improve their organization's data management system. The six basic steps identified may appear somewhat simple; however, adequate planning, proper resources, and the involvement of management will determine the success of a computerized facility management data base. Helpful suggestions are noted throughout the paper to insure the development of a practical computerized data management system. (Author)

A77-27033 **Introduction to systems engineering - Foundations, capabilities, and limits (Einführung in die Systemtechnik - Grundlagen, Möglichkeiten und Grenzen).** R. Huber. *(Verein Deutscher Ingenieure and Deutsche Gesellschaft für Luft- und Raumfahrt, Tagung über die Grundlagen und Anwendung der Systemtechnik als rationales Hilfsmittel für Wirtschaft, Staat und Forschung, Bonn, West Germany, Nov. 9, 10, 1976.) VDI-Berichte,* no. 262, 1976, p. 5-17. 40 refs. In German.

After a brief review of general systems theory, cybernetics, decision and utility theory as the theoretical foundations of systems engineering, basic definitions related to systems, their behavior and stabilization are discussed as well as the various types of systems models. The second part of the paper explains the content and process of the systems engineering approach, thereby distinguishing three categories of systems in systems engineering: technical systems, action systems and objective systems. The basic model of decision theory serves to illustrate the problem of systems planning. The main problem with a systematic application of systems engineering in real life relates to its effective integration into existing decision-making bodies and processes. (Author)

A77-27034 **Experience of aeronautics and astronautics in the application of systems engineering (Erfahrungen der Luft- und Raumfahrt bei der Anwendung der Systemtechnik).** A. Kutzer. *(Verein Deutscher Ingenieure and Deutsche Gesellschaft für Luft- und Raumfahrt, Tagung über die Grundlagen und Anwendung der Systemtechnik als rationales Hilfsmittel für Wirtschaft, Staat und Forschung, Bonn, West Germany, Nov. 9, 10, 1976.) VDI-Berichte,* no. 262, 1976, p. 19-45. 21 refs. In German.

The paper describes the development of systems engineering and management principles that grew out of the particular needs of NASA and German space programs. The procedures and logic involved in evaluating a complex program are outlined. The effectiveness of application of system engineering management principles in handling the Azur satellite project is studied as an example. P.T.H.

A77-27035 **Optimization of transport aircraft availability as illustrated on the example of the Airbus A 300 (Optimierung der Verfügbarkeit von Verkehrsflugzeugen - dargestellt am Airbus A 300).** P. Triep. *(Verein Deutscher Ingenieure and Deutsche Gesellschaft für Luft- und Raumfahrt, Tagung über die Grundlagen und Anwendung der Systemtechnik als rationales Hilfsmittel für Wirtschaft, Staat und Forschung, Bonn, West Germany, Nov. 9, 10, 1976.) VDI-Berichte,* no. 262, 1976, p. 53-62. In German.

The systems engineering principles which are applied in the design, development, and operation of transport aircraft for ensuring high availability rate and optimum cost effectiveness of operating an aircraft in a complex service system are explained. The logic and structure of spares support, spares planning, spares documentation, technical support and operation support are described. The basic concepts of the computer-supported Reliability Data on Demand (ROD) information project introduced for the Airbus A 300 aircraft are discussed. P.T.H.

A77-27038 **Planning models in the electric economy (Planungsmodelle in der Elektrizitätswirtschaft).** H. Tröscher. *(Verein Deutscher Ingenieure and Deutsche Gesellschaft für Luft- und Raumfahrt, Tagung über die Grundlagen und Anwendung der Systemtechnik als rationales Hilfsmittel für Wirtschaft, Staat und Forschung, Bonn, West Germany, Nov. 9, 10, 1976.) VDI-Berichte,* no. 262, 1976, p. 91-105. In German.

The paper examines the possibilities of using computer-supported models for prediction and planning in the electric economy. The emphasis is on capital investment planning. P.T.H.

A77-27161 # **Scientific work organization, an important intensification factor (Wissenschaftliche Arbeitsorganisation - Ein wichtiger Intensivierungsfaktor).** K. Huhndorf. *Technisch-ökonomische Information der zivilen Luftfahrt,* vol. 12, no. 6, 1976, p. 305-312. In German.

The scientific work organization in the German Democratic Republic has the objective to guarantee continuous work performance, enhance the degree of working time utilization, modernize the existing techniques, increase the amount of quality work, improve the material working conditions, and ensure that new standards are introduced in connection with new technology. A description is presented of aspects related to the implementation of the considered objective in connection with the operations of the airline INTERFLUG. G.R.

A77-27163 # **The calculation of cost as an instrument for the management and planning of transportation processes (Kostenrechnung als Instrument der Leitung und Plannung des Transportprozesses).** U. Niemeyer. *Technisch-ökonomische Information der zivilen Luftfahrt,* vol. 12, no. 6, 1976, p. 320-333. 17 refs. In German.

The significance of cost calculations with respect to the national economy and operational considerations is investigated, taking into account the importance of cost determinations for the control and the analysis of costs, the role of cost data as a source of information for management and workers, and the structure of cost determination procedures for the INTERFLUG airline in the German Democratic Republic. Attention is given to cost categories considered in the INTERFLUG organization, details regarding cost determination procedures, and the requirements and possibilities concerning a further development of cost-computational processes. G.R.

A77-27208 **The Civil Aeronautics Board and foreign air carrier permits.** H. DeSaussure. *Air Law,* vol. 1, no. 3, 1976, p. 146-156. 51 refs.

The paper is concerned with the legality of Part 213 of the Federal Aviation Act of 1958. This Part contains the possibility of a first and second step order to foreign air lines. As a first step, the Civil Aeronautics Board may order a foreign air carrier to file its flight schedules in the U.S.; as a second step, the Board may curtail, suspend, or revoke the right of the foreign carrier to fly under any of the schedules filed. The 1974 amendment to Part 213 broadens the Board's base for issuing the first step order to one of economic balance and unilateral public interest of the U.S., which seems to run counter to the air transport policy formulated by the British and the U.S. in Bermuda in 1946. The paper discusses whether Board action under Part 213 is consistent with U.S. international obligations and discusses the reviewability of orders issued under Part 213 by the Federal Courts of Appeal. The challenge of KLM Royal Dutch Airlines to Part 213 proceedings is examined in particular. P.T.H.

A77-27639 **Upward trends in telecommunications marketing and finance.** S. Topol (Scientific-Atlanta, Inc., Atlanta, Ga.). In: EASCON '76; Electronics and Aerospace Systems Convention, Washington, D.C., September 26-29, 1976, Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 46-A to 46-C.

Barriers to expanded use of telecommunications in the domestic and world markets are assessed. Major approaches to overcoming barriers are identified as: strong standard product approach, vigorous marketing, manufacturing in production runs, and cooperative government and industry financing programs. Opportunities for the U.S. to capture a leading role in the world market, repeating the experience in airframes, jet engines, computers, and semiconductors, are assessed. R.D.V.

A77-27762 **Weakest-point analysis in the production domain using multimoment studies - A case analysis (Schwachstellenanalyse im Fertigungsbereich mit Hilfe von Multimomentstudien - Ein Fallbeispiel).** U. Maier and P. S. Niess (Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung, Institut für Produktionstechnik und Automatisierung, Stuttgart, West Germany). *VDI-Z,* vol. 119, no. 6, Mar. 1977, p. 301-307. 5 refs. In German.

Use of multimoment studies to pinpoint the weakest points or bottlenecks in a production cycle is demonstrated. Measures to achieve the smoothest data acquisition to that end are suggested, and a program is elaborated for evaluation of multimoment patterns so as to locate orders with long transit times and plot their progress through the cycle. The multimoment order tracking approach can reveal problems in data updating that escape detection by other techniques. R.D.V.

A77-28063 **The safe airline.** J. M. Ramsden. London, Macdonald and Jane's Publishers, Ltd., 1976. 244 p. $8.60.

Safety practices and experiences for airlines, aircraft, airports and pertinent agencies, air crimes, emergency procedures and measures, weather hazards, safety philosophy and relevant legislation, aircraft and airport noise, human factors and pilot performance, and survivability are discussed. Procedures for reporting and assessing of major and minor incidents, approaches to measuring air safety and possible statistical pitfalls, airlines tests, practices followed by some airlines, and emergency responses to total electric failure and fire, accident investigation and accident liability, hazardous cargo, maintenance/overhaul, and relevance of airline financial state are also covered. Hijacking and sabotage, clear air turbulence, storms and lightning, wake turbulence, bird strikes, collision avoidance measures, visual/audible warning systems, and simulator training of pilots are among other topics discussed. R.D.V.

A77-28223 **Principles of computer process planning.** S. J. Pflederer and W. S. Mann (United Technologies Research Center, East Hartford, Conn.). *Society of Automotive Engineers, Aerospace Engineering and Manufacturing Meeting, San Diego, Calif., Nov. 29-Dec. 2, 1976, Paper 760914.* 13 p. 7 refs.

An analytic framework for process planning activity has been formulated and incorporated as the basis of a generative computer process planning system. The system uses full geometric design data and produces, under interactive control, detailed operation sheets with dimensioned workpiece drawings. The major elements of the system technology are process decision models, machining analysis and optimization models, a special process planning language, and man-machine communication by interactive graphics. (Author)

A77-28287 # **Global radio navigation - A challenge for management and international cooperation.** J. M. Beukers (Beukers Laboratories, Inc., Bohemia, N.Y.). In: International Navigational Congress, Boston, Mass., August 3-6, 1976, Proceedings. Washington, D.C., Institute of Navigation, 1976, p. 42-49. 26 refs.

The paper addresses the need for publication of firm technical specifications of the Loran-C and Omega systems and the need for definition of the frequency spectrum required by these navigational signal transmissions. The following recommendations are made: (1) that the transmitted signal rate structure for the Loran-C is agreed upon internationally, (2) that a common format is established for communications within Loran-C, (3) that priority is given to the frequency spectrum of 90-110 kHz, (4) that a frequency is allocated and a format established for communicating phase corrections when Omega is employed in the differential mode. B.J.

A77-28541 # **Investment economics of industrial gas turbines.** M. C. Doherty (General Electric Co., Industrial Sales Div., Schenectady, N.Y.). *American Society of Mechanical Engineers, Gas Turbine Conference and Products Show, Philadelphia, Pa., Mar. 27-31, 1977, Paper 77-GT-26.* 10 p. Members, $1.50; nonmembers, $3.00.

The reported investigation represents an application of the principles of engineering economy to the evaluation of gas turbines for industrial energy systems. Attention is given to the definition of a minimum investment base case as an economic benchmark against which the preferred alternatives can be evaluated, the development of alternatives, and an example problem for illustrating the described procedure. Economic evaluation methods are discussed, taking into account tax considerations, payout, discounted cash flow, and fixed charges. G.R.

A77-28609 # **Life Cycle Cost as a propulsion system design consideration.** C. E. Curry (General Motors Corp., Detroit Diesel Allison Div., Indianapolis, Ind.). *American Society of Mechanical Engineers, Gas Turbine Conference and Products Show, Philadelphia, Pa., Mar. 27-31, 1977, Paper 77-GT-99.* 7 p. 7 refs. Members, $1.50; nonmembers, $3.00.

This paper deals with applying Life Cycle Cost (LCC) and Design to Cost (DTC) principles to aircraft engine programs. The dynamic driving elements of LCC are identified with an example of direct application to a deterministic computer model. This model was used as the principal tool to project operating and support costs for the XT701 turboshaft engine in conjunction with the U.S. Army Heavy Lift Helicopter Development that featured a specific DTC-related award fee in the contract. The overall methodology of LCC and DTC supported by the math model earned a Superior evaluation with an unprecedented 100 percent award fee for this kind of application. The customer audit, in support of the performance award, supports the conclusion that computer models can be used to enhance the LCC aspects of propulsion system development programs. (Author)

A77-28627 **A comparison of enroute conflict risk for three 1995 air traffic surveillance systems.** I. M. Weiss (Rockwell International Corp., El Segundo, Calif.) and J. F. Bellantoni (U.S. Department of Transportation, Transportation Systems Center, Cambridge, Mass.). In: Productivity; Proceedings of the Joint Automatic Control Conference, West Lafayette, Ind., July 27-30, 1976. New York, American Society of Mechanical Engineers, 1976, p. 89-99. 24 refs.

This paper compares three surveillance systems on the basis of their effect on the manual enroute conflict rate and collision rate, estimated for a postulated 1995 traffic level. The three systems are an Advanced Air Traffic Management System based on satellite surveillance; the Upgraded Third Generation Air Traffic System based on an improved radar beacon system; and a system based on current surveillance radars. These three systems were characterized in this study by their surveillance accuracy and the results presented apply to any systems of equal accuracy. (Author)

A77-28684 **Juridical questions concerning the supply with energy in times of crisis - Regulations regarding the assurance of the supply with electricity /electrical load distribution regulations/ and the supply with gas /gas load distribution regulation/. III (Rechtsfragen der Energieversorgung in Krisenzeiten - Zur Verordnung über die Sicherstellung der Elektrizitätsversorgung /Elektrizitätslastverteilungs-Verordnung/ und der Gasversorgung /Gaslastverteilungs-Verordnung/. III).** U. Büdenbender. *Energiewirtschaftliche Tagesfragen,* vol. 27, Mar. 1977, p. 216-219. 15 refs. In German.

Questions of juridical design and expression in relation to the dispositions of the agency charged with the distribution functions in the case of an energy crisis are discussed, taking into account the characteristics of various types of such dispositions. Attention is also given to financial compensation claims and the relation of the considered regulations to other rules and statutes. G.R.

A77-29026 * # **Opening a new era in space.** P. E. Culbertson and T. P. Bold (NASA, Office of Planning and Program Integration, Washington, D.C.). *Astronautics and Aeronautics,* vol. 15, Apr. 1977, p. 20-25.

The overall payload planning aimed at initial projected use of the Space Transportation System (STS) which will establish a new capability for exploring and using space through operations of the Shuttle, Spacelab, and Interim Upper Stage (IUS) in the Eighties is reviewed, and the significance of this planning for science and technology is discussed. The first payloads will fly on the STS during Orbital Flight Tests (OFT) beginning in March 1979. Primary OFT objectives include verifying flight systems and the Shuttle's ability to accomodate various types of payloads in different mission modes. The STS schedule will build up to as many as 60 flights in 1984. The STS payloads will make contributions to the management on a global scale of the interrelationship of production, consumption, population growth, and pollution. A.Y.

A77-29029 # **Shuttle payloads - Opportunities to expand ground-based research.** R. L. Merrill and B. W. Davis (Battelle Memorial Institute, Columbus, Ohio). *Astronautics and Aeronautics,* vol. 15, Apr. 1977, p. 38-43.

The capabilities of the upcoming Shuttle flights include: accommodation of very large payloads in both weight (up to 65,000 lb) and size (60 by 15 ft); stay in orbit for extended periods (7 to 30 days); launching and retrieving objects in space (free flyers); returning payloads to earth unharmed; frequent flight schedules (one flight per week by 1985); relatively low cost. These capabilities will enable the earth-bound researchers to move their laboratories to space and take advantage of the properties of the space environment. The cost of space research must be measured in terms of the cost per useful data point, and not the cost per flight. The space research is and will be used in mapping, mineral exploration, land use planning, agricultural crop measurements and forecasting, water-resource management, and environmental monitoring. The exploitation of research opportunities based on the properties of the space environment can potentially contribute to a broad spectrum of physical, biological, chemical, and engineering sciences as well as a very large number of industrial processes. A.Y.

A77-29030 # **How do U.S. companies view space industrialization.** A. M. Dula (Butler, Binion, Rice, Cook and Knapp; Houston, University, Houston, Tex.). *Astronautics and Aeronautics,* vol. 15, Apr. 1977, p. 44-46.

Results from a questionnaire on space industrialization sent to chief executive officers of 378 American companies are discussed. Twenty percent of the companies returned the questionnaire completed. The average company responding to the questionnaire had annual gross sales of $2.5 billion. Some 30% of the respondents were aware of and interested in the possibility of solar power satellites and communication satellites. Forty-seven percent of the respondents felt that there was some probability of both their industries and their companies becoming involved in a Shuttle-based program. A.Y.

A77-29079 **MIL-STD-1567 - Productivity growth through work measurement.** M. A. Nassr (USAF, Systems Command, Washington, D.C.). *Defense Management Journal,* vol. 13, Apr. 1977, p. 16-20. 7 refs.

MIL-STD-1567, published in 1975, specifies certain minimum requirements which must be met for a contractor's work measurement system to be acceptable. The general requirements call for a documented work measurement system with a clear designation of the organization and personnel responsible for its execution, a plan to establish engineered standards of recognized accuracy, and a plan to use labor standards as inputs to budgeting, estimating, and production planning. Application of the standard to B-1 and F-16 aircraft production is discussed. B.J.

A77-29080 **Manufacturing technology + teamwork = economy.** C. P. Downer (U.S. Department of Defense, Office of the Assistant Secretary of Defense /Installations and Logistics/, Washington, D.C.). *Defense Management Journal,* vol. 13, Apr. 1977, p. 28-33.

The paper considers the DOD Manufacturing Technology program which is designed to develop or improve manufacturing techniques, processes, materials, and equipment to provide for timely, reliable, and economical production of defense material. Attention is given to ways of reducing costs and improving fabrication, and to the Integrated Computer-Aided Manufacturing program. B.J.

A77-29298 **Comments concerning the dynamics of aeronautical and astronautical research (Gedanken zur Dynamik der Luft- und Raumfahrtforschung).** O. H. Gerlach (Nationaal Lucht- en Ruimtevaartlaboratorium, Delft, Netherlands). *DFVLR-Nachrichten,* Feb. 1977, p. 820-827. In German.

Questions concerning the need for aeronautical research projects are investigated, taking into account developments regarding the increase in the cost of aircraft fuel, environmental requirements, noise reduction problems, advanced aerodynamical structural forms, new materials and new construction methods, and modern flight control methods. Attention is given to the innovation process in aircraft development, aspects of cooperation between research institutes and state, questions of financing, the significance of 'spin-in' and 'spin-off' effects, and problems related to an employment of new study methods and new installations. G.R.

A77-29435 **Airport systems planning: A critical look at the methods and experience.** R. de Neufville. Cambridge, Mass., MIT Press, 1976. 214 p. 189 refs. $14.95.

The work examines how the systems approach can be applied to airport planning by example and application to specific issues - economic, social, political, and technological. Four basic questions are addressed: (1) what are the biases and implicit assumptions of the industry; (2) what is the nature of the public interest in this aspect of airport systems; (3) what are the forces and constraints which define and limit the possibilities; and (4) what kind of solution is the community entitled to expect. B.J.

A77-29472 * **Effects of selected R&D options on fuel usage in the commercial air system.** F. W. Gobetz and A. P. Dubin (United Technologies Research Center, East Hartford, Conn.). In: Annual Intersociety Conference on Transportation, 4th, Los Angeles, Calif., July 18-23, 1976, Proceedings. New York, American Society of Mechanical Engineers, 1976. 10 p. Contract No. NAS2-8608.

The study on which this paper is based, known as RECAT (Study of Cost Benefit Tradeoffs for Reducing the Energy Consumption of the Commercial Air Transportation System), was sponsored by NASA to establish a basis for assigning priorities in its aircraft fuel-conservation R&D program. The study involved coordinated efforts by four independent contractors to conceive and quantify fuel-conserving technology alternatives, transform these alternatives into viable R&D options, and simulate each option in a general model of the U.S. domestic air transportation system. This paper deals primarily with the latter phase and concentrates on the results of the study, as revealed not only by estimated fuel usage but also by other impacts of the technology options, such as demand growth, operator economics, and fleet composition. However, while the paper focuses on results, the basic assumptions and technology inputs are documented, and a general description of the modeling approach is provided to demonstrate the level of detail considered in the analysis. (Author)

A77-29496 **Computer aided aircraft project design.** H. P. Y. Hitch (British Aircraft Corp., Ltd., Weybridge, Surrey, England). *Aeronautical Journal,* vol. 81, Feb. 1977, p. 51-62. 19 refs.

The task of projecting a new aircraft consists essentially of finding an optimum practical solution to a complex problem with known constraints. The paper discusses ways in which the computer can be used to assist in the project of aircraft development. Attention is directed to the development of typical computer-aided project design program, to examples of computer-aided project systems currently in use, and to the use of programs for preliminary wing structural design and weight estimation. A properly used computer-aided project design program can assist not only in the development and optimization of specific projects but also in determining the best use of research funds, since the likely gains to be made using advanced technology can be predicted with ease and consistency. S.D.

A77-29665 # **Costs and decision making.** J. C. Wimpenny (Hawker Siddeley Aviation, Ltd., Hatfield, Herts., England). In: Seeds for success in civil aircraft design in the next two decades; Proceedings of the Spring Convention, London, England, May 19, 20, 1976. London, Royal Aeronautical Society, 1976. 31 p.; Discussion, p. K.1, K.2, L.1. 7 refs.

As the aircraft industry matures, performance gains come less readily and costs appear to be a much greater determinant of progress. Some of the fundamentals of cost reduction are examined. Since cost reduction must be balanced against product effectiveness and there are major interactions between possible cost levels and sales volume, emphasis is placed on treating the subject in the broader framework of commercial viability. The discussion covers cost reduction areas, market prospect, and investment basis and appraisal. A critical review is presented of the investment decisions needed, many of which are urgent and critically important for the future of the civil transport industry. There are indications of profitable growth potential arising from improvements in air traffic control, airport and ground access, and route networks. S.D.

A77-29666 **Tehran International Airport.** W. Prokosch. *(American Society of Civil Engineers, National Convention, Denver, Colo., Nov. 3-7, 1975, Preprint 2553.) ASCE, Transportation Engineering Journal,* vol. 103, Mar. 1977, p. 223-241.

Innovation features of planning and consultative work on the Tehran International Airport (situated 50 km from downtown Tehran) are described. A high-speed train brings passengers to and from the airport and the capital express, making a few local stops at the terminal area. Passenger flow through the terminal is unidirectional for emplaning passengers and unidirectional for deplaning passengers, and (bilingual) signs are kept to a minimum number. Roadway access, climate, precursor concepts (Dallas/Ft. Worth airport), and special facilities (Royal Pavilion for the monarch, a Hadj terminal for Mecca pilgrims) and loading bridge innovations are described. R.D.V.

A77-29927 **Waste reduction - Issues and policies.** W. D. Conn (California, University, Los Angeles, Calif.). *Resources Policy,* vol. 3, Mar. 1977, p. 23-38. 28 refs.

Twelve policy options for reducing waste are analyzed to identify the effects of each option on the solid waste stream; materials and energy utilization and environmental impact; government revenues and costs; industry; employment; and consumers. Options include project and purchasing regulations; warranty requirements; mandatory disclosure of environmental impact; mandatory refunds on beverage containers; and various taxes and fees. Goals and likelihood of government action are briefly discussed. M.L.

A77-30477 **A distributed air defense information system.** D. K. Tucker. *IEEE Transactions on Aerospace and Electronic Systems,* vol. AES-13, Mar. 1977, p. 91-95.

A cybernetic systems approach is recommended to the development of air defense systems, with available air defense ground environment (ADGE) systems (NADGE, SAGE, LINESMAN) considered as examples. Poor management of the system and project as a whole, long lead times and obsolescence of system goals, and treating the ADGE system as a radar system rather than a data processing system, are seen as main contributors to system concept inadequacy. The central role of a digital communications network in such systems, track extraction options, juxtaposition of a system and presumed antisystem, and system design flexibility are emphasized. R.D.V.

A77-30591 **Economic and policy problems in satellite communications.** Edited by J. N. Pelton (International Telecommunications Satellite Organization, Washington D.C.) and M. S. Snow (Hawaii, University, Honolulu, Hawaii). New York, Praeger Publishers, Inc., 1977. 257 p. $18.50.

Questions of price discrimination and economies of scale in international satellite communications are considered along with economic issues related to the establishment of domestic satellite communications and economic issues in international telecommunications. Attention is given to key problems in satellite communications, political and social implications of communications satellite applications in developed and developing countries, and sources and directions of U.S. satellite policy. G.R.

A77-30592 **Price discrimination and economies of scale in international satellite communications.** M. S. Snow (Hawaii, University, Honolulu, Hawaii). In: Economic and policy problems in satellite communications. New York, Praeger Publishers, Inc., 1977, p. 5-30. 47 refs.

Price discrimination is used as a neutral term in economics to refer to the sale of the same product to different individuals or groups of individuals at different prices when no underlying cost differences are involved. Price discrimination can arise only in monopoly. The relations of the theory of price discrimination considered are applied in a study of the pricing regulations in the case of the Intelsat commercial satellite system. It is pointed out that Intelsat's price discrimination has been used strictly as an adjunct to its overall policy of average cost pricing, in which it resembles most regulated public utilities. G.R.

A77-30593 **Domestic satellite communications - Economic issues in a regulated industry undergoing technical change.** R. W. Nelson (New York, Federal Reserve Bank, New York, N.Y.). In: Economic and policy problems in satellite communications. New York, Praeger Publishers, Inc., 1977, p. 31-61. 17 refs.

The economic issues raised by the proposal for domestic satellite communication are assessed from the viewpoint of the regulation of an industry undergoing technical change. A description of the economic and regulatory environment of domestic satellite communication is presented, taking into account the industry structure and technology of long-distance telecommunications prior to satellites, the development of the regulatory issues, and the basic economic issues. Attention is also given to questions concerning the desirability of technical change, the desirability of regulatory control over entry, and the desirability of an experimental pilot approach. G. R.

A77-30594 **Economic issues in international telecommunications - A public policy dilemma.** K. B. Stanley (Federal Communications Commission, Washington, D.C.). In: Economic and policy problems in satellite communications. New York, Praeger Publishers, Inc., 1977, p. 62-88. 31 refs.

Selected aspects of economic performance in the international telecommunications industry are examined. Attention is given to Comsat and the Federal Communications Commission (FCC), the market structure and FCC policy decisions, the investment behavior and incentives of rate of return regulation, technological progress and depreciation policy, pricing practices of Comsat, and interactions of market structure, investment policies, and regulatory policies. G.R.

A77-30595 **Key problems in satellite communications Proliferation, competition, and planning in an uncertain environment.** J. N. Pelton (International Telecommunications Satellite Organization, Washington, D.C.). In: Economic and policy problems in satellite communications. New York, Praeger Publishers, Inc., 1977, p. 93-123. 32 refs.

The current stage in the development of communications satellites is characterized by the rapid proliferation of communications satellite systems, both those systems presently deployed and those planned for deployment in the next few years. Major issues posed by this proliferation are examined, taking into account geosynchronous orbital locations, frequency allocations, and economic competition. Challenges related to planning in an uncertain environment are discussed, giving attention to multipurpose versus specialized satellite systems, cables versus satellites, the lack of common objectives, and the challenge of new technologies and unknown service requirements. G.R.

A77-30875 **Advanced systems development management.** J. Coutinho. New York, Wiley-Interscience, 1977. 449 p. 206 refs. $23.

This book is concerned with large, complex, high cost systems that make use of advanced technology and that are generally produced in small quantities or one of a kind. The impact of technology on society is considered along with questions of systems assurance, hardware or engineering models, software models, management structures, questions of systems procurement, the systems development and demonstration cycle, design-to-performance and design-to-cost procedures, contractual incentives, technical requirements, and aspects of systems engineering. Attention is also given to problems of design assurance, the organization of the technical

development staff, systems development management, the principles of quality assurance, operational testing and product improvement, and professional responsibilities. G.R.

A77-31066 Technology and decision making in the air transport industry. D. Schiffel (NSF, Policy Research and Analysis Div., Washington, D.C.). *Traffic Quarterly,* vol. 31, Apr. 1977, p. 317-331. 39 refs.

A review of the literature and synthesis of factors involved in the innovation process in commercial aeronautical technology with three concluding points: new aircraft technology is developed exogenously, outside the control of the air carriers; technological developments are subsequently embodied in new aircraft at times dictated by competition among airframe manufacturers; and as a result of the nonprice nature of competition in the airline industry, the airlines are competitively induced to seek new aircraft and buy new aircraft as they become available. Some permissive factors in decisions about airline flight equipment include the rate of traffic growth, rates of return, and aircraft-operating economies. M.L.

A77-31067 Local and commuter airlines in the United States. J. D. Mayer (Great Lake Basin Commission, Ann Arbor, Mich.). *Traffic Quarterly,* vol. 31, Apr. 1977, p. 333-349. 32 refs.

The division of the United States air transportation system into three or four hierarchical levels and the history of local airlines are reviewed. It is concluded that local-service airlines will increasingly resemble the major trunk airlines in terms of volume of business, routing, and operating complexity. These airlines will tend to withdraw from the marginal service areas, leaving them to the air taxis and commuter airlines which in turn will face increasing competition from ground transportation. To withstand competition commuter airlines should improve the frequency and quality of their service. M.L.

A77-31341 An improved management approach to upgrade avionic system reliability. L. S. Klivans (Hughes Aircraft Co., Canoga Park, Calif.). *IEEE Transactions on Reliability,* vol. R-26, Apr. 1977, p. 23-28.

The paper describes a program for reliability improvement aimed at reducing failures and operating anomalies in avionics systems regardless of frequency of occurrence. The approach included determining the causes of malfunctions during manufacturing and field use, and developing ways to eliminate those causes by concurrently improving design change, part specification, and/or manufacturing quality or process control. The program concepts include quantification of specific failure items/modes, verification through test-analyze-fix, and fleet demonstration of required system performance. P.T.H.

A77-31499 Studies pinpoint cost-saving F-16 manufacturing techniques. E. J. Bulban. *Aviation Week and Space Technology,* vol. 106, May 2, 1977, p. 81, 82, 87, 89, 91.

Manufacturing program for the F-16 emphasizes innovative, cost-effective approaches aimed at making the multinational combat aircraft a viable production program into the latter part of the 1980s and beyond. Studies have indicated cost savings of better than $23.5 million over a production run of 650 USAF F-16As and F-16Bs, and approximately $1.5 million for the development aircraft. Cost reduction entailed such factors as modular design, part commonality, extensive use of aluminum, standard fasteners, forging and castings, pre-cut bulkheads, large-volume materials purchasing, coproduction support, production increase keyed to the learning curve, fabrication task studies, improved assembly line procedures, and search for advanced technology. A.Y.

A77-31501 # Organisation of an operations centre. B. M. Walker (ESA, European Space Operations Centre, Darmstadt, West Germany). *ESA Bulletin,* Nov. 1976, p. 8-13.

The European Space Operations Center (ESOC) manages the portion of the ESA budget allocated to the operation of orbiting satellites. In recent years, the Agency has set aside 19% of its labor and 9% of its total budget for satellite operations. In the present paper, the basic management task to be carried out by the ESOC organization is illustrated by examining the relationship between the cost of operations and the likelihood of their being successful. V.P.

A77-31504 # Some aspects of mission analysis. H. A. Kellner (ESA, European Space Operations Centre, Darmstadt, West Germany). *ESA Bulletin,* Nov. 1976, p. 23-25.

In the present paper, the major problems involved in mission analysis in the course of project definition and development are discussed. It is shown how a workable system for achieving the mission objectives can be obtained by establishing the functional requirements for five subsystems: the launcher, spacecraft, experiment package, data acquisition, and data utilization. The relations between these subsystems across the interface are identified and investigated; the entire system is then checked out, compromises are introduced where necessary, and the procedure is repeated at subsystem level. V.P.

A77-31558 Commercial considerations in remote sensing engineering. G. Lewis (British Aircraft Corp., Space Systems Group, Bristol, England). In: Environmental remote sensing 2: Practices and problems. London, Edward Arnold (Publishers), Ltd., 1977, p. 25-40.

The industrial process is considered, taking into account the research phase, design considerations, the development process, and aspects of manufacture and quality control. Problems connected with the conduction of external relations with organizations and committees representing the user of the equipment are considered along with difficulties related to changes in the specification of a piece of equipment. Attention is also given to questions of cost and details regarding the characteristics of the contract. G.R.

A77-31836 # Needed - A Federal R&D policy. K. P. Heiss (Econ, Inc., Princeton, N.J.). *Astronautics and Aeronautics,* vol. 15, May 1977, p. 44, 45.

In 1967, when potential and actual GNP matched nearly one to one, the United States was spending about 3.2% of GNP on R&D, 2.2% of that funded by the Federal government. In constant dollars, the Federal funding of R&D has dropped from about $17 billion in 1967 to $13.8 billion in 1977, while R&D funding by industry has stayed constant, at 1% of GNP. Despite the increasing gap between actual and potential gross national product, the government is not considering a massive R&D program, partly because of the long lead-times between cost and payback, also because there is no government agency whose primary purpose is to organize a venture R&D project market. Increased federal planning and spending for research and development is urged. M.L.

A77-31975 The economy of air transportation /2nd edition/ (L'économie du transport aérien /2nd edition/). J. Belotti. Châtillon-sous-Bagneux, Hauts-de-Seine, France, J. Belotti, 1976. 853 p. 201 refs. In French.

The work concentrates on the role of economic factors in air transportation giving attention to design and construction, airports, airlines, and air transport demand. Also considered is a forecasting model for the future of air transportation consisting of a call for technological cooperation and a restructuring of the European air transportation system. B.J.

A77-32071 # A cost benefit analysis of space manufacturing facilities. M. M. Hopkins (Harvard University, Cambridge, Mass.). *American Institute of Aeronautics and Astronautics and Princeton University, Conference on Space Manufacturing Facilities, 3rd, Princeton, N.J., May 9-12, 1977, AIAA Paper 77-556.* 9 p. 9 refs. Research supported by the L-5 Society.

The update of a method (1975) designed to evaluate the costs and benefits of space settlements suggests that the economics of space manufacturing facilities (SMF) are substantially better than the favorable results found for space settlements in earlier applications of the method. The development costs and the cost benefits of SMF are estimated, and the role of public and private financing is discussed. Comparisons with the Econ study of earth-launched satellite power stations (SPS) lead to the suggestion that the SMF option for producing SPS might be less risky than earth-based construction and launching. M.L.

A77-32475 Practical approach to evaluation of research projects. M. J. Fleetwood (Inco Europe, Ltd., Birmingham, England). *Metals Technology,* vol. 4, Apr. 1977, p. 223-229. 15 refs.

Against the background of a predominantly metallurgical research laboratory, the reasons for choosing a simple cash-flow method for evaluating projects are discussed. Approaches to the estimation of cost, benefit, and probability of success are outlined; it was found that effort is particularly needed to overcome persistent underestimates of time to completion and the difficulties people experience in estimating likely market penetration and probability. A scoring method of deriving probability from a checklist of factors known to lead to project failure has proved useful. Three years' experience in using the evaluation method provides the basis for a discussion of its accuracy and effects on research projects and people. (Author)

A77-33889 Government-sponsored demonstrations of new technologies. W. S. Baer, L. L. Johnson, and E. W. Merrow (Rand Corp., Santa Monica, Calif.). *Science,* vol. 196, May 27, 1977, p. 950-957. 15 refs. U.S. Department of Commerce Contract No. 4-35959.

An analysis of federally funded demonstration projects suggests several characteristics that are associated with success in speeding commercialization of a new technology. They include a technology well in hand, cost- and risk-sharing with nonfederal participants, project initiative at the local level, a strong industrial system for commercialization, participation in the demonstration by those who will take responsibility for further diffusion, and the absence of tight time constraints. Attention is given to such projects as mechanized refuse collection, computer-assisted electrocardiogram analysis, and a dial-a-ride transportation system. B.J.

A77-34302 Aircraft manufacturer warranties - Protection for the manufacturer or the purchaser. H. Hughes. *Air Law,* vol. 2, no. 2, 1977, p. 71-81. 34 refs.

Legal decisions enabling aircraft manufacturers to avoid liability for defects in aircraft sold to airlines are discussed. Cases analyzed include actions grounded in strict tort liability, actions alleging negligence, actions based on implied warranty, and actions based on the express warranties in the purchase agreement. In commercial situations, disclaimers of tort liability have often been found not to violate public policy, the decisions apparently based on the policy rationale that business concerns must be allowed to assign the risk of loss to one of the parties to the contract and allocate the price accordingly. Sometimes when an express warranty is breached the manufacturer is liable only for replacement of the defective part even if extensive aircraft damage was caused by the defect. The implications of permitting a company to contractually excuse itself from liability from its own tortuous acts are considered. M.L.

A77-34303 Status report on the renegotiation of the U.S.-U.K. Bilateral Air Transport Agreement /Bermuda Agreement/. P. B. Larsen (Georgetown University; U.S. Department of Transportation, Washington, D.C.). *Air Law,* vol. 2, no. 2, 1977, p. 82-90. 28 refs.

The issues at stake in the renegotiation of the U.S.-U.K. Bilateral Air Transport Agreement (Bermuda Agreement) are discussed. The British are concerned about the fact that U.K. carriers earned much less than U.S. carriers; the British are said to favor market control of routes, capacity, and fares. The U.S. is said to feel that the market itself should be the deciding factor in regulating air service. The U.K. is reported to support, and the U.S. oppose, the designation of a single carrier from each country for each major route. The U.K. is reported to favor a reduction in fifth freedom traffic rights (traffic beyond the contracting state to a noncontracting state, after an initial flight from one contracting state to the other contracting state). This reduction would affect the ability of U.S. carriers to participate in major trunk routes, the basis for the U.S. international system of air carriage. The Bermuda Agreement was denounced by the U.K. on June 22, 1976 and is scheduled to expire June 22, 1977, unless renegotiated. M.L.

A77-34305 Liability of carriers for damages of passengers on charter flights. G. Camarda (Palermo, Università, Palermo, Italy). *(International Symposium on the Air Charter Transport and its Impact upon Tourism, Messina, Italy, Nov. 19-21, 1976.) Air Law,* vol. 2, no. 2, 1977, p. 96-98. 10 refs. Translation.

It is suggested that the charterer (usually a travel agency) remains liable for injuries and losses to passengers on charter flights even when the charterer has issued the transit ticket in the name of the actual carrier. Although this principle was established by the Guadalajara Convention, some charterers still issue tickets in the name of the carrier, in accordance with the system that developed under the provisions of the Warsaw convention, and a new convention is urged for the purpose of resolving ambiguities in the liability of carriers involved in charter flights. M.L.

A77-34307 ICAM - Revolution in manufacturing. M. D. Zimmerman. *Machine Design,* vol. 49, May 26, 1977, p. 86-91.

Integrated Computer Aided Manufacturing (ICAM) is a system that uses computers to organize every step of manufacturing - from parts design to physical location of machine tools to shipping - in an economical and efficient mode. The system, a response to the proliferation of unrelated computer systems that sometimes cause extra problems in manufacturing, is scheduled for completion by late 1981. The planning and development process is described. Task I calls for developing an architectural model that blueprints various manufacturing complexities. Task II concerns group technology, in which parts and processes are grouped according to common features. Since ICAM is initially geared toward the batch manufacture of aircraft parts that require metalworking processes, Task III involves the assessment of sheet-metal formability and assembly technology. Flow charts and organization tables are displayed. M.L.

A77-34470 I.B.M. reaches for a golden future in the heavens. B. Uttal. *Fortune,* vol. 95, June 1977, p. 172-176, 178, 180, 182, 184.

The potentialities and potential impact of I.B.M.'s Satellite Business Systems (SBS) project (in partnership with Comsat and Aetna Life and Casualty) are assessed. Use of large-scale central computers, satellite technology, and ultrahigh microwave frequencies for voluminous data to serve corporate customers utilizing ground ministations is envisaged. Applications include: teleconferences, fast retrieval of high-volume offshore oil exploration data, adjusting system loads to handle computer overloads and bottlenecks, high-volume facsimile service combined with digital data and voice data. A data flow of 41 Megabits per second is projected. The impact of such a system on the business community is assessed. R.D.V.

A77-34493 Technological change and cost analysis of high-technology systems. E. N. Dodson (General Research Corp., Santa Barbara, Calif.). *IEEE Transactions on Engineering Management,* vol. EM-24, May 1977, p. 38-45. 14 refs.

Technological change is discussed in the context of systems cost analysis in two ways. First, it is a specific objective of research and development programs and is a direct determinant of research and

development cost. Methods of measuring technological change are evaluated and an example of an research and development cost equation is set forth. Second, technological change underlies the relationships between design/performance characteristics and procurement costs. For many systems, the year-to-year change is highly significant, and cost analyses which overlook this phenomenon can be in serious error. Examples are discussed. (Author)

A77-34494 Management by objectives in the R & D environment - A simulation. E. J. Poziomek (U.S. Army, Chemical Systems Laboratory, Aberdeen Proving Ground, Md.), D. W. Rice (Department of Communications, Communications Research Centre, Ottawa, Canada), and D. F. Andersen (MIT, Cambridge, Mass.). *IEEE Transactions on Engineering Management,* vol. EM-24, May 1977, p. 45-51. 32 refs.

A System Dynamics model of the interrelations in an R&D organization between management by objectives (MBO), social interaction, and employee motivation and productivity is presented. In many cases, MBO is shown to increase employee productivity by generating task-related work pressures. However, longer run counteracting decreases in productivity may result if management neglects the negative effects of task pressure on social interaction. Policies are discussed for managing these positive and negative effects inherent in MBO. (Author)

A77-34495 Organizing collection, selection, and ranking of ideas leading to national R & D projects. E. Trattner (Israel Institute of Productivity, Tel Aviv, Israel). *IEEE Transactions on Engineering Management,* vol. EM-24, May 1977, p. 51-59. 22 refs.

A rational way of collecting, selecting and ranking problem-generating ideas to be solved by research and development on a national plane is presented. A questionnaire was worked out for the collection of technological, economic and financial information related to the idea supplied. A sifting system has been devised for selection from among the ideas collected, based on the following two criteria: that the idea should not be achievable by technological transfer, and that the idea should be technologically feasible and economically efficient. B.J.

A77-34496 A management information system for engineering and research. D. W. Karger (Rensselaer Polytechnic Institute, Troy, N.Y.) and R. G. Murdick (Florida Atlantic University, Boca Raton, Fla.). *IEEE Transactions on Engineering Management,* vol. EM-24, May 1977, p. 72-75.

This article describes in practical managerial language (1) management information systems (MIS), (2) the benefits and advantages to be gained by utilizing an MIS, and (3) the major attributes and guidelines for construction. To accomplish its objective it is necessary to note and reference many important practices vital to successful management. (Author)

A77-34642 Cut energy costs: A guide for buying and plant operation (Energiekosten senken: Ein Leitfaden für Einkauf und Betrieb). Edited by K. Deparade. Gräfelfing, West Germany, Technischer Verlag Resch, 1977. 178 p. In German. $12.50.

This book is a collection of papers examining the energy-economical aspects of plant operation, with numerous suggestions being made for procedures which reduce energy losses in an industrial process. Topics discussed include electric power supply contracts and special price controls, energy cost reduction by maximum monitoring and maximum load optimization, electricity cost reduction by reactive current compensation, natural gas purchasing contracts and features of natural gas supply, and energy saving by heat insulation. P.T.H.

A77-35171 Technology for the control of sulfur oxides and nitrogen oxides in Japan. Y. Masuto (Japan Trade Center, Houston, Tex.). In: Energy and the environment; Proceedings of the Third National Conference, Oxford, Ohio, September 29-October 1, 1975. Dayton, Ohio, American Institute of Chemical Engineers, 1975, p. 317-324. 12 refs.

Japan ranks second among the world's nations in total Gross National Product value. Along with this economic success, however, has come the problem of increased air pollution. To prevent this smothering of its living environment, Japan has become one of the leaders among countries in the demand for active concern about contaminant in its air. The atmosphere is polluted by industrial processes mainly with the following substances: hydrocarbons, sulfur oxides, carbon monoxide, nitrogen oxides, suspended particulate matter, and photochemical oxidants. This paper considers only the oxides of sulfur and nitrogen. A view of the current SOx and NOx situation in Japan is given, and countermeasures against this pollution are outlined by citing environmental standards and regulation, then listing antipollution budgets and investment. SOx and NOx pollution control technology is considered from the standpoint of applications, research, and development. (Author)

A77-35308 * Establishing effective working relations with a potential user community - NASA Lewis Research Center experience. P. Foster (NASA, Lewis Research Center, Cleveland, Ohio). In: Space Congress, 14th, Cocoa Beach, Fla., April 27-29, 1977, Proceedings. Cocoa Beach, Fla., Canaveral Council of Technical Societies, 1977, p. 2-6 to 2-11.

The NASA Lewis Research Center has held a series of six major and unique technology utilization conferences which were major milestones in planned structured efforts to establish effective working relationships with specific technology user communities. These efforts were unique in that the activities undertaken prior to the conference were extensive, and effectively laid the groundwork for productive technology transfer following, and as a direct result of, the conferences. The effort leading to the conference was in each case tailored to the characteristics of the potential user community, however, the common factors comprise a basic framework applicable to similar endeavors. The process is essentially a planned sequence of steps that constitute a technical market survey and a marketing program for the development of beneficial applications of aerospace technology beyond the aerospace field. (Author)

A77-35325 * Protecting proprietary rights - A potential Shuttle user's view. J. B. Day (Battelle Columbus Laboratories, Columbus, Ohio). In: Space Congress, 14th, Cocoa Beach, Fla., April 27-29, 1977, Proceedings. Cocoa Beach, Fla., Canaveral Council of Technical Societies, 1977, p. 7-26 to 7-29. NASA-supported research.

Maintaining a high degree of industrial security in the multiple-payload Shuttle environment poses a number of problems for NASA. As a part of Battelle-Columbus' support of NASA's User Development Program, this paper presents a potential user's perspective on this situation. The need for security, the nature of the problem, and precedents for NASA security measures are discussed. Eleven policy guidelines representing desirable features from a potential user's viewpoint are presented for NASA consideration. (Author)

A77-36262 Large and small-scale systems engineering. A. M. Lavie (Tel Aviv University, Tel Aviv, Israel). *(Israel Conference on Mechanical Engineering, 10th, University of the Negev, Beersheba, Israel, June 21, 22, 1976.) Israel Journal of Technology,* vol. 14, no. 4-5, 1976, p. 196-206. 7 refs.

In this article, large-scale systems engineering is related to the whole sequence of operations involved in the complete life cycle of an engineering system, from its generation until its phasing out and replacement by a new one. Small-scale systems engineering is related to the justification phase, when different alternatives are designed and analyzed in order to choose the best compromise and to justify the development of a new system. The large scale is claimed to have a triangular structure: it is divided into three phases (justification phase, development and production phase and operation phase) and each phase is composed of three basic activities. Interesting features of systems engineering are analyzed, such as the mechanism of formulating requirements, the design to cost concept, the strategy

which a small company should adopt in developing products, and the impact of advanced technologies. (Author)

A77-36274 **A regional environmental quality management model - An assessment.** C. S. Russell and W. O. Spofford, Jr. (Resources for the Future, Inc., Washington, D.C.). *(American Association of Environmental Economists, Annual Meeting, 1st, Dallas, Tex., Dec. 28, 1975.) Journal of Environmental Economics and Management,* vol. 4, June 1977, p. 89-110. 23 refs.

The principal purpose of this paper is to discuss the research and policy lessons learned from a large environmental quality management model constructed for the Lower Delaware River Valley Region. The policy lessons involve estimates of the costs of meeting varying standards on air and water quality and the impact on those costs of certain region-wide management alternatives. The research lessons concern: (1) the desirability of considering air and water quality, and solid waste disposal, simultaneously in a single model; (2) the costs of and returns to including nonlinear models of natural systems in a regional optimization framework; and (3) the feasibility of working with constraints on the geographic distribution of the costs of environmental quality improvement within the regional, nonlinear model. (Author)

A77-36389 **But where's the money coming from.** J. L. Blonstein (Eurospace, Paris, France). *British Interplanetary Society, Journal (Space Communications),* vol. 30, Apr. 1977, p. 155-159.

It is maintained that the establishment of satellite communications systems in the developing countries is no longer a question of technology, but a question of money. The paper attempts to show why the developing countries need more and better communications, and the means by which they can attain them. The use of the Symphonie satellite in the ESOPE program is discussed. B.J.

A77-36424 *Energy management.* P. W. O'Callaghan and S. D. Probert (Cranfield Institute of Technology, Cranfield, Beds., England). *Applied Energy,* vol. 3, Apr. 1977, p. 127-138. 5 refs.

Metering, critically examining and if necessary modifying the energy flow through a system is desirable in order to achieve a high efficiency. Systematic procedures for energy management and audit of processes and products are suggested: they involve energy flow charts and assessment questionnaires and thereby facilitate the location, and reduction or elimination, of energy profligate subsystems. Design rules for the improvement of energy flow systems are listed. (Author)

A77-36618 **Multiuser area-coverage automatic vehicle monitoring program.** D. J. Symes (U.S. Department of Transportation, Office of Research and Development, Washington, D.C.). *IEEE Transactions on Vehicular Technology,* vol. VT-26, May 1977, p. 187-191.

A two-phase program for testing an automatic vehicle monitoring (AVM) system to accommodate both fixed-route and random-route users is described. Field tests and benefit-cost studies in phase I are an essential prerequisite to phase II development. Four types of location subsystems (signpost, radio frequency, dead reckoning, a hybrid combination of the first three) are under test in the Philadelphia area. Data processing, communications, system capacity, location accuracy, and waypoint display arrangements of the AVM system are discussed. R.D.V.

A77-36956 **Temperature measurement technology - Sensor techniques and instrumentation.** D. M. MacKenzie and W. E. Kehret (Doric Scientific). In: International Instrumentation Symposium, 22nd, San Diego, Calif., May 25-27, 1976, Tutorial Proceedings. Pittsburgh, Pa., Instrument Society of America, 1976, p. 89-107.

Temperature sensor technology has a dramatic impact on instrumentation. Sensor technologies reviewed include metal and semiconductor resistance thermometry, metal and semiconductor junction thermometry and pyrometry. Instrumentation considerations discussed include sensor lead configuration, excitation and referencing, noise rejection, multiplexing, analog to digital conversion and linearization. Special attention is given to both thermal and electrical parasitic effect. Data processing, alarming and display are also considered both with a functional and a human engineering perspective. Reliability and value engineering concepts are related to actual hardware implementation. (Author)

A77-37358 **A marketplace approach to military avionics standardization.** C. N. D. Smith (Arinc Research Corp., Annapolis, Md.). In: NAECON '76; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 18-20, 1976. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 33-41. 14 refs.

This paper explores the commercial practices widely used today by the airlines industry to develop effective avionics specifications and high-quality hardware. Principal among these practices is the Airlines Electronic Engineering Committee's open forum process; the use of form, fit, and function specifications; the use of marketplace forces; the application of warranties; and data exchange within the Avionics Maintenance Conference. It describes some of the major elements of these practices and explores their potential impact on competition, profit, reliability, maintainability, and life-cycle costs. The possible application of commercial avionics acquisition processes to the military environment is reviewed. (Author)

A77-37384 **An approach to modern avionics integration support.** A. E. Patterson and R. G. Algire (USAF, Sacramento Air Logistics Center, McClellan AFB, Calif.). In: NAECON '76; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 18-20, 1976. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 243-249. 5 refs.

Attention is given to the F-111 Avionics Integration Support Facility, whose most critical function is the provision of a pool of expertise and system resources ready to respond to the day-to-day avionics system problems as they occur. The resources of the facility include system and subsystem mock-ups, operational flight program simulation systems, a computer support system, flight tests, and a staff of highly skilled personnel. B.J.

A77-37426 **Managing engineers by objectives.** J. P. Martino (Dayton, University, Dayton, Ohio). In: NAECON '76; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 18-20, 1976. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 571-578.

The paper describes the use of the management-by-objectives method to manage a medium-sized engineering organization for the Department of Defense. Attention is given to the historical background of the program and to the benefits and shortcomings of the program. B.J.

A77-37427 **The potential in the management of engineering design for reduction of life cycle costs.** M. L. Ritchie (Wright State University, Dayton, Ohio). In: NAECON '76; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 18-20, 1976. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 583-588. 11 refs. Grant No. AF-AFOSR-73-2569.

The paper examines a number of problems associated with the reduction of life cycle costs in Air Force aircraft design. These include the fact that manpower costs must be traded off with other aspects of systems design, and the lack of background of engineers and engineering managers in manpower variables. B.J.

A77-37428 **Influences on system designers which compete with the work statement.** M. L. Ritchie, P. Vendt, and N. S. Nataraj (Wright State University, Dayton, Ohio). In: NAECON '76; Proceedings of the National Aerospace and Electronics Conference, Dayton,

Ohio, May 18-20, 1976. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 600-603. Grant No. AF-AFOSR-73-2569.

A confidential questionnaire was used to determine if designers of Air Force equipment are subjected to influences which detract from straightforward solutions to design problems. It was found that the decisions of the design engineer are affected by the school in which he learned engineering, by the nature and outlook of his immediate supervisor, by what his colleagues approve and expect of him, by his company's policies, and by what he can interpret from the data made available to him. B.J.

A77-37441 Interactive versions of cost models. F. W. Kurtz (USAF, Avionics Laboratory, Wright-Patterson AFB, Ohio). In: NAECON '76; Proceedings of the National Aerospace and Electronics Conference, Dayton, Ohio, May 18-20, 1976. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 696-698.

An interactive cost estimating model is a procedure by which managers get immediate answers to questions concerning the extent to which cost estimates will be influenced by variations in specific factors. Several cost estimating models have been converted to interactive models at Wright-Patterson Air Force Base. The procedure involves modifying a program so that it may be queried on either a teletype or video screen by a decision maker, top manager, or staff assistant, who has not had extensive training in cost estimating methodology. B.J.

A77-37582 Let's get serious about total life cycle costs. E. P. Eaton (USAF, Office of the Assistant Secretary of Defense, Washington, D.C.). *Defense Management Journal,* vol. 13, Jan. 1977, p. 2-11.

Design analysis methods used to link weapon system performance to dollar costs to control and, if possible, reduce acquisition, design to cost, and downstream operating and support costs are outlined. Special attention is given to the analysis of cost drivers inherent in the support structure of a system. The practical application of the principles described in the Trident submarine system, the Advanced Medium STOL Transport Project, and the Electronically Agile Radar (EAR) program is examined. C.K.D.

A77-37584 The PRAM program - Capitalizing on cost-reducing opportunities. G. E. Gabel (USAF, Avionics Div., Washington, D.C.). *Defense Management Journal,* vol. 13, Jan. 1977, p. 24-29.

The Air Force PRAM (Productivity, Reliability, Availability, and Maintainability) program, which focuses management funds and attention on selective innovative investment in projects to reduce operational weapons system support costs is described. Prime areas of interest include improved weapon system reliability, maintainability, and supportability; improved efficiency and productivity of maintenance and logistics support operations; exploitation of lower life cycle cost alternatives through standardization and use of current technology components, and elaboration of new research, development, test, and engineering approaches to better accommodate life cycle cost considerations. Methods used to screen investment proposals and results obtained to date are discussed. C.K.D.

A77-37585 When managing - Think statistics. R. Glubin (USAF, Office of the Assistant Secretary of Defense, Washington, D.C.). *Defense Management Journal,* vol. 13, Jan. 1977, p. 48-55.

The use of statistics to reduce the areas of uncertainty in managerial decision-making is discussed. Suggestions are given for promoting better understanding and cooperation between manager and statistician and for accelerating the pace of management use of statistics. Such topics as coordinating data collection, refining statistical support for management needs, the use of statistical sampling, and budget projections based on statistics are considered. C.K.D.

A77-37586 The Raytheon approach - Reliability success via total management involvement. D. M. Fradette and J. W. McFarland (Raytheon Co., Missile Systems Div., Bedford, Mass.). *Defense Management Journal,* vol. 13, Jan. 1977, p. 59-67.

The elaboration of a management program which emphasizes reliability at all stages of development of a weapons system program is described. Among the aspects considered are the initial establishment of realistic reliability requirements; determination of causes of unreliability; development of control procedures for purchased material. Techniques for controlling reliability at different stages of fabrication are discussed together with methods for continually assessing the reliability of deployed hardware. C.K.D.

A77-37587 Critical Path Method - A simple tool for the working manager. G. E. Rutledge (Arizona, University, Tucson, Ariz.). *Defense Management Journal,* vol. 13, Jan. 1977, p. 68-71. 9 refs.

The Critical Path Method for analyzing, planning and scheduling a project is outlined. Each activity or event is situated with respect to the rest of the project by determining which activities must be completed before its initiation, which may be carried out concurrently, and which depend on its completion. A network identifying activities in an ordered sequence of relationships (paths) indicating the flow of activities necessary to complete a task is constructed. Three time estimates are made for each path: the most likely time to completion plus a pessimistic estimate and an optimistic estimate. The path with no slack time available is identified as the critical path for the project. C.K.D.

A77-37798 # An integrated program and data management system for engineering applications. A. J. Becqué. Delft, Technische Hogeschool, Doctor in de technische Wetenschappen Dissertation, 1977. 623 p. 73 refs.

Aspects of the LPR (List PRocessing) integrated programming and data base software system, a tool for developing computer programs and data bases for engineering purposes, are discussed. LPR subroutines used in programming create, lengthen, delete, or read from tables; analyze commands; produce trace output when debugging a program module of a subsystem; edit output. User profiles are examined. Preparation of input data using the 'data language' and the 'function language' is discussed, together with subsystem definition. The LPR subroutines available to the FORTRAN programmer are described. Examples of existing subprograms in the older LPR2 version are given. C.K.D.

A77-38218 Energy R&D modeling for budgetary decisions. K. Chen, J. Lathrop, C. Kirkwood, and S. Pollock (Michigan, University, Ann Arbor, Mich.). In: Modeling and simulation. Volume 7 - Proceedings of the Seventh Annual Pittsburgh Conference, Pittsburgh, Pa., April 26, 27, 1976. Part 2. Pittsburgh, Pa., Instrument Society of America, 1976, p. 955-962. 23 refs. NSF Grant No. ENG-74-22564.

A top-down approach is taken to apply multi-objective decision analysis to the strategic budgetary decisions in energy RD&D (research, development and demonstration) planning. A model is developed for the explicit and quantitative treatment of uncertainties and project interrelationships. The model is applied to an example budgetary allocation between two coal liquefaction programs, H-Coal and Synthoil. The example demonstrtes the potential appropriateness of decision analysis in energy RD&D strategic planning. (Author)

A77-38627 # Noise regulations of the Federal Government. C. R. Foster (FAA, Washington, D.C.). *American Institute of Aeronautics and Astronautics and Society of Automotive Engineers, Propulsion Conference, 13th, Orlando, Fla., July 11-13, 1977, AIAA Paper 77-995.* 15 p.

The FAA is charged with the development and promulgation of aircraft noise certification standards. These noise standards are required to be economically reasonable, technologically practicable, appropriate to airplane type, consistent with the highest standards of safety, and compatible with public health and welfare requirements. In addition, it is highly desirable that U.S. noise certification rules be compatible with noise requirements and constraints in other countries. Thus the rulemaking process is fully coordinated with the International Civil Aviation Organization activities in this area. (Author)

A77-38675 Accounting methods for new-technology non-utility energy installations. A. J. Appleby (CNRS, Laboratoire d'Electrolyse, Meudon, Hauts-de-Seine, France). *Energy* (UK), vol. 2, Sept. 1977, p. 317-319.

Inflation of energy costs, until 1973 an unimportant factor in determining the overall rate of inflation in the economy, promises to become a major influence in determining future price increases as society moves towards the use of nonfossil and synthetic fuels. Since the conventional interest rate is effectively indexed to inflation, and since the energy costs in question are strongly capital-intensive, a snowball effect seems inevitable. A mortage-repayment formula is suggested that has obvious importance when used in an inflationary environment, since it reduces the initial impact of new-technology energy costs compared with formulas used in conventional accounting. In addition, it is advantageous for technologies requiring longer write-off times, and may be particularly useful for small non-utility (e.g., solar) energy installations. (Author)

A77-38792 * The next 25 years: Industrialization of space - Rationale for planning. J. von Puttkamer (NASA, Office of Space Flight, Washington, D.C.). *British Interplanetary Society, Journal (Space Technology)*, vol. 30, July 1977, p. 257-264. 15 refs.

A methodology for planning the industralization of space is discussed. The suggested approach combines the extrapolative ('push') approach, in which alternative futures are projected on the basis of past and current trends and tendencies, with the normative ('pull') view, in which an ideal state in the far future is postulated and policies and decisions are directed toward its attainment. Time-reversed vectors of the future are tied to extrapolated, trend-oriented vectors of the quasi-present to identify common plateaus or stepping stones in technological development. Important steps in the industrialization of space to attain the short-range goals of production of space-derived energy, goods and services and the long-range goal of space colonization are discussed. C.K.D.

A77-39099 The airlines mutual aid pact - A lesson in escalated economic warfare and abdicated regulatory responsibility. W. G. Mahoney. *Journal of Air Law and Commerce*, vol. 42, Autumn 1976, p. 847-878. 140 refs.

A77-39102 French regulations and practices for the allocation of air routes. F. Legrez (Compagnie Nationale Air France, Paris, France). *Air Law*, vol. 2, no. 1, 1977, p. 19-23.

A77-39373 Transportation policy in the eighties. M. Wachs (California, University, Los Angeles, Calif.). *(Association of Engineers and Architects in Israel and International Technical Cooperation Centre, World Congress of Engineers and Architects, 4th, Tel Aviv, Israel, Dec. 13-19, 1976.) Transportation*, vol. 6, June 1977, p. 103-119. 14 refs.

Urban transportation policy during the nineteen seventies has been characterized by attempts to deal with four major problems: (1) the minimization of environmental impacts of transport investments, (2) the alleviation of inequities in mobility, and financial burdens imposed upon some groups by earlier investments in capital intensive highway networks, (3) the accommodation of demands for public participation in transport decision-making, and (4) the precipitous rise of public transit operating costs. Examples of policies which have been pursued in attempting to solve each of these problems are given. It is shown that policies designed to solve one of them have often intensified others. Thus, current policy is characterized by reliance upon very small-scale and timid plans and proposals. The eighties may see a return to large-scale and comprehensive transport plans, but these will not be exclusively physical or system plans. Rather, transportation plans in the eighties will include a balance among physical facilities, institutional arrangements, financial plans, and user incentives and disincentives. Several examples of such comprehensive policies are provided. (Author)

A77-39778 Aerospace cost prediction - The way ahead. J. E. A. Harrison (Ministry of Defence /Procurement Executive/, London, England). *(Royal Aeronautical Society, Symposium on Methods of Cost Prediction, London, England, Mar. 9, 1977.) Aeronautical Journal*, vol. 81, May 1977, p. 213-219. 6 refs.

An overview of past and present approaches to aerospace cost prediction for budgetary purposes within government is presented. The goals and objectives of budgetary cost prediction are outlined, and the application of cost prediction methods in predicting costs of an engine development program is examined in detail. The assessment of life cycle costs is discussed. The influence of changing technological, managerial, operational and policy factors on cost analysis methods is considered, and future trends in cost analysis for budgetary purposes are predicted. C.K.D.

A77-40007 Methods of cost prediction, Proceedings of the Symposium, London, England, March 9, 1977. Symposium sponsored by the Royal Aeronautical Society. London, Royal Aeronautical Society, 1977. 96 p. $7.75.

A collection of papers on project planning and cost prediction methods for aerospace applications is presented. Topics include the prediction of design and development costs of civil airliners; problems of research and development cost predictions in an avionics supply company; aero engine development costing; project planning and control for risk projects. C.K.D.

A77-40009 # Problems of research and development cost predictions in an avionics supply company. H. K. Quilter (Smiths Industries, Ltd., London, England). In: Methods of cost prediction; Proceedings of the Symposium, London, England, March 9, 1977. London, Royal Aeronautical Society, 1977. 12 p.

The procedures, methods, and philosophy of preparing research and development cost predictions for avionics projects are discussed. The initial screening of proposals to identify those likely to be economically productive is described, together with cost monitoring and reporting after project initiation. The allocation of responsibility for the execution of design and development tasks within cost constraints is discussed. Cost constraints faced by avionics companies are outlined, and possible approaches to better project definition and more effective cost control are suggested. C.K.D.

A77-40011 # A commentary on project planning and control for risk projects. D. Loveridge (Pilkington Bros., Ltd., Lathom, Lancs., England). In: Methods of cost prediction; Proceedings of the Symposium, London, England, March 9, 1977. London, Royal Aeronautical Society, 1977. 13 p.

The selection of the form of organization and of planning and control procedures appropriate to risk projects is discussed. The construction of a geometric system model for the development of a new product is described, and the translation of geometric models into partial arithmetic models is outlined. The synthesis of a boiler plant is illustrated. Two mutually supportive feedback control systems are described. C.K.D.

A77-40081 **Computer aided process planning.** R. C. Read, Jr. (Bell Helicopter Textron, Fort Worth, Tex.). In: American Helicopter Society, Annual National Forum, 33rd, Washington, D.C., May 9-11, 1977, Proceedings. Washington, D.C., American Helicopter Society, Inc., 1977. 8 p. (AHS 77-33-54)

The Bell Computer Aided Process Planning System is an on-line system designed to maximize the planners productivity and reduce the clerical effort required to prepare and release planning. The system uses the latest in data base technology and is the nucleus of Bell's integrated manufacturing system. Planning is automatically printed by the computer from a response from the Work-In-Process (WIP) System. A 40,000 man-hour savings has resulted in the Traveler Reproduction Department since the CAP System was installed. Planning effort has been reduced by a minimum of 20%. The MENU approach (Modules of Canned Planning) allows the planner to create the entire operations section of the planning from a seven digit code. MENU's also promote standardization and traceability of existing planning. Other areas of manufacturing are also experiencing benefits from CAP such as automatic provisioning of material codes, mechanical generation of assembly requisition bill of materials, part and stock location callouts, raw material requisitions, and more accurate planning. (Author)

A77-40721 # **Structural-logic diagram for ensuring high-rate products (Strukturno-logicheskaia skhema obespecheniia pokazatelei kachestva izdelii).** A. S. Shevelev. *Aviatsionnaia Tekhnika,* vol. 20, no. 1, 1977, p. 117-124. In Russian.

The paper deals with the application of automation and computers to the development of technological processes in the aircraft industry. Specifically, a structural-logic diagram, using which a functional connection can be established between design parameters and technological factors, is proposed as a means of obtaining reliable initial information for use in the development of automated and computer-aided technological processes. V.P.

A77-40819 # **Questions relating to the planning of the scientific-technical activity of an academic oceanographic research institute (Voprosy sovershenstvovaniia planirovaniia nauchno-tekhnicheskoi deiatel'nosti akademicheskogo NII okeanograficheskogo profilia).** V. E. Lapushkin. *Morskie Gidrofizicheskie Issledovaniia,* no. 4, 1976, p. 144-155. In Russian.

A system approach is taken to describing the structure of the research plans of an oceanographic institute and a need for a complex approach to planning the scientific-technical activity of the institute is emphasized. Attention is given to a costs-results model of an academic research institute and the structure of research control and planning is considered. B.J.

A77-40928 **Crash management at airports.** J. C. Self (Aerospace Management Services International, Los Angeles, Calif.). *National Fire Protection Association, International Seminar on Aircraft Rescue and Fire Fighting, Geneva, Switzerland, Sept. 13-17, 1976, Paper.* 11 p.

Meshing of community-supported rescue agencies (mutual aid or civil defense organizations) and airport-based crash rescue teams is discussed. Generally an airport should concentrate on providing immediately needed services, such as prompt firefighting. In accidents involving serious fire, for example, only sixty to ninety seconds may be available for evacuating the cabin. Evacuation teams should arrive with the second wave of firefighting equipment and should be equipped to gain access to the cabin in the presence of fire damage and in any crash configuration; be able to work in a toxic atmosphere; and be trained in using backboard and other victim handling techniques. Back-up manpower should be capable of controlling crowds, manning first aid stations, and coordinating airport and community rescue services. Creating a victim profile and a spectrum of hypothetical accidents is discussed, and a typical response system for an airport with two ambulances, a paramedic team, and one doctor is outlined. The time periods needed to evacuate, triage, transport, and begin treatment of victims are also defined. J.M.B.

A77-41553 # **Alternatives to oil and gas through energy management.** J. A. Belding (ERDA, Div. of Conservation Research and Technology, Washington, D.C.). In: New options in energy technology; Proceedings of the Conference, San Francisco, Calif., August 2-4, 1977. New York, American Institute of Aeronautics and Astronautics, Inc., 1977, p. 4-11. 12 refs. (AIAA 77-1006)

The vital importance of improved energy production and reutilization management in helping to meet energy needs is discussed in relation to short-term candidates for replacing petroleum and natural gas: solar power, nuclear power, and coal. Electric power utilities, transportation, large industry, commercial/residential uses are covered in relation to the problem addressed. Energy management, energy efficiency enhancement, conservation cost/benefits, cost-time analysis, investment in conservation, waste heat utilization, and applications of advanced fuel cells in major power systems are dealt with. R.D.V.

A77-41644 **Market incentives for recycling - The tax credit and product charge compared.** K. C. Devine. *Environmental Affairs,* vol. 5, no. 4, 1976, p. 669-695. 197 refs.

Section 2006 of the Senate Finance Committee's draft of the Tax Reform Act of 1976, which provides tax credits to purchasers of recyclable solid wastes, is compared with Section 306 of the House Commerce Committee's 1975 draft of the Solid Waste Utilization Act. Shortcomings of the Senate measure include: failure to take into account the inherent inelasticities in supply and demand of waste materials, which renders the proposal an ineffective instrument for promoting recycling; failure to provide disincentives to discourage the use of virgin materials; and high costs passed on to the consumer. By imposing an excise tax on the use of virgin materials while also providing credits to stimulate reuse of wastes, the House measure will promote increased recycling. In addition, revenues from the excise tax will yield substantial support for local waste management agencies; since it is levied on a small sector of industry, the tax will be no more complex or difficult to collect than similar levies now in effect. J.M.B.

A77-40926 **Lessons from individual aircraft fire accidents: TWA L1011 aircraft fire - Logan International Airport, Boston, Massachusetts, U.S.A., 20 April 1974.** G. H. Tryon (National Fire Protection Association, Boston, Mass.). *National Fire Protection Association, International Seminar on Aircraft Rescue and Fire Fighting, Geneva, Switzerland, Sept. 13-17, 1976, Paper.* 7 p.

A77-41937 # **The value of commercial air transportation to the economy.** G. W. James (Air Transport Association of America, Washington, D.C.). In: The place of aviation in society; Proceedings of the Fifteenth Anglo-American Aeronautical Conference, London, England, May 31-June 2, 1977. London, Royal Aeronautical Society, 1977. 11 p.

Quantifiable benefits of commercial air transportation to world and national economies are examined, taking into account a contribution of commercial aviation to the U.S. economy of over 3 percent of the gross national product, the purchases of goods and services by airlines, the employment provided by the airlines in various countries, the development of the tourism industry, and the significance of air transportation for trade. Quantifiable benefits provided by commercial air transportation for local economies are also considered. Many of the benefits of commercial air transportation to society cannot be quantified. Attention is given to benefits related to short transportation times, the value of the educational experience of travel, the importance of cultural and technical interchange, national security, unifying effects, and new cargo markets. G.R.

A77-42047 **Partnership for a future - Airline view.** P. M. Johnstone (Eastern Air Lines, Inc., New York, N.Y.). *Society of Automotive Engineers, Air Transportation Meeting, Washington, D.C., May 10-12, 1977, Paper 770577.* 7 p.

Comparisons of airline expenditures per available seat mile in 1970 and in 1976 indicate a large increase in costs outside the airlines' control (fuel, landing fees, and commissions), but also significant increases in the cost of maintenance, labor, and materials. To bring maintenance costs under control, the following recommendations are made: cooperation between airlines and aircraft manufacturers in developing tools and machines which require minimum manual intervention for repairs; engineering increased reliability of aircraft to reduce out-of-service time; and reexamination of development and acquisition of new aircraft. Research and development programs, the success of which is linked to deregulation of the airlines, include: development of alternate fuels for aircraft, together with equitable allotment of petroleum fuels; studies of noise abatement and emission control; and research into the cost-effectiveness of some safety requirements. J.M.B.

A77-42049 **Airport planning and economics - Some changing perspectives.** J. R. Goodwin (FAA, Washington, D.C.). *Society of Automotive Engineers, Air Transportation Meeting, Washington, D.C., May 10-12, 1977, Paper 770581.* 6 p.

Airport planners need to consider the effects of economic fluctuations on the accuracy of long-range projections of air traffic, and should plan adequate lead times for improving capacity in handling aircraft, passengers, baggage, and surface transport. The FAA's Upgraded Third Generation Air Traffic Control System is discussed, and increased capacities attainable through its wake-vortex avoidance system, metering and spacing capability, and discrete address beacon system are mentioned. Other problems confronting airport planners are considered, including the integration of public transport into airport transport systems, effects of environmental accountability legislation on airport development, and methods for choosing or arranging compromises between central, linear, or transporter design of airports. J.M.B.

A77-42376 **National science and technology policy - Current policies and options for the future.** B. Ancker-Johnson (U.S. Department of Commerce, Washington, D.C.). *Research Management,* vol. 20, Jan. 1977, p. 7-12. Abridged.

An examination of federal policies regarding technological and scientific research reveals the lack of broadly based, systematic, and continuous planning for a coordinated and effective national technology policy. Possible federal technology policy options are considered. These cover analysis and planning to develop appropriate technico-economic indicators characterizing the needs and opportunities in various industries and possibly furnishing inputs for the formulation of investment guidance policies; actions designed to assure basic resources, appropriate proprietary rights, and direct support for industrial research and development; tax measures affecting the industrial research and development phase of the innovation process; measures for the diffusion of technical information; and means of improving U.S. competitiveness in international trade and providing technological support to developing nations. C.K.D.

A77-42377 **National science and technology policy - Its impact on technological change.** J. D. Lewis (National Bureau of Standards, Washington, D.C.). *Research Management,* vol. 20, Jan. 1977, p. 13-16.

The impact of national science and technology policy on technological change is examined. Differences between the criteria used to allocate resources in the public and private markets are discussed. Difficulties arising with the current policies regarding federal sponsorship of research and development are outlined. It is suggested that the major thrust of technology-sensitive policies be directed to the production and marketing stages of technological change, which bear larger costs and risks than the research and development stage. Such policies are discussed in the context of the basic policy instruments available to the Federal Government: subsidies, regulation, and early procurement of innovative products. C.K.D.

A77-42378 **National science and technology policy - Perceptions of barriers to innovation.** H. K. Nason (Monsanto Research Corp., Miamisburg, Ohio). *Research Management,* vol. 20, Jan. 1977, p. 17-20. 11 refs.

The findings and recommendations of recent studies and reports on causes and remedies for the apparent erosion of the technical base for innovation in the U.S. are outlined and compared. These include the report of the Commerce Technical Advisory Board, the 'Charpie Report' submitted by the Panel on Invention and Innovation, a study sponsored by the National Science Foundation, and the Northwestern University study conducted by Rubenstein et al. (1974). Key issues raised in these reports center around refining the perception of barriers and of stimulators for technological innovation. C.K.D.

A77-42379 **National science and technology policy - Needed: Institutional breakthroughs.** L. Levy. *Research Management,* vol. 20, Jan. 1977, p. 21-24. Abridged.

Some institutional changes which could stimulate effective application of research and development resources to solve national problems are suggested. Special consideration is given to government aid to small research and development companies. It is suggested that existing procurement regulations be modified to allow more sole source contracts to be granted to research and development firms which submit worthy ideas and are qualified to develop them, and that procurement procedures be streamlined. Other proposals concern initiation of a loan guarantee program for investors similar to that administered by the Overseas Private Investment Corporation, and creation of an organization analogous to the National Research and Development Corporation of the U.K. to develop and finance worthy projects which are rejected by normal venture capital sources. C.K.D.

A77-42380 **Improving R&D productivity - A study program and its application.** R. M. Ranftl (Hughes Aircraft Co., Culver City, Calif.). *Research Management,* vol. 20, Jan. 1977, p. 25-29.

Results of a two-year study of research and development productivity are presented. The study identified useful techniques for optimizing productivity in traditional research and development environments and in key interfacing activities, such as marketing, manufacturing, support, and services. Profiles of the productive employee, manager, and organization were developed, and factors counterproductive to productivity were described. A productivity improvement program based on the study is discussed. C.K.D.

A77-42381 **Improving R&D productivity - A program for support operations.** A. D. Togna (Texaco, Inc., New York, N.Y.). *(Industrial Research Institute, Annual Meeting, Boca Raton, Fla., May 9-12, 1976.) Research Management,* vol. 20, Jan. 1977, p. 30-34.

A program applying productivity improvement principles to support activities for a research and development department is described. Two approaches are discussed: general employee participation, in which all personnel are urged to accept work improvement as a daily responsibility, and assignment of selected personnel to survey teams which review work improvement techniques, generate work improvement ideas and make recommendations to management. Emphasis in the programs placed on minimizing hidden lost time, streamlining work procedures, simplifying laboratory test procedures, and exploiting labor saving devices. C.K.D.

A77-42382 **Improving R&D productivity - Measuring innovation and productivity: A peer rating approach.** M. J. Stahl (USAF, Institute of Technology, Wright-Patterson AFB, Ohio) and J. A. Steger (Rensselaer Polytechnic Institute, Troy, N.Y.). *Research Management,* vol. 20, Jan. 1977, p. 35-38. 21 refs.

The authors define 'innovation' as a particular subset of output: output which is original and useful. 'Productivity' is defined as a quantity of output. It is argued that quantitative indicators such as number of patents or publications measure productivity but not innovation, which by definition requires a qualitative method of evaluation. Professional colleagues have been shown to provide suitable evaluations of the innovativeness of a researcher's output. C.K.D.

A77-42383 Impact of regulations on R & D - The costs and effects of regulations. P. F. Chenea (GM Research Laboratories, Warren, Mich.). *(Industrial Research Institute, Fall Meeting, Philadelphia, Pa., Oct. 17-20, 1976.) Research Management,* vol. 20, Mar. 1977, p. 22-26.

The costs to General Motors of compliance with and administration of government regulations regarding vehicle design and plant facilities are discussed. It is argued that some regulations are excessive and based on insufficient data. The opinion is advanced that present excessive regulation has negative effects on the national economy and hobbles research while yielding only insignificant improvements in the quality of life. C.K.D.

A77-42384 Measuring the performance of R & D departments. D. W. Collier (Borg-Warner Corp., Chicago, Ill.). *Research Management,* vol. 20, Mar. 1977, p. 30-34.

A method for evaluating the performance of research and development departments is suggested. To develop a score reflecting the success of a department in meeting its objectives, a rating is assigned to each project based on a comparison of actual performance with objectives set for that project. Each project rating is multiplied by the money spent on it, the products for all projects are added, and the sum is divided by the total expense for the research group. A second step determines the value of business opportunity created by each project which has reached a transitional stage between research and development and other phases of production. Experience gained in application of this return-on research index over a three-year period is discussed. C.K.D.

A77-42385 Project selection methods that pick winners. A. Paolini, Jr. and M. A. Glaser (Dexter Corp., Pittsburgh, Calif.). *Research Management,* vol. 20, May 1977, p. 26-29.

The three basic approaches used to select meaningful research projects, or to rank potential projects with respect to one another, are discussed. These include benefit/cost ratio methods, which are largely based on financial considerations and which make use of techniques used in capital budgeting, mathematical programming techniques, and the innovation potential method, in which a project is rated on the basis of eight essential factors (the technical-marketing, technical-customer, and technical-technical interfaces; scientific and technological competence; the effectiveness of the project's champion; marketing opportunity; technical opportunity, top management interest; competitive pressures; timing). The advantages and limitations of each method are considered. C.K.D.

A77-42386 Effective transfer of technology from research to development. W. White. *Research Management,* vol. 20, May 1977, p. 30-34.

A general model for the transfer of a project from the research phase to the developmental phases is presented. Special attention is directed to the management of this transition period for technologies new to a corporation. The method gives high priority to the establishment of effective lines of communication between all groups involved in research and development, including marketing and top management. The allocation of responsibility in the transfer stage is discussed. C.K.D.

A77-42448 Passenger transportation in the suburban area of a large city (Passazhirskii transport v prigorodnoi zone krupnogo goroda). Edited by I. A. Molodykh. Moscow, Izdatel'stvo Transport, 1976. 144 p. In Russian.

Current trends in the planning and design of transportation networks connecting suburban areas with large cities are discussed. Factors affecting the development of suburban transportation systems, including the mobility of the population, accessibility of trains or vehicles, and desired speeds and head-times are considered. Technical and economic analysis methods are presented for different forms of transportation. New mass transport technologies in research and development phases in the Soviet Union and abroad are described. Special consideration is given to the design of systems linking a large city with an airport located in its suburbs. C.K.D.

A77-42855 The United States energy dilemma - How can we solve it. G. R. Hill (Electric Power Research Institute, Palo Alto, Calif.). *(Peninsula Professional Societies, Environmental Pollution Symposium on Practical Alternatives to Present Urban Life, 5th, Menlo Park, Calif., May 12, 13, 1976.) Water, Air, and Soil Pollution,* vol. 7, Feb. 1977, p. 141-146.

The basis for the present energy dilemma is described. The current solution to the inadequate petroleum and natural gas supplies and possible long-term solutions are developed. Current efforts within ERDA and by industry and the public to help solve the problem are considered. An important element in solving the problem is the establishment of platforms where effective dialogue can be developed between those concerned with the environment and those trying to produce energy. There the necessary tradeoffs can be discussed and an action plan developed. Finally, possible mechanisms for moving toward energy independence are suggested. (Author)

A77-43144 A two-stage forecasting methodology for developing a national energy policy. T. J. Murray (Missouri-St. Louis, University, St. Louis, Mo.) and Y. Omurtag (Missouri-Rolla, University, Rolla, Mo.). *Energy Communications,* vol. 3, no. 4, 1977, p. 407-427. 24 refs.

The problem of formulating a national energy policy is discussed. A review of the more common forecasting techniques, including regression techniques, time series analysis, spectral analysis, smoothing techniques, and S curve techniques leads to the conclusion that none completely meets the requirements for long-term energy planning. A two-stage forecasting approach is suggested. The first stage uses traditional forecasting models and techniques to generate quantitative and qualitative information which is integrated in the second stage using the Delphi technique. C.K.D.

A77-43399 National Airlines Fuel Management and Allocation Model. D. W. Darnell (National Airlines, Inc., Miami, Fla.) and C. Loflin. *Interfaces,* vol. 7, Feb. 1977, p. 1-16.

The Fuel Management and Allocation Model determines the optimal strategy for fueling aircraft and can be used to support both short and long-term planning. It has been used operationally by the Fuels Management and Flight Control Departments of National Airlines for over two years, resulting in multi-million dollar savings. The model specifies the best fueling station and vendor for each flight, based on prices, availability, fuel burn, flight data, and cost of tankerage. The model also uses extensive sensitivity analysis techniques to alert management as to when a new policy may be required. (Author)

A77-43637 # Analysis under constraints and decision-making aid for certain scheduling problems (Analyse sous contraintes et aide à la décision pour certains problèmes d'ordonnancement). J. Erschler. Toulouse III, Université, Docteur d'Etat Thesis, 1976. 192 p. 42 refs. In French.

This thesis describes a strictly deterministic approach to a general class of scheduling problems with constraints on available resources. The general problem considered is that of carrying out N projects, each consisting of some number of tasks, where each task cannot be interrupted and is characterized by its duration, the set of

resources it requires, the amount of each resource, and its starting date. Several types of constraints are taken into account: internal constraints of technological coherence, expressed by a set of inequalities on the starting dates of tasks of a given project; external constraints of resource availability; and external constraints regarding deadlines. Modeling is accomplished by means of a nonconjunctive potential-task graph. A specific approach is proposed for a shop scheduling problem with interval disjunction constraints. P.T.H.

A77-44315 # **Support cost impacts of reliability predictions.** R. B. Waina and J. H. Brady (Hughes Aircraft Co., Canoga Park, Calif.). *American Institute of Aeronautics and Astronautics, Aircraft Systems and Technology Meeting, Seattle, Wash., Aug. 22-24, 1977, Paper 77-1206.* 6 p.

Unit and system reliability predictions based on piece-part reliability estimates are often used as the basis for forecasting logistics support requirements and life cycle costs. A study was made to determine how closely the actual distribution of field failure rates tracks the predicted distribution. The results of the investigation revealed gross disparities. Such disparities lead to a lack of confidence in support cost predictions, inappropriate maintenance concept choices, and acquisition of incorrect quantities of support resources. New predictive techniques, better utilization of early field usage data, and more flexible contractual support arrangements are required in order to attain the goal of reduced life cycle support costs. (Author)

A77-44342 # **Minimizing operating costs.** B. L. Terrell (Delta Air Lines, Inc., Atlanta, Ga.). *American Institute of Aeronautics and Astronautics, Aircraft Systems and Technology Meeting, Seattle, Wash., Aug. 22-24, 1977, Paper 77-1254.* 7 p.

Commercial air transport operators necessarily operate as profit-making ventures. Grossly simplified, profit is income minus expenditures. In general, successful operators maximize profits by maximizing income and minimizing expenditures. This paper outlines some activities aimed at minimizing the expenditures of a commercial air carrier. These activities include maintenance programs, management information systems, corrosion control, reduced engine thrust, reduced drag and attendant fuel consumption, hardware modifications, and operational techniques. (Author)

A77-44934 # **An approach to a rational distribution of capital investments between production and environmental cleanup sectors (Ob odnom podkhode ratsional'nogo raspredeleniia kapital'nykh vlozhenii mezhdu sektorami proizvodstva i ochistki).** R. S. Shelegiia and M. I. Alpaidze (Tbilisskii Gosudarstvennyi Universitet, Tiflis, Georgian SSR). *Akademiia Nauk Gruzinskoi SSR, Soobshcheniia,* vol. 86, Apr. 1977, p. 213-215. In Russian.

The article outlines one possible approach to achieving a rational distribution of capital investments between new production plant development and promoting cleanup of the environment exposed to industrial pollution. Products of exponential functions are formulated for the flow of harmful production wastes into the environment, with the flow of harmful effluents into the environment from the production sector and the fraction of harmful wastes managing to get through the cleanup sector without undergoing transformation as component terms. Product unit price, product net production cost, net profit, and excess remaining in the production sector are included in the formulation, and a criterion for calculating the rational fraction of capital investments is formulated. R.D.V.

A77-45172 **Design to life cycle costs and logistics alternatives; Conference, Arlington, Va., December 6, 7, 1976 and New Port Beach, Calif., February 8, 9, 1977, Abridged Proceedings.** Conference sponsored by the American Institute of Aeronautics and Astronautics. Los Angeles, American Institute of Aeronautics and Astronautics, Inc., 1977. 150 p. $10.00.

Attention is given to a DOD overview of life cycle cost management, life cycling costing in the system acquisition process, life cycle costing for the F-18 aircraft, and the projection of life cycle costs for the NATO hydrofoil. Also considered are logistics management, aircraft logistics, effective contractual incentives for life cycle cost control, the impact of life cycle costs on electronically agile radar, an a low cost high volume production program involving Omega navigation. B.J.

A77-45503 # **The timing of technology - Commercial transport aircraft.** J. E. Steiner (Boeing Co., Seattle, Wash.). *American Institute of Aeronautics and Astronautics, Aircraft Systems and Technology Meeting, Seattle, Wash., Aug. 22-24, 1977, Paper 77-1200.* 17 p.

An investigation is conducted of the factors that control the acqusition and the technology of new aircraft, taking into account the current situation and the potential of about 100% improvement in passenger miles per gallon over the pre-1970 aircraft. It is pointed out that the combination of traffic growth and replacement of the older, less efficient, and noisier aircraft brings with it opportunity for technological infusion. Attention is given to the composition of the open market, the U.S. aircraft obsolescence situation, the U.S. cyclic buying situation, the noise regulation situation, the significance of new technology, long-term technological benefits, technology applicable to the next generation, and the magnitude of the next buying cycle. G.R.

A77-45622 **Government regulation effects on the direction of innovation - A focus on performance standards.** A. Gerstenfeld (Worcester Polytechnic Institute, Worcester, Mass.). *IEEE Transactions on Engineering Management,* vol. EM-24, Aug. 1977, p. 82-86. 19 refs. NSF-supported research.

The effect of government regulations concerning performance on the direction of innovation was evaluated by interviewing project managers of 107 projects in eleven different industry categories. In 36% of the cases, the role of government was cited as a major factor affecting the innovations, most of which were correlated with success. The federal government was most often cited as the source of regulation. The type of regulation which most often appeared was safety, followed by pollution. The federal regulations were seen as both a stimulant to the direction of innovation and an expense. P.T.H.

A77-45623 **International transfer of technology system.** B. Joshi (Institute of Economic and Social Research, Ahmedabad, India). *IEEE Transactions on Engineering Management,* vol. EM-24, Aug. 1977, p. 86-93. 24 refs.

The nature, cost, and impact of the complex phenomenon of international transfer of technology have been studied at some length, but factors concerning the transfer process have yet to be given adequate attention. This paper attempts to describe the transfer process at a microenterprise level with the aid of the systems approach. The causal interrelationship among the relevant elements and their components is argued. Next, the model is utilized to analyze an actual case of technology transfer. The particular systems output performance is evaluated, and behavioral abnormalities are explained along with peculiarities of internal structure. The case study also identifies the implications of various elements of the internal structure on the overall performance of the system. (Author)

A77-45624 **Leadership effectiveness in program management.** H. J. Thamhain (GTE Sylvania, Inc., Needham, Mass.) and D. L. Wilemon (Syracuse University, Syracuse, N.Y.). *IEEE Transactions on Engineering Management,* vol. EM-24, Aug. 1977, p. 102-108. 21 refs.

The paper reports the results of an exploratory field study designed to investigate the effectiveness of leadership styles in

various project-oriented work environments. The study concludes that the effectiveness of project managers depends primarily on their leadership style and work environment. A leader-oriented management approach appears most effective in a poor work environment, while in a good organizational climate a team-oriented style seems to be most effective. The findings presented should help the professional project manager to understand the complex interrelationships among position power, leadership style, and organizational variables. Through this understanding he may be able to identify the leadership style which optimizes project performance in his specific work. (Author)

A77-45955 **Project management: How to make it work.** C. C. Martin (United States Management, Inc., New York, N.Y.). New York, AMACOM, 1976. 318 p. $14.95.

The characteristics of project management as a highly effective management tool are examined. A project has a single set of objectives; achieving them represents completion of the project. A project manager with the necessary authority and control over the resources needed to do the job must be appointed. Attention is given to special features of project management, the establishment of a project, the project management process, people and the project environment, the project-oriented organization, integrated quantitative planning, project direction and control of changes, project-oriented controls, personnel management of the project team, the executive decision to organize a project, the launching of the project, executive decision making at key milestones, tradeoff decisions during project execution, and general management surveillance and support. G.R.

A77-46644 **Railroad transportation planning models and their success.** P. N. Belshaw (Canadian National Railways, Montreal, Canada). In: Control in transportation system; Proceedings of the Third International Symposium, Columbus, Ohio, August 9-13, 1976. Helsinki, International Federation of Automatic Control; Pittsburgh, Pa., Instrument Society of America, 1976, p. 89-96. 6 refs.

The paper describes some computer models and systems developed during the last two years which have assisted planning in Canadian National Railways. The main features of these models are summarized together with comments on their implementation. The first model is an information system for planning. This system includes models which translate market forecasts into workloads. Although the forecast is common to all planners, individual planners can draw off unique subfiles for their particular problems. The second model is an analytical or algebraic model which estimates average over-the-road time for different types of trains moving over a common track. The third model simulates trains moving across the main line and through small yards. It helps in optimally scheduling trains. (Author)

A77-46650 **Vehicle management policies for automated transportation systems.** S. J. Kiselewich, Y. M. Tong, and A. S. Morse (Yale University, New Haven, Conn.). In: Control in transportation systems; Proceedings of the Third International Symposium, Columbus, Ohio, August 9-13, 1976. Helsinki, International Federation of Automatic Control; Pittsburgh, Pa., Instrument Society of America, 1976, p. 223-227. 12 refs. NSF Grant No. KO-39072.

A new approach to the problem of managing vehicles within a personalized automated transportation system is outlined. Two alternative vehicle management strategies are suggested; each is potentially applicable to either scheduled or demand responsive systems possessing large numbers of vehicles, topologically complicated guideway networks and capacitated stations. The proposed strategies take station capacity constraints into account by guaranteeing that under normal operating conditions (i.e., no emergencies) no vehicle is ever prevented from entering its destination station because of the unavailability of a berth. (Author)

A77-46655 **Selected experiments on fleet utilization for a planned personal rapid transit system.** R. E. Ward (West Virginia University, Morgantown, W. Va.). In: Control in transportation systems; Proceedings of the Third International Symposium, Columbus, Ohio, August 9-13, 1976. Helsinki, International Federation of Automatic Control; Pittsburgh, Pa., Instrument Society of America, 1976, p. 295-306.

The principal objective of this paper is to report on the application of a discrete event digital simulation model to selected experimentation with one aspect of fleet utilization in a PRT, namely, empty vehicle management. In this context a given empty vehicle management strategy was conceived as a combination of three different factors and the way in which each was to be implemented for a given test. Each factor was actually implemented in either one of two ways, and from an experimental viewpoint these alternatives were viewed as levels of the respective factor, or substrategies. Therefore, the results are expressed as the outcome of a 2 to the third power factorial fixed-effects experiment. (Author)

A77-46700 **Cost-sharing approach for air quality control implementation - A case study.** Y. Y. Haimes (Case-Western-Reserve University, Cleveland, Ohio), W. S. Nainis (Arthur D. Little, Inc., Cambridge, Mass.), and S. Goldstone (Energy Commission, Energy Assessment Div., Sacramento, Calif.). *Journal of Environmental Economics and Management*, vol. 4, Sept. 1977, p. 219-238. 20 refs.

A program of cost-sharing among industries within an airshed is proposed to aid in the implementation of the U.S. Clean Air Act as amended in 1970. In particular, the cost-sharing approach addresses the problem of meeting federal standards for sulfur dioxides and particulate levels in the ambient air. The proposal is applied to an industrialized county in Ohio; even without the availability of devices such as wet scrubbers or limestone injectors to desulfurize emissions, it was found that a cost-sharing scheme could provide, at significantly lower capital costs, county-wide sulfur dioxide and particulate removal efficiencies comparable to those obtained through individual plant control plans. The possible role of local and state agencies in promoting cost-sharing air pollution control plans is also discussed. J.M.B.

A77-46739 **Design to cost; Proceedings of the Conference, San Francisco, Calif., October 13-15, 1976.** Conference sponsored by the American Institute of Industrial Engineers. Edited by D. T. Newman (Management Education Corp., Santa Monica, Calif.). Santa Monica, Calif., Management Education Corp., 1976. 560 p. $50.

Attention is given to the implementation of design to cost (the Tomahawk Cruise Missile Project, the Lightweight Doppler Navigation System, the Defense Satellite Communications System, etc.) and to design-to-cost requirements and objectives. Life cycle costing with reference to weapon system acquisition is considered along with contractual source selection in DOD systems and parametric cost models. B.J.

A77-46740 **Design-to-cost - A major parameter in the acquisition process.** R. G. Freeman, III (U.S. Naval Weapons Center, China Lake, Calif.). In: Design to cost; Proceedings of the Conference, San Francisco, Calif., October 13-15, 1976. Santa Monica, Calif., Management Education Corp., 1976, p. 107, 108A-108G.

A methodology for conducting a rational hardware definition process which would better accommodate the introduction of design-to-cost criteria early in the weapon system acquisition process is described. It is proposed that design-to-cost is an essential objective in the development of a new system, if adherence to design-to-cost criteria assists in achieving acceptable life cycle costs. B.J.

A77-46742 **Avoiding design to cost roadblocks.** G. W. Talbot (Motorola, Inc., Scottsdale, Ariz.). In: Design to cost; Proceedings of the Conference, San Francisco, Calif., October 13-15, 1976. Santa Monica, Calif., Management Education Corp., 1976, p. 191, 193-207.

Attention is given to the following design-to-cost roadblocks: design-to-cost requirements placed in the contract, tradeoffs over the various requirements (weight, shock, vibrations, schedule, sensitivity, etc.), tradeoff with all the functional and environmental requirements, and price accuracy. The starting point to overcoming these roadblocks is getting the design-to-cost requirements in the design specification, so that design-to-cost responsibility is assigned where it belongs - in both the buying and selling organization in the engineering departments. B.J.

A77-46743 Obstacles to effective cost reduction on DOD programs. R. Kendall (Motorola, Inc., Arlington, Va.). In: Design to cost; Proceedings of the Conference, San Francisco, Calif., October 13-15, 1976. Santa Monica, Calif., Management Education Corp., 1976, p. 209, 211-216.

A draft of recommendations for improvements in DOD programs is presented, relating to 'color of money' restrictions and the attainment of significant cost reductions. Progress made in reducing costs since the implementation of design-to-cost programs is reviewed. B.J.

A77-46744 Management aid - Systematic Adjustment of Funds and Schedules /SAFS/. J. Ludick (Teledyne Brown Engineering, Huntsville, Ala.). In: Design to cost; Proceedings of the Conference, San Francisco, Calif., October 13-15, 1976. Santa Monica, Calif., Management Education Corp., 1976, p. 583, 585-592.

SAFS is a computer program designed for systematically adjusting schedules and funds by emulating the optimum predetermined pattern. The rationale which underlies SAFS is that a best-fit curve can be found that will adequately represent the profile of the direct task-related costs over time. New schedule or cost changes cause a reapportionment of the area under the curve which projects new time and cost data. B.J.

A77-46745 PRICE - A cost-predicting model. F. R. Freiman (RCA, Government and Commercial Systems, Moorestown, N.J.). In: Design to cost; Proceedings of the Conference, San Francisco, Calif., October 13-15, 1976. Santa Monica, Calif., Management Education Corp., 1976, p. 593, 595-602.

PRICE (Programmed Review of Information for Costing and Evaluation), a parametric cost modeling technique, is a computerized methodology which provides reliable estimates of system acquisition costs (development and production) during the conceptual phase of a program. It can accommodate variations in designs, performance schedules, reliability, economic escalations and other variables, and provides cost estimates based on the physical description of the device or system to be built and the schedule for design and build. B.J.

A77-46746 DOD progress in design to cost. J. J. Bennett (U.S. Department of Defense, Office of the Assistant Secretary of Defense, Washington, D.C.). In: Design to cost; Proceedings of the Conference, San Francisco, Calif., October 13-15, 1976. Santa Monica, Calif., Management Education Corp., 1976, p. 607, 609-618.

The management environment in which DOD currently operates is discussed together with the role of design to cost in this environment. The viability of design to cost as a management approach and probable future trends and new initiatives in the field are also considered. B.J.

A77-46785 International Federation of Operational Research Societies, Airline Group, Symposium, 16th, Key Biscayne, Fla., September 26-October 1, 1976, Proceedings. Miami, Fla., International Federation of Operational Research Societies, Airline Group, 1976. 558 p. $40.

The application of operations research to such problems of airline management as control of airport congestion, fleet planning, schedule elaboration and seat allocation, aircraft maintenance programs, fuel optimization, flight crew, cabin crew and reservations personnel management and procurement cost allocation, is discussed. Topics of the papers include the reduction of airport congestion by use of optimal runway configurations, an algorithm for planning short-haul aircraft fleets, the application to scheduling of a stochastic model of transportation demand, the management of spare-part inventories, a simulation of an aircraft maintenance program, short- and long-term fuel allocation planning, staffing of reservation and maintenance facilities, recruiting and training of pilots and development of cabin attendant work schedules. J.M.B.

A77-46902 # Creating corporate incentives to promote creativity. E. J. Nunlist (Pfaudler Co., Rochester, N.Y.). *American Society of Mechanical Engineers, Design Engineering Conference and Show, Chicago, Ill., May 9-12, 1977, Paper 77-DE-5.* 10 p. 13 refs. Members, $1.50; nonmembers, $3.00.

There is ample evidence that the United States is gradually losing its technological dominance in many fields. Since the government and large corporations do the lion's share of R&D, their operations are scrutinized. Indications are that large corporations could be more productive with inventions and innovations, and the government is dampening the enthusiasm of the small operators. To achieve better progress, the employed inventor needs more motivation in big corporations, but best results could be achieved if business and the government would advocate and support a 'seeding' program that enables the proliferation of small, technology-improving enterprises. Their eventual acquisition by larger business establishments would make such operations 'sacrificial,' but the system would perpetuate their existence. (Author)

A77-46903 # Conflict management for engineers. R. F. Solberg, Jr. (Southwest Research Institute, San Antonio, Tex.). *American Society of Mechanical Engineers, Design Engineering Conference and Show, Chicago, Ill., May 9-12, 1977, Paper 77-DE-6.* 8 p. 14 refs. Members, $1.50; nonmembers, $3.00.

Attitudes about conflict have changed recently, and conflict between individuals, groups, and organizations is now considered inevitable. However, conflict can also be constructive, productive, and functional, or it can be destructive, harmful, and dysfunctional. Guides on recognizing the difference between these types of conflict and some causes of conflict are presented. Methods of managing conflict are presented with the problem-solving technique being offered as the most effective and desirable under most conditions. Skills can be developed - even for those in nonformal management positions, like many engineers - to effectively utilize the potential benefits of conflict. (Author)

A77-46904 # Design-to-cost in action. R. L. Bidwell (U.S. Department of Defense, Product Engineering Services Office, Alexandria, Va.). *American Society of Mechanical Engineers, Design Engineering Conference and Show, Chicago, Ill., May 9-12, 1977, Paper 77-DE-9.* 8 p. Members, $1.50; nonmembers, $3.00.

The design-to-cost management philosophy instituted by the U.S. Department of Defense to analyze and control cost overruns incurred by contractors is discussed. Case histories involving successes and failures in obtaining adequate product cost estimates from defense contractors and subcontractors during the design phase are given, and a detailed set of criteria for evaluating the acceptability of a contractor's design-to-cost program is provided. Emphasis is placed on identifying and controlling the most costly elements in a design, incorporating production and support costs into design-phase estimates and expressing costs in terms of man-hours of production and material costs. J.M.B.

A77-46908 # Establishing concrete R&D payback criteria to increase cost effectiveness of R&D operations. S. A. Spachner (Gulf and Western Advanced Development and Engineering Center, Swarthmore, Pa.). *American Society of Mechanical Engineers, Design*

Engineering Conference and Show, Chicago, Ill., May 9-12, 1977, Paper 77-DE-25. 4 p. Members, $1.50; nonmembers, $3.00.

In this paper, consideration will be given to the establishment of R&D goals and to examples of R&D payback criteria. Since industrial R&D organizations generally are concerned with new product development and improved process and equipment development for production of existing products, payback criteria will be considered for activity in these areas. (Author)

A77-47212 The MITRE Solid Waste Management Planning Model - A status report. E. B. Berman and W. M. Stein (Mitre Corp., Bedford, Mass.). In: Energy from solid waste utilization; Proceedings of the Sixth Annual Northeastern Regional Antipollution Conference on a New Source of Materials, Energy and Jobs - Solid Wastes Processing, Kingston, R.I., July 8, 9, 1975.
Westport, Conn., Technomic Publishing Co., Inc., 1976, p. 95-135. 5 refs. Research supported by the U.S. Environmental Protection Agency.

The paper describes an optimizing model and the setting which it serves for regional solid waste management planning, consisting basically of a spatial analysis, using fixed-charge linear programming to identify minimum cost alternatives in regional planning of solid waste management systems with resource recovery. The model and its use are described in terms of structure, cost, and procedure. Applications in Massachusetts, St. Louis, and Massachusetts/New Hampshire regions are discussed in full; several maps, graphs, and tables are provided. S.C.S.

A77-47457 Concepts in orthophoto machines and their economics. J. Höhle and P. B. Stewardson (Wild Heerbrugg, Ltd., Heerbrugg, Switzerland). In: American Society of Photogrammetry and American Congress on Surveying and Mapping, Fall Convention, Seattle, Wash., September 28-October 1, 1976, Proceedings.
Falls Church, Va., American Society of Photogrammetry, 1976, p. 538-552. 14 refs.

The costs and performance of on-line and off-line orthophoto machines are compared. For the typical task involving exposure in the final map scale, a cost/value analysis suggests that the OR 1 off-line printer is more economical than the A 8/PPO 8 machine if it is assumed that two scanning units are required. Although the latter machine can produce orthophotos within one or one-and-a-half hours in a production environment, the image quality of the OR 1 off-line printer is better because image defects resulting from slope in the terrain or scanning errors by the operator can be avoided. Additional production methods increasing the usefulness of the digitally controlled OR 1 are described. M.L.

A77-47647 International airlines and public interests: An overview - 1977. R. M. Jackson (Seabord World Airlines, Inc., Jamaica, N.Y.). *Chartered Institute of Transport Journal,* vol. 39, Mar. 1977, p. 251-255.

A review of the problems facing the international air transport industry, with special mention of problems regarding all-cargo airlines is presented. National issues are discussed, such as governmental interference and regulations imposed on taxation, zoning, pollution and safety. The conflict of objectives between nations, and their impact on the airline industry is discussed, including the U.S.-U.K. bilateral agreement on dollar-pound conversion rates. The need for all-cargo airlines is analyzed, and various industry malpractices are identified. S.C.S.

A77-48450 Parts coding cuts costs. V. F. Bobrowicz (Manufacturing Data Systems, Inc., Ann Arbor, Mich.). *Machine Design,* vol. 49, Sept. 22, 1977, p. 82-86.

Parts classification and coding, using a computer in possible conjunction with a microfilm system, is suggested as a means to organize graphics, drawings, and other engineering documents. A combination of a hierarchic and a polycode system is usually the most applicable for engineering purposes as the hierarchic concept separates parts into major shape characteristics, and the polycode system classifies secondary characteristics. The implementation of such a system is discussed in terms of sorting documents into standard categories, designing the classification and coding system, and training analysts. Applications of part classification and coding systems are presented, such as (1) cost comparison by means of reviewing the history of existing parts being manufactured, (2) design data retrieval for large collections of drawings, (3) product standardization based on analyses of design characteristics, and (4) value analysis, contrasting cost information to parts classification. S.C.S.

A77-48573 Organizational climate changes in the project life cycle. S. E. Barndt (USAF, Institute of Technology, Wright-Patterson AFB, Ohio), J. C. Larsen (USAF, Tactical Air Command, Eglin AFB, Fla.), and P. J. Ruppert (USAF, Systems Command, Washington, D.C.). *Research Management,* vol. 20, Sept. 1977, p. 33-36. 15 refs.

The working environment as perceived by personnel involved in U.S. Air Force hardware acquisition programs is analyzed. Principal phases of the typical acquisition program, including concept identification, full-scale development and production/deployment, are defined; management systems, such as those characterized by exploitative-authoritative, benevolent-authoritative, consultative and participative organizations are also described. A survey of personnel involved in various phases of development programs was conducted. Results indicated that the concept-identification stage was perceived in the most positive light, followed by the production/deployment phase, and lastly the full-scale development stage. J.M.B.

A77-48574 Uses and benefits of technical information systems. F. W. Wolek (U.S. Department of Commerce, Office of the Assistant Secretary for Science and Technology, Washington, D.C.). *Research Management,* vol. 20, Sept. 1977, p. 37-41. 11 refs. NSF Grant No. DS-176-21055.

The use of scientific and technical information systems in industrial research and development programs is discussed. Surveys of commercially available technical information systems, the usefulness of data indexing and the efficiency of data searches, due to such innovations as microfilm, are considered. The integration of information libraries into the daily research and development processes is described; the importance of literature searches in generating development proposals is assessed. Data storage and retrieval systems are also suggested as a means for determining the availability of patents and licences and for maintaining compliance with governmental regulations. In addition, the costs of operating scientific and technical information systems are mentioned. J.M.B.

A77-48679 The use of decision table logic in a manufacturing system. D. A. Milner (Aston, University, Birmingham, England). *International Journal of Production Research,* vol. 15, Jan. 1977, p. 17-26. 5 refs.

Decision tables provide a graphical representation of complex procedures in a way that is easy to visualize and understand. The work required to define the system, develop and programme the solution and to provide the often neglected documentation can be incorporated in a tabular form so that all elements of decision taking are precisely defined. The tables present the relationships among the interfacing variables clearly and show the necessary sequences of conditions and actions in a simple manner. The writing and development of decision tables for implementation in a manufacturing system is indicated here giving details of appropriate checking procedures and constraint boundaries. (Author)

A77-48680 Forecasting of critical materials flow - Managerial decisions utilizing sequential methodology. M. S. Parks, J. M. Mogg, and W. B. Lee (Houston, University, Houston, Tex.). *International Journal of Production Research,* vol. 15, Jan. 1977, p. 27-36. 7 refs.

This paper addresses a significant problem in the management of production logistics systems: the influence of quality control activities on production scheduling. A sequential three-way classification decision model is presented for rapidly identifying trends in vendor lot quality. The effectiveness of this decision model is illustrated using a simulation model of a material and information flow system. The results show significant cost savings using this approach rather than the more traditional and passive methods of control over vendor quality. (Author)

A77-49066 The financial incentives for the fabrication of improved absorption coatings for the flat plate collector. F. de Winter (Atlas Corp., Santa Clara, Calif.) and L. D. Fitzgerald (International Copper Research Association, Inc., New York, N.Y.). In: Sharing the sun: Solar technology in the seventies; Proceedings of the Joint Conference, Winnipeg, Canada, August 15-20, 1976. Volume 6. Cape Canaveral, Fla., International Solar Energy Society, 1976, p. 216-239. 27 refs.

A77-49121 Daedalophobia - Diagnosis and prognosis. H. D. Foster and W. R. D. Sewell (Victoria, University, Victoria, British Columbia, Canada). In: Sharing the sun: Solar technology in the seventies; Proceedings of the Joint Conference, Winnipeg, Canada, August 15-20, 1976. Volume 9. Cape Canaveral, Fla., International Solar Energy Society, 1976, p. 83-90. 11 refs.

Difficulties associated with the adoption of solar space heating systems in Canada are considered. The funding levels for government-sponsored research and development of solar heating systems in Canada are found to be inadequate; a lack of capital investment in the building materials industries is also noted. Nonuniform building codes in Canadian localities are cited as having a detrimental effect on the introduction of solar space heating systems. Dissemination of information on the cost and effectiveness of solar heating systems is discussed. J.M.B.

A77-49648 US Army TMDE Program and investigation of a family of Automatic Test Support Systems /ATSS/. C. G. Adenauer (U.S. Army, Logistics Center, Fort Lee, Va.) and P. T. Smith (U.S. Army, Maintenance Management Center, Lexington, Ky.). In: AUTOTESTCON '76; Proceedings of the Symposium, Arlington, Tex., November 10-12, 1976. New York, Institute of Electrical and Electronics Engineers, Inc., 1976, p. 166-171.

A77-49799 * Overcoming people problems in the switch to automated composition. D. K. Korbuly (California Institute of Technology, Jet Propulsion Laboratory, Technical Information and Documentation Div., Pasadena, Calif.). *(Institute of Electrical and Electronics Engineers, Conference on Scientific Journals, 3rd, Reston, Va., May 2-4, 1977.) IEEE Transactions on Professional Communication,* vol. PC-20, Sept. 1977, p. 58-61. Contract No. NAS7-100.

A77-49800 Information dissemination - A systems viewpoint. N. A. Bhagat (National Enquiry into Scholarly Communication, Princeton, N.J.). *(Institute of Electrical and Electronics Engineers, Conference on Scientific Journals, 3rd, Reston, Va., May 2-4, 1977.) IEEE Transactions on Professional Communication,* vol. PC-20, Sept. 1977, p. 76-79.

The impact of current market conditions, costs of publishing processes/materials/services, and restriction of library budgets on publishers, libraries, and user-scholars is assessed, within a 'systemic framework,' and trends in the immediate future are projected. Approaches to minimizing the total of all costs incurred at each link of the author-publisher-library-user chain are considered. With intensified publish-or-perish pressures extending to smaller colleges and institutions, an increase in supply of manuscripts accompanied by shrinking sales markets is envisaged. New functions for libraries with respect to users, and possibilities in interlibrary loans, are discussed. R.D.V.

A77-49801 Data base publishing at NTIS. J. G. Coyne (U.S. Department of Commerce, National Technical Information Service, Springfield, Va.). *(Institute of Electrical and Electronics Engineers, Conference on Scientific Journals, 3rd, Reston, Va., May 2-4, 1977.) IEEE Transactions on Professional Communication,* vol. PC-20, Sept. 1977, p. 94, 95.

The National Technical Information Service is the central source for the public sale of Government-sponsored research, development, and engineering reports and other analyses prepared by Federal agencies, their contractors, and grantees. Current summaries of these reports are published by NTIS in over 30 newsletters, catalogs, and journals. The system used to organize these summaries permits NTIS to create a number of useful information products from a single machine-readable data file. The presentation covers the range of products made available and some of the techniques that are used and that may be applicable to other publishers. (Author)

A77-49802 Marketing mix for publishing profit. J. A. Memmolo (American Institute of Aeronautics and Astronautics, Inc., New York, N.Y.). *(Institute of Electrical and Electronics Engineers, Conference on Scientific Journals, 3rd, Reston, Va., May 2-4, 1977.) IEEE Transactions on Professional Communication,* vol. PC-20, Sept. 1977, p. 117-120.

With the spiraling costs of printing and book manufacturing, and high overhead factors, many societies have discovered net losing operations in publications even with the assistance of page charges and other support. Discussed in this paper is the marketing mix - what activities societies should implement to make publications a profitable operation and become a major contribution to society income. (Author)

A77-50298 Transportation economics and public policy: With urban extensions. A. Abouchar (Toronto, University, Toronto, Canada). New York, Wiley-Interscience, 1977. 337 p. 112 refs. $17.95.

The book seeks to integrate the three main aspects of public sector transportation analysis and decision making - pricing theory and policy, cost theory and measurement, and investment choice - and to develop policy guidelines on the basis of welfare maximizing principles and real world complexities and constraints. Topics include theories of public expenditure, justification for less-than-full-cost pricing, and the theory of marginal cost and optimal price and financing policy. Other topics include road transport costs, railroad costs, shadow prices, and using cost analysis to evaluate pricing policies and traffic allocation. Additional topics include investment criteria for the private sector, the form of the public sector criterion, the measurements of benefits, and project decisions with physical criteria. Several problems in urban economic analysis, including the theory of congestion and congestion optimization, and decision rules for urban projects and the interpretation of property value change, are discussed. M.L.

A77-50451 Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Symposium sponsored by IEEE, AIAA, ASME, ASQC, IES, SOLE, and SSS. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977. 531 p. $24.

The papers collected in this volume deal with new reliability models and techniques as applied to parts reliability, human reliability, consumer products, system safety, nuclear power, and aerospace systems. Also included are papers on statistical test design and evaluation, reliability improvement warranties, and design to cost. P.T.H.

A77-50455 **A model for an estimation of the product warranty return rate.** K. W. Yun and F. E. Kalivoda (Copeland Corp., Sidney, Ohio). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 31-37.

Effective cost control requires an accurate understanding of product failure costs. Expensively gathered failure data often, however, cannot be utilized effectively because of possible inaccuracies. This paper develops a simple model for estimating realistic warranty return levels corrected for human errors in the determination of product failures and the various constraints imposed by operational procedures in warranty administration. An application of the model is illustrated. An experimental determination of probabilistic information in analyzing warranty return product is also suggested, as well as a method of setting upper and lower limits of the probability values from warranty return data. (Author)

A77-50456 **Reliability, availability, maintainability/logistics /RAM/LOG/.** L. L. Bishop, T. A. Cronogue, R. Hoffman, D. Reside, G. Donald, and R. Flynn (U.S. Army, Aviation Systems Command, St. Louis, Mo.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 49-68.

The paper covers various aspects of the reliability, availability, maintainability/logistics (RAM/LOG) methodology of the U.S. Army Aviation for development aircraft. RAM/LOG data acquisition, processing and computation, and assessment are described. P.T.H.

A77-50457 **Consumer demand results in development of a reliability standard.** A. H. Murphy (Lockheed Missiles and Space Co., Inc., Sunnyvale, Calif.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 74-77.

In order to enable a producer to assure himself and the consumer that all possible actions have been taken to meet new government regulations on product quality and advertising claims, a standardized reliability program is outlined. The reliability standard proposed is a minimum specification. Prediction and demonstration are coupled. P.T.H.

A77-50459 **Using pattern recognition in product assurance.** R. A. Hughes (Lockheed Missiles and Space Co., Inc., Sunnyvale, Calif.), M. A. Fischler, and H. E. Rauch (Lockheed Research Laboratories, Palo Alto, Calif.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 101-107. 8 refs.

This paper shows how pattern recognition techniques can lead to the solution of problems in product assurance which did not appear to be open to solution using only conventional statistical or mathematical approaches. The techniques described here include conventional statistical analysis as well as discrimination or classification (Fisher linear discriminant), hypothesis generation (minimum spanning tree clustering and centroid clustering), data display (two-dimensional projection), and data base handling and interactive graphics. This paper presents an overview of methods and experience gained in using the above combination of techniques for exploratory data analysis, decision making, and monitoring of manufacturing processes in problems involving product assurance and quality control. (Author)

A77-50461 **Failure modes and effects analysis by matrix method.** G. L. Barbour (Aeronutronic Ford Corp., Palo Alto, Calif.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 114-119.

A matrix method for analyzing failure modes and effects has been developed that supplements the standard narrative-tabular and fault tree methods. The new method uses condensed graphic displays of vertical and horizontal lines so that failure effects on the highest system level can be traced down through subsystem and lower equipment levels to the contributing piece part failure modes. In addition to this traceability feature, this approach provides more effective accountability of such items as piece parts, interface connector pins, circuit solder joints, and wiring. This capability becomes invaluable in identifying single point failure modes, that is, single failures that can cause catastrophic loss or major degradation of system performance. The matrix method of analysis can also be used for safety hazard analyses, for determining test and telemetry failure detectability, and for preparing maintenance malfunction location charts. (Author)

A77-50462 **The life cycle cost impacts of unsafe designs.** R. L. Weber (USAF, Inspection and Safety Center, Norton AFB, Calif.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 120-123.

The paper outlines how accident costs can be incorporated into life cycle cost estimates. The problem of analyzing costs due to accidents and combining them with operating and servicing costs is discussed. P.T.H.

A77-50464 * **Space transportation system payload safety policy.** J. A. Scheller (NASA, Washington, D.C.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 130-133.

A brief description of the Space Transportation System (STS) is given, and the evolution of a payload safety policy for it is described. The policy adopted in June, 1976, minimizes STS involvement in the payload design process while maintaining the assurance of a safe operation. The payload developer is responsible for assurance of safety and verification of compliance with the requirements. The STS will exercise reviews to ensure that interaction between payloads does not create hazards. P.T.H.

A77-50469 **Optimization of structural design/analysis/testing.** R. E. Maxwell and C. W. Johnson (Hercules, Inc., Magna, Utah). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 175-180. 9 refs.

A technique has been developed to design, analyze, test, and set up a production quality assurance program for a given set of primary failure modes which gives the required performance and structural reliability at a near minimum overall cost. New and established methods are blended in a unique way to give a powerful and practical system to meet contractual requirements and minimize cost. The system is illustrated by application to an aluminum structure. (Author)

A77-50470 **Reliability growth curves for one shot devices.** A. J. Bonis (Rochester Institute of Technology, Rochester, N.Y.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 181-185. 6 refs.

A simple and practical procedure for plotting reliability growth curves for one shot devices is described. These are tested in stages of development. The results of each stage of testing are used to improve

the item prior to testing in the next stage. A steady improvement effort is assumed. The model presented (The Modified Exponential Growth Curve) can be used before testing to plan the test program. After testing, the model will permit measuring and predicting reliability. The model should lead to a valuable planning system for new programs. (Author)

A77-50472 Statistical design of R/M experiments. C. H. McCall, Jr. (CACI, Inc., Los Angeles, Calif.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 194-197. 5 refs.

In this paper, the basic concepts of experimental design, from a statistical viewpoint, will be summarized. Primary emphasis is on terminology and philosophy. Following this introduction, the concepts will be related directly to potential requirements in R/M testing. No examples are worked out in detail, but rather are utilized to reenforce the introductory experimental design concepts. (Author)

A77-50473 Planning statistical experimental designs in R & M applications. G. R. Herd (Bird Engineering Research Associates, Inc., Vienna, Va.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 198-202.

The paper discusses the planning of tests using statistical design of experiments in reliability and maintainability applications, emphasizing the practical issues involved in the engineering situation regardless of the type of experimental design employed, the type of hardware system, or the operational environment within which the experiment is to be conducted. Three distinct aspects of experimental design planning are addressed: (1) the physical system and its inherent technical characteristics, (2) the statistical requirements involving randomization, isolation of sources of variation and data analysis, and (3) the organization and management aspects of the test program. B.J.

A77-50476 Mutual development, application and control of suppliers warranties. W. W. Flottman (American Airlines, Inc., New York, N.Y.) and M. R. Worstell (Litton Industries, Aero Products Div., Woodland Hills, Calif.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 213-221.

A warranty is defined from the points of view of the airline and the supplier and reasons for its necessity are discussed. Also considered are the elements of a warranty, factors to be considered when specifying elements of a warranty, and improvements that can be made in reference to warranties. A copy of a typical warranty claim is presented and some practical applications are illustrated. B.J.

A77-50477 Reliability improvement warranty techniques and applications. C. A. Hardy and R. J. Allen (General Dynamics Corp., Fort Worth, Tex.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 222-228.

Incentives provided by the Air Force to contractors of new systems to design and produce electronic equipment with low failure rates and low repair costs in operational use are included in the procurement contracts as Reliability Improvement Warranty (RIW) provisions. These provisions obligate the contractor to accomplish repair and replacement of failed equipment at a fixed price during operational use of the equipment by the Air Force, and to guarantee the MTBF of the equipment during the warranty period. This paper defines the RIW concept and discusses it in reference to F-16 development. B.J.

A77-50478 Quantitative models used in the RIW decision process. R. K. Gates, R. S. Bicknell, and J. E. Bortz (Analytic Sciences Corp., Reading, Mass.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 229-236. 9 refs.

Recognition is being given to the potential value of the Reliability Improvement Warranty (RIW) provision in acquiring reliable military equipment and controlling life cycle cost. The decisions that must be made in conjunction with RIW implementation, both by the government and the contractor, are identified and quantitative models for the decision maker are presented. A case study is included to illustrate the decision processes leading up to contract award. (Author)

A77-50479 Reliability Improvement Warranty /RIW/ and the Army Lightweight Doppler Navigation System /LDNS/. R. Kowalski (ARINC Research Corp., Annapolis, Md.) and R. White (U.S. Army, Fort Monmouth, N.J.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 237-241. 7 refs.

The Army NAVCON Project Office has issued solicitations for low rate initial production (LRIP) of the Lightweight Doppler Navigation System to two engineering development contractors. The solicitation contains an option for a Reliability Improvement Warranty (RIW) as an alternative to in-service maintenance over the initial years of LDNS deployment. The paper describes NAVCON's management approach in developing the RIW terms and conditions for LRIP. Attention is given to the warranty period, exclusions, unverified failures, pipeline flow, operating-hour adjustment and government obligations. B.J.

A77-50481 Optimum test samples for reliability improvement. E. Boyle (Lockheed Missiles and Space Co., Inc., Sunnyvale, Calif.) and L. Stewart (Lockheed Research Laboratories, Palo Alto, Calif.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 248-251.

Formulas are derived and discussed which provide optimum sample sizes for discovering failure mechanisms. Two cases are considered: (1) the sample size for a single hardware component is determined to obtain an optimal balance between expected improvement in reliability and test cost; and (2) the sample sizes are determined for all hardware components which comprise a system such that the expected improvement in reliability of the system is maximized for a given fixed total test budget. (Author)

A77-50482 A cost effective approach to weapon acceptance. J. M. Perkins and E. E. Leach (U.S. Navy, Pacific Missile Test Center, Point Mugu, Calif.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 252-256.

The paper reviews the development of production acceptance testing of Navy guided weapon systems at the Pacific Missile Test Center since 1959. The development of the acceptance process for air-launched weapons is used to illustrate how technological improvements in the test process can balance increasing costs. A flight test simulation facility was completed that allows the measurement of weapon reliability under environmental conditions that simulate the fleet operating environment. The results are integrated with results obtained from flight and ground tests to provide a balanced program that has proven to be effective in assessing production quality. B.J.

A77-50483 RIW experience at ECOM. R. A. Mlinarchik (U.S. Army, Systems Analysis Office, Fort Monmouth, N.J.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa.,

January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 257-260.

The paper reviews the RIW (Reliability Improvement Warranty) experience at the Army Electronic Command (ECOM) with two RIW programs - CONUS NAV and the Absolute Altimeter. The RIW requirements for the two programs are examined with emphasis on warranty period, exclusions, operating-time adjustments and MTBF guarantee. B.J.

A77-50484 Warranty contract impact on product liability. W. J. Bonner (Litton Industries, Inc., Guidance and Control Systems Div., Woodland Hills, Calif.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 261-263.

The paper examines warranty contract provisions and addresses the question whether a contractor's risks under present product liability law are increased by virtue of his producing equipment under a Reliability Improvement or similar warranty contract. Consideration is given only to manufacturer's liability for injury caused by a defect in his product. The effects of the warranty on basic liability, the burden of proof and the likelihood of suit are discussed. B.J.

A77-50487 A reliability control tool during manufacturing. H. D. Rue (Hughes Aircraft Co., Culver City, Calif.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 275-280.

The figure-of-merit methodology of reliability control is based on the notion that catastrophic and sudden failures occur during manufacturing due to initial weakness or defects. As these failures are corrected, a decreasing failure rate is usually experienced. This paper reviews figure-of-merit methodology and presents a quality-control model incorporating comparison factor representing unit failures, system failures, product testing efficiency and manufacturing processes and workmanship controls. The model is applied to the example of an avionics system composed of 22 units. B.J.

A77-50488 Effectiveness of reliability system testing on quality and reliability. J. B. Hovis (Westinghouse Electric Corp., Baltimore, Md.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 281-285.

This paper presents a reliability approach to a program for a high reliability airborne search and track combat radar which was based on three successful approaches evolved at Westinghouse Defense and Electronic Systems Center. The reliability program plan implemented for this radar equipment was designed to produce a system which would perform in a flyoff test better than a predetermined mean-time-between-failure (MTBF). The basis of this approach was basically that used in the successful Electro-Optical system known as the B-52 Steerable TV (AN/AVQ-22) which achieved a field MTBF approximately equal to the predicted value and demonstrated in a Mil-Std-781 test a greater MTBF than the required value. It is felt that the principles described herein could be applied to any program to achieve the desired results in field usage. (Author)

A77-50489 Predicting the cost impact of system improvements. R. L. Morris (Hughes Aircraft Co., Canoga Park, Calif.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 286-289.

The paper describes a study undertaken to find one or more elements in proposed system improvements, which elements can be used to predict the life cycle costs of these improvements. A body of Engineering Change Proposals (ECPs), relating to the performance of a fire control system and associated test equipment, was used as the source data. The ECPs were broken down into samples according to subsystem in which the change was to be located, purpose of change, or a combination of these two factors. For the sample and each subsample, relationships were sought between costs and parts and/or Integrated Logistics Support elements. Existing computer routines were used to perform correlation, regression and evaluation computations, and equations were found which could predict some cost element based on hardware or logistics elements. B.J.

A77-50490 * Shuttle payload minimum cost vibroacoustic tests. C. V. Stahle, H. R. Gongloff (General Electric Co., Space Div., Philadelphia, Pa,), J. P. Young, and W. B. Keegan (NASA, Goddard Space Flight Center, Greenbelt, Md.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 290-296.

This paper is directed toward the development of the methodology needed to evaluate cost effective vibroacoustic test plans for Shuttle Spacelab payloads. Statistical decision theory is used to quantitatively evaluate seven alternate test plans by deriving optimum test levels and the expected cost for each multiple mission payload considered. The results indicate that minimum costs can vary by as much as $6 million for the various test plans. The lowest cost approach eliminates component testing and maintains flight vibration reliability by performing subassembly tests at a relatively high acoustic level. Test plans using system testing or combinations of component and assembly level testing are attractive alternatives. Component testing alone is shown not to be cost effective. (Author)

A77-50491 A support system life cycle cost model. C. Brook and R. Barasia (Bell Northern Research, Ottawa, Canada). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 297-302. 5 refs.

A feasibility study, under contract to the Canadian Department of National Defence, to establish management guidelines for the evaluation of Automatic Test Systems (ATS) requirements has been completed. This paper presents an overview of these guidelines, and discusses a case study which was performed to demonstrate the applicability of the recommended procedures. A graph is presented which shows the relationship between the prime system availability, and the support system life cycle costs. (Author)

A77-50492 Weapon system parametric life cycle cost analysis. H. W. Wynholds and J. P. Skratt (ECON, Inc., San Jose, Calif.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 303-309. 10 refs.

A general approach to parametric life-cycle cost analysis is described in this paper. Foundation of the methodology is a three-dimensional work breakdown structure (program elements, subdivisions of work, and life-cycle program phases). The other important ingredient is a set of parametric cost estimating relationships. Adaptation as an interactive computer model with automated data input and selective output is also discussed. (Author)

A77-50493 SPRINT missile subsystem reliability achievements. A. R. Clark (Martin Marietta Aerospace, Orlando, Fla.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 367-371.

The reliability of the SPRINT subsystem is discussed with emphasis on launch and flight performance and long term storage survivability. The following techniques were used to achieve the reliability objectives: (1) use of high reliability parts, (2) use of one-shot device redundancy, (3) derating, (4) testability, (5) production environmental testing, (6) lot sampling, dissection analysis and storage, (7) certified lines, (8) clean room assembly area, (9) reliability growth test, (10) preflight management review and inspection, (11) no change policy between R & D and production, (12) production line sampling and environmental test, and (13) overstress qualification testing. B.J.

A77-50495 A reliability incentive based bid decision. C. A. Pell (Boeing Aerospace Co., Seattle, Wash.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 396-400.

The paper discusses a hypothetical program in which two satellites are to be used to perform a space mission and the contractor's fee is based on reliability performance incentive. Payment begins when the hardware produced has operated beyond some minimum lifetime and it ends at some maximum value. Since the satellite lifetimes are uncertain, the producer's payoff is a random variable, whose distribution depends on the design reliability of the hardware. A probabilistic decision approach provides the potential producer with a description of arrangements under which it is worthwhile to bid at all, and if the decision is made, what investment in design reliability is optimal for a given incentive rate. B.J.

A77-50498 How to get more mileage out of your data. R. H. Dudley, S. E. Van Vleck, R. J. Pooch (Lockheed Missiles and Space Co., Inc., Sunnyvale, Calif.), and T. R. Chow (ESL, Inc., Sunnyvale, Calif.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 414-420.

A statistical model and methodology is presented for using test data - either piece part, package, or system - as the data become available. The discussion is structured to answer two specific questions: (1) when is it judicious to combine data types and (2) how does one combine data types. Combining the results of statistical models with the results of engineering models to augment the limited sample size available for statistical models is addressed. Examples are provided to illustrate decisions of when and how to combine data from engineering models with statistical models. (Author)

A77-50500 Technical problem management. F. J. Kreuze (Xerox Corp., Rochester, N.Y.). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 427-431.

Technical problem management is a 'last ditch' reliability control technique which enables the tracking of problems through the identification, definition, resolution and verification phases in a systematic way. It provides a means for the technical program manager to coordinate the efforts of contributing groups and communicate necessary problem/fix related information to supporting agencies. It also assists in prioritization of problems and makes possible an evaluative process to refine analytical tools. B.J.

A77-50505 Some graphical methods for maintenance planning. B. Bergman (Saab-Scania AB, Linkoping, Sweden). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 467-471. 6 refs. Research supported by the Transport Research Delegation of Sweden.

The paper addresses the problem of determining a component-failure control strategy that balances the cost of replacements with the cost of failures and results in a minimum total long-run average cost per unit time. The approach suggested is the use of a simple graphical method of nonparametric age replacement policy. The method is based on data using the Total Time on Test plot (developed by Barlow and Campo, 1975) that employs a component lifetime model. The method may be generalized in some situations where information is available about the state of the unit under evalution to serve as a basis for the planning of maintenance 'on condition'. B.J.

A77-50510 Logistics planning simulation model for USAF spare engine management. H. J. Benet (Texas A & M University, College Station, Tex.) and C. H. Shipman (USAF, Wright-Patterson AFB, Ohio). In: Annual Reliability and Maintainability Symposium, Philadelphia, Pa., January 18-20, 1977, Proceedings. Piscataway, N.J., Institute of Electrical and Electronics Engineers, Inc., 1977, p. 500-505. 13 refs.

The simulation model described herein is designed to assist Air Force Logistics Planners in predicting future aircraft engine removals and evaluating the adequacy of spare engine supplies. Written in FORTRAN, the model will give quarterly predictions of both the mean and variance of removals and stockouts so that confidence limits may be set on the ability of the logistics system to support programmed flying requirements. (Author)

A77-50545 System availability and optimum spare units. M. Sasaki, S. Kaburaki, and S. Yanagi (National Defense Academy, Yokosuka, Japan). *IEEE Transactions on Reliability*, vol. R-26, Aug. 1977, p. 182-188. 8 refs.

The steady-state availability of a repairable system with cold standbys and nonzero replacement time is maximized under constraints of total cost and total weight. Likewise the cost can be minimized under constraints of steady-state availability and total weight. A new, more efficient algorithm is used for the constrained optimization. The problem is formulated as a nonlinear integer programming problem. Since the objective functions are monotone, it is easy to obtain optimal solutions. These new algorithms are natural extensions of the Lawler-Bell algorithm. Availability is adjusted by the number of spares allowed. Other measures of system goodness are considered, viz. failure rate, weight, price, mean repair time, mean repair cost, mean replacement time, and mean replacement cost of a unit. (Author)

A77-50546 Cost model for testing program based on nonhomogeneous Poisson failure model. J. Donelson, III (Institute for Defense Analyses, Arlington, Va.). *IEEE Transactions on Reliability*, vol. R-26, Aug. 1977, p. 189-194. 6 refs.

A model for the s-expected cost of a development testing program is presented in this paper. The total cost function consists of two terms. The first term is proportional to the duration of the testing program; the second term is a loss function that assesses additional costs for failure to meet reliability goals during the testing program. The reliability growth model assumes that failures during the program occur according to a nonhomogeneous Poisson process having a power-law rate. An example shows how the duration of the test program can be chosen to minimize s-expected total cost. (Author)

A77-50549 Optimum demonstration tests with grouped inspection data from an exponential distribution. W. Nelson (GE Research and Development Center, Schenectady, N.Y.). *IEEE Transactions on Reliability*, vol. R-26, Aug. 1977, p. 226-231.

Life test data from periodic inspection of test items consist of the number of items failing in each inspection period and are called

grouped data. This paper presents statistical methods for reliability measurement and demonstration from grouped data on items from an exponential life distribution. The maximum likelihood method is used to estimate mean life; tables are given for optimum inspection times. A new statistical (demonstration) test for mean life is locally most powerful and is simpler than the test based on the maximum likelihood estimate. Tables for this test are provided. These tests also apply to a Weibull distribution with known shape parameter. (Author)

A77-51228 Applying a system concept to R & D management. P. E. Love (Programmes Analysis Unit, Chilton, Oxon, England). *R & D Management*, vol. 7, Oct. 1976, p.9-13. 11 refs.

This paper attempts to show that a basic closed-loop system is the only rational precursor to methodology development for decision making. If this action reveals the genuine system parameters then the researcher may well be performing his most helpful service to the decision maker. (Author)

A77-51230 Innovation and productivity in R & D - Associated individual and organizational variables. M. J. Stahl (USAF, School of Engineering, Wright-Patterson AFB, Ohio) and J. A. Steger (Rensselaer Polytechnic Institute, Troy, N.Y.). *R & D Management*, vol. 7, Feb. 1977, p. 71-76. 22 refs.

The relationships of organizational variables with innovation and productivity of scientists and engineers in R & D laboratories were explored. Peer ratings of innovation (original and useful output) and productivity (quantity of output) were utilized as criteria. Information was obtained on 154 scientists/engineers in 35 work groups in three Air Force R & D laboratories. Significant relationships found between organizational variables and innovation and productivity included: rewards for innovation, communication on technical matters with other scientists/engineers within the work group, and an age-education demographic group of variables. Level of participation in goal setting and group leader's level of empathy were also consistently related to level of productivity. (Author)

A77-51231 Aspects of project control in R & D. R. D. Reader (British Gas Corp., Research and Development Div., London, England). *R & D Management*, vol. 7, Feb. 1977, p. 77-84.

This paper examines the concept of project control in the context of an R & D laboratory, and reviews some of the methods of presenting control or monitoring information that have been found of use by management for different types of work. The concepts described are those which the author has found of practical value in his own work, and which also figure in some R & D Management training courses within British Gas. (Author)

A77-51232 Introduction of a matrix structure into an R & D establishment. H. P. Gunz and A. W. Pearson (Manchester Business School, Manchester, England). *R & D Management*, vol. 7, June 1977, p. 173-181. 15 refs.

Matrix organization is increasingly being written about in terms which suggest that it is almost axiomatic that it is the best way of structuring an R & D lab. In this paper we wish to introduce a note of scepticism into the discussion, for the following reasons. Firstly, we suspect that not everyone has the same thing in mind when discussing matrix organizations. Secondly, we believe that there are many circumstances under which it clearly is not the best way of organizing, although there are plenty under which it is. Thirdly, we have seen in use many variants of the structure, suggesting to us that while there is an underlying, unifying concept at work, it needs to be much modified in most cases before it can succesfully be applied. Finally, any reorganizing is a hazardous business, and a change to matrix involves particular difficulties of its own which need highlighting. (Author)

A77-51233 Responsibility and authority in the matrix organization or is ambiguity a good thing. K. Knight (Brunel University, Uxbridge, Middx., England). *R & D Management*, vol. 7, June 1977, p. 183-186. 13 refs.

Ambiguous definition of roles in the matrix is sometimes advocated, but there is evidence that ambiguity can lead to stress and is often experienced as a major problem. A popular alternative is to define the responsibility of project managers without giving them any formal authority. For this to be workable the selection of project managers and the establishment of their function must ensure that they have other sources of effective power. But there is a third option, which is to define responsibility and authority in the matrix clearly and consistently. This approach reveals a range of choice in the authority to be given to project managers, and can be supplemented by the technique of responsibility charting. Finally, choices will need to be made and the paper sets out some of the relevant considerations to be taken into account. (Author)

A77-51283 Water resources planning and management goals. C. H. Gaum (U.S. Army, Corps of Engineers, Washington, D.C.). *(American Society of Civil Engineers, National Water Resources and Ocean Engineering Convention, San Diego, Calif., Apr. 5-8, 1976.) American Society of Civil Engineers, Water Resources Planning and Management Division, Journal*, vol. 103, May 1977, p. 73-82.

The basic difficulty concerning the solution of the various water resources problems is related to the limitations of funds which are available. Approaches for overcoming this difficulty are discussed. It is pointed out that water resources planning and management must be comprehensive in order to define what can be accomplished within the budget dollar available. Attention is given to a planning technique for federal projects, aspects of plan formulation, and the utilization of short cuts in methods. G.R.

A77-51387 Communication satellites for public service. F. W. Norwood (Joint Council on Educational Telecommunications, Washington, D.C.) and J. P. Witherspoon (Public Service Satellite Consortium, San Diego, Calif.). *International Astronautical Federation, International Astronautical Congress, 28th, Prague, Czechoslovakia, Sept. 25-Oct. 1, 1977, Paper 77-19.* 10 p.

The advantages of using communications satellites to deliver educational and health services to widely scattered locations are discussed. In particular, the adoption of high-power satellites and relatively simple ground stations is suggested as a means to provide inexpensive data links between communities isolated by terrain, climate or long distances. Furthermore, satellite communications networks may be quickly instituted and readily modified to include such capabilities as voice and data transmission in addition to television transmission. The application of satellite communications systems, including the Applications Technology Satellite-6 and the Communications Technology Satellite, to remote medical diagnoses, agricultural education programs and the delivery of public services is considered. J.M.B.

A77-51526 * Organizing for low cost space transportation. C. M. Lee (NASA, Washington, D.C.). *International Astronautical Federation, International Astronautical Congress, 28th, Prague, Czechoslovakia, Sept. 25-Oct. 1, 1977, Paper A-77-55.* 37 p.

The paper describes the management concepts and organizational structure NASA is establishing to operate the Space Transportation System. Policies which would encourage public and commercial organizations and private individuals to use the new STS are discussed, and design criteria for experiments, spacecraft, and other systems elements are considered. The design criteria are intented to facilitate cost reductions for space operations. NASA plans for the transition from currently used expendable launch vehicles to Shuttle use and Shuttle pricing policies are explained in detail. Hardware development is basically complete, management functions have been defined, pricing policies have been published, and procedures for user contact and services have been places into operation. M.L.

A77-51529 **Some aspects of economically-effective prediction for an optimal program of space system designing.** D. N. Shcheverov and V. N. Novikov (Academy of Sciences, Intercosmos Council, Moscow, USSR). *International Astronautical Federation, International Astronautical Congress, 28th, Prague, Czechoslovakia, Sept. 25-Oct. 1, 1977, Paper A-77-61.* 12 p. 7 refs.

A design system is presented for the financial management and resources distribution to be used in the development of a space program. It consists of a noncontour oriented graph of works with arcs representing reliability, time, measure, and effectiveness. Various stages of program planning are outlined, noting the change of reliability, and a model for reliability optimization is proposed.

S.C.S.

A77-51230 **Innovation and productivity in R & D - Associated individual and organizational variables.** M. J. Stahl (USAF, School of Engineering, Wright-Patterson AFB, Ohio) and J. A. Steger (Rensselaer Polytechnic Institute, Troy, N.Y.). *R & D Management,* vol. 7, Feb. 1977, p. 71-76. 22 refs.

The relationships of organizational variables with innovation and productivity of scientists and engineers in R & D laboratories were explored. Peer ratings of innovation (original and useful output) and productivity (quantity of output) were utilized as criteria. Information was obtained on 154 scientists/engineers in 35 work groups in three Air Force R & D laboratories. Significant relationships found between organizational variables and innovation and productivity included: rewards for innovation, communication on technical matters with other scientists/engineers within the work group, and an age-education demographic group of variables. Level of participation in goal setting and group leader's level of empathy were also consistently related to level of productivity. (Author)

STAR ENTRIES

N77-10109*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
AN APPROACH TO IMPROVE MANAGEMENT VISIBILITY WITHIN THE PROCUREMENT AND FINANCIAL GROUP AT GOLDSTONE
F. R. Maiocco and J. B. Rozek *In its* The Deep Space Network 15 Oct. 1976 p 171-179 ref

Avail: NTIS HC A10/MF A01 CSCL 05A

Improvements in the operational efficiency of the data management systems at the Goldstone Deep Space Communications Complex (GDSCC) are discussed. This addresses the existing procurement and financial management data system at GDSCC, identifies management requirements for better visibility, descrives a proposed computerized data management system, summarizes results to data, and identifies plans for future development.
Author

N77-10388# National Bureau of Standards, Washington, D.C.
METRICATION PROBLEMS IN THE CONSTRUCTION CODES AND STANDARDS SECTOR Final Report
Charles T. Mahaffrey Jun. 1976 28 p
(PB-253666/2; NBS-TN-915) Avail: NTIS HC A03/MF A01 CSCL 13M

The problems to be faced by the building standards development and building regulatory sectors of the American building industry are outlined. It includes a discussion of the SI metric units themselves, giving examples of the conventions regarding their use adopted in other countries to illustrate the nature of the decisions that must be made by the U.S. building industry. It discusses the relationship of dimensional coordination to the metric conversion effort, its impact on the U.S. building regulatory system and illustrates some of the decisions these sectors need to make. It also discusses some of the organizational problems required to involve all segments of the industry in this decision-making process, and for implementing these decisions in a coordinated way on a national scale. GRA

N77-10547# Laboratoire de Recherches Balistiques et Aerodynamiques, Vernon (France).
SPARE PARTS CALCULATIONS [CALCUL DES RECHANGES]
Gourden and Jouanneau 5 Aug. 1975 20 p In FRENCH
(LRBA-NT-24/75/BT) Avail: NTIS HC A02/MF A01

An analytical simplified formula is sought to determine the number of spare parts to be available at user premises taking into account the various repair hypotheses on time to repair, autarky, and defects on items in stock. ESA

N77-10665# Battelle Columbus Labs., Ohio.
ENERGY: THE POLICY PLANNING FRAMEWORK IN STATE GOVERNMENTS. VOLUME 1: SUMMARY REPORT
Jules J. Duga, David W. Malone, and Richard M. Davis 1976 48 p refs
(Grant NSF SIA-75-18811)
(PB-254466/6; NSF/RA-760120-Vol-1) Avail: NTIS HC A03/MF A01 CSCL 04A

A summary of the evaluation methodology developed and a brief description of the status of energy policy planning across the country, particularly in the five states funded through the NSF/RANN programs are presented. The methodology was developed for the purpose of providing a framework within which programs could be evaluated. GRA

N77-10666# Battelle Columbus Labs., Ohio.
ENERGY: THE POLICY PLANNING FRAMEWORK IN STATE GOVERNMENTS. VOLUME 2: APPENDICES
Jules J. Duga, David W. Malone, and Richard M. Davis 1976 90 p refs
(Grant NSF SIA-75-18811)
(PB-254467/4; NSF/RA-760121-Vol-2) Avail: NTIS HC A05/MF A01 CSCL 05A
For abstract, see N77-10665.

N77-10857# Georgia Inst. of Tech., Atlanta. School of Industrial and Systems Engineering.
APPLICATION OF DECISION RISK ANALYSIS IN OPERATIONAL TESTS AND EVALUATION Final Summary Report
Douglas C. Montgomery, Leslie G. Callahan, Jr., and Harrison M. Wadsworth Sep. 1975 57 p
(Contract DAAG39-75-C-0097)
(AD-A024205) Avail: NTIS HC A04/MF A01 CSCL 15/5

The objectives of this project were to develop a methodology with a set of procedures for applying decision/risk analysis to the design of operational tests and the analysis of operational test results. It was assumed that existing principles and techniques of decision theory and risk analysis are applicable to this problem. GRA

N77-10942# D. P. Management Corp., Lexington, Mass.
A METHODOLOGY FOR EVALUATING ALTERNATIVE TECHNICAL AND INFORMATION MANAGEMENT APPROACHES TO PRIVACY REQUIREMENTS Final Report
Robert C. Goldstein, Henry H. Seward, and Richard L. Nolan Jun. 1976 75 p
(Contract NBS-5-35935)
(PB-254048/2; NBS-TN-906) Avail: NTIS HC A04/MF A01 CSCL 09B

Cost becomes an early concern in applying privacy safeguards to any computerized record keeping system. To determine privacy cost impact a concrete and rigorous approach that permits repeated analysis of carefully documented assumptions is required. The application of that methodology to the technical requirements flowing from the Privacy Act of 1974 is presented. The privacy model contains algorithms reflecting resource expenditures for 56 distinct actions. Written as a FORTRAN program, the model produces several printouts that show the user the consequences of the input data. In addition to a total cost for conversion and an annual operating cost, the model provides subtotal costs for each compliance step. GRA

N77-10943# Comptroller General of the United States, Washington, D.C.
REPORT TO THE CONGRESS BY THE COMPTROLLER GENERAL OF THE UNITED STATES: MANAGERS NEED TO PROVIDE BETTER PROTECTION FOR FEDERAL AUTOMATIC DATA PROCESSING FACILITIES
10 May 1976 71 p Prepared by General Accounting Office, Washington, D. C.
(PB-254077/1; FGMSD-76-40; B-115369) Avail: NTIS MF A01; HC: US General Accounting Office, distribution section, P. O. Box 1020, Washington, D. C. 20013, $1.00 CSCL 09B

Government wide policies and practices used for determining physical security requirements at Federal data processing installations are covered. The following items were examined: (1) policies and procedures regarding automatic data processing systems; (2) security techniques employed at 28 data processing installations; (3) Air Force, agriculture, transportation, state, and health, education, and welfare and the Veterans Administration; (4) types of data processing security used at selected government contractors, universities, private companies, a bank, and a local government; and (5) types of security problems experienced at 23 additional Federal data processing installations. GRA

N77-10958# International Planning Management Corp., Bethesda, Md.
SMALL BUSINESS IN THE METALS INDUSTRY: A BACKGROUND STUDY Final Report
24 May 1976 88 p refs
(NSF Order 76-SP-0871)
(PB-255649/6; NSF/RA-760017) Avail: NTIS HC A05/MF A01 CSCL 05C

The principal small business roles in, and innovations of particular importance to, the metallurgical industry, together with associated planning and policy issues, marketing issues, and institutional arrangements are identified. The extraction and processing phases of the metals cycle are studied. Extraction includes all stages prior to metal processing: mining, benefication of ores, reduction, smelting, and refining of the pure metals. Processing includes alloying, heat treating, rolling, casting, and fabrication. Three broad areas were identified in which small business is actively involved: high technology, service companies, and secondary recovery. GRA

N77-10961# California State Univ., Los Angeles.
THE ROLE OF GOVERNMENT IN THE ALLOCATION OF RESOURCES TO TECHNOLOGICAL INNOVATION. VOLUME 1: EXECUTIVE SUMMARY Final Report
Harold J. Brumm, Jr. and John M. Hemphill, Jr. 1 Oct. 1975 22 p refs 3 Vol.
(Grant NSF RDA-74-23122)
(PB-252478/3; NSF/RDA-75/1/1-Vol-1) Avail: NTIS HC A02/MF A01; HC also available in set of 3 reports as PB-252477-SET, HC $14.00 CSCL 05A

A state-of-the-art review of the theoretical and empirical literature addressed to the role of government in the allocation of resources to technological innovation is reported. Criteria for government involvement in the direction and support of technological innovation and the expenditure mechanisms through which government does or should fund technological innovation in order to obtain an efficient allocation of resources are examined. An analytical report on the state of the art, a policy oriented summary of the analytical report and an annotated bibliography are presented. GRA

N77-10962# California State Univ., Los Angeles.
THE ROLE OF GOVERNMENT IN THE ALLOCATION OF RESOURCES TO TECHNICAL INNOVATION. VOLUME 2: SURVEY OF THE LITERATURE, POLICY GUIDELINES, AND AGENDA FOR FUTURE RESEARCH Final Report
Harold J. Brumm, Jr. and John M. Hemphill, Jr. Feb. 1976 108 p refs 3 Vol.
(Grant NSF RDA-74-23122)
(PB-252479/1; NSF/RDA-75/1/2-Vol-2) Avail: NTIS HC A06/MF A01; HC also available in set of 3 reports as PB-252477-SET, HC $14.00 CSCL 05A

For abstract, see N77-10961.

N77-10963# California State Univ., Los Angeles.
THE ROLE OF GOVERNMENT IN THE ALLOCATION OF RESOURCES TO TECHNOLOGICAL INNOVATION. VOLUME 3: ABSTRACTS/ANNOTATED BIBLIOGRAPHY Final Report
Harold J. Brumm, Jr. and John M. Hemphill, Jr. Feb. 1976 182 p refs 3 Vol.
(Grant NSF RDA-74-23122)
(PB-252480/9; NSF/RDA-75/1/3-Vol-3) Avail: NTIS HC A09/MF A01; HC also available in set of 3 reports as PB-252477-SET, HC $14.00 CSCL 05A

For abstract, see N77-10961.

N77-10966# Massachusetts Inst. of Tech., Cambridge. Center for Policy Alternatives.
NATIONAL SUPPORT FOR SCIENCE AND TECHNOLOGY: AN EXAMINATION OF FOREIGN EXPERIENCE. VOLUME 2: COUNTRY MONOGRAPHS Final Report
Nicholas A. Ashford 21 Nov. 1975 832 p
(Contract NSF RDA-73-07228)
(PB-253364/4; CPA-75-12-Vol-2; NSF/RDA-73/5/3-Vol-2) Avail: NTIS HC A99/MF A01 CSCL 05A

A comparative analysis is made across five countries (France, Germany, the Netherlands, the United Kingdom and Japan) of the ways in which governments influence technological change. This influence operates through government instruments designed or intended to affect: (1) the innovation process, (2) the intellectual resource base, and (3) the adverse consequences of technology such as deterioration of the environment and labor's resistance to technological change. For the purpose of analysis, twelve categories were constructed--each containing a number of diverse government programs of instruments affecting one or more of the three areas described above. GRA

N77-10968# Washington Univ., Seattle. Urban Transportation Program.
A PRELIMINARY SYSTEMS DESIGN FOR A MULTI-PURPOSE TRANSIT PLANNING AND MANAGEMENT INFORMATION SYSTEM
Thomas Walter Friedman Mar. 1976 102 p refs
(Contract FWPCA-WA-11-0005)
(PB-255178/6; RR-76-1; UMTA-WA-11-0005-76-1) Avail: NTIS HC A06/MF A01 CSCL 13B

A preliminary systems design for a multi-purpose transit planning and management information system is presented. It conceptualizes two such information systems: one for the automation of transit schedule data for the production of scheduling related reports, and the other for the automation of transit schedule data and street network data for a general transit information system. While the former system is designed to produce the types of reports currently manually produced and in use by the transit industry, the latter system is intended to provide an automated data base for the planning and marketing of transit services. Transit properties and others with an efficient file structure for organizing schedule data for the production of various types of output based on the concept of random access search are provided. GRA

N77-10973# California State Office of Planning and Research, Sacramento.
A STATE ROLE IN COMMUNITY DEVELOPMENT
Jun. 1976 119 p refs
(PB-255537/3; EDA-76-016) Avail: NTIS HC A06/MF A01 CSCL 13B

How state government can become more responsive to local and urban needs through its policies, plans and programs is examined. While federal programs are being organized to meet local comprehensive community development needs, state programs continue emphasis on many objectives. GRA

N77-11475# Transportation Research Board, Washington, D.C.
OPTIMIZING THE USE OF MATERIALS AND ENERGY IN TRANSPORTATION CONSTRUCTION
1976 81 p refs Proceedings held at Washington, D. C., 12-14 Nov. 1975 Sponsored by FEA, FHWA, and ERDA
(PB-253713/2; TRB/SR-166; ISBN-0-309-02477-3) Avail: NTIS HC A05/MF A01 CSCL 13C

These proceedings include the papers by the 4 keynote speakers who emphasized the following: the energy crisis is real and serious; how energy implications can affect roadway decision making; the construction materials situation and where materials may be in short supply; and one contractor's view of how energy and materials can be optimized. These papers are followed by the reports of the 7 topics chairmen, a general discussion, and suggestions from state transportation agencies on ways to minimize the impact of energy and material shortages. GRA

N77-11483 Pennsylvania Univ., Philadelphia.
A SYSTEMATIC APPROACH TO OPERATIONAL SCHEDULING FOR INFORMATION COLLECTION SYSTEMS Ph.D. Thesis

David Sims 1976 357 p
Avail: Univ. Microfilms Order No. 76-22783

A systematic methodology is presented which enables one to construct and solve a large scale linear zero-one mathematical programming model of an information collection system. The parameters of this model define the system's operational capability, its resources, its management's operational philosophy, and its users' desires. The solution to this model specifies the system's optimum operational schedule. The presented methodology is employed to formulate a computerized scheduling process for the Earth Resources Technology Satellite system. This process is termed a control mechanism. It utilized state variables to define the system element's operational modes and the system's environment. A utility space is established to quantify the management philosophy and the users' desires. The solution process utilizes heuristic programming, the principle of tearing, dynamic programming, and constrained continuous optimization. A methodology for solving the large-scale zero-one model is presented Dissert. Abstr.

N77-11604# Environmental Protection Agency, Washington, D.C.
JUSTIFICATIONS OF APPROPRIATION ESTIMATES FOR COMMITTEE ON APPROPRIATIONS, FISCAL YEAR 1976
1976 322 p
(PB-256464/9) Avail: NTIS HC A14/MF A01 CSCL 13B

The Environmental Protection Agency's 1976 budget proposal provides for an increase of $47 million and is presented under eight appropriations. A summary of each area and the major changes for 1976 are given. GRA

N77-11679# Stanford Univ., Calif. Dept. of Civil Engineering.
CONTINUING RESEARCH IN THE DEVELOPMENT OF INTERACTIVE MAN-COMPUTER SYSTEMS FOR ENGINEERING-CONSTRUCTION PROJECTS Final Report, 1 Apr. 1974 - 30 Sep. 1975
Boyd C. Paulson, Jr. Sep. 1975 68 p refs
(Grant NSF GK-42132)
(PB-252927/9; TR-200; NSF/GK-42132/SU-TR-200) Avail: NTIS HC A04/MF A01 CSCL 13B

An interactive man-computer environment is reported to develop, implement and test hypotheses and systems involving integrated network models for the planning and control of resources and operations on large engineering-construction projects. Examples include rapid transit systems, nuclear power plants, and mining developments. GRA

N77-11743 Pennsylvania Univ., Philadelphia.
MAN, DESIGN, MACHINE: AN INQUIRY INTO PRINCIPLES OF NORMATIVE PLANNING FOR COMPUTER-BASED TECHNICAL SYSTEMS ILLUSTRATED BY A CASE DESIGN OF AN ENTRY, STORAGE AND RETRIEVAL SYSTEM FOR SCIENTIFIC COMMUNICATION AND TECHNOLOGY TRANFER Ph.D. Thesis
Wlodzimierz Michel Sachs 1976 195 p
Avail: Univ. Microfilms Order No. 76-22774

Systems theory and normative planning are discussed. Fundamental properties of an IDEAL instrumental system based on advanced computer technology are examined. The properties that such a system should display, assuming no design constraints other than technological feasibility and operational viability are established. The principal arguments are: (1) that design of instruments should be SOCIO-TECHNICAL rather than technocratic; (2) such instruments should offer as many standard services as possible to their users; and (3) that they should also allow for users to program their own services. Dissert. Abstr.

N77-11894# Aeronautical Systems Div., Wright-Patterson AFB, Ohio. PRAM Program Office.
PROJECT SCREENING Final Report
Gordon W. Spray 15 Oct. 1976 36 p
(AD-A023837; ASD/RAXA-76-5) Avail: NTIS HC A03/MF A01 CSCL 05/1

The effective handling of ideas for potential PRAM projects requires a screening process that considers multiple factors. The mechanization of this process, while it is not a mandatory requirement, is definitely a practical necessity. The applicability of this screening methodology and computer design is demonstrated, including several types of computer output printouts and screening worksheets. GRA

N77-11895# Army War Coll., Carlisle Barracks, Pa.
APPLICATION OF PRINCIPLES OF ORGANIZATIONAL STRUCTURE TO HIGH TECHNOLOGY ACTIVITIES
Thomas G. Evans 20 Oct. 1975 27 p refs
(AD-A024012) Avail: NTIS HC A03/MF A01 CSCL 05/1

The objective of this paper is to provide information about principles of organizational structure as they apply to high technology activities. To acquire background about these principles, an extensive review of the literature was conducted. Those principles that seemed most generally applicable were selected for analysis. The review of the literature demonstrated that merely listing and analyzing the most applicable principles would not adequately satisfy the objective of the paper. It was obvious that human behavioral and system concepts of organization, which are not readily expressed as principles, must be included in order to provide a balanced development of the objective. Thus, this paper lists and analyzes the most applicable principles of organizational structure. Additionally, it discusses human behavioral and systems concepts of organization and, where possible, expresses these concepts as principles. Three major conclusions come from the analysis that was conducted. The first is that principles of organizational structure must be applied in a flexible manner. The second is that traditional principles, to a great degree, continue to apply to high technology activities. The third conclusion is that human behavioral and systems concepts have increased application in high technology activities. Author (GRA)

N77-11896# Air Force Academy, Colo.
A CONCEPTUAL MODEL FOR EVALUATING CONTRACTOR MANAGEMENT DURING SOURCE SELECTION Final Report
F. Theodore Helmer and Robert L. Taylor Mar. 1976 54 p refs
(AD-A023817; USAFA-TR-76-6) Avail: NTIS HC A04/MF A01 CSCL 05/1

The evaluation model in this report is not a definitive outline of what must be done during source selection; it is, rather, a discussion of a number of the variables that ought to be considered. One can then include only those variables relevant to the task at hand. The model should be viewed as a thought-triggering device for source selection panels to define and structure contractor management evaluation during the source selection process. The evaluation of contractor management is divided into major functional areas: planning, organizing, and controlling. A checklist of variables under each topic is included, with examples of a numerical scoring system, a color-coded evaluation system, and a descriptive adjective evaluation system. The report concludes with a detailed example of a complete source selection numerical scoring system, including technical, cost, management, quality, reliability, experience, facilities, and contract evaluations. GRA

N77-11897# California State Univ., Los Angeles.
PROGRAM EVALUATION AND REVIEW TECHNIQUE (PERT): A PLANNING AND CONTROL TOOL FOR OCCUPATIONAL FIELD STUDIES
John M. Hemphill, Jr., Harold C. Stone, and Dale Yoder Sep. 1975 59 p refs Sponsored in part by the US Marine Corps, Washington, D. C.
(Contract N00014-74-A-0436-0001; NR Proj. 151-370; RR0420402)
(AD-A024131; TR-3) Avail: NTIS HC A04/MF A01 CSCL 05/1

PERT is a management tool that makes possible more accurate, more objective, and more rapid planning and control of a complex project. Applied research by the ONR-MC Task

Analysis project staff indicated that a full description of PERT and its applications to Occupational Field (OF) studies would be of operational value to the Office of Manpower Utilization (OMU), HQ, USMC. This report on PERT is designed to serve two purposes. First, it can be used as training material for new personnel to introduce them to techniques of planning and control in OF studies. Second, it can provide ready reference materials for individuals directly involved in designing, directing, planning, and controlling OF studies. The description of PERT in this report is specifically addressed to Task Analysis as conducted by the Marine Corps. Accordingly, the various steps, events and activities used as illustrations in the application of PERT employ the terminology of the different phases of OMU's Task Analysis process. GRA

N77-11898# California State Univ., Los Angeles.
GUIDELINES FOR RESEARCH PLANNING AND DESIGN IN TASK ANALYSIS
William T. Farrell, C. Harold Stone, and Dale Yoder Sep. 1975 30 p refs Sponsored in part by the US Marine Corps, Washington, D. C.
(Contract N00014-74-A-0436-0001; NR Proj. 151-370; RR0420402)
(AD-A024132; TR-4) Avail: NTIS HC A03/MF A01 CSCL 05/1

The report focuses upon Task Analysis as research. It is based upon the the fact that the Task Analysis program conducted by the Office of Manpower Utilization, HQ, USMC (OMU) involves purposive, systematic investigations and analyses in order to prepare reports of findings that will be useful and influential in Marine Corps planning, policy determination, and management. Guidelines are presented for the planning and design of OMU's projects so that they will justify proper respect and credibility and thereby achieve maximum impact and value. Principles and procedures are outlined so that each Task Analysis project can be planned, designed and conducted in a manner consistent with recognized criteria of dependable scientific research. In addition to the focus upon the research nature of Task Analysis, the qualities of the researcher himself, and his influence upon the research are discussed. The main emphasis of the report is upon research planning and design. GRA

N77-11899# California State Univ., Los Angeles.
MANAGEMENT AUDITING
John M. Hemphill, Jr. and Dale Yoder Sep. 1975 28 p refs Sponsored in part by the US Marine Corps, Washington, D. C.
(Contract N00014-74-A-0436-0001; NR Proj. 151-370; RR0420402)
(AD-A024133; TR-5) Avail: NTIS HC A03/MF A01 CSCL 05/1

The Management Audit is described for possible application as an extension of the mission of the Office of Manpower Utilization (OMU), HQ, USMC. The present mission of OMU is viewed as a manpower research program to conduct Task Analysis of Marine Corps Occupational Fields. Purpose of the analyses is to improve the functional areas of classification, assignment, training, grade and MOS structure, job requirements, and job validation. Major topics in this report are purpose and scope of management auditing, overview of the management audit process, comparison of the management audit with task analysis, and implications of the management audit approach for OMU. Annotations of significant references on management auditing are included in a selected bibliography. GRA

N77-11900 Pennsylvania Univ., Philadelphia.
THE EVALUATION OF INTEGRATED MARKET RESEARCH INFORMATION SYSTEMS FOR NEW PRODUCT DECISIONS Ph.D. Thesis
Lawrence Lapide 1976 181 p
Avail: Univ. Microfilms Order No. 76-22724

A methodology with which to evaluate the benefits that can be derived from using various combinations of market research data sources to aid new product decisions is presented. Multimeasurement systems consisting of retail outlet surveys and consumer panel surveys are emphasized. The new product innovation process and its informational requirements for decision making is discussed. Test marketing is identified as a key phase to focus upon because of the importance of retail outlets and consumer panel surveys in monitoring test market. Rollout commercialization is also identified as another key phase since it is essentially sequential test marketing. The advantages and disadvantages of various data sources for test marketing are discussed as well as the source of error in a test market and their relationship to its duration. Dissert. Abstr.

N77-11913 Cincinnati Univ., Ohio.
OPTIMAL PRODUCTIVITY FOR SOLID WASTE COLLECTION: A SYSTEMS APPROACH Ph.D. Thesis
Robert Maurice Clark 1976 104 p
Avail: Univ. Microfilms Order No. 76-21095

Analytic techniques or models were developed which provide normative measures of optimal solid waste collection productivity. The first model developed is the REM which can be used to rate each collection route based on physical and managerial variables as to its difficulty in terms of the weight which is collected from it, during a maximum work day. If the levels of the variables on the right side of the equation are fixed then the ratio of W sub d to W sub u gives the household units which a crew can serve per day on a given route. This ratio is the collection coefficient which is utilized in the ROM. The Route Optimization Model can be applied to achieve the minimum cost, set of crews, trucks, and routes to serve a given solid waste collection service area. Both models are fully transferable between systems and allow an objective comparison between the results achieved in one system versus results achieved in another. Dissert. Abstr.

N77-11922# Massachusetts Inst. of Tech., Cambridge. School of Engineering.
ADVANCED DIAL-A-RIDE ALGORITHMS RESEARCH PROJECT Final Report, Apr. 1974 - Dec. 1975
Nigel H. M. Wilson, Richard W. Weissberg, and John Hauser Mar. 1976 130 p refs
(Grant UMTA-MA-11-0024)
(PB-254752/9; UMTA-MA-11-0024-76-1) Avail: NTIS HC A07/MF A01 CSCL 13B

Advanced dial-a-ride (ADAR) control procedures were developed and the problem of controlling integrated dial-a-ride/fixed route services was investigated. Background material (what a control algorithm does, who it serves, and various general elements of algorithms planning) is discussed along with work performed under the ADAR Project, and lessons learned from various demonstrations. GRA

N77-11925# Transportation Research Board, Washington, D.C.
PLANNING AND PROGRAMMING FOR TRANSPORTATION
William T. Mikolowsky 1976 62 p refs
(PB-255637/1; TRB/TRR-574; ISBN-0-309-03488-9) Avail: NTIS HC A04/MF A01 CSCL 13B

The papers in this Record include: (1) an analysis of near-term transportation alternatives for the Los Angeles region; (2) a presentation of some of the long-range transportation planning alternatives for Saigon and some of the problems associated with applying the U.S. Department of Transportation planning packages in a remote location; (3) a description of a new interactive programming system for transportation planning; (4) a discussion of the development of a procedure for using the goal-programming technique to evaluate urban transit systems for meeting the transportation-related goals of a community; and (5) a discussion of how the linear-programming formulation is a valuable extension of current methods of cost-benefit analysis for highway improvements. GRA

N77-11927# Army War Coll., Carlisle Barracks, Pa.
AN ANALYSIS OF THE TECHNOLOGY ROLE IN US POWER DURING THE MID-RANGE PERIOD Student Essay
Edward Miltner 21 Nov. 1975 31 p refs
(AD-A024042) Avail: NTIS HC A03/MF A01 CSCL 05/1

The role of technology predominates all elements of U.S. power. It is the key ingredient of defense planning; it looms as the bright spot in our balance of trade; it represents the heart of detente; it is responsible for the enormous improvement in our quality of life; and it is in the direction of technology that mankind seeks solutions in this new age of global interdependency and increased shortages of natural resources. The accelerating importance of technology to our nation's security and world leadership posture stands in astonishing contrast to the long and continuing decline of U.S. funding for research and development. A decline that poses a threat to our national defense - to our economic power - to the quality of life. Data was provided primarily from business and technology periodicals, federal budget review and texts pertaining to technology and its impact on the future. Federal support of R and D has dropped severely over the last decade to 1.2% of GNP. In view of the facts respecting the vital nature of technology to the nation and this reduced support of the R and D effort in the United States, it is recommended that all of the elements of U.S. power be reflected in the President's cabinet. The President's cabinet should be reorganized so that all five elements of U.S. power are represented, and in particular there be created a Secretary of Science and Technology and as a principal arm he creates a National Institute of Science and Technology. It is further suggested that national policy be established to provide five percent of gross national product for research and development.
Author (GRA)

N77-11931# Urban Inst., Washington, D.C.
THE CONSEQUENCES OF TRANSIT FARE AND SERVICE POLICIES: A CLASSIFIED BIBLIOGRAPHY
Michael A. Kemp and Rebecca L. Rea Apr. 1976 40 p refs
Sponsored by Urban Mass Transportation Administration
(PB-253101/0; UMTA-DC-06-0120-76-3; Working-Paper-5050-1-2) Avail: NTIS HC A03/MF A01 CSCL 13B

The bibliography is concerned with the consequences---most specifically the ridership and cost implications--of various policies regarding service and fare levels for urban public transit. Cited publications are classified under separate headings for ease in reference. These are: the demand for transit service, fare and service elasticities of demand; transit operating costs; the economics of transit pricing; public subsidies for transit operations; low-fare and no-fare transit; transit fare structures; transit fare and the distribution of income; transit and the transportation disadvantaged; transit planning, operation and evaluation; marketing transit; and general reference material. (GRA)

N77-12105# Aerospace Corp., El Segundo, Calif. Satellite Systems Div.
ON-ORBIT AND IN-PLANT SATELLITE STORAGE Final Report
Roy Hammerand 19 May 1976 28 p refs
(Contract F04701-75-C-0076)
(AD-A025902; TR-0076(6793)-1; SAMSO-TR-76-111) Avail: NTIS HC A03/MF A01 CSCL 22/2

The increasing need to maintain uninterrupted military communications service and the economies inherent in batch satellite buys have forced programs to decide on a mode of storage for those satellites not immediately needed for the on-orbit operational system. The experience of on-going satellite programs is reviewed to determine the relative benefits of on-orbit versus on-the-ground (in-plant) storage. Design factors that must be considered for storage on orbit are addressed and show that the impact on satellite design is small. Data on the operability of units (black boxes) that were turned on after years of on-orbit dormancy indicated very low on-orbit dormancy failure rates. GRA

N77-12478*# ECON, Inc., Princeton, N.J.
A METHODOLOGY FOR THE EVALUATION OF PROGRAM COST AND SCHEDULE RISK FOR THE SEASAT PROGRAM
Philip Abram and Debra Myers 31 Aug. 1976 63 p
(Contract NASw-2558)
(NASA-CR-149230; Rept-76-113-1) Avail: NTIS HC A04/MF A01 CSCL 05A

An interactive computerized project management software package (RISKNET) is designed to analyze the effect of the risk involved in each specific activity on the results of the total SEASAT-A program. Both the time and the cost of each distinct activity can be modeled with an uncertainty interval so as to provide the project manager with not only the expected time and cost for the completion of the total program, but also with the expected range of costs corresponding to any desired level of significance. The nature of the SEASAT-A program is described. The capabilities of RISKNET and the implementation plan of a RISKNET analysis for the development of SEASAT-A are presented. Author

N77-12502# American Inst. of Mining, Metallurgical, and Petroleum Engineers, Inc., Washington, D. C.
PROCEEDINGS OF THE MINERAL ECONOMICS SYMPOSIUM: WINNING THE HIGH STAKES AT THE CRITICAL COMMODITY GAME
K. L. Wang, ed. and B. W. Klein, ed. 11 Nov. 1975 104 p
Symp. held at Arlington, Va., 11 Nov. 1975
(PB-255607/4; NSF/RA-760162) Avail: NTIS HC A06/MF A01 CSCL 08I

The proceedings of the First Mineral Economics Symposium are reported. Of the 170 (approximately) people in attendance, five departments of Government and 13 Government agencies are represented as well as attendees from industry, trade associations, academia, nonprofit research organizations and foundations, and independent consultants. A forum for exchanging views on commodity agreements and cartels and the related economic stockpile issue was provided. GRA

N77-12574# Systems Control, Inc., Palo Alto, Calif.
EVALUATION OF WATER QUALITY MODELS: A MANAGEMENT GUIDE FOR PLANNERS Final Report
G. Paul Grimsrud, E. John Finnemore, and H. James Owen Jul. 1976 186 p refs
(Contract EPA-68-01-2641)
(PB-256412/8; EPA-600/5-76-004) Avail: NTIS HC A09/MF A01 CSCL 13B

A handbook specifically oriented to water quality and water resources planners and managers is presented. Procedures for model evaluation, model selection, integration of modeling with planning activities, and contracting modeling projects are described. Planners without previous experience in water quality modeling may use the information and procedures to determine

whether a water quality model could and should be used in a particular planning program, and which specific model would be cost effective according to specific project needs. GRA

N77-12576# Massachusetts Inst. of Tech., Cambridge. Center for Transportation Studies.
AIR QUALITY CONSIDERATIONS IN TRANSPORTATION PLANNING: FINDINGS AND RECOMMENDATIONS ON TRANSPORTATION CONTROL PLANNING, PHASE 2 Final Report
Elizabeth Bennett, Creig Harvey, Ann Rappaport, and Mabelle Bessey 30 Dec. 1975 223 p refs
(Contract EPA-68-01-2476)
(PB-256424/3; CTS-75-21) Avail: NTIS HC A10/MF A01 CSCL 13B

Transportation control plan (TCP) development was merged with ongoing transportation activities. Recommended procedures for assessing the consistency between transportation proposals and air quality needs are presented. Opportunities for improving coordination among DOT and EPA programs are identified. Issues involved in parking management are explored, and recommendations are made on the development of amendments to the Clean Air Act. GRA

N77-12592# Energy and Environmental Analysis, Inc., Arlington, Va.
LAWS AND REGULATIONS AFFECTING COAL WITH SUMMARIES OF FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS PERTAINING TO AIR AND WATER POLLUTION CONTROL, RECLAMATION, DILIGENCE AND HEALTH AND SAFETY, PART 1
Jun. 1976 571 p refs
(Contract DI-14-01-0001-2115)
(PB-255927/6; DOI/OMPRA/CL-76/01-Pt-1) Avail: NTIS HC A24/MF A01 CSCL 13B

All of the federal, state, and local laws and regulations which affect the production and consumption of coal are summarized. GRA

N77-12825# DARCOM Intern Training Center, Texarkana, Tex.
A REPLACEMENT POLICY FOR COMPONENTS OF A PURE SERIES SYSTEM UTILIZING ONE COMPONENT AS AN INDICATOR OF REPLACEMENT TIME Final Report
Michael G. Orrell May 1976 85 p refs
(AD-A024979; DARCOM-ITC-02-08-76-214) Avail: NTIS HC A05/MF A01 CSCL 15/5

The purpose of this paper is to develop a replacement policy. The policy will be for systems consisting of 'N' independently failing subsystems in a series configuration. The decision to replace a component of the system will be determined by a certain number of failures of another component in the system. This paper offers general equations adaptable for different time to failure distributions and it contains a specific example. The specific example is done showing all mathematical developments and results are given in tabular form. Finally, the replacement policy derived in the paper is compared to a more conventional replacement policy and the results show that the developed replacement policy's relative cost is approximately the same as the optimal solution. Author (GRA)

N77-12920# Army Engineer Waterways Experiment Station, Vicksburg, Miss.
RESEARCH AND DEVELOPMENT MANAGEMENT ANALYSIS SYSTEM (RDMAS) Final Report, 1973 - 1976
Stephen F. Rutz Apr. 1976 125 p
(AD-A025447; WES-Instruction-S-76-1) Avail: NTIS HC A06/MF A01 CSCL 05/1

This report describes a Research and Development Management Analysis Systems (RDMAS), developed and implemented in the Soils and Pavements Lab. of this Station (WES) during the period 1973-1976 as an extension of the WES Management Information System to provide closer control of the assigned research projects. The RDMAS provides a system of management tools and techniques for formulating research programs, initiating new research projects, determining the resources required/available to accomplish the effort, assessing the relative priority of competing items, evaluating technical productivity versus expenditure of funds, and monitoring participating elements on a continuous basis throughout the effort life. The report describes the general logic flow of the RDMAS in the basic text with details discussed in five instructional appendixes. GRA

N77-12925*# National Aeronautics and Space Administration, Washington, D.C.
RESEARCH AND TECHNOLOGY OBJECTIVES AND PLANS. A SUMMARY, FY 1977 RESEARCH AND TECHNOLOGY PROGRAM
1976 199 p
(NASA-TM-X-74296) Avail: NTIS HC $4.75 CSCL 05B

A compilation of the summary portion of each of the Research and Technology Operating Plans (RTOP) used for management review and control of research currently in progress throughout NASA is presented along with citations and abstracts of the RTOPs. Four indexes are included: (1) subject; (2) technical monitor; (3) responsible NASA organization; and (4) RTOP number. Author

N77-12926# Stanford Research Inst., Menlo Park, Calif.
AN INITIAL STUDY OF CURRENT AND PROJECTED PUBLISHING TECHNOLOGY PERTINENT TO THE NAVY TECHNICAL MANUAL SYSTEM (NTMS) Final Report
Jack J. Bialik, Thomas L. Humphrey, Patricia Whiting-OKeefe, and Raymond Zablocki Mar. 1976 131 p refs
(Contract N00014-76-C-0407; SRI Proj. 4739)
(AD-A025744) Avail: NTIS HC A07/MF A01 CSCL 14/5

The U.S. Navy has begun a program to develop an integrated, automated system to prepare, produce, distribute, and update Navy Technical Manuals (TMs). This program, called the Navy Technical Manual System (NTMS), will probably require at least three years to bring to the initial operating phase. It is therefore important to consider technology trends when committing to the design of the system. For this contract, SRI interviewed 30 companies and five newspaper corporations that are users and/or suppliers of automation technology in the printing and publishing fields. Each source contacted was questioned about experience with the use of the equipment, intended plans for use of new or additional equipment, and/or plans to introduce new products into the marketplace in the next two to three years. This report contains the results of the interviews together with an analysis of the information obtained from the interviews. The analysis is directed toward the particular problems that will face the NTMS when it is in operation. GRA

N77-12931# Institute for Defense Analyses, Arlington, Va. Science and Technology Div.
THE APPLICATION OF DESIGN-TO-COST ACQUISITION POLICIES TO SELECTED ELECTRONICS SUBSYSTEM DEVELOPMENT PROGRAMS Final Report, May 1974 - May 1975
C. David Weimer Jun. 1975 185 p refs
(Contract DAHC15-73-C-0200)
(AD-A024895; S-459; IDA/HQ-75-17527) Avail: NTIS HC A09/MF A01 CSCL 14/1

This report presents findings and conclusions resulting from a one-year study to observe, record, and analyze the Department of Defense (DOD) experience in applying Design-to-Cost (DTC) acquisition policies to electronics subsystems. Eleven DTC subsystems and three non-DTC subsystems, representing all three major Services and involving 27 industrial contractors, were investigated. Guidelines for future policy development resulting from the findings were recommended in the areas of DTC subsystem program planning, prediction of production costs and equipment performance, reliability improvement warranties, and subsystem management. These recommendations emphasized the importance of planning for DTC early in the development process and providing development time and funds, as necessary, to achieve production or life-cycle cost goals. Recommendations were also focused upon improving the production cost and performance estimating process, identifying risk areas for application of reliability improvement warranties, managing key subcontractors and vendors, and continuing analytic effects to derive DTC 'lessons learned' at the subsystem level. GRA

N77-12932# National Archives and Records Service, Washington, D.C.
CODE OF FEDERAL REGULATIONS. 14. AERONAUTICS AND SPACE, PARTS 1 TO 59
1 Jan. 1976 740 p refs Revised
Avail: NTIS MF A01; SOD HC $5.30

Federal aviation procedural rules and standards for certification in some of the following areas are presented: (1) air products, (2) aircraft parts, (3) pilots, and (4) flight instructors. Other areas reported include operating rules for (1) air traffic, (2) airport traffic patterns and (3) airport security. B.B.

N77-12933# National Archives and Records Service, Washington, D.C.
CODE OF FEDERAL REGULATIONS. 14. AERONAUTICS AND SPACE, PARTS 60 TO 199
1 Jan. 1976 786 p refs Revised
Avail: NTIS MF A01; SOD HC $5.60

For abstract, see N77-12932.

N77-12934# National Archives and Records Service, Washington, D.C.
CODE OF FEDERAL REGULATIONS. 14. AERONAUTICS AND SPACE, PARTS 200 TO 1199
1 Jan. 1976 742 p refs Revised
Avail: NTIS MF A01; SOD HC $6.20

Economic, procedural, and special regulations for the Civil Aeronautics Board are presented along with statements of general policy. B.B.

N77-12936# National Swedish Inst. for Building Research, Stockholm.
ECONOMIC EVALUATION METHODS IN COMMUNITY PLANNING
Per Ahren Jan. 1976 112 p refs
(PB-253432/9; D2:1976; ISBN-91-540-2540-0) Avail: NTIS HC $5.50 CSCL 13B

Various methods of assessing in economic terms the future results of municipal planning are analyzed. Characteristic features of city planning, types of plans and planning situations are discussed. Societal economics of built-up areas are investigated from the viewpoint of the user's premise of values, in contrast to that of the decision-maker. Negative and positive effects of plans are given in monetary terms. Author (GRA)

N77-12937# Miami Valley Regional Planning Commission, Dayton, Ohio.
FINANCIAL CRITICAL FACTORS ANALYSIS Final Report
Mar. 1976 64 p refs Prepared by Linton and Co., Inc.
(Grant EPA-P-005160-01)
(PB-254377/5; EPA-208-MVRPC-M6) Avail: NTIS HC A04/MF A01 CSCL 13B

State constitutional and statutory methods available to various types of Ohio governmental units for the financing of waste treatment facilities are described. The circumstances necessary for financing through state agencies or with federal funds are identified. Ten local governmental financing experiences are related. The information is used in the development of alternatives for the financing of structural waste treatment facilities in the areawide waste treatment management plan. GRA

N77-13269# Oregon Univ., Eugene. Dept. of Marketing, Transportation and Business Environment.
AN INVESTIGATION OF CHANGE IN DIRECT LABOR REQUIREMENTS RESULTING FROM CHANGES IN AIRFRAME PRODUCTION RATES Final Report Ph.D. Thesis
Larry L. Smith Jun. 1976 166 p refs
(AD-A026112; AFBRMC-B-2-2-75) Avail: NTIS HC A08/MF A01 CSCL 13/8

The purpose of this research is to develop a procedure to consider the effect of a production rate change on direct production labor requirements for additional airframe production. The procedure encompasses the needed elements of data collection, variable formation, data analysis and forecasting. In the following chapter, airframe cost elements are discussed, and the topic is narrowed to estimating airframe direct production labor hours. A third chapter summarizes previous studies in the area. The fourth chapter outlines the approach for conducting the research and identifies sources of data. An analysis of the data is presented in the fifth chapter. The paper closes with a summary, some conclusions and suggestions for further research. GRA

N77-13438# European Space Agency, Paris (France).
PRODUCT ASSURANCE
Sep. 1976 725 p refs Proc. of a Symp. held in Frascati, Italy, 4-6 May 1976
(ESA-SP-116) Avail: NTIS HC A99/MF A01

Articles are presented on customers' and contractors' views on product assurance, materials, information systems, component parts, systems, reliability/hazard control, and product assurance cost effectiveness. Author (ESA)

N77-13493*# General Electric Co., Philadelphia, Pa. Space Div.
LANDSAT D USER DATA PROCESSING STUDY Final Report
22 Nov. 1976 57 p
(Contract NAS5-23412)
(NASA-CR-144826; GE-76SDS4277) Avail: NTIS HC A04/MF A01 CSCL 05B

The major expected users of the LANDSAT D system and a preliminary system design of their required facilities are investigated. This system design will then be costed in order to provide an estimate of the incremental user costs necessitated by LANDSAT D. One major use of these cost estimates is as part of an overall economic cost/benefit argument being developed for the LANDSAT D system. The implication of this motive is key; the system design (and corresponding cost estimates) must be a credible one, but not necessarily an optimum one. Author

N77-13495*# General Electric Co., Philadelphia, Pa. Space Div.
LANDSAT D DATA PROCESSING FACILITY STUDY Final Report
22 Nov. 1976 69 p
(Contract NAS5-23412)
(NASA-CR-144828; GE-76SDS4277) Avail: NTIS HC A04/MF A01 CSCL 05B

Mission planning of the LANDSAT D is discussed which will present several major advances in the spacecraft, sensor (Thematic Mapper), ground systems and overall system design. The system provides for two data links-direct satellite to ground, and via the Tracking and Data Relay Satellite. M.C.F.

N77-13772+ Wetenschappelijk en Technisch Documentatie- en Informatiecentrum voor de Krijgsmacht, The Hague (Netherlands).
OPERATIONS RESEARCH 16, O.R. 186 UP TO AND INCLUDING O.R. 197. A BIBLIOGRAPHY
1975 73 p refs Partly in ENGLISH, GERMAN, FRENCH, and DUTCH
(TDCK-67083) Avail: NTIS HC A04

The index contains titles of publications of the Survey Operations Research published in 1975. The titles of reports are designated by their TDCK number, the articles are numbered XOR. Theoretical studies include queuing problems, programming, games, optimum distribution of effort, and stock management. Management applications such as routing, maintenance, and systems analysis are dealt with, whereas military applications involve fighting, probability of hitting, weapon systems, logistics, aeronautics, and education. ESA

N77-13891*# National Aeronautics and Space Administration, Washington, D.C.
NASA'S UNIVERSITY PROGRAM: ACTIVE GRANTS AND RESEARCH CONTRACTS, FISCAL YEAR 1976

1976 335 p
(NASA-TM-X-74142) Avail: NTIS HC A15/MF A01 CSCL 05A

NASA Field Centers and certain Headquarters Program Offices provide funds for those research and development activities in universities which contribute to the mission needs of that particular NASA element. Although NASA has no predetermined amount of money to devote to university activities, the effort funded each year is substantial. This annual report is one means of documenting the NASA-university relationship, frequently denoted, collectively, as NASA's University Program. Author

N77-13892# Forschungsinstitut fuer Funk und Mathematik, Werthoven (West Germany).
EVALUATION OF COMMAND AND CONTROL INFORMATION SYSTEMS FROM THE USER'S POINT OF VIEW
Karlheinz Wagner and Guenter Gabisch Jul. 1976 57 p refs In GERMAN; ENGLISH summary
(FFM-241) Avail: NTIS HC A04/MF A01

A method of evaluation for military command and control system is presented; a user requirement profile was developed based on the decision making process. Requirements for the user and for the management information systems are discussed, and an evaluation using a task matrix is proposed.

N77-13894 Forschungsinstitut fuer Funk und Mathematik, Werthoven (West Germany).
MIS AND ITS USER
Guenter Gabisch (Fernuniv. Hagen, West Ger.) *In its* Evaluation of Command and Control Inform. Systems Jul. 1976 p 24-52 refs In GERMAN; ENGLISH summary

The requirements for the user and for the MIS are discussed using bibliographical data. A method is presented based on partial objectives of the MIS and defining a task matrix. With this matrix the functional intensity of institutions and the institutional intensity of functions are shown. Author (ESA)

N77-13895# Texas A&M Univ., College Station. Inst. of Statistics.
A STATISTICAL PROCEDURE FOR OPTIMIZATION OF PERT (PROJECT EVALUATION AND REVIEW TECHNIQUE) NETWORK SCHEDULING SYSTEMS
R. K. Spoeri, L. J. Ringer, and R. L. Sielken, Jr. Apr. 1976 192 p refs
(Contract N00014-68-A-0140; NR Proj. 047-700)
(AD-A025022; THEMIS-TR-53) Avail: NTIS HC A09/MF A01 CSCL 05/1

This report is concerned with developing and documenting a system for the statistical analysis and optimization of Program Evaluation and Review Technique (PERT) network scheduling systems. Previous research and results are noted and documented. A technique to allow for network simplification based upon 'blocks' of activity configurations is discussed. Approximation of network completion time distribution and moments based on two points from each activity:s completion time distribution is studied, and extended to allow for unequal probability at each percentile. Also, a procedure for optimum allocation of time to project activities when network completion time is to be reduced or compressed is presented. Existing computer programs are modified, tested and documented. New codes have been prepared as required and combined with the others to facilitate implementation of the total program package. The integrated system incorporating all areas is explained, so as to provide for statistical and optimization analysis of PERT networks. GRA

N77-13896# Texas A&M Univ., College Station. Inst. of Statistics.
INCORPORATING PROJECT COST CONSIDERATIONS INTO STOCHASTIC PERT (PROJECT EVALUATION AND REVIEW TECHNIQUE)
Paul P. Beimer and Robert L. Sielken, Jr. Nov. 1975 65 p refs
(Contract N00014-68-A-0140; NR Proj. 047-700)
(AD-A025021; THEMIS-TR-52) Avail: NTIS HC A04/MF A01 CSCL 05/1

This report extends classical PERT to incorporate both random activity durations and project cost considerations. Project costs include both planned activity costs and penalties for activities exceeding their allowed durations. Several problem formulations are mentioned, and the determination of a minimum cost schedule satisfying a predetermined project deadline is discussed in detail. This latter problem is formulated as a separable programming problem which can be solved by the computer algorithm documented in the appendices. GRA

N77-13901# Office of Telecommunications, Washington, D.C.
COMMUNITY INFORMATION AND SERVICES CENTERS (CISC'S): CONCEPTS FOR ACTIVATION
Cleve Hopkins Jul. 1976 128 p refs
(PB-256428/4; OTR-76-94) Avail: NTIS HC A07/MF A01 CSCL 05B

Telecommunications technology is described as are data bank contents, an operational plan, basic community service center functions, and integration of a CISC with the 911 emergency center. Comments are made on staff training, space requirements, CISC location, and estimated costs of the experiment. A bibliography is included. GRA

N77-13904# DARCOM Intern Training Center, Texarkana, Tex.
ANALYSIS OF THE EFFECTIVENESS OF THE PREPRODUCTION EVALUATION CONTRACT IN PREVENTING COST OVERRUNS Final Report
George N. Cone May 1976 47 p refs
(AD-A024818; DARCOM-ITC-02-08-76-220) Avail: NTIS HC A03/MF A01 CSCL 05/3

This research report examines the cost overrun figures for both PPE and conventional contracts. It compares the cost of the two types of contracts, and statistical methods are employed to measure the cost overrun differences between them. The shortcomings of conventional contracting methods are reviewed and the advantages and disadvantages of the PPE concept are discussed. The data revealed significant differences between the two types of contracts examined and recommendations are made as to when the more complex PPE concept is justified.
Author (GRA)

N77-13922# Department of Transportation, Washington, D.C. Office of R and D Plans and Resources.
ANALYSIS OF FISCAL YEAR 1977 DOT PROGRAM BY POLICY AND RD AND D MANAGEMENT OBJECTIVES. PROGRAM LEVELS FOR FISCAL YEARS 1975, 1976, 1977, VOLUME 1 Management Report, 1975 - 1977
Jun. 1976 218 p 2 Vol.
(PB-255401/2; DOT-TST-76-69.1) Avail: NTIS HC A10/MF A01 CSCL 13B

The analysis of the DOT budget requests for fiscal year 1977 is presented in terms of its relationship to DOT policy and RD and D objectives. These objectives are: (1) modernize regulation and legislation, (2) increase efficiency and service, (3) improve safety and security, (4) lessen unfavorable environmental impacts, (5) minimize adverse impacts on energy constraints, and (6) increase knowledge base. The total budget of $14.1 billion contains $367.7 million for RD and D or about 2.6 percent of the total. GRA

N77-13923# Department of Transportation, Washington, D.C. Office of R and D Plans and Resources.
ANALYSIS OF FISCAL YEAR 1977 DOT PROGRAM BY POLICY AND RD AND D MANAGEMENT OBJECTIVES. PROGRAM LEVELS FOR FISCAL YEARS 1975, 1976, 1977, VOLUME 2 Management Report, 1975 - 1977
Jun. 1976 553 p 2 Vol.
(PB-255402/0; DOT-TST-76-69.2) Avail: NTIS HC A24/MF A01 CSCL 13B
For abstract, see N77-13922.

N77-13925# Booz-Allen and Hamilton, Inc., Washington, D.C.
RELATIONSHIP OF ENVIRONMENTAL IMPROVEMENT EFFORTS ON DEVELOPMENT IN ECONOMICALLY DISTRESSED AREAS
May 1976 40 p
(Grant EDA-PF-503)
(PB-256702/2; EDA/OER-76/011) Avail: NTIS HC A03/MF A01 CSCL 05C

The impact that environmental pollution controls might have on patterns of area development is discussed with particular emphasis on economically distressed areas. This problem statement represents a synthesis of three concerns or observations: (1) efforts to comply with environmental protection standards will increase the capital and operating costs of industry which may result in plant closings, unemployment and disruptive effects on community life; (2) differential enforcement of environmental standards across geographic areas may influence the movement and location of industry between cities, and redefine the balance between urban and rural centers; and (3) programs and policies designed specifically to spur economic activity in distressed areas may be impacted by counter directional environmental control efforts. GRA

N77-14022# Westinghouse Electric Corp., Baltimore, Md.
MODULAR PACKAGING APPROACHES, VOLUME 1 Interim Report, 1 Jun. - 30 Nov. 1975
W. W. Staley Wright-Patterson AFB, Ohio AFAL Jun. 1976 103 p refs
(Contract F33615-75-C-1269)
(AD-A027520; AFAL-TR-76-61-Vol-1; Rept-75-1161-Vol-1)
Avail: NTIS HC A06/MF A01 CSCL 09/3

The objective of the study is to investigate the feasibility, practicality, and implementation of standard electronic modules (SEM) for avionics. Tradeoff studies are used to provide quantitative data to assist the Air Force Engineers in selecting the SEM format(s). The broad spectrum of considerations necessary to characterize standard packaging for a wide class of avionics applications are investigated. In depth quantification is placed primarily on digital signal processing and to a lesser degree on analog circuitry. The work is performed in three tasks whereby Task I evaluates current and past industry and DOD module programs, Task II studies present technology and technology trends for determination of the standard avionics module(s), and Task III is a compilation of industry and DOD data concerning standard module information and concepts. The report describes the details of the study with conclusions made and recommendations for future work to be considered. GRA

N77-14023# Defense Systems Management School, Fort Belvoir, Va.
ADVANCED AVIONICS FOR THE A-10: A DECISION ANALYSIS MODEL
Jackson A. Thomas May 1975 49 p refs
(AD-A027678) Avail: NTIS HC A03/MF A01 CSCL 09/3

Using decision analysis techniques a generic decision model for potential avionics enhancements to the A-10 aircraft is developed. Five generic avionics additions and the baseline single seat aircraft are considered in the decision model. Aspects of systems acquisition and the impact of war are also incorporated. The model developed provides the basis for a flexible management tool that can assist the program manager in reaching a decision, if one should be required, concerning avionics additions to the A-10 aircraft. The model demonstrates how the decision analysis techniques can be applied to an unstructured decision problem encountered in program management. Author (GRA)

N77-14040# Braddock, Dunn and McDonald, Inc., Vienna, Va.
OPERATIONAL TEST INSTRUMENTATION GUIDE. VOLUME 3: NON-ARMY DOD TEST FACILITIES
1 Mar. 1976 579 p refs Prepared jointly with RMC Research Corp., Bethesda, Md.
(Contract DAAG39-73-C-0130)
(AD-A026664) HC A25/MF A01 CSCL 14/2

The United States Army Operational Test and Evaluation Agency (OTEA) Instrumentation Guide presents, in three volumes, the results of an operational test-oriented survey of some thirty-three Department of Defense test/training facilities. In addition to the available instrumentation, detailed information is provided on the landspace, airspace, data reduction, and other general support capabilities of each installation. The general support area includes such information as: (a) type, location, size, and commitments of nearby military units; (b) facility access; (c) maintenance and logistics capability; (d) climate and topography; and (e) power/communications availability. Test support equipment mobility is addressed throughout the guide to indicate its flexibility for use. The Summary (volume I) presents an overview and provides an easy rapid determination of the general facility capabilities for operational tests of Army materiel as compared, in matrix form, with the other potential test facilities. The two succeeding volumes present detailed test support information for each facility. Volume II contains annexes addressing the capabilities of US Army facilities and Volume III presents information for the non-Army DOD facilities. General (unclassified) discussions of threat hardware and targets available at the test facility are presented. Other detailed information in this critical area was reported in Operational Test and Evaluation Simulation Guide, Volume III, Classified Simulator Devices (U), AD-C000 021 published in March 1974. Author (GRA)

N77-14187# Defense Systems Management School, Fort Belvoir, Va.
MANAGEMENT OF DOD SPACE PAYLOAD INTEGRATION IN THE SPACE SHUTTLE ERA
Henry W. Steinkamp, Jr. May 1976 62 p refs
(AD-A026384; DSMS-PMC-76-1) Avail: NTIS HC A04/MF A01 CSCL 05/1

This report reviews the current management of DOD launch vehicle/spacecraft integration and then shows how the characteristics of the space shuttle will require changes to this baseline. The study has been based on a review of NASA and DOD literature, interviews with knowledgeable USAF officials and the author's experience in expendable launch vehicle planning and in Shuttle payload integration development. The results of the investigation provided supporting rationale for establishing a centralized DOD payload/space shuttle integration management structure. An important question was whether centralized management would motivate more economical utilization of the shuttle. In comparison to management decentralized to satellite System Program Offices of Industrial Fund Techniques, it was concluded that centralization would be more effective and efficient. Author (GRA)

N77-14574# Oklahoma Univ., Norman. Bureau of Water and Environmental Resources Research.
INTERDISCIPLINARY / INTERINSTITUTIONAL REQUIREMENTS FOR WATER RESOURCE PLANNING: PROCESSES TO ENHANCE COOPERATION
George W. Reid and James O. Dritt Jan. 1976 132 p refs Sponsored by the Dept. of Interior
(PB-255632/2; W76-10609; OWRT-X-122(3749)(1)) Avail: NTIS HC A07/MF A01 CSCL 13B

Difficulties and opportunities for effective cooperation within an interdisciplinary research group are explored. While emphasizing such research within an academic environment and on water resources related cases, this study is directed toward a broad spectrum of research project leaders and team participants. The analytical framework was designed to point out differences that exist between single, multidisciplinary and interdisciplinary team research. An opportunity to respond and share future results is provided. Several steps were suggested for the optimal use of interdisciplinary personnel in water resources research. The salient organizational and situational conditions include the establishment of favorable internal relationships and coalitions as a basis for administrative support and cooperation. GRA

N77-14921 Nebraska Univ., Lincoln.
AN INVESTIGATION OF PRIORITY SCHEDULING METHODS FOR PROJECTS REQUIRING MULTIPLE LIMITED RESOURCES Ph.D. Thesis

Glen Eugene Andersen 1976 169 p refs
Avail: Univ. Microfilms Order No. 76-25855

Four different priority scheduling methods were examined using data on an actual group of data processing systems projects. Three of the scheduling methods examined are in use and are the first-come-first scheduled method, the rate of return method, and the rate of return with replacement method. The fourth scheduling method was the present worth maximization method. No evidence was found indicating that this method was defined previously or applied to the project scheduling problem. The same group of projects was scheduled with the four different scheduling methods with all scheduling conventions, not unique to a particular method, applied consistently. The scheduled projects required varying amounts of three different types of manpower resources, all of which were in limited supply. The primary evaluation of the scheduling methods was based on the total net present worths of project returns resulting from the application of the respective methods. Dissert. Abstr.

N77-14922# Tennessee Univ., Knoxville. Transportation Center.

THE MANAGEMENT OF LARGE-SCALE INTERDISCIPLINARY RESEARCH

Jul. 1976 147 p refs Conf. held at Knoxville, Tenn., 14-17 Oct. 1975
(Grant NSF MN-44410)
(PB-256573/7; TC-76-019) Avail: NTIS HC A07/MF A01 CSCL 05A

This conference focused upon the issues and problems related to the management of interdisciplinary research. The conference proceedings comprise both resource papers and proceedings from formal workshops. GRA

N77-14923# Contract Research Corp., Belmont, Mass.

AN EVALUATION OF MONITORING SYSTEMS IN SELECTED REGIONAL PROGRAM AREAS Final Report, Aug. 1975 - May 1976

Jack Donovan May 1976 384 p
(Contract DHEW/R03-75-130-76-2)
(PB-255981/3; HEW/Reg-3-75/2) Avail: NTIS HC A17/MF A01 CSCL 05K

Regional information needs as well as information management problems were identified that interface with a manager's capability to function in all the expected roles. Three program areas were concentrated on: (1) child support enforcement; (2) head start; and (3) vocational education. GRA

N77-14925# Naval Postgraduate School, Monterey, Calif.

DESIGN CONSIDERATIONS FOR IMPLEMENTING A SHIPBOARD COMPUTER SUPPORTED COMMAND MANAGEMENT SYSTEM M.S. Thesis

Patrick Anthony Callahan Jun. 1976 51 p refs
(AD-A027290) Avail: NTIS HC A04/MF A01 CSCL 05/1

This report outlines an approach for the implementation of a shipboard computer supported management information system. The physical design specifications and design philosophy are investigated. The application of mini-computer technology applied to the shipboard environment is presented. Specific administrative functions are recommended for automation. Author (GRA)

N77-14926# Carnegie-Mellon Univ., Pittsburgh, Pa. School of Industrial Administration.

COORDINATION AND ORGANIZATIONAL EFFECTIVENESS: A CANONICAL ANALYSIS Report, 1 Apr. 1976 - 31 Mar. 1977

Johannes M. Pennings 31 May 1976 35 p refs Presented at the Intern. Conf. on Coord. and Control of Group and Organ. Performance, Jul. 1976, Munich, West Ger.
(Contract N00014-75-C-0973; NR Proj. 170-801)
(AD-A026440; Rept-2) Avail: NTIS HC A03/MF A01 CSCL 05/1

This paper relates six coordination variables to seven effectiveness variables. Using a canonical correlations analysis it was possible to jointly examine the interrelatedness between the two sets of variables. Data from brokerage offices reveal that the frequency of meetings, participation in decision making and team effort are pertinent determinants of effectiveness as measured by static and dynamic archival indices. Author (GRA)

N77-14927# Ohio State Univ., Columbus. Disaster Research Center.

ORGANIZATIONAL COMMUNICATIONS AND DECISION MAKING IN CRISES Final Report, 1 Dec. 1974 - 31 Mar. 1976

Russell R. Dynes and E. L. Quarentelli May 1976 63 p refs
(Contract N00014-75-C-0458; ARPA Order 2851)
(AD-A026984; DRC-Misc-18) Avail: NTIS HC A04/MF A01 CSCL 05/1

The primary focus of this study is on the response of organizations to crises, paying special attention to decision making and communication. The primary data base utilized involves materials collected in community-wide natural disasters by this Center in previous field work. From this data base, a series of propositions are derived, using decision making and communication, both as independent and dependent variables. To make future propositions more specific, the following dimensions must be taken into account: (1) The specific type of organization which experiences crises; (2) The different effect of various crisis agents; (3) The fact that crisis events always have a time and space referent; and (4) That intraorganizational functioning in crises is conditioned by the interorganizational context in which it must operate. A typology of group and organizational behavior in crises is derived from a cross classification of two variables: the nature of the crisis tasks undertaken by groups and the structure of these groups in the emergency period. An extension of this typology is explored, focusing on the importance of organizational coordination in crises. GRA

N77-14928# Defense Systems Management School, Fort Belvoir, Va.

PARTICIPATIVE DECISION MAKING: AN INVESTIGATION OF ITS EFFECTIVENESS IN THE PROGRAM MANAGEMENT OFFICE

Thomas W. Honeywill May 1976 41 p refs
(AD-A026381) Avail: NTIS HC A03/MF A01 CSCL 05/1

The purpose of this study project was to investigate two intervening variables to mediate the effectiveness of PDM: (1) The nature of the task and, (2) the subordinate personality characteristics need for independence. Secondly, to investigate the degree of presence of the variables in the PMO. The study showed that PDM will have positive effects on job performance and attitude when (1) the task environment is characterized by uncertainty, complexity, and rapidly changing technology and: (2) the subordinates possess a moderate or high need for independence. The study showed that the task environment of the PMO is permeated with uncertainty, complexity and changing technology. Additionally, through the sample use of Vroom's need for independence questionnaire it was determined that as many as 90% of PMO subordinates possess a moderate to high need for independence. The study concludes that PDM is a potentially effective management strategy that warrants serious consideration by program managers. Author (GRA)

N77-14929# Defense Systems Management School, Fort Belvoir, Va.

AN EVALUATION OF USAF INTERNATIONAL COOPERATIVE R AND D

George Fletcher Hunter Nov. 1975 64 p refs
(DSMS Proj. PMC-75-2)
(AD-A027130) Avail: NTIS HC A04/MF A01 CSCL 05/1

International cooperative research and development (ICR/D) is the collaboration of the U.S. and one or more of its allies in various R/D ventures to fulfill a common requirement. This report covers the purpose, scope and posture of the USAF in its dealings in ICR/D. The attitudes and barriers toward ICR/D are discussed in light of today's environment. Evolution of the ICR/D concept/process, types of cooperation and the mechanics of implementing ICR/D are also dealt with. The report concludes that attitudes/barriers to ICR/D are manageable, but without a change in outlook and posture, cooperation will tend to remain dormant. Author (GRA)

N77-14930# Defense Systems Management School, Fort Belvoir, Va.

THE INTEGRATION OF FRAGMENTED NON-MAJOR SYSTEMS: A MANAGEMENT PROBLEM

Kenneth Allen Gale Nov. 1975 54 p refs
(DSMS Proj. PMC-75-2)
(AD-A026566) Avail: NTIS HC A04/MF A01 CSCL 05/1

The Air Force has proposed the modular weapons concept as a weapon acquisition technique to provide technically sufficient weapons while avoiding the proliferation of individual weapon systems. This concept, being applied to the development of the Air Force's guided weapons program, is to develop a standardized set of weapon components. This will provide a mechanism for systematic upgrading of weapons by incorporating new technology into the modular weapon family in the form of a new module. It will require the integration of fragmented weapon components which can be developed throughout the Air Force Systems Command. This study looks at the integration process and at the management problems associated with implementing the modular weapons concept. The main source of problems is that the process is dynamic and requires the PM to work horizontally across the DoD organizations. This is difficult to accomplish on a broad scale in the bureaucratic form of organization. The concept is further compounded by the lack of an approved DoD plan for implementing the concept on a tri-Service basis. GRA

N77-14931# Defense Systems Management School, Fort Belvoir, Va.

MULTIPLE SMALL PROJECT MANAGEMENT

George F. Christensen Nov. 1975 43 p refs
(AD-A026564) Avail: NTIS HC A03/MF A01 CSCL 05A

This report presents a series of actions that the Product Manager may take to lessen this managerial workload. Methods involving the development of specialized task areas within the Product Manager's Office are also discussed. The actions specified should reduce the managerial work load and the organizational changes provide increased efficiency that will lead to greater mission accomplishment. It is concluded that an indepth examination of the need, development schedule, budget and acquisition strategy for each project may identify redundant and/or unnecessary tasks that can be eliminated from the management problem. Maximum utilization of support from the commodity commands and other services must be assured through communication and agreements. The development of specialists within the Product Manager's Office to handle specific and recurring tasks and maximum use of computer aids will increase efficiency and thus productivity. The ideas discussed have application to many Product/Program Managers faced with similar challenges. GRA

N77-14932# Defense Systems Management School, Fort Belvoir, Va.

CONTRACTING FOR OPERATIONAL AVAILABILITY: AN IMPOSSIBLE GOAL

Lawrence B. Residori May 1976 63 p refs
(AD-A026383; DSMS-PMC-76-1) Avail: NTIS HC A04/MF A01 CSCL 05/1

The purpose of this study project is to examine the feasibility of contracting for system operational availability as the ultimate means of achieving system readiness at reduced support costs. The study was conducted based upon the author's experience in the field of establishing reliability, availability, and maintainability (RAM) requirements for inclusion in systems requirements documents. Review of DoD guidance pertaining to RAM and cost effectiveness was accomplished to provide the basic data for analysis. All the parameters which comprise RAM were examined in detail with emphasis on their interrelationship among themselves and logistics. Operational availability was identified as a most meaningful parameter in that it had a direct impact on system effectiveness. The study concluded that increased operational readiness at reduced life cycle cost can only be achieved by stating RAM/logistics requirements in terms of reliability and operational availability. It was further concluded that a systems effectiveness approach is required in order for the system design to be influenced by RAM/logistics requirements. The study recommends that DoD implement the concept of contracting for operational availability and a plan for implementation is presented. The implication of the study is that DoD is incorrectly emphasizing reliability and maintainability in an effort to reduce life cycle costs. Author (GRA)

N77-14933# Massachusetts Inst. of Tech., Cambridge. Operations Research Center.

COMS: A COMPUTER-BASED OPERATIONS MANAGEMENT SYSTEM

Arnold C. Hax, Jonathan Golovin, Michael Bosyj, and Thomas Victor Jun. 1976 238 p refs
(Contracts N00014-75-C-0556; N00014-75-C-0661; MIT Proj. OSP-82491; NR Proj. 347-027)
(AD-A026250; TR-125) Avail: NTIS HC A11/MF A01 CSCL 05/1

This paper provides a detailed documentation, by means of flowcharts, of the basic modules for a hierarchical production planning and inventory control system. The system is based on the concept of hierarchization of decisions with linkage mechanisms between decision levels. GRA

N77-14934# Defense Systems Management School, Fort Belvoir, Va.

INFORMATION PROCESSING MODERNIZATION

John Gioia Nov. 1975 80 p
(AD-A026978) Avail: NTIS HC A05/MF A01 CSCL 09/2

Support costs have skyrocketed in the Department of Defense over the last five years. A substantial portion of the budget is now inflexible and must be used for obligated support costs such as retired pay personnel, and various levels of housekeeping support. The Chief of Staff, USAF is attempting to reduce resource costs wherever possible to put back into the system needed flexibility to develop systems for and to operationally support the combat forces. This paper looks at the administrative area and the possibility of identifying resource savings in the area of modernization. The general conclusion reached is that modernizing the administrative section in the Air Force at all levels is feasible and cost effective, provided each unit thus reconfigured is tailored to its local environment and that surveys pre-determine the cost benefits to be derived. In addition modernized administrative function should provide a synergistic savings in the long run. Program management depends quite heavily on administrative support to perform the mission. The trend toward administrative centers is clear and major Air Force acquisition offices are close to incorporating a new system. Hence program managers will have to depend on the new concept to obtain their administrative support required in the future. GRA

N77-14951# Defense Systems Management School, Fort Belvoir, Va.

USEFUL LIFE CYCLE COST ESTIMATES FOR DEFENSE SYSTEMS: AN EVALUATION

Carlton Franklin Roberson Nov. 1975 45 p refs
(AD-A026560) Avail: NTIS HC A03/MF A01 CSCL 05/1

This study analyzes and evaluates the concept and framework of Life Cycle Cost (LCC) estimate policy, guidance, and methodology efforts within the context of DoD major weapon system acquisition strategy. The analysis considered the general types of LCC estimates, the value of estimates in the decision making process, and the interaction of the OSD Assistant Secretaries and policy councils in LCC policy formulation and implementation. Current DOD publications, staff memoranda, and informal interviews with OSD officials were used as the basis for the analysis and evaluation. The study concludes that the ambiguity of current DoD directives regarding LCC estimate policy, guidance, and methodology responsibility makes it extremely difficult to understand where the DoD stands today with LCC. Although within OSD an overall LCC plan may exist in conjunction with well understood in-house responsibilities, in the opinion of the author it has not been clearly nor consistently promulgated within the whole of DoD. The emergence of a single, comprehensive LCC estimating concept which embodies all phases of weapon system acquisition and ownership does not appear to be forthcoming. GRA

N77-14953# Economica, Inc., Tarrytown, N. Y.

REGIONAL ECONOMIC DEVELOPMENT AND FEDERAL LEGISLATION

Stanley L. Friedlander Mar. 1976 59 p
(Grant EDA-PF-506)
(PB-256179/3; EDA/OER-76-010) Avail: NTIS HC A04/MF A01 CSCL 05C

The relationship and potential impact of three legislative acts, the Comprehensive Employment and Training Act of 1973, the Housing and Community Development Act of 1974, the Trade Act of 1972, and three bills, the Public Works Employment Act of 1976, the Balanced Growth and Economic Planning Act of 1975, and the Land Resource Planning Assistance Act of 1975, on regional economic development and, in particular on economic development districts was analyzed. This legislative analysis was to improve the effectiveness of economic development districts by integrating funds and programs established by Federal legislation with programs operated by the Economic Development Administration. GRA

N77-14958# Transportation Research Board, Washington, D.C.
INNOVATIONS IN TRANSPORTATION SYSTEM PLANNING
Walter G. Hansen 1976 94 p refs Presented at the 54th Ann. Meeting of the Transportation Res. Board, Washington, D. C., 1976
(PB-256972/1; TRB/TRR-582; ISBN-0-309-02496-X) Avail: NTIS HC A05/MF A01 CSCL 13B

Seven papers on various aspects of transportation planning ranging from state and regional planning to metropolitan and subcommunity planning are presented. They include (a) review of the metropolitan transportation planning process of the 1960s; (b) discussion of the community aggregate planning model; (c) discussion of circulation simulation model to be used in a heuristic method of evaluating and selecting from alternative transit designs, (d) presentation of a conceptual approach to formulate a more comprehensive program for studying and improving trails for park and recreational areas; (e) discussion of the purposes and objectives of the Regional Rail Reorganization Act of 1973; (f) a report on the progress being made in developing a regional simulation model that is interactive and linked with employment, population, land use, and transportation components; and (g) discussion of experience in Wisconsin as it relates to state-regional transportation planning. GRA

N77-14985# National Research Council of Canada, Ottawa (Ontario).
CANADIAN RESEARCH AND DEVELOPMENT POLICIES

J. D. Keys *In* AGARD 11th AGARD Ann. Meeting Feb. 1976 p 19-21
Avail: NTIS HC A04/MF A01

There is no single science policy suitable for Canada. Instead, it is accepted that the federal government's science policy is the sum of three distinct areas: (1) policies for support of science; (2) policies for application of science and technology; and (3) science as a component of public policy. Author

N77-15007*# Lockheed-California Co., Burbank.
STUDY OF THE COST/BENEFIT TRADEOFFS FOR REDUCING THE ENERGY CONSUMPTION OF THE COMMERCIAL AIR TRANSPORTATION SYSTEM Final Report, Nov. 1974 - Mar. 1976
John P. Hopkins Aug. 1976 331 p refs
(Contract NAS2-8612)
(NASA-CR-137926; LR-27769-2) Avail: NTIS HC A15/MF A01 CSCL 05C

Practical means were assessed for achieving reduced fuel consumption in commercial air transportation. Five areas were investigated: current aircraft types, revised operational procedures, modifications to current aircraft, derivatives of current aircraft and new near-term fuel conservative aircraft. As part of a multiparticipant coordinated effort, detailed performance and operating cost data in each of these areas were supplied to the contractor responsible for the overall analysis of the cost/benefit tradeoffs for reducing the energy consumption of the domestic commercial air transportation system. A follow-on study was performed to assess the potential of an advanced turboprop transport aircraft concept. To provide a valid basis for comparison, an equivalent turbofan transport aircraft concept incorporating equal technology levels was also derived. The aircraft as compared on the basis of weight, size, fuel utilization, operational characteristics and costs. Author

N77-15008*# Lockheed-California Co., Burbank.
STUDY OF THE COST/BENEFIT TRADEOFFS FOR REDUCING THE ENERGY CONSUMPTION OF THE COMMERCIAL AIR TRANSPORTATION SYSTEM Summary Report, Nov. 1974 - Mar. 1976
John P. Hopkins and H. E. Wharton Aug. 1976 100 p
(Contract NAS2-8612)
(NASA-CR-137927; LR-27769-1) Avail: NTIS HC A05/MF A01 CSCL 05C

For abstract, see N77-15007.

N77-15319# Martin Marietta Aerospace, Orlando, Fla.
PRINTED WIRING BOARD PRODUCTION ASSEMBLY COST GUIDELINES MANUAL Final Report, 26 Mar. 1975 - 25 Mar. 1976
Sol C. Osborne, Wendell R. Hutchinson, and Frederick E. Tartaglia Mar. 1976 270 p
(Contract DAAB07-75-C-0029)
(AD-A026944; OR-13826-2) Avail: NTIS HC A09/MF A01 CSCL 09/5

Cost forms, cost/manhour data tables and equipment payoff breakeven cost models provided for the user of this manual a direct approach of selecting the lowest cost PWB component assembly method. The comparisons required for solving assembly problems are given on state-of-the-art manual and automatic assembly methods. Formulated assembly and cost guidelines are provided for processes and equipment described for a variety of manual and automatic assembly methods. Author (GRA)

N77-15700# Defense Systems Management School, Fort Belvoir, Va.
RELIABLE COMPUTER SOFTWARE. WHAT IT IS AND HOW TO GET IT
David N. Farnan Nov. 1975 42 p refs
(DSMS Proj. PMC-75-2)
(AD-A026988) Avail: NTIS HC A03/MF A01 CSCL 09/2

The paper attempts to motivate software acquisition managers to give more attention to software development. Up to now, more attention has been given to hardware acquisition at the expense of software. Since computer software can't really be seen, it is easily ignored. Therefore, it requires greater management visibility. There are many techniques available today which can improve the software design and increase software reliability. The techniques briefly described are: modularization, top-down programming, structured programming, egoless programming, chief programmer team, good programming style, and configuration management. Author (GRA)

N77-15718# California Univ., Livermore. Lawrence Livermore Lab.
MULTI-MINI SYSTEMS: A FUNCTIONAL DEVELOPMENT OF THE ARCHITECTURE FOR TOMORROW'S ADMINISTRATIVE COMPUTING
D. L. Seibel 15 Mar. 1976 33 p refs Presented at Assoc. ERDA Systems, Operations and Programming Conf., Arlington, Va., 30 Mar. 1976
(Contract W-7405-eng-48)
(UCRL-77946; Conf-760325-2) Avail: NTIS HC A03/MF A01

The technology required for a disbursement of computing power is well beyond the capabilities of most installations currently to utilize such a network in an efficient and cost-effective manner. As the industry trend progresses further and further toward these noncentralized facilities, however, it is imperative for DP managers to come to grips with this evolution--and to take steps today to plan and implement these systems of tomorrow carefully. These steps are delineated, and some future technologies which may significantly impact the administrative data processing of tomorrow are projected. Author (ERA)

N77-15890# Defense Systems Management School, Fort Belvoir, Va.
NAVY AIRBORNE TACTICAL SOFTWARE MANAGEMENT POLICY: REVIEW AND EVALUATION

Dale C. Dunham Nov. 1975 35 p refs
(AD-A027023) Avail: NTIS HC A03/MF A01 CSCL 09/2

The purposes of this report are to review current and proposed policies pertaining to management of airborne tactical software in the Navy and then present some views on the effectiveness of these policies. Views on the effectiveness of the current and proposed policies on management of airborne software were obtained by interviewing NAVAIRSYSCOM personal. In general, it was found that the current and proposed policies on management of airborne tactical software were considered adequate, that airborne tactical software is treated as a configuration item, and that in-house organic support for airborne tactical software is considered essential after the host aircraft system is in full production to ensure maintenance as the software after the host aircraft system production has been completed. GRA

N77-15891# Dikewood Industries, Inc., Albuquerque, N. Mex.
A SURVEY OF EXISTING MANAGEMENT INFORMATION SYSTEMS. SOFTWARE AND HARDWARE OPTIONS Final Report
B. G. VanBlaricum and C. A. Luff Kirtland AFB, N. Mex. AFSWC Jun. 1976 92 p refs
(Contract F29601-74-C-0022)
(AD-A027046; AFSWC-TR-75-10) Avail: NTIS HC A05/MF A01 CSCL 09/2

A survey of available management information systems and subsystems to determine appropriate packages for TESPO's needs was conducted throughout the various technical environments. The survey was confined first to automated, and later, to all MIS portions that could be applied to project management, to automated network analyses, and to appropriate subsystems. Twenty systems are reviewed in detail for software, hardware and procedural constraints. A complete economic and overall technical evaluation is assessed each of the reviewed systems. Preferred alternatives, both economic and technical, are presented with guidelines for the next efforts. The survey report will be updated by ongoing contact with the various MIS communities. Also, the preliminary design and development of TESPO's own Management Information System is outlined briefly.
Author (GRA)

N77-15892# Stanford Research Inst., Menlo Park, Calif.
DEVELOPMENT OF AUTOMATED AIDS FOR DECISION ANALYSIS Final Report
Allen C. Miller, Miley W. Merkhofer, Ronald A. Howard, James E. Matheson, and Thomas R. Rice May 1976 215 p refs
(Contract MDA903-74-C-0240; DARPA Order 2742; SRI Proj. 3309)
(AD-A026379) Avail: NTIS HC A10/MF A01 CSCL 09/2

This report summarizes research undertaken to initiate development of a system of automated decision aids. The purpose of these aids is to facilitate the application of decision analysis to major decisions within the Department of Defense. The report contains: (1) a characterization of the spectrum of decision situations that are encountered in practice and an exploration of the implications of these characteristics for automated decision aids; (2) a description of the types of decision models available for analyzing various decision situations; (3) a description of the process by which decision models are constructed; and (4) an identification of several modeling concepts that provide a basis for designing and constructing a pilot-level system of automated decision aids. Author (GRA)

N77-15893# Comptroller General of the United States, Washington, D.C. Resources and Economic Development Div.
NEED FOR BETTER MANAGEMENT AND CONTROL OVER SCIENTIFIC EQUIPMENT (REPORT TO THE CONGRESS)
3 May 1976 24 p Prepared in cooperation with EPA, Washington, D.C.
(PB-257289/9; RED-76-100; B-166506-760503) Avail: NTIS HC A02/MF A01 CSCL 14B

The need for the Environmental Protection Agency to improve its management of scientific laboratory equipment is outlined. The review was made because in earlier review work at Environmental Protection Agency laboratories need for improvement in property records was found. Coordination should be limited areas where the interests of the centers overlap. Collaboration may be possible to develop new techniques such as the use of OCR for data input. Techniques for data manipulation may have applications outside the areas with which the data centers themselves are concerned. Author

N77-15894# Arizona State Univ., Tempe.
EVALUATION OF A CONTINGENCY JOB DESIGN MODEL IN AN INFORMATION TECHNOLOGY ENVIRONMENT
Philip Edward Lowry May 1976 177 p refs
(AD-A026943) Avail: NTIS HC A08/MF A01 CSCL 05/9

This study evaluated a contingency job design model in an information technology environment. The study involved employees (military and civilian) of two United States Army organizations which develop and operate ADP programs. The objective was to determine whether the design model predicts organization behavior in certain ADP jobs. The study examined the relationship between certain job characteristics (task significance, task identity, skill variety, autonomy, and feedback from the job) and on job behavior as represented by internal motivation, general satisfaction, performance, turnover, and absenteeism. Also, the study examined the extent to which growth needs and work values moderated the relationship betwen job characteristics and job behavior. Results of the study indicate that internal motivation, general satisfaction, and performance of ADP personnel are affected by job characteristics. While growth needs and work values do moderate the relationship, the moderating value is relatively weak. Age, sex, and education demonstrated insignificant or weak influence on job behavior. The study was relevant to the United States Army. Nearly eleven thousand Army employees are in ADP jobs. The ultimate result of improved job design can be increased satisfaction and higher quality performance. Author (GRA)

N77-15895*# Defense Systems Management School, Fort Belvoir, Va.
DOD/NASA SUPPORT OPERATIONS MANAGEMENT INTERFACE
Thomas E. Timothy Nov. 1975 56 p refs Sponsored in part by NASA
(NASA-CR-149203; AD-A027276) Avail: NTIS HC A04/MF A01 CSCL 05/1

The purpose of this study was to investigate the manner in which support operations have been provided from DOD resources to the NASA for manned space flight endeavors. Of particular interest was the investigation of the new Space Shuttle program. The approach used was to examine the historical documents of manned space flight through the recently concluded Apollo Soyuz mission. This investigation developed the extremely successful way in which support operations have been managed by the DOD. Additional research was carried into the Space Shuttle documentation for an insight into how this same type support might be supplied for that mission. This study points out how a well defined, operationally tested management interface is being allowed to deteriorate and perhaps be discarded for a program that appears to need it desperately. GRA

N77-15900# British Library Lending Div., Boston Spa (England).
A PRELIMINARY STUDY OF DATA HANDLING TECHNIQUES IN THE UNITED KINGDOM, VOLUME 1 Final Report, Nov. 1975 - Apr. 1976
A. Robson Apr. 1976 187 p refs
(BLL-BLRD-5296-Vol-1) Avail: British Library Lending Div., Boston Spa, Engl.

The data handling techniques of a small number of United Kingdom data centers were examined in detail and a methodology was demonstrated for describing them. Comparisons were made between the centers in an effort to identify the different data handling techniques and processes. Collaboration between centers on data collection seems not to be feasible except in the very limited areas where the interests of the centers overlap. Collaboration may be possible to develop new techniques such as the use of OCR for data input. Techniques for data manipulation may have applications outside the areas with which the data centers themselves are concerned. Author

N77-15906# British Library Lending Div., Boston Spa (England).
TRENDS IN SCIENTIFIC AND TECHNICAL PRIMARY JOURNAL PUBLISHING IN THE USA
Peter W. Lea Mar. 1976 33 p refs
(BLL-BLRD-5272; ISBN-0-85350-138-6) Avail: British Library Lending Div., Boston Spa, Engl.: £2.50

Current ideas on scientific and technical primary journal publishing were discussed. Trends and innovations were identified. Discussions were held with primary publishers, both commercial and institutional, secondary publishers and various other representatives. The main trends identified include the growth of computer photocomposition, Federal Government involvement in research relating to electronic alternatives, and various activities in microform publishing. Two NSF projects are summarized; one is a study of the relationship between journals and their users; the other is a guide to innovations in scientific and technical publishing. Recommendations are made and the need for international cooperation is emphasized. Author

N77-15907# British Library Lending Div., Boston Spa (England).
COMMUNICATION NETWORKS IN R AND D: A CONTRIBUTION TO METHODOLOGY AND SOME RESULTS IN A PARTICULAR LABORATORY
E. Ritchie and A. Hindle May 1976 69 p refs
(BLL-BLRD-5291) Avail: British Library Lending Div., Boston Spa, Engl.

Methods of identifying and analyzing the patterns of technical communication within the laboratory were developed. Experimental tools were designed which can be used with relatively little disruptive effect on the laboratory. This method makes experimentation feasible to discover directly the response of technical communication patterns to managerial actions. This methodology can also be used for exploring these inter-relationships by monitoring communication patterns and managerial actions over time. In this way, the degree of management control over technical communication can be established. In identifying and analyzing the patterns of technical communication in the laboratory the main contribution was in the application of path methods. The data concerning communication were obtained from a detailed questionnaire survey of the laboratory personnel. Each node in the resulting networks is a scientist and each element represents the frequency of communication (of a pre-defined type) between any pair of scientists. Author

N77-15918# Metropolitan Transportation Commission, Berkeley, Calif.
ENVIRONMENTAL IMPACTS OF BART INTERIM SERVICE FINDINGS, REPORT ON PHASE 1
Jan. 1976 137 p refs Sponsored in part by HUD Prepared in cooperation with Gruen Assoc., Los Angeles; and DeLeuw, Cather and Co., San Francisco
(Contract DOT-OS-30176)
(PB-257498/6; DOT-BIP-FR-2-4-75) Avail: NTIS HC A07/MF A01 CSCL 13B

During this phase, the project has concentrated on BART's immediate effects on the physical dimensions of the urban ecosystem. It has examined what aspects of the environment have been affected by BART, what physical and operational characteristics of BART cause the impact where the impacts are occurring, what the demographic characteristics are of those who are affected, and how lessons from BART can be used to guide decision-making on urban transportation and development in the bay area and elsewhere. GRA

N77-15924# Battelle Columbus Labs., Ohio.
THE MICROCOMPUTER: TECHNOLOGY INNOVATION AND TRANSFER Working Paper, Sep. - Nov. 1975
Herbert S. Kleiman 16 Dec. 1975 41 p
(Contract MDA903-75-C-0131; ARPA Order 2857)
(AD-A026970) Avail: NTIS HC A03/MF A01 CSCL 05/3

A research program to better understand technology transfer within the Soviet Union, whether that technology is obtained from outside or internal sources, is currently underway. Ultimately, this program should assist U.S. decisionmakers in analyzing a variety of related questions, including those associated with aspects of export embargo controls. GRA

N77-15934# Pennsylvania State Univ., University Park. Center for the Study of Science Policy.
DIFFUSION OF INNOVATIONS IN MUNICIPAL GOVERNMENTS Executive Summary
Irwin Feller, Donald C. Menzel, and Lee Ann Kozak Jun. 1976 27 p
(Grant NSF DA-74-20621)
(PB-257068/7; NSF/PRA-74-20-1) Avail: NTIS HC A03/MF A01 CSCL 05A

The processes of diffusion in municipal governments were described, and by doing so, the importance of factors which were identified in the theoretical literature as determinants of the diffusion of innovations in organizations was examined. The hypothesis that the creation of a performance gap is a critical factor in shaping public sector receptivity to new technologies was tested. The hypothesis was explored that the observed patterns of adoption of new technologies in the public sector--which are often attributed to the organizational characteristics of given state or local agencies--may in fact reflect the independently determined marketing strategies of the manufacturers of these technologies. GRA

N77-15935# Pennsylvania State Univ., University Park. Center for the Study of Science Policy.
DIFFUSION OF INNOVATIONS IN MUNICIPAL GOVERNMENTS Final Report
Irwin Feller, Donald C. Menzel, and Lee Ann Kozak Jun. 1976 446 p refs
(Grant NSF DA-74-20621)
(PB-257069/5; NSF/PRA-74-20-2) Avail: NTIS HC A19/MF A01 CSCL 05A

The findings of an investigation into the diffusion of technological innovations among line agencies in municipal governments are presented. An attempt to provide an improved understanding of the processes of innovation and diffusion in municipal governments, an improvement in the state of diffusion theory, and a set of recommendations on policies that can be employed to foster the diffusion of innovations in municipal governments are represented. GRA

N77-16012 Texas Univ., Arlington.
AN ANALYSIS OF AN APPLICATION OF AEROSPACE SYSTEMS ENGINEERING PROCESS AS IT AFFECTS DESIGN Ph.D. Thesis
John G. Heit 1976 327 p
Avail: Univ. Microfilms Order No. 76-30314

The effect of the systems engineering process on aerospace development programs was ascertained. Any factors that impeded its effectiveness were identified. The specific function under investigation was the design process. The research methodology was formulated around case studies of two aerospace development programs. The evaluation of the systems engineering process was accomplished through a comparison of the resultant data. Both programs were developed under the weapon systems management concept. Dissert. Abstr.

N77-16079# Dornier-System G.m.b.H., Friedrichshafen (West Germany).
COSTING STUDY FOR LIDAR FACILITY ESA Spacelab Utilization Program. Final Report
R. Henkel, G. Neumann, H. Koch, and E. Wedel Aug. 1976 97 p
(Contract ESA-2704/76)
(ESA-CR(P)-863) Avail: NTIS HC A05/MF A01

The basis for this study is the 'Final Report of the Phase-A Study, Spacelabborne Lidar for Atmospheric Research' prepared by MATRA/CNRS. No reworking of the basic documents was undertaken and the only technical modification made was the provision of a degassing filter on the telescope structure. At the first attempt, an overall development time of 36 months was found. This was incompatible with the required delivery time. After consultation with structure, cooling, and mechanism experts, it was found possible to reduce the schedule to 32 months. The conversion of an extended 'Flight Qualification Phase' into a reduced 'Flight Verification Phase' contributed to the reduction in the schedule. Author (ESA)

N77-16363# Army Materiel Command, Alexandria, Va.
ENGINEERING DESIGN HANDBOOK. DEVELOPMENT GUIDE FOR RELIABILITY. PART 4: RELIABILITY MEASUREMENT
Jan. 1976 298 p refs
(AD-A027371; AMCP-706-198-Pt-4) Avail: NTIS HC A13/MF A01 CSCL 14/4

Reliability measurement techniques provide a common discipline that can be used to make system reliability projections throughout the life cycle of a system. The data on component and equipment failures obtained during the reliability measurement program can be used to compute component failure distributions and equipment reliability characteristics. Reliability measurement techniques are used during the research and development phase to measure the reliability of components and equipments and to evaluate the relationships between applied stresses and environments and reliability. Later in a system life cycle, reliability measurement and testing procedures can be used to demonstrate that contractually required reliability levels have been met. GRA

N77-16451# Econometrica International, Santa Barbara, Calif.
DEVELOPMENT OF METHODS FOR FORECASTING THE NATIONAL INDUSTRIAL DEMAND FOR ENERGY Final Report
Jul. 1976 116 p refs Sponsored by Electric Power Res. Inst.
(PB-257914/2; EPRI-EA-242) Avail: NTIS HC A06/MF A01 CSCL 10A

A theoretical model was developed to be used for forecasting energy demand by individual industries; it also discusses alternative specifications of functional forms in the theoretical model and implements the model using data for several two-digit (SIC) industries. GRA

N77-16586# Centre Oceanologique de Bretagne, Brest (France).
DATA MANAGEMENT PLAN FOR THE OCEANOGRAPHIC SUB-PROGRAMME DATA CENTRE
In WMO The Final Plan for the GATE Sub-programme Data Centres Apr. 1976 20 p

Avail: NTIS HC A09/MF A01

The background to the Oceanographic Sub-programme Radiation Centre (OSDC) is given followed by a description of the data sets and displays to be produced by the OSDC. International data validation is discussed and scientific analysis products as well as inventories and catalogs are discussed. ESA

N77-16657# World Meteorological Organization, Geneva (Switzerland).
REPORT OF THE THIRD SESSION OF WMO EXECUTIVE COMMITTEE INTERGOVERNMENTAL PANEL ON THE FIRST GARP GLOBAL EXPERIMENT
Jul. 1976 84 p Conf. held at Geneva, 19-23 Jul. 1976 Prepared jointly with ICSU, Rome
(GARP-Spec-Rept-22) Avail: NTIS HC A05/MF A01; WMO, Geneva

The following aspects were discussed: general strategy for further planning; implementation plan for the FGGE; regional experiments; oceanographic program for the FGGE; and research aspects of the FGGE. ESA

N77-16720* Hewlett-Packard Co., Waltham, Mass.
BIOMEDICAL TECHNOLOGY TRANSFER: A MANUFACTURER'S VIEWPOINT
Dean O. Morton *In* Soc. of Photo-Opt. Instrumentation Engrs. Cardiovascular Imaging and Image Processing 1976 p 321-324

Copyright. Avail: Issuing Activity CSCL 06B

Transfer of technology from non-commercial institutions to industry has played an important role in the development of medical electronics. It is a difficult process, but if the ideas are sound, if clear medical benefits exist and if there is good fit with business plans and the strengths and goals of both parties are complementary, it can work well. In the evaluation process it is considered whether the device meets general tests for suitability for the company, whether there are opportunities for proprietary or patent protection, and whether the medical benefits are self evident or the acceptance period is apt to be long. Author

N77-16744 Michigan Univ., Ann Arbor.
A METHODOLOGY FOR GENERALIZED DATABASE RESTRUCTURING, VOLUMES 1 AND 2 Ph.D. Thesis
Shamkant Bhalchandra Navathe 1976 484 p refs
Avail: Univ. Microfilms Order No. 76-27557

A generalized database restructuring problem independent of a specific system environment is formulated and a generalized methodology for building a restructurer to solve the problem is proposed. Dissert. Abstr.

N77-16845# North Carolina Univ., Charlotte. Dept. of Mathematics.
OPTIMAL REPLACEMENT OF DAMAGED DEVICES
M. Abdel-Hameed and I. N. Shimi (Florida State Univ.) Jul. 1976 14 p refs
(Contract N00014-76-C-0840).
(AD-A029244) Avail: NTIS HC A02/MF A01 CSCL 12/1

Suppose that a device is subject to a sequence of shocks occurring randomly at times n = 1, 2....., according to a Poisson distribution. Shocks cause damage and damages accumulate additively. The device can be replaced before or at failure. The cost of replacement before failure depends on the cumulative damage at replacement time. Cost of replacement at failure is assumed to be a constant. In this paper, we derive the optimal replacement policy for such devices using the long run average cost criterion. Author (GRA)

N77-16925# Wisconsin Univ., Madison. Mathematics Research Center.
A STUDY OF BUFFER MANAGEMENT POLICIES FOR DATA MANAGEMENT SYSTEMS
Allen Reiter Mar. 1976 26 p refs
(Contract DAAG29-75-C-0024)
(AD-A027890; MRC-TSR-1619) Avail: NTIS HC A03/MF A01 CSCL 09/2

Using a simulation model, several buffer assignment algorithms were investigated experimentally. A simple least-recently-used (LRU) technique was compared with one which took into account the type of data and the number of current users (DS). Also investigated was the use of anticipatory fetching. Performance as a function of the number of available buffers was measured for each strategy. For the application and job mix in question it turns out that anticipatory fetching does not pay, and that DS in general behaves somewhat better than LRU. GRA

N77-16948*# National Aeronautics and Space Administration, Washington, D.C.
FULL EMPLOYMENT MAINTENANCE IN THE PRIVATE SECTOR
Gifford A. Young 1976 29 p Presented at 4th Ann. Atlantic Econ. Conf., Washington, D. C., 13-16 Oct. 1976 Submitted for publication
(NASA-TM-X-74334) Avail: NTIS HC A03/MF A01 CSCL 05C

Operationally, full employment can be accomplished by applying modern computer capabilities, game and decision concepts, and communication feedback possibilities, rather than accepted economic tools, to the problem of assuring invariant full employment. The government must provide positive direction to individual firms concerning the net number of employees that each firm must hire or refrain from hiring to assure national full employment. To preserve free enterprise and the decision making power of the individual manager, this direction must be based on each private firm's own numerical employment projections. Author

N77-16954*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
SUMMARY OF DEVELOPMENT AND RECOMMENDATIONS FOR A QUALITY ASSURANCE PROGRAM FOR THE PROCUREMENT AND MANUFACTURE OF URBAN MASS TRANSIT OPERATING EQUIPMENT AND SYSTEMS Final Report
Stephen A. Witkin Aug. 1976 23 p
(NASA-CR-149559; JPL-5040-35) Avail: NTIS HC A02/MF A01 CSCL 14D

A viable quality program for the urban mass transit industry, and a management approach to ensure compliance with the program are outlined. Included are: (1) a set of guidelines for quality assurance to be imposed on transit authorities, and a management approach to ensure compliance with them; (2) a management approach to be used by the transit authorities (properties) for assuring compliance with the QA guidelines; and (3) quality assurance guidelines to be imposed by properties and umta for procurement of hardware and systems. Author

N77-16955*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
QUALITY ASSURANCE PROGRAM GUIDELINES FOR APPLICATION TO AND USE BY MANUFACTURERS OF RAIL/GUIDEWAY VEHICLES, BUSES, AUTOMATIC TRAIN CONTROL SYSTEMS, AND THEIR MAJOR SUBSYSTEMS
Stephen A. Witkin Aug. 1976 33 p
(NASA-CR-149558; JPL-5040-34) Avail: NTIS HC A03/MF A01 CSCL 14D

Guidelines are presented for a quality assurance system to be implemented by the manufacturer in support of designing, developing, fabricating, assembling, inspecting, testing, handling, and delivery of equipment being procured for use in public urban mass transit systems. The guidelines apply to this equipment when being procured for: (1) use in revenue service; (2) demonstration of systems that will be revenue producing or used by the public; (3) use as a prototype for follow-on operational/revenue producing equipment procurements; and (4) qualification tests. Author

N77-17124# Committee on Science and Technology (U. S. House).
TRACKING AND DATA RELAY SATELLITE SYSTEM
Washington GPO 1976 36 p Hearing before Subcomm. on Space Sci. and Applications of Comm. on Sci. and Technol., 94th Congr., 2d Sess., No. 91, 21 Sep. 1976*
(GPO-78-978) Avail: Subcomm. on Space Sci. and Applications

The tracking and data relay satellite system will permit NASA to phase out ship, aircraft, and many ground stations facilities in meeting the support requirements of the space shuttle era. Two proposals received for TDRSS services from potential contractors are analyzed. The total costs of the leased approach are compared with the equivalent costs of a government owned or purchased system. Procurement contract negotiations are discussed. A.R.H.

N77-17134# Committee on Science and Technology (U. S. House).
OPERATIONAL COST ESTIMATES, SPACE SHUTTLE
Washington GPO 1977 24 p Rept. for Subcomm. on Space Sci. and Applications of Comm. on Sci. and Technol., 94th Congr., 2d Sess., Dec. 1976
(GPO-81-196) Avail: Subcomm. on Space Sci. and Applications

The rationale for NASA's estimated out of the pocket cost of $10.5 million (1971 dollars) per shuttle flight for 60 missions a year is given. Shuttle operating costs are used to develop the charge policy for various government and industrial users of the space transportation system. A comparison of various reimbursable service charges is included. A.R.H.

N77-17479# Bendix Corp., Kansas City, Mo.
GROUP TECHNOLOGY
C. P. Rome Jan. 1976 69 p refs Presented at CAM-1 Coding and Classification Workshop, St. Louis, 20 Jan. 1976
(Contract AT(29-1)-613)
(BDX-613-1478) Avail: NTIS HC A04/MF A01

A manufacturing philosophy directed toward increasing batch-lot production efficiency was conceptually applied to the manufacture of batch-lots of 554 machined electromechanical parts which now require 79 different types of metal-removal tools. The products are grouped into 7 distinct families which require from 8 to 22 machines in each machine-cell. Throughput time can be significantly reduced, and savings can be realized from tooling, direct-labor, and indirect-labor costs. ERA

N77-17548*# Washington Univ., St. Louis, Mo. Center for Development Technology.
PROGRAM ON EARTH OBSERVATION DATA MANAGEMENT SYSTEMS (EODMS) Final Report, 1 Jun. - 31 Dec. 1976
Lester F. Eastwood, Jr., John Kenneth Gohagan, Christopher T. Hill, Robert P. Morgan, Timothy R. Hays, Richard J. Ballard, Gregory R. Crnkovick, and Mark A. Schaeffer 31 Dec. 1976 268 p refs
(Contract NAS5-20680)
(NASA-CR-144845) Avail: NTIS HC A12/MF A01 CSCL 05B

An assessment was made of the needs of a group of potential users of satellite remotely sensed data (state, regional, and local agencies) involved in natural resources management in five states, and alternative data management systems to satisfy these needs are outlined. Tasks described include: (1) a comprehensive data needs analysis of state and local users; (2) the design of remote sensing-derivable information products that serve priority state and local data needs; (3) a cost and performance analysis of alternative processing centers for producing these products; (4) an assessment of the impacts of policy, regulation and government structure on implementing large-scale use of remote sensing technology in this community of users; and (5) the elaboration of alternative institutional arrangements for operational Earth Observation Data Management Systems (EODMS). It is concluded that an operational EODMS will be of most use to state, regional, and local agencies if it provides a full range of information services -- from raw data acquisition to interpretation and dissemination of final information products. Author

N77-17781# Defense Systems Management School, Fort Belvoir, Va.
MANAGEMENT INFORMATION SYSTEMS FOR THE US ARMY SATELLITE COMMUNICATIONS AGENCY
Edwin L. Cross May 1976 44 p refs
(AD-A029273) Avail: NTIS HC A03/MF A01 CSCL 05/1

This report describes the potential benefits which would accrue from a central computerized Management Information System (MIS) installed at the U.S. Army Satellite Communications Agency, and how such a system might be developed. GRA

N77-17817# Yale Univ., New Haven, Conn. School of Organization and Management.
BIASED VARIANCE ESTIMATORS FOR STATISTICAL INVENTORY POLICIES
John G. Klincewicz Aug. 1976 32 p refs
(Contract N00014-75-C-0241; Grant DAHC04-75-G-0079; NR Proj. 047-140; ARO Proj. P-11639-M)
(AD-A028960; TR-8) Avail: NTIS HC A03/MF A01 CSCL 05/1

In practice, scientific inventory decisions frequently are based on statistical estimates of the mean mu and variance ((s sup 2) of demand. This report examines the efficacy of modified variance estimates of the form beta (s sup 2), where the scaling factor beta is selected according to the criterion of minimizing expected total operating cost per period. Simulation experiments are run with a number of economic parameter settings for both cases of known and statistically estimated mean, and the value of using a beta value other than unity is assessed. GRA

N77-17924# Unternehmensberatung Zangemeister, Cologne (West Germany).
PLANNING AND MULTIPLE CRITERIA DECISION MAKING WITH NAPSY, A COMPUTERIZED SYSTEM FOR EVALUATING COMPLEX ALTERNATIVES Final Report
Christof Zangemeister Bonn Bundesmin. fuer Forsch. u. Technol. Oct. 1976 77 p refs In GERMAN; ENGLISH summary
(Contract BMFT-WRT-1073)
(BMFT-FB-W-76-19) Avail: NTIS HC A05/MF A01; ZLDI, Munich, DM 15,35

A survey is presented of the computerized decision making utility analysis system NAPSY. NAPSY is a flexible aid in management problem solving at multiple criteria level when complex alternatives have to be evaluated in regard to a hierarchically structured goal system by different experts. The system allows for sealing preferences, aggregation, and sensitivity analysis, which may be used in a stepwise man-machine problem solving process. ESA

N77-17925# Florida Univ., Gainesville. Dept. of Industrial and Systems Engineering.
AN ANALYTIC APPROACH FOR A CAPACITATED CPM PROBLEM
C. Stafford Loveland and Thom J. Hodgson May 1976 47 p refs
(Contract N00014-76-C-0096)
(AD-A028285; RR-76-12) Avail: NTIS HC A03/MF A01 CSCL 12/2

The capacitated C.P.M. problem with a single resource and jobs having unit duration and requiring a single unit of resource is formulated efficiently as a 0-1 linear integer program. Individual job precedences are combined into groups and modeled as multiple-precedence constraints. The problem of finding the optimal integer solution is one of finding a feasible basis to the linear program which contains the slack variables of the precedence constraints. The special case containing two multiple-precedence constraints is considered. It is shown that an optimal basis of a linear relaxation of the problem is at most two simplex pivots from the basis of an optimal integer solution. GRA

N77-17926# George Washington Univ., Washington, D.C. School of Engineering and Applied Science.
MINIMIZING THE COST OF COMPLETING A PROJECT SUBJECT TO A BOUND ON THE EXPECTED DELAY TIME
James E. Falk 14 May 1976 22 p refs
(Contract N00014-75-C-0729; NR Proj. 347-020)
(AD-A027882; Serial-T-336) Avail: NTIS HC A02/MF A01 CSCL 15/5

Given a project with well-defined events and activities, suppose the starting times of the activities are subject to random delays. Suppose it is possible to reduce the magnitude of these delays at additional cost. In this paper, we derive an expression for the total expected delay time of the project, and show that it can be expressed as the maximum of a number of linear expressions. To achieve at most a given expected delay time at minimum cost, we are led to examine an optimization problem with an excessively large number of linear constraints. A simple cutting plane algorithm is applied to the problem, yielding a practical method of solution. A non-convex example with five activities is used to illustrate the method. Author (GRA)

N77-17927# Naval Postgraduate School, Monterey, Calif.
AN IMPLEMENTATION OF A CODASYL BASED DATA BASE MANAGEMENT SYSTEM UNDER THE UNIX OPERATING SYSTEM M.S. Thesis
John Edward Howard Jun. 1976 168 p
(AD-A028893) Avail: NTIS HC A08/MF A01 CSCL 09/2

This thesis reports the implementation of a Data Base Management System (DBMS) based on the CODASYL design. The DBMS was implemented on a DEC PDP 11/50 computer utilizing the UNIX operating system. Background material includes a discussion of data base history and techniques, design of UNIX and the C programming language. The research performed was the adaptation of the CODASYL DBMS design to the UNIX environment and the design of a C language Data Description Language (DDL) and Data Manipulation Language (DML) to interface the DBMS to user programs. Conclusions and recommendations for improvements are also included. Author (GRA)

N77-17928# Naval Training Equipment Center, Orlando, Fla.
PRELIMINARY INVESTIGATIONS CONCERNING THE TRAINING OF TACTICAL DECISION MAKING BEHAVIOR Final Report, Jun. 1974 - Jan. 1976
R. H. Jr. Ahlers Jul. 1976 34 p refs
(AD-A028722; NAVTRAEQUIPC-IH-269) Avail: NTIS HC A03/MF A01 CSCL 05/9

An accelerating trend for military decision making in command and control situations is to provide the decision maker with statistically processed data. There are obvious benefits to be derived from training a decision maker to be a more efficient user of such diagnostic data. But there is little empirical evidence that training is effective in bringing about an enhancement of decision making performance. Two experiments are reported in which it was attempted to determine the effectiveness of a scenario approach for training individuals to make an abstract type of tactical decision based upon probabilistic data. GRA

N77-17929# Defense Systems Management School, Fort Belvoir, Va.
MANAGEMENT BY EXCEPTION: A DECISION PROCESS
George R. Baldwin May 1976 39 p refs
(AD-A028943) Avail: NTIS HC A03/MF A01 CSCL 05/1

The report reviews the history and background of the management by exception concept. The concept is a valid tool in management and is often neglected by managers. The management information and control system is also a tool to be utilized by management and provides an excellent base for the management by exception concept. Once the principles of the concept have been accepted, the project manager may be able to develop more accurate and timely decisions during the decision making process. The report further indicates that the utilization of automatic data processing equipment will enhance management operations and particularly the management by exception concept. GRA

N77-17930# Defense Systems Management School, Fort Belvoir, Va.
APPLICATION OF THE CRITICAL PATH METHOD NETWORK TECHNIQUE TO THE INTEGRATED LOGISTICS SUPPORT PLAN OF THE AIM-9L PROGRAM
Wallace T. Bucher May 1976 37 p refs
(AD-A028923) Avail: NTIS HC A03/MF A01 CSCL 05/1

The purpose of this report is to show how the logistics managers of the AIM-9L program initiated and used a Critical Path Method network to monitor and control the scheduling aspects of their program. The report begins by showing the environment in which the logistics managers were operating and the rationale for the employment of a networking technique. The selection process for the particular networking technique and computer program is shown in detail with emphasis on the selection criteria employed. The construction of the network through the use of a Precedence Diagram is then delineated. The use of the network is shown through the analysis of the output reports. This is intended to provide an example of how a network was successfully initiated and used in the AIM-9L logistics program. Author (GRA)

N77-17931# Defense Systems Management School, Fort Belvoir, Va.
CONTRACT DATA MANAGEMENT
Ronald J. Duddleston May 1976 51 p refs
(AD-A029272) Avail: NTIS HC A04/MF A01

It is the purpose of this paper to provide an overview of the discipline of contract data management and in particular the implementation of DOD data management policies within the NAVAL SEA SYSTEMS COMMAND and its Project Offices. To the end of trying to provide in a single paper that information required by a Program Manager to become sufficiently conversant in the discipline of data management to effectively and efficiently manage his program, this paper has been prepared. GRA

N77-17937# National Bureau of Standards, Washington, D.C.
DATA BASE DIRECTIONS: THE NEXT STEPS Final Report
John L. Berg, ed. Sep. 1976 177 p refs Conf. Proc. of the Workshop of the Natl. Bureau of Standards and the Association for Computing Machinery, Ft. Lauderdale, Fla., 29-31 Oct. 1975 Sponsored in part by the Association for Computing Machinery, Ft. Lauderdale, Fla., 29-31 Oct. 1975
(PB-258103/1; NBS-SP-451; LC-76-608219) Avail: NTIS HC A09/MF A01 CSCL 09B

A workshop of approximately 80 experts in five major subject areas was established. The five subject areas were auditing, evolving technology, government regulations, standards, and user experience. The proceedings provide guidance on steps managers should follow to prepare themselves and their organization for the installation of data base management concepts. GRA

N77-17940*# Lockheed Missiles and Space Co., Sunnyvale, Calif. Space Systems Div.
LOW COST PROGRAM PRACTICES FOR FUTURE NASA SPACE PROGRAMS, VOLUME 1 Final Report, Jun. 1974 - Dec. 1975
15 Dec. 1975 65 p
(Contract NASw-2752)
(NASA-CR-149656; LMSC-D469858-Vol-1; LMSC-D469857-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 05C

The progress and outcomes of a NASA/HQ indepth analysis of NASA program practices are documented. Included is a survey of NASA and industry reaction to the utility and application of a Program Effects Relationship Handbook. The results and outcomes of all study tasks are presented as engineering memoranda as the appendix. Author

N77-17941*# Lockheed Missiles and Space Co., Sunnyvale, Calif. Space Systems Div.
LOW COST PROGRAM PRACTICES FOR FUTURE NASA SPACE PROGRAMS. VOLUME 2: APPENDIX Final Report
15 Dec. 1975 487 p refs
(Contract NASw-2752)
(NASA-CR-149657; LMSC-D469858-Vol-2-App; LMSC-D469857-Vol-2-App) Avail: NTIS HC A21/MF A01 CSCL 05C

For abstract, see N77-17940.

N77-17942# Committee on Science and Technology (U. S. House).
NASA AUTHORIZATION, 1978, VOLUME 1, PART 1
Washington GPO 1977 655 p refs Hearings on H.R. 2221 before Subcomm. on Space Sci. and Applications of Comm. on Sci. and Technol., 94th Congr., 2d Sess., 14-16 Sep. 1976
(GPO-79-706) Avail: Subcomm. on Space Sci. and Applications

NASA research and development activities are described in detail to justify allocations authorized in the budget. A.H.

N77-17943# Committee on Science and Technology (U. S. House).
NASA AUTHORIZATION, 1978, VOLUME 2, PART 1
Washington GPO 1976 259 p refs Hearings on H.R. 2221 before Subcomm. on Aviation and Transportation R and D of the Comm. on Science and Technol., 94th Congr., 2d Sess., 14-15 Sep. 1976
(GPO-70-664) Avail: Subcomm. on Aviation and Transportation R and D

For abstract, see N77-17942.

N77-17955# Environmental Protection Agency, Washington, D.C. Office of Solid Waste Management Programs.
DESIGN CRITERIA FOR SOLID WASTE MANAGEMENT IN RECREATIONAL AREAS
Harry R. Little 1972 76 p refs
(PB-258597/4; EPA-SW-91ts) Avail: NTIS HC A05/MF A01 CSCL 13B

Because of the periods of low usage that occur in recreational areas, the overall solid waste disposal system cost on a basis of dollars per ton or per can is much higher than in an urban area where continuous use tends to reduce the unit cost. Data from recent studies, demonstrations, and research projects are presented for consideration in designing a system. GRA

N77-17970# Action for Bridgeport Community Development, Inc., Conn.
FRONT END RECYCLING: A STUDY OF THE ECONOMICS OF RECYCLING BY SOURCE SEPARATION AND ITS APPLICATION FOR FAIRFIELD COUNTY, CONNECTICUT
Ronald Fattibene and Irving Moy Jun. 1976 94 p refs Sponsored by the Conn. Resources Recovery Authority and the Economic Development Admin.
(PB-257404/4; EDA-76-043) Avail: NTIS HC A05/MF A01 CSCL 13B

The feasibility of a technology system for recycling by source separation and to determine the practicability of instituting such a system and the resulting economic impact of such an enterprise in Fairfield County is assessed. Factors to be explored in the course of the study were creation of new jobs, new business, cost benefits from the sale of recycled materials, and cost savings to communities. Conclusions and recommendations reflect the system as it existed at this writing. GRA

N77-17971# Urban Mass Transportation Administration, Washington, D.C. Office of Policy and Program Development.
TRANSPORTATION SYSTEM MANAGEMENT: A BIBLIOGRAPHY OF TECHNICAL REPORTS Final Report
Richard L. Oram May 1976 153 p Sponsored in part by Federal Highway Admin., Washington, D.C.
(PB-257273/3; UMTA-UPP-L-76-1) Avail: NTIS HC A08/MF A01 CSCL 13B

Descriptions and availability information on over 150 reports dealing with low capital, short range, or policy oriented urban transportation improvements are included and classified into 9 sections. The first, General, includes transportation management overviews, survey reports on the various operational approaches and strategies for improved transportation efficiency, and demonstration program reports. The remaining sections contain more focused reports in the following areas: Preferential Treatment for High Occupancy Vehicles, Traffic Operations, Parking Management, Transit Improvements, Transit Management, Pooling and Paratransit. GRA

N77-18045# RAND Corp., Santa Monica, Calif.
SCHEDULED MAINTENANCE POLICIES FOR THE F-4 AIRCRAFT: RESULTS OF THE MAINTENANCE POSTURE IMPROVEMENT PROGRAM
Ralph Elwell and Chris Roach Jun. 1976 75 p refs
(Contract F44620-73-C-0011)
(AD-A030146; R-1942-PR) Avail: NTIS HC A04/MF A01 CSCL 01/3

Maintenance procedures for the F-4 aircraft in support of the AF Maintenance Posture Improvement Program were examined. The F-4 has been receiving maintenance on two independent schedules, one being a major calendar-based overhaul at a depot, the other being less drastic maintenance phased into six evenly spaced inspections and cyclically performed at the air base every 450 flying hours. It was found that: (1) certain minor inspections were unnecessary or unnecessarily frequent; (2) it was possible, with safety, to extend the base to 600 hours; and (3) many individual base inspections could be performed more efficiently during the dismantling at the depot. With all three steps implemented, it is estimated that, for the entire F-4 force, 1,537,500 maintenance man-hours (over 70 percent) per year would be saved. Furthermore, the number of aircraft tied up in the inspection docks on any given day would be reduced nearly 70 percent -- from 129 to 41. GRA

N77-18046# Saint Louis Univ., Cahokia, Ill. Parks Coll.
AH-1G FLAT RATE MANUAL Final Report, 1 Jul. 1970 - 1 Jul. 1974
Harold W. Sutphin, William E. Brand, and Gary Crawford 30 Aug. 1976 415 p refs
(Contract DAAJ01-72-A-0027)
(AD-A029933; USAAVSCOM-TR-76-40) Avail: NTIS HC A18/MF A01 CSCL 15/5

The purpose of this Flat Rate Manual is to provide statistical man-hour parameters for the performance of tasks involved at the Organizational, Direct, and General maintenance levels for the AH-1G aircraft. It is intended for evaluating and predicting maintenance requirements and/or comparing the performance of an activity against a recognized standard. Author (GRA)

N77-18121# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
A COMPUTER-ASSISTED METHOD FOR DETERMINING LOGAIR ROUTE STRUCTURES M.S. Thesis
Michael F. McPherson Jun. 1976 82 p refs
(AD-A030288; SLSR-17-76A) Avail: NTIS HC A05/MF A01 CSCL 15/5

This study developed a computer-assisted method for determining LOGAIR route structures. A Mixed-integer model was used to develop the route structures. The objective was to minimize contract cost which was expressed as a function of miles flown and landings. The Honeywell LP6000 package was used to solve the model. The computer-assisted method was tested for FY 75 and FY 76. The computer-assisted method solutions were compared to the routes used by AFLC during FY 75 and FY 76. The results show that the computer-assisted method obtained an estimated savings of approximately $2 million in FY 75 and $1 million in FY 76. The writers conclude that the computer method is a useful tool for developing route structures and recommend the procedure be adopted by AFLC. Author (GRA)

N77-18124# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
A MATHEMATICAL MODEL FOR DETERMINING LOGAIR FLIGHT SCHEDULES M.S. Thesis
K. D. Moberly and Theodore C. Gorychka Jun. 1976 100 p refs
(AD-A030295; SLSR-27-76A) Avail: NTIS HC A05/MF A01 CSCL 15/5

Logistics Air Transportation System (LOGAIR) is a contracted priority cargo airlift service operated by the United States Air Force. An important problem facing the LOGAIR system is the amount of pipeline time incurred by cargo moving through the system. This thesis develops a mathematical model which reduces pipeline time. The model is a linear program that produces a schedule of aircraft arrival and departure times for a specified route structure consisting of flights and stations. The objective function is structured to minimize ground time for cargo moving station to station on the same flight, and for cargo transferring between flights. The model solution produced an optimum schedule for six flights connecting eleven stations with sixteen transfers in the LOGAIR system. Analysis indicated a significant reduction in pipeline time when compared to an actual LOGAIR schedule that was manually formulated. Author (GRA)

N77-18151# Army Command and General Staff Coll., Fort Leavenworth, Kansas.
THE AEROCRANE IN LOTS OPERATIONS M.S. Thesis. Final Report
John Robert Hauser, Jr. 11 Jun. 1976 78 p refs
(AD-A029793) Avail: NTIS HC A05/MF A01 CSCL 13/10

The Army has relied on Logistics Over the Shore (LOTS) operations to resupply forces already ashore in the absence of adequate fixed port facilities. Large scale use of containers has become standard operating procedure in the Army. Proposals have been made to meet these new requirements. One such proposal resulted in the testing of all currently available lighterage vehicles and the adoption of the Lighterage Air Cushion Vehicle (LACV-30) to support containerized LOTS operations. Another more recent proposal has been the use of the Aerocrane as a potential lighterage vehicle. The thesis investigated this relatively new development to determine the feasibility of using Aerocranes in LOTS operations and their advantage in comparison with current Army lighterage. The conclusion is that the Aerocrane is both more responsive and more cost effective and should be adopted to support containerized LOTS operations. GRA

N77-18162# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
THE ENGINE ACTUARIAL SYSTEM M.S. Thesis
Robert J. Carlson and Richard J. Smith Jun. 1976 144 p refs
(AD-A030312; SLSR-7-76A) Avail: NTIS HC A07/MF A01 CSCL 21/5

The purpose of this study was to examine the method for collecting historical engine data and the influence of various managerial decisions on engine workload forecasts. The J79-GE-15 and TF30-PW-7 engines were selected for this study and were assumed to be representative of engines with large and small inventories. The data base was prepared from approximately 180,000 AF Form 1534's (Engine Status Report). The authors concluded that cluster sampling procedures could significantly reduce the number of bases required to report engine failure data. In addition, it was noted that small changes in the managerial decisions which establish planning factors related to flying hour programs, Maximum Operating Time (MOT), Jet Engine Base Maintenance Return Rate (JEBM/RR), and Dependability Index (DI) could significantly affect the actuarial forecast. Further research is recommended to develop a deterministic method of establishing MOT, JEBM/RR, and DI factors. The data handling tools developed by this research are included as appendixes for use by future researchers. Author (GRA)

N77-18172# European Space Research and Technology Center, Noordwijk (Netherlands). Structures and Thermal Control Div.
EUROPEAN SPACE TRIBOLOGY LABORATORY MANAGEMENT PROCEDURES HANDBOOK
1 Nov. 1976 21 p
(ESA-PSS-06-Issue-2) Avail: NTIS HC A02/MF A01

A description is given of the management structures by which ESTL is operated, the constitution and responsibilities of the management bodies and the key individuals, and the procedures to be used to implement the management policies decided on from time to time by ESA. These procedures are mandatory, and alterations, additions, or amendments to them will be made only with the agreement of the Steering Group acting on behalf of the ESTEC Directorate. Author (ESA)

N77-18215# Oak Ridge National Lab., Tenn.
WORKSHOP ON TECHNICAL ASSESSMENT OF INDUSTRIAL THERMAL INSULATION MATERIALS: SUMMARY
S. Peterson, ed. Jul. 1976 28 p refs Proc. held at Oak Ridge Tenn., 24 Mar. 1976
(Contract W-7405-eng-26)
(ORNL-TM-5515) Avail: NTIS HC A03/MF A01

Presentations on the performance of available materials, economic considerations, and measurement problems were followed by discussion. A final wrap-up session concluded that the report was valuable in pointing the direction for needed effort in the area, confirmed the indicated actions needed to further industrial application of insulation, and called for future meetings to continue the dialogue between the various facets of the industry. ERA

N77-18468# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
THE EFFECTS OF RENEWAL PROCESSES UPON STOCHASTIC RELIABILITY MODELS M.S. Thesis
Louis A. Dugas, Jr. and David H. Hartmann Jun. 1976 279 p refs
(AD-A030297; SLSR-16-76A) Avail: NTIS HC A13/MF A01 CSCL 15/5

Maintenance policies for stochastically failing equipment determine the timing and extent of component replacement. The reliability of the assembly and the demands for assemblies are affected by the replacement of components. Policies may include preventive or opportunistic maintenance. A discrete-event stochastic simulation model is used to determine time related reliability and demand patterns. The model utilizes the Simscript II.5 language. The emphasis of this study is upon the transition period to include the introduction phase of new assemblies until steady state to examine aggregate mean time between failures and demands for assemblies. The assemblies modeled consisted of components with increasing, decreasing, and constant failure rates. Combinatorial assemblies employing various component failure rates are also modeled to examine the bathtub failure distribution. The data for the combination of five policies and nine type of assemblies are graphically displayed. It was discovered that certain combinations of policies and unit types produced unexpected peaks in aggregated assembly failure rates and demands. Author (GRA)

N77-18585# Federal Energy Administration, Washington, D.C. Office of Regulation Development.

PROPOSED ENERGY CONSERVATION CONTINGENCY PLAN: EMERGENCY COMMUTER PARKING MANAGEMENT AND CARPOOLING INCENTIVES. ECONOMIC IMPACT ANALYSIS. ENVIRONMENTAL IMPACT ASSESSMENT Contingency Plan No. 2

Sep. 1976 214 p refs

(PB-258625/3; FEA/H-76/431) Avail: NTIS HC A10/MF A01 CSCL 10A

The economic impact of a plan whose objective is to reduce demand for gasoline by restricting the availability of auto parking for commuters and encouraging commuters to form carpools or use mass transit during a supply interruption is described. GRA

N77-18628# Army Construction Engineering Research Lab., Champaign, Ill.

AIR POLLUTION SURVEY GUIDELINES FOR ARMY INSTALLATIONS Final Report

Bernard A. Donahue and Gary W. Schanche Jul. 1976 51 p refs

(DA Proj. 4A1-62121-A-896)

(AD-A029633; CERL-TR-N-5) Avail: NTIS HC A04/MF A01 CSCL 13/2

This report on air pollution survey techniques is the second of a series presenting solid waste, air pollutions, and water pollution survey guidelines. It is intended primarily for use by installation planning, operating, and maintenance personnel. The report presents guidelines for developing a comprehensive air pollution management plan and contains information on emission inventory procedures, source categorization, emission calculations, and regulation comparisons. Air pollution dispersion is discussed, along with factors affecting dispersion, such as source characteristics, meteorological factors, and physiological effects. A section about ambient air monitoring discusses the classification of common air pollutants and some general principles of an ambient air-monitoring network, such as instrument selection and optimum instrument siting. GRA

N77-18791# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

AN EXPLORATORY STUDY OF SOFTWARE COST ESTIMATING AT THE ELECTRONIC SYSTEMS DIVISION M.S. Thesis

Thomas J. Devenny Jul. 1976 163 p refs

(AD-A030162; GSM/SM/76S-4) Avail: NTIS HC A08/MF A01 CSCL 09/2

The estimate of software development cost is the key piece of information in many software management decisions. No technique exists which can consistently produce the reliable and accurate cost estimates which managers need. This thesis research effort explored the software cost estimating process at the Electronic Systems Division of the Air Force Systems Command. The purpose of the research was to provide managers, researchers, and cost estimators with a better insight into the cost estimating process. Data were gathered from 16 major software acqusitions at ESD using both a structured interview and contractor furnished Cost performance Reports. The research findings identified some major problems which are currently inhibiting the development of accurate and reliable software cost estimates. To reduce these problems, recommendations are made to adopt a common cost estimating technique and to modify the use of contractor furnished software cost information. While the research was limited to ESD, the research findings and the recommendations may be applicable to other DoD software acquisition agencies. Author (GRA)

N77-18804# California Univ., Livermore. Lawrence Livermore Lab.

MINICOMPUTER BASED, CONTROLLED MATERIALS INFORMATION SYSTEM

N. Roberts, T. Jessen, O. Meadows, and D. Seibel 1 Jun. 1976 7 p refs Presented at the 17th Ann. Meeting of the Inst. of Nucl. Mater. Management, Seattle, 23 Jun. 1976

(Contract W-7405-eng-48)

(UCRL-78215; Conf-760615-3) Avail: NTIS HC A02/MF A01

The LLL, Materials Management Group and Data Processing Services developed a transaction-oriented, minicomputer system for the management of the Laboratory's controlled materials. The system consists of a multi-vendor hardware system designed for ease of operation, maximum reliability, and quick response and the requirements imposed on the hardware and software systems are discussed. GRA

N77-18940# Defense Dept., Washington, D.C.

MANAGING KNOWLEDGE AS A CORPORATE RESOURCE

J. F. Berry and C. M. Cook 28 May 1976 71 p refs

(AD-A029891) Avail: NTIS HC A04/MF A01 CSCL 05/10

Knowledge (as opposed to data or information) is proposed as a basic resource of an enterprise. The differences and interdependencies among data, information, and knowledge are discussed along with some ideas on what constitutes effective knowledge management for an enterprise. Three views of data management (Structural, Functional, and Physical) are put forward as necessary to the proper understanding of the data management activity of an enterprise. The Structural View is used to outline potential problems in knowledge management and to list several areas where further research and development are needed. Finally, a logical system design for possible implementation is suggested along with a discussion of essential managerial steps which should be taken to achieve corporate knowledge management. Author (GRA)

N77-18942# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.

THE WRM INFORMATION SYSTEM M.S. Thesis

Dennis A. Carlson and Carlos M. Talbott, Jr. Jun. 1976 185 p refs

(AD-A030242; SLSR-15-76A) Avail: NTIS HC A09/MF A01 CSCL 05/1

In this research, an information system was developed which analyzes MAJCOM WRM data files. The system manipulates data in the RCS: HAF LGS (M) 7107 report and the WCDO, WMP-V, and 2C data files to provide overage and shortage inventory information. Further, it provides an ability to compute WRM requirements for any unplanned contingency force and to compare those requirements with on-hand status information. The FORTRAN program was written to investigate the following research hypothesis: given changes in a USAF general war or contingency plan, the response time in determining the adjustments to be made in WRM stockpiles can be reduced by automated analysis of WRM data files. Statistical and operational evaluations supported this hypothesis. The research also addresses several management information system design considerations used in developing the prototype system. The considerations differentiate data from information and suggest

that automated analysis systems should produce information useful for managerial decision making. Included with the research are the computer program and instructions for its implementation and operation. Author (GRA)

N77-18943# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

A STUDY OF INFLUENCE METHODS USED BY PROJECT AND FUNCTIONAL MANAGERS IN A MATRIX ORGANIZATIONAL ENVIRONMENT M.S. Thesis

Leonard J. Melhart, Jr. Jul. 1976 165 p refs

(AD-A030299; GSM/SM/76S-18) Avail: NTIS HC A08/MF A01 CSCL 05/1

Modern development projects are costly and involve many complex interdependent tasks. To facilitate the accomplishment of these tasks, the matrix organizational concept has evolved. It is employed by both industry and government and is intended to aid the decision making process by allowing flexible horizontal and diagonal relationships. A unique feature of this concept is the multiple supervision of project personnel. In essence, project personnel have a dual allegiance to and are influenced by project and immediate functional managers. Under this arrangement project managers do not have formal authority over project personnel and therefore must rely on other types of influence methods. The influence methods that are exercised in this unique situation are the primary concern of this study. GRA

N77-18944# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.

AN ANALYSIS OF THE RELATIONSHIP BETWEEN MANUFACTURER ASSEMBLY TIME AND INTERMEDIATE-LEVEL MAINTENANCE REPAIR TIME M.S. Thesis

Prescott D. Farris Jun. 1976 73 p refs

(AD-A030229; SLSR-11-76A) Avail: NTIS HC A04/MF A01 CSCL 15/5

Numerous models have been developed for predicting logistic support costs of which intermediate-level maintenance repair time is an important consideration. However, the major problem is obtaining accurate input data elements to drive the models. The current technique of using historical data extrapolation has proven successful in some cases, yet additional improvement is required. One approach which could circumvent the utilization of historical data is the use of the manufacturer's initial assembly time to predict the intermediate-level maintenance time required to repair a unit. The purpose of this study was to evaluate the relationship between assembly time and repair time. Avionics communication-navigation units were selected as a study vehicle, and the relationship was statistically analyzed through regression analysis. The results obtained failed to indicate that a significant relationship exists between manufacturer assembly time and intermediate-level maintenance repair time; therefore, the study did not provide a viable alternative to the use of the historical data for predicting maintenance repair time. GRA

N77-18945# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.

AN INVESTIGATION OF THE DCAS MANAGEMENT INFORMATION SYSTEM AS A SOURCE OF INFORMATION FOR ALLOCATION OF PROCUREMENT QUALITY ASSURANCE MANPOWER RESOURCES M.S. Thesis

Louis R. Albani, William J. Manley, and Roger A. Sindle Jun. 1976 95 p refs

(AD-A030313; SLSR-6-76A) Avail: NTIS HC A05/MF A01 CSCL 15/5

This research was directed at determining if the Dayton Defense Contract Administration Service District (DCASD) Management Information System (MIS) could be of value to the Quality Assurance (QA) manager in the allocation of manpower resources. Data representing 131 contractors under the cognizance of the Dayton DCASD during the period July through December 1975 were collected and analyzed. One data element reported in the MIS, corrective action hours, was expected to be related to product quality. The research was aimed at determining what QA activities and other MIS variables were predictors for the number of hours expended in corrective action. Multiple regression analysis was used both to describe the existing relationships between corrective action hours as a dependent variable and the independent variables in the MIS, and to develop a model useful in predicting corrective action hours. GRA

N77-18946# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.

APPLICABILITY OF DESIGN-TO-COST TO SIMULATOR ACQUISITION M.S. Thesis

Kaleem Hazer, Jr. and Daniel L. Ringler Jun. 1976 168 p refs

(AD-A030231; SLSR-36-76A) Avail: NTIS HC A08/MF A01 CSCL 14/1

A decision model for determining the appropriateness of applying the Design-to-Cost (DTC) concept to a particular weapons acquisition program had not previously been available within the Air Force Systems Command (AFSC). To formulate such a model, an extensive literature review was made to identify program characteristics which other writers considered necessary or desirable to the successful application of the DTC concept. A set of these characteristics was validated through a structured managerial interview schedule. From this set of characteristics the decision model was designed and applied to the AFSC simulator acquisition process as an example for employing the model. Although many of the characteristics applicable to DTC were also applicable to simulator acquisitions, the authors concluded from the model that the DTC concept would not be applicable for the few simulators normally procured in a small but highly competitive civilian market. However, if a large number of simulator systems had to be procured and then produced on an assembly line basis or if a new system or component that was not available in private industry had to be developed, then DTC would be applicable. This decision model can be applied to other AFSC acquisition programs. Author (GRA)

N77-18952# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.

A TAXONOMY OF COST ESTIMATING CHARACTERISTICS AS APPLIED TO AN AIRCRAFT REPLENISHMENT SPARES MODEL M.S. Thesis

Eric E. Nelson and William E. Smith Jun. 1976 206 p refs

(AD-A030239; SLSR-01-76A) Avail: NTIS HC A10/MF A01 CSCL 15/5

Department of Defense cost estimation requires improvement, particularly as it applies to budgetary estimates for major weapon system acquisitions. This research explores ways of improving cost estimating methodology by the development of a taxonomy of cost estimating characteristics which may be used as a guide in constructing and evaluating cost estimating models. Such a guide was developed on a framework of systems theory and applied to the construction of a conceptual model designed to estimate replenishment investment spares budgetary requirements for the Air Force Logistics Command (AFLC) in support of major weapon systems acquisitions. The taxonomy of cost estimating characteristics was then used to evaluate the conceptual model and the present AFLC replenishment investment spares model. The research demonstrated the usefulness of a taxonomy of cost estimating characteristics and concluded that budgetary estimates for replenishment investment spares could be improved. Author (GRA)

N77-18953# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.

LIFE CYCLE COST MODELS FOR DURABLE VERSUS DISPOSABLE PACKAGE DECISIONS M.S. Thesis

James A. Arnestad and Samuel C. Emerson Jun. 1976 118 p refs

(AD-A030293; SLSR-26-76A) Avail: NTIS HC A06/MF A01 CSCL 15/5

The Department of Defense (DOD) and its service branches have placed increasing attention on defense expenditures. The importance of finding new cost reduction methods cannot be over-emphasized. DOD packaging costs are significant. These costs can probably be reduced by the application of proven management techniques. This research effort applies accepted life cycle cost techniques to the area of packaging decisions.

The application of these techniques can act as a decision tool for selecting preferred alternatives. Air Force Logistics Command (AFLC) packaging managers have indicated that a life cycle cost model would be of invaluable assistance to their Air Logistics Center (ALC) item managers (IM) as well as Air Force Systems Command's System Program Offices (SPO), in the selection of package types. GRA

N77-18955# California Univ., Livermore. Lawrence Livermore Lab.
METHOD OF ASSESSING STRATEGIES FOR TRANSPORTATION ENERGY CONSERVATION
C. J. Anderson and S. J. LaBelle Apr. 1976 17 p refs
(Contract W-7405-eng-48)
(UCRL-52051) Avail: NTIS HC A02/MF A01

A method of strategy assessment is proposed to guide the analyst in developing energy conservation programs in the transportation sector. The strategies are described and their impacts projected within a well defined future (the scenario). The impacts on selected decision variables such as economic impact or energy use impact are assessed. A decision is made based on a judgment of values and priorities are set upon which to make recommendations. ERA

N77-18956# Massachusetts Univ., Amherst. Water Resources Research Center.
EFFECTIVENESS OF INFORMATION TRANSFER THROUGH WATER RESOURCES RESEARCHER/USER GROUP INTERACTION Completion Report
Ruth Kreplick and John C. Sawyer Jun. 1976 157 p refs
(Contract DI-14-31-0001-5021; OWRT Proj. A-076-MASS(1))
(PB-258767/3; Completion-FY-76-17; Pub-73; W77-00151)
Avail: NTIS HC A08/MF A01 CSCL 05K

The interpersonal user group approach was utilized to communicate relevancy of water resources research to local, state, and federal agency personnel. Approximately 100 professionals participated in stages of the project, from experience interviews to interaction in 18 informal meetings. Discussion is presented in the context of pertinent studies, communication patterns and systems, perceptions of institutional arrangements, current utilization and fields related to research utilization. The effectiveness of interpersonal communication was measured by a questionnaire on the awareness and attitude dimensions. GRA

N77-18961# Environmental Protection Agency, Washington, D.C. Office of Solid Waste Management Programs.
DECISION-MAKERS GUIDE IN SOLID WASTE MANAGEMENT
Robert A. Colonna, Cynthia McLaren, and Emily Sano, ed. 1976 187 p refs
(PB-258266/6; EPA-SW-500) Avail: NTIS HC A09/MF A01 CSCL 13B

A guide discussing key issues of solid waste management in a decision-making context is presented. It attempts to anticipate all of the important decisions which local government managers must make in the effort to develop and operate solid waste programs in a responsive, cost-effective manner. Each chapter presents an issue, describes the alternatives, gives the advantages and disadvantages, and concludes with a summary statement which may include an EPA recommendation on the issue. GRA

N77-18962# Environmental Protection Agency, Washington, D.C.
MODEL PLAN OF STUDY, SUPPLEMENT TO: GUIDANCE FOR PREPARING A FACILITY PLAN, MUNICIPAL WASTEWATER TREATMENT WORKS CONSTRUCTION GRANTS PROGRAM
Mar. 1976 13 p Sponsored by EPA
(PB-257650/2; EPA-430/9-76-004-Suppl; EPA-MCD-24) Avail: NTIS HC A02/MF A01 CSCL 13B

A fictitious community is used to illustrate the amount of detail required from a grant applicant to fulfill regulatory requirements for preparing a plan of study for construction of a publicly owned facility in a small or medium size community. GRA

N77-18963# Environmental Protection Agency, Washington, D.C. Municipal Construction Div.
FEDERAL GUIDELINES: INDUSTRIAL COST RECOVERY SYSTEMS, MUNICIPAL WASTEWATER TREATMENT WORKS CONSTRUCTION GRANTS PROGRAM
Feb. 1976 32 p refs
(PB-257651/0; EPA-MCD-45) Avail: NTIS HC A03/MF A01 CSCL 13B

The Federal Water Pollution Control Act Amendments of 1972 require that industrial users of municipal wastewater treatment works make payments for the portion of the cost of construction of such treatment works (as determined by the Administrator) which is allocable to the treatment of such industrial wastes. These guidelines are published to establish general minimum guidance and to inform industrial users, grantees, regional administrator, and the public concerning industrial cost recovery. The guidelines increase understanding, assist preparation, simplify evaluation, and accelerate approval, implementation and maintenance of industrial cost recovery systems. GRA

N77-18972# Virodyne Corp., Littleton, Colo.
TECHNOLOGY ASSESSMENT FOR NEW WATER DEVELOPMENT PROJECTS, VOLUME 1 Final Technical Completion Report
J. C. Kellogg Aug. 1976 499 p refs
(Contract DI-14-31-0001-9062)
(PB-259276/4; W77-00527; OWRT-C-4319(9062)(1)) Avail: NTIS HC A21/MF A01 CSCL 13B

In using the theme that water resources planning is future-oriented, methods of technology assessment are utilized for tracing possible effects of legislative proposals, technologies or other water actions and programs which may pre-ordain a whole lifestyle change in the region. Three clusters of technology assessment methods are used to illustrate the usefulness of this approach, namely descriptive (e.g., dynamic modeling and cross-impact matrices); predictive (such as trend extrapolation and correlation); and, prescriptive (includine Delphi, decision trees and scenarios). GRA

N77-18974# Public Technology, Inc., Washington, D.C.
TRANSPORTATION FOR ELDERLY AND HANDICAPPED PERSONS. AN INFORMATION BULLETIN OF THE TRANSPORTATION TASK FORCE OF THE URBAN CONSORTIUM OF TECHNOLOGY INITIATIVES
Beth Irons French Oct. 1976 37 p refs
(Contract DOT-OST-60076)
(PB-258734/3; DOT-TST-77-9) Avail: NTIS HC A03/MF A01 CSCL 13B

Legislative background of the handicapped and elderly problem is presented. User groups are examined and system services characteristics are reviewed. An overview of equipment and service coordination issues are provided. Also included are a list of contacts and a bibliography. Author

N77-18976# Environmental Protection Agency, Washington, D.C.
DRAFT GUIDELINES FOR STATE AND AREAWIDE WATER QUALITY MANAGEMENT PROGRAM DEVELOPMENT
Feb. 1976 344 p
(PB-259507/2) Avail: NTIS HC A15/MF A01 CSCL 13B

Guidelines to assist the States in setting up a management program and institutional arrangements to integrate water quality and other resource management decisions are presented. Development and implementation of State Water Quality Management Plans so that the longer range goals of the Federal Water Pollution Control Act Amendments of 1972 can be met is emphasized. To achieve these goals, it will be necessary to develop a water quality management process at the State and local level that assures continuous planning for and implementation of pollution control measures. GRA

N77-19078# California Univ., Livermore. Lawrence Livermore Lab.
HIGH-PRESSURE SAFETY AT THE LAWRENCE LIVERMORE LABORATORY, AN ENERGY RESEARCH FACILITY

W. A. Burton 6 May 1976 23 p Presented at Intern. Joint Pressure Vessels and Piping and Petrol. Mech. Eng. Conf., Mexico City, 19-23 Sep. 1976 Revised
(Contract W-7405-eng-48)
(UCRL-77724-Rev-1; Conf-760905-8) Avail: NTIS HC A02/MF A01

A high pressure safety program geared towards preventing lost time high pressure accidents is studied. Program organization, personnel training and qualification, pressure vessel criteria and documentation, and pressure testing and inspection are discussed. ERA

N77-19079# Los Alamos Scientific Lab., N.Mex.
COMPUTER-ASSISTED ESTIMATING FOR THE LOS ALAMOS SCIENTIFIC LABORATORY
James E. Spooner Feb. 1976 15 p
(Contract W-7405-eng-36)
(LA-6254-MS) Avail: NTIS HC A02/MF A01

An analysis is made of the cost estimating system currently in use at the Los Alamos Scientific Laboratory (LASL), and the benefits of computer assistance are evaluated. A computer-assisted estimating system (CAE) is proposed for LASL. CAE decreases turnaround and provides more flexible response to management requests for cost information and analyses. It enhances value optimization at the design stage, improves cost control and change order justification, and widens the use of cost information in the design process. ERA

N77-19107*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
STOCHASTIC MODELS FOR SOFTWARE PROJECT MANAGEMENT
R. C. Tausworthe *In its* The Deep Space Network 15 Feb. 1977 p 118-126 ref

Avail: NTIS HC A13/MF A01 CSCL 05A

A method for determining the number and characteristics of milestones to be achieved during a development project is presented in order that effective monitors of progress can be provided. Projections of progress data lead to estimates of the completion with determinable accuracy, but accuracy imposes a requirement that the number of milestones be inversely proportional to the estimate-error variance, and that the milestones themselves be defined in such a way that each represents approximately the same level of effort to complete. Author

N77-19483# Army Scientific Advisory Panel, Washington, D.C.
REVIEW OF DARCOM'S USE OF RELIABILITY GROWTH MANAGEMENT TECHNIQUES
Gerhard Reethof 1 Aug. 1976 17 p
(AD-A031102) Avail: NTIS HC A02/MF A01 CSCL 14/4

A review of reliability growth management techniques attempts to answer the questions: Is the reliability growth effort, as currently applied, a worthwhile activity in terms of aiding the decision-making processes and affecting the course of development programs? Specifically, has the reliability growth methodology affected decisions at the technical and managerial level? How can the reliability growth concept application be strengthened and improved? Author (GRA)

N77-19619# Sandia Labs., Albuquerque, N.Mex.
PERSPECTIVE ON MATERIALS IN THE ENERGY PROGRAM
R. S. Claassen 22 Jan. 1976 34 p refs Presented at Distinguished Lecture Series 2, Albuquerque, N. Mex. 22 Jan. 1976 Sponsored by ERDA
(SAND-76-5155) Avail: NTIS HC A03/MF A01

The uses of energy and the forms that energy must take to be consumable are summarized. Financial aspects, particularly capitalization problems and fuel expenses, are covered. A brief description of the materials problems are discussed. ERA

N77-19924# Army Logistics Management Center, Philadelphia, Pa.
FORECASTING OF SECONDARY ITEM RETURNS Final Report
Richard M. A. Urbach Aug. 1976 25 p ref
(AD-A030343; IRO-243) Avail: NTIS HC A02/MF A01 CSCL 15/5

A family of Return Rate models using a Kalman Filter to estimate unserviceable returns per unit of program (Flying Hours or Item Density) is examined. A comparison--based on several measures of forecast error--is made with the current forecasting model of unserviceable returns per unit of demand. The current model produces forecast errors 10 to 20 percent higher than the Kalman Filter models. GRA

N77-19933# California Univ., Berkeley. Lawrence Berkeley Lab.
ECONOMIC MODELING: AN AID TO THE PRICING OF INFORMATION SERVICES
Harriet W. Zais Aug. 1976 16 p refs Presented at the Ann. Meeting of the Am. Soc. for Inform. Sci., San Francisco, 5 Oct. 1976
(Contract W-7405-eng-48)
(LBL-4899; Conf-761011-3) Avail: NTIS HC A02/MF A01

Components of the pricing decision are identified: the pricing objectives pursued, the pricing policies these aims are translated into, and the actual pricing methods employed in calculating what price to charge. Several of the pricing practices are described using a basic classification scheme developed for the field of marketing: cost-oriented, competition-oriented, and demand-oriented approaches to pricing. Costs represent a starting point for developing pricing structure, and cost-oriented pricing techniques are taken up in detail. Cost functions are identified, and their impact on price setting is suggested. Examples and data are provided from recent research into the pricing of computer-assisted selective dissemination of information services. The techniques of price discrimination, marginal cost pricing, and break-even analysis are discussed. ERA

N77-19942# Mitre Corp., Bedford, Mass.
RESOURCE RECOVERY PLANT IMPLEMENTATION: GUIDES FOR MUNICIPAL OFFICIALS, PROCUREMENT
Alan Shilepsky 1976 73 p
(Contract EPA-68-01-2647)
(PB-259140/2; EPA/SW-157.5) Avail: NTIS HC A04/MF A01 CSCL 13B

A competitive negotiation approach to procurement of resource recovery systems and services is refined and explained. This approach offers flexibility and is appropriately used to procure not only equipment and facilities, but also a 'system designer' whether a consulting engineer or a design and construct contractor. Topics that are treated in some detail are managing the procurement process, i.e., procedures for soliciting and evaluating proposals, and preparing the Request for Proposals. GRA

N77-19943# Environmental Protection Agency, Cincinnati, Ohio. Office of Solid Waste Management Programs.
RESOURCE RECOVERY PLANT IMPLEMENTATION: GUIDES FOR MUNICIPAL OFFICIALS, MARKETS
Yvonne M. Garbe and Steven J. Levy 1976 54 p refs Sponsored by EPA
(PB-259141/0; EPA/SW-157.3) Avail: NTIS HC A04/MF A01 CSCL 13B

Several materials and a variety of different energy products can potentially be recovered from municipal solid waste and sold to produce revenue. The markets for these energy and material products are discussed, focusing on those characteristics that effect marketability. Included are descriptions and locations of potential markets, the product quality required by those markets, and approximate market prices. Marketing techniques are addressed with directions for conducting a market research and obtaining purchase agreement. GRA

N77-19944# Environmental Protection Agency, Cincinnati, Ohio. Office of Solid Waste Management Programs.
RESOURCE RECOVERY PLANT IMPLEMENTATION: GUIDES FOR MUNICIPAL OFFICIALS, RISKS AND CONTRACTS
Robert E. Randol 1976 63 p refs
(PB-259142/8; EPA/SW-157.7) Avail: NTIS HC A04/MF A01 CSCL 13B

Guidelines are presented to aid states, municipalities, and private industry in their efforts to achieve fair and equitable agreements for the implementation of resource recovery systems. Contents include: resource recovery risks and contracts; risks in resource recovery; the effect of risks on contractual relationships: some case study experience; resource recovery risk allocations; and contracting for a resource recovery system: insights from three pioneering projects. GRA

N77-19945# Environmental Protection Agency, Cincinnati, Ohio. Office of Solid Waste Management Programs.
RESOURCE RECOVERY PLANT IMPLEMENTATION: GUIDES FOR MUNICIPAL OFFICIALS, ACCOUNTING FORMAT
David B. Sussman 1976 22 p Sponsored by EPA
(PB-259143/6; EPA/SW-157.6) Avail: NTIS HC A02/MF A01 CSCL 13B

The economics of various types of resource recovery systems are difficult to compare. System technologies vary, capital and operating costs vary, revenues from the recovered products vary, the recovered products themselves vary, and the cost accounting methods used to analyze system economics vary. This paper proposed a method of reporting costs and revenues to aid in comparing the costs of various resource recovery systems. The proposed method includes a standardized accounting format and a normalized accounting format. GRA

N77-19946# Environmental Protection Agency, Cincinnati, Ohio. Office of Solid Waste Management Programs.
RESOURCE RECOVERY PLANT IMPLEMENTATION: GUIDES FOR MUNICIPAL OFFICIALS, TECHNOLOGIES
Bob Lowe, Bob Holloway, David B. Sussman, and Yvonne M. Garbe 1976 86 p refs Sponsored by EPA
(PB-259144/4; EPA/SW-157.2) Avail: NTIS HC A05/MF A01 CSCL 13B

Techniques for converting mixed municipal waste into marketable products give municipal and regional officials a variety of new options for solving their solid waste management problems. Although these resource recovery systems cannot be expected to operate at a profit and although they will not allow a community to close down its landfill, the life of the landfill can be extended tremendously by the weight and volume reductions achieved. A technology review is presented to acquaint the reader with the available and emerging technology options for processing of mixed municipal waste for resource recovery. GRA

N77-19958# Dynatrend, Inc., Burlington, Mass.
TRANSPORTATION TECHNICAL ASSISTANCE NEEDS AND REQUIREMENTS ANALYSIS Final Report, Jul. - Sep. 1976
Peter A. Albin and Rudolph G. DiLuzio Sep. 1976 37 p refs (Contract DOT-OS-60500)
(PB-259680/7; DYN-UR-003; DOT-TST-76T-14) Avail: NTIS HC A03/MF A01 CSCL 13B

As part of the reevaluation of the priorities of transportation decision makers, the Office of R and D Policy (OST) has undertaken a study to determine the transportation technical assistance needs of the various user groups in the infrastructure. This determination was based on four independent studies: (1) TSC Technology Sharing surveys, (2) the report of the OBM Study Committee on Policy Management Assistance, (3) Urban Consortium for Technology Initiatives needs determination, and (4) the National Conference of State Legislatures survey. The analysis of these needs determinations was stratified to identify those needs peculiar to each of three user groups: (1) policy, (2) planning and evaluation, and (3) operations. The relationship of the needs to both the public management processes and Federal transportation policy is presented. GRA

N77-20057# Transportation Research Board, Washington, D.C.
AIRPORT AND AIR TRANSPORT PLANNING
David Rubin 1976 49 p refs
(PB-259413/3; TRB/TRR-588; ISBN-0-309-02554-0) Avail: NTIS HC A03/MF A01 CSCL 01B

Air passenger forecasting in a multiairport region is discussed along with interactive computing techniques in airport master planning. Staging runway expansion by dynamic programming for Washington National and Dulles International airports is introduced. Passenger behavior and design of airport terminals and a way to survey pedestrian traffic in airport terminals by use of time stamping cards is studied. Economic impact associated with development of an airport industrial complex, and scheduling analysis model of rural commuter air service are reported. GRA

N77-20118# Douglas Aircraft Co., Inc., Long Beach, Calif.
TECHNIQUES FOR DETERMINING AIRPORT AIRSIDE CAPACITY AND DELAY Final Report
Jun. 1976 239 p refs Prepared in cooperation with Peat, Marwick, Mitchell and Co., San Francisco, McDonnell Douglas Automation Co., Long Beach, Calif., and American Airlines, Inc., New York
(Contract DOT-FA72WA-2897)
(AD-A032475/6; FAA-RD-74-124) Avail: NTIS HC A11/MF A01 CSCL 01/5

Methods for determining how best to increase capacity and minimize congestion on an airfield were investigated. Procedures are given for determining the capacity of the airfield and its components and for determining delays to aircraft operating on the airfield. Data are structured to permit the user to choose the method of analysis most suited to the complexity of the user's problem or the level of detail desired. Author

N77-20284# Army Command and General Staff Coll., Fort Leavenworth, Kansas.
CONVERSION OF SELECTED MILITARY FORCES TO THE USE OF METRIC MEASUREMENT UNITS M.S. Thesis. Final Report
Gordon L. Boozer 11 Jun. 1976 94 p refs
(AD-A029707) Avail: NTIS HC A05/MF A01 CSCL 05/1

Conversion of the United States military to the International System of measurement units is in the very early stages. Little

formal planning has been done to articulate the management required to complete the conversion of operational Army and Air Force units. For those operational forces tasked to provide continuous combat readiness throughout metrication, management problems associated with the conversion are particularly difficult because of the nature of these assigned missions. This is the case for the 82nd Airborne Division ready brigade force (DRB) and the Military Airlift Command (MAC) strategic airlift system operating the C-141 and C-5A aircraft. GRA

N77-20305# Federal Communications Commission, Washington, D.C. Spectrum Allocations Staff.
AN INVESTIGATION OF ECONOMIC FACTORS IN FCC SPECTRUM MANAGEMENT
John O. Robinson Aug. 1976 37 p refs
(PB-258500/8; FCC/OCE/SAS-76-01) Avail: NTIS HC A03/MF A01 CSCL 17B

The result of a preliminary analysis of the feasibility and merit of introducing market characteristics into the FCC spectrum management process are reported. The investigation is aimed at the more modest, but also the more practical, goal of introducing those economic techniques into spectrum management that will eventually result in some measure of increased efficiency in spectrum allocation and use. A free market in the spectrum is considered and rejected as not feasible at this time because of the cost of enforcing property rights. The investigation shows, however, that market characteristics applied within an administrative management process would result in more efficient allocation and use of the spectrum. Three techniques emerged as promising means by which to incorporate economic factors into administrative spectrum management. These include shadow pricing, user charges and auctions. GRA

N77-20315# Federal Communications Commission, Washington, D.C.
CHRONOLOGY OF THE NATIONAL SPECTRUM MANAGEMENT PROGRAM
Diane King Aug. 1976 33 p refs
(PB-259621/1; FCC/OCE/SMTF-76/01) Avail: NTIS HC A03/MF A01 CSCL 17B

The Federal Communications Commission established the Spectrum Management Task Force (SMTF) in 1970 in response to the growing problem of spectrum congestion. Charged with the responsibility to develop decentralized spectrum management techniques, the SMTF focused initially on the Land Mobile Radio Services, wherein congestion was most severe. GRA

N77-20391# York Research Corp., Stamford, Conn.
ETI: ECONOMIC THICKNESS FOR INDUSTRIAL INSULATION Final Report
Washington, D. C. FEA Aug. 1976 202 p refs
(Contract FEA-CO-04-50169)
(PB-259937/1; FEA/P-75/712; FEA/D-CP-46) Avail: NTIS HC A10/MF A01 CSCL 13H

The conservation of energy through the use of optimal economic insulation thickness has obvious benefits for industry. The solution for economic thickness on both hot and cold systems is given. Since the insulation required to prevent condensate formation on cold systems may exceed the economic specification, a method for calculating the thickness required to prevent condensation has also been included. A procedure for calculating the economic thickness of insulation retrofitted in existing facilities is presented, as well as example problems on the economic thickness determination. GRA

N77-20464# California Univ., Berkeley. Operations Research Center.
A RENEWAL DECISION PROBLEM
C. Derman, G. J. Lieberman, and S. M. Ross Sep. 1976 21 p refs
(Grants DAAG29-76-G-0042; DAHC04-75-G-0163; ARO Proj. P-13179-M)
(AD-A031413; ORC-76-28) Avail: NTIS HC A02/MF A01 CSCL 12/2

A system must operate for t units of time. A certain component is essential for its operation and must be replaced, when it fails, with a new component. The class of spare components is grouped into n categories with components of the Ith category costing a positive amount (C sub i) and functioning for an exponential length of time with rate (lambda sub i). The main problem of interest is, for a given t, to assign the initial component and subsequent replacements from among the n categories of spare components so as to minimize the expected cost of providing an operative component for t units of time. GRA

N77-20808# Logicon, Inc., Dayton, Ohio.
MANAGEMENT GUIDE TO AVIONICS SOFTWARE ACQUISITION. VOLUME 3: SUMMARY OF SOFTWARE RELATED STANDARDS AND REGULATIONS Final Report, Jan. 1975 - May 1976
Jun. 1976 59 p
(Contract F33657-76-C-0234; AF Proj. 2257)
(AD-A030593; R-RW-75002-3-Vol-3; ASD-TR-76-11-Vol-3)
Avail: NTIS HC A04/MF A01 CSCL 01/3

Summary of Software Related Standards and Regulations. This volume is an aid for effective use of existing Air Force Regulations and Military Standards. It provides an interpretation and summary of the applicable software portions of these controlling documents for the project manager. GRA

N77-20809# Logicon, Inc., Dayton, Ohio.
MANAGEMENT GUIDE TO AVIONICS SOFTWARE ACQUISITION. VOLUME 4: TECHNICAL ASPECTS RELATIVE TO SOFTWARE ACQUISITION Final Report, Jan. 1975 - May 1976
Jun. 1976 167 p refs
(Contract F33657-76-C-0234; AF Proj. 2257)
(AD-A030594; R-RW-75002-4-Vol-4; ASD-TR-76-11-Vol-4)
Avail: NTIS HC A08/MF A01 CSCL 01/3

Summary of Technical Aspects Relative to Software Acquisition. This volume presents basic technical information which will aid in the appreciation of the complexities of avionics software acquisition. It provides the project manager with a deeper understanding of computer hardware/software interfaces and software design. Author (GRA)

N77-20908# Scientific Control Systems Ltd., London (England).
APPLICATION OF SUITABLE TECHNIQUES TO PROBLEMS OF OPTIMAL SCHEDULING, VOLUME 1
D. Zachary, J. Poston, S. Storey, S. Sassoon, and N. Seaman Nov. 1976 76 p 3 Vol.
(Contract ESOC-TA/154/75-AR)
(ESA-CR(P)-893-Vol-1) Avail: NTIS HC A05/MF A01

A simple basic computer configuration in a ground support system was studied with a view to optimizing scheduling. Operational problems likely to occur on this system were examined and where possible related to the design of the system. Some of the operational difficulties that will arrise are highlighted, and methods of solution for a more complex network configuration are extrapolated. Ground system parameters of interest are identified and illustrated by the ESOC program for Meteosat. Operational problems that will exist are identified, and a proposal is made for the development of solution methods. ESA

N77-20909# Scientific Control Systems Ltd., London (England).
APPLICATION OF SUITABLE TECHNIQUES TO PROBLEMS OF OPTIMAL SCHEDULING, VOLUME 2
D. Zachary, J. Poston, S. Storey, S. Sassoon, and N. Seaman Nov. 1976 68 p 3 Vol.
(Contract ESOC-TA/154/75-AR)
(ESA-CR(P)-893-Vol-2) Avail: NTIS HC A04/MF A01

Possible techniques for solving the problems of satellite ground computer systems optimal scheduling were developed. Mathematical programming is discussed as the most useful family of optimization techniques. Various formulations directly dependent on the mode of operations are proposed, and, for each, the most likely application possibilities are indicated. For unsolvable cases such as representation in a closed functional form of some of the relationships of the ground system, simulation techniques are discussed. Several useful techniques are identified which can be applied in both the transition stages of ground system operations, in planning for expected contingencies, and in the analysis that will accompany the experimental phase of a satellite system. ESA

N77-20910# Scientific Control Systems Ltd., London (England).
APPLICATION OF SUITABLE TECHNIQUES TO PROBLEMS OF OPTIMAL SCHEDULING, VOLUME 3
D. Zachary, J. Poston, S. Storey, S. Sassoon, and N. Seaman Nov. 1976 42 p refs 3 Vol.
(Contract ESOC-TA/154/75-AR)
(ESA-CR(P)-893-Vol-3) Avail: NTIS HC A03/MF A01

Two further phases of the optimal scheduling of ESOC ground support systems are discussed. The implementation of the scheduling system and the development costs of the application programs as well as the scheduling software are outlined. Likely development phases the various application programs will go through are identified. A literature evaluation is also presented. ESA

N77-20911# American Univ., Washington, D.C. Coll. of Public Affairs.
PUBLIC MANAGEMENT OF SCIENCE: CASE STUDIES
1 Oct. 1976 582 p refs
(PB-258945/5) Avail: NTIS HC A25/MF A01 CSCL 05A

In a graduate course on the Public Management of Science each student undertook to prepare a descriptive monograph on the management of science in a Federal agency. To provide a self-learning experience and a useful exchange of findings within the class data gathered will provide a better base of documentation for students in subsequent offerings of the course. GRA

N77-20912# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
A COMPARISON OF SELECTED SCHEDULING HEURISTICS FOR A TAC F-4E MAINTENANCE ORGANIZATION M.S. Thesis
Richard F. Glad and Robert T. Pierce Sep. 1976 87 p refs
(AD-A032327; SLSR-23-76B) Avail: NTIS HC A05/MF A01 CSCL 15/5

Scheduling of activities in simple and complex environments has been a subject of active research for many years. The USAF has actively supported such research in its continuing efforts to determine the impact of scheduling effectiveness on mission capability. The recent validation and availability of the Logistics Composite Model (L-COM) made it possible to test selected scheduling heuristics in the dynamic maintenance environment of a TAC F-4E squadron. Five heuristics were formulated, inserted into the model, and allowed to operate during simulation. Results of the simulation indicated that the selected heuristics did impact mission capability, that rank ordering occurred between them, and that there was a statistically significant difference between the worst and the best heuristic (88.15% to 91.57% sortie effectiveness). GRA

N77-20913# Army Construction Engineering Research Lab., Champaign, Ill.
A PRELIMINARY CONCEPT FOR A DESIGN CRITERIA MANAGEMENT SYSTEM
Michael J. OConnor and David A. Jordani Sep. 1976 89 p refs
(AD-A032125; ERL-SR-P-74) Avail: NTIS HC A05/MF A01 CSCL 13/13

The Corps of Engineers' design process relies on the relevancy and currentness of the data used in facility design and the transfer of these data to and from a variety of design and review levels. This report presents a conceptual description of an effective system for the organization, management, and communication of Department of Defense and Corps of Engineers military construction design criteria. The conceptual system comprises three major subsystems: (1) the Standard Design Criteria Subsystem provides for the handling, consistency checking, and production of standard design criteria; (2) the Project-Specific Design Criteria Subsystem permits the introduction of project-specific criteria and the merging of them with standard criteria; and (3) the Facility Criteria File Generation Subsystem translates the criteria into an appropriate format and relates the criteria to the design procedures. Author (GRA)

N77-20914# Picatinny Arsenal, Dover, N.J. Management Information Systems Directorate.
GRAFTEK - GRAFFIT CURVE FITTING PROGRAM TEKTRONIX VERSION Final Report
Wayne D. Lunger Sep. 1976 138 p
(AD-A031854; MISD-UM-76-3) Avail: NTIS HC A07/MF A01 CSCL 09/2

GRAFTEK is an interactive graphics program that fits by least squares, a curve to N data points. This code combines two CDC 274 graphics curve fitting programs (GRAFFIT, LSQ) for use on the TEKtronix 4014 storage tube using Tektronix software (TCS). The program fits the curve and determines the constants for any of nine empirical equations or a polynomial of up to 11th degree, and displays the fitted curve (up to three at one time) against a background of the data points. Options include reading in new data, rescale of axes, deleting all displayed curves, deleting points, adding new points, restoring all original or selected deleted points, specifying constants, and calling for CALCOMP plotter or quick look hard copy of output. Author (GRA)

N77-20915# Naval Postgraduate School, Monterey, Calif.
THE SYSTEM APPROACH TO MANAGEMENT: A PARADIGM FOR THE TEST AND EVALUATION PROCESS M.S. Thesis
William Michael Branch Sep. 1976 86 p refs
(AD-A032381) Avail: NTIS HC A05/MF A01 CSCL 05/1

This thesis addresses the Test and Evaluation process and demonstrates, through application of a dynamic systems model, that the Test and Evaluation process is a conglomerate of lower-order systems. Each system can be characteristically analyzed by focusing on objectives, input/outputs, interfaces, environmental, and effectiveness dimensions. Hence, the systems approach to management is suggested as a paradigm for the Test and Evaluation process. This approach provides a systematic way of thinking about the job of management and emphasizes viewing the Test and Evaluation system as a whole instead of as segregated parts. The classic functions of management can be put in juxtaposition with the phases of test and Evaluation to provide a better insight to management of scarce resources. Implementation of a strategy is perhaps the most important first step in practically using the systems approach and as such stimulates the manager to think in the proper perspective. Author (GRA)

N77-20916# Naval Postgraduate School, Monterey, Calif.
AN HEURISTIC SCHELDULING ALGORITHM FOR RESOURCE-CONSTRAINED PROJECT NETWORKS M.S. Thesis
Stewart Iden Marsh, Jr. Dec. 1976 41 p refs
(AD-A031819) Avail: NTIS HC A03/MF A01 CSCL 05/1

An algorithm is proposed for scheduling project networks having a single constraining resource and a constant level of available resources. The algorithm seeks to generate a minimum length schedule indirectly by maximizing the average resource utilization over the two time intervals represented by the current decision point and its successor. An attempt is made to schedule all of the activities whose predecessors have been completed; failing this, all feasible subsets are considered. Where

possible, the algorithm considers only those subsets which introduce new activities at the subsequent decision point. GRA

N77-20935# Committee on Aeronautical and Space Sciences (U. S. Senate).
NASA AUTHORIZATION FOR FISCAL YEAR 1977
Washington GPO 1976 56 p Rept. on H.R. 12453 of Comm. on Aeronautical and Space Sci., 94th Congr., 2d Sess., 30 Mar. 1976
(GPO-57-010) Avail: US Capitol, Senate Document Room
A Senate bill authorizing appropriations to NASA totaling $3,696,850,000 is presented. The space budgets of other agencies are included. A.R.H.

N77-20936# Committee on Science and Technology (U. S. House).
AUTHORIZING APPROPRIATIONS TO THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Washington GPO 1977 208 p Rept. to accompany H.R. 4088 from Comm. on Sci. and Technol., 95th Congr., 1st Sess., 10 Mar. 1977
(H-Rept-95-67) Avail: US Capitol, House Document Room
The bill authorizing appropriations for NASA research and development, construction of facilities, and research and program management is presented. Included are cost and budget data, the effect of legislation on inflation, changes in existing law, oversight findings and recommendations, and estimates and comparisons from the Congressional Budget Office. A.R.H.

N77-20938*# National Academy of Public Administration, Washington, D.C.
THE BALTIMORE APPLICATIONS PROJECT: A NEW LOOK AT TECHNOLOGY TRANSFER
Mar. 1977 116 p
(Contract NAS5-23564)
(NASA-CR-152462) Avail: NTIS HC A06/MF A01 CSCL 05A
The history of cooperation between Goddard Space Flight Center and Baltimore City administrators in solving urban problems is summarized. NASA provided consultation and advisory services as well as technology resources and demonstrations. Research and development programs for 69 tasks are briefly described. Technology utilization for incinerator energy, data collection, Health Department problems; and solarization experiments are presented as case histories. A.H.

N77-20943# PEDCO-Environmental Specialists, Inc., Cincinnati, Ohio.
RESIDUAL WASTE BEST MANAGEMENT PRACTICES: A WATER PLANNER'S GUIDE TO LAND DISPOSAL
Jun. 1976 290 p refs
(Contract EPA-68-01-3503)
(PB-258849/9; EPA-440/9-76-022) Avail: NTIS HC A13/MF A01 CSCL 13B
This planner's handbook describes residual wastes from nine most frequently encountered sources and relates management of these wastes to exhaustive enumeration of BMP's. This will provide the potential users-planners, engineers, administrators, lawyers, elected officials and others, with a reference for carrying out their residual waste management responsibilities under areawide or State water quality management planning programs and other regional/local activities. GRA

N77-20949# Little (Arthur D.), Inc., Cambridge, Mass.
WASTE CLEARINGHOUSES AND EXCHANGES: NEW WAYS FOR IDENTIFYING AND TRANSFERRING REUSABLE INDUSTRIAL PROCESS WASTES Final Report
Robert C. Terry, Jr., Joan B. Berkowitz, C. Michael Mohr, Joseph Tratnyek, and John T. Funkhouser Oct. 1976 148 p refs
(Contract EPA-68-01-3241)
(PB-261287/7; ADL-C-78494; EPA/SW-130C) Avail: NTIS HC A07/MF A01 CSCL 13B
The experience of the industrial waste information clearinghouses operating since 1972 in ten European countries, explores opportunities for the waste transfer concept in the United States, outlines the requirements for successful transfer organizations, and describes their techniques and procedures. The study analyzes concepts and requirements for transferring wastes, distinguishing between trash waste, having no reuse value whatever, and scrap waste, having some reuse value. It identifies and estimates quantities of industries process wastes suitable for transfer, especially in the Philadelphia SMSA. GRA

N77-20954# Denver Research Inst., Colo.
FEDERAL INCENTIVES FOR INNOVATION. WHY INNOVATIONS FALTER AND FAIL: A STUDY OF 200 CASES
Sumner Myers and Eldon E. Sweezy Jan. 1976 85 p refs
(Contract NSF C-860)
(PB-259208/7; NSF/RA-760232; R-75-04) Avail: NTIS HC A05/MF A01 CSCL 05A
Innovations that pass initial screenings but fail after entering the pipe-line are studied. Actual industrial innovations that fail and attempts to determine why they fail are examined with a view to suggesting public policies that might decrease the rate of failure. The obstacles to innovative success as identified by management officials involved in decisions to scrap innovations are cited, and these obstacles are related to other aspects of the innovation process, such as the stages of development at which decisions are made to scrap innovations and the attitudes of management toward these decisions. GRA

N77-20955# Utah Univ., Salt Lake City. Dept. of Mechanical and Industrial Engineering.
PROCEEDINGS OF THE WESTERN REGIONAL WORKSHOP ON TECHNOLOGY ASSESSMENT
Richard E. Turley and Wyatt M. Rogers, Jr. Jul. 1976 68 p refs Proc. held at Salt Lake City, 11-13 Jun. 1975; sponsored in part by Utah State Advisory Council on Science and Technology, Western Interstate Nuclear Board, and Federation of Rocky Mountain States Sponsored in part by Utah State Advisory Council on Science and Technology, Western Interstate Nuclear Board, and Federation of Rocky Mountain States
(Contract NSF ISR-75-06142)
(PB-259040/4; NSF/RA-760222) Avail: NTIS HC A04/MF A01 CSCL 05A
The West is in the midst of preparing for the jolt it will experience in many areas, especially in energy and mineral development. There are many challenges and problems common to the Rocky Mountain States: roads need to be built, tax revenue laws and procedures need to be reevaluated, municipal services in prospective boomtowns in most cases are already at capacity, the scenic western environment needs to be preserved, social equities need to be defined, and the social risks and impacts, brought about by the national need to develop western resources, need to be balanced with commensurate benefits. This workshop provides an analytical base of this region, and helps to insure that future decisions and policies are made with as much knowledge as possible. Attendees principally include state governments, industry, and academia from the western states. GRA

N77-20956# Los Angeles County Dept. of Urban Affairs, Calif.
EXPEDITING DIVERSIFICATION OF DEPARTMENT OF DEFENSE CONTRACTORS Draft Final Report
Apr. 1976 136 p Prepared by Ultrasystems, Inc., Irvine, Calif.
(Contract EDA-07-6-01495-26)
(PB-259190/7; EDA-76-054) Avail: NTIS HC A07/MF A01 CSCL 05C
The primary goal of this study was the development of diversification techniques to ensure that defense dependent firms located in Los Angeles County could participate in high technology non-defense markets. The purpose was to develop and test, on a pilot basis, an economic diversification program designed to lessen the potential impact of defense contract cutbacks on the economy of Los Angeles. The key to any identification of diversification opportunities, whether it be market, product or capabilities diversification, is an up-to-date knowledge of future markets that pertain to the capability levels of the contractor group being assisted. GRA

N77-20969# Environmental Protection Agency, Washington, D.C. Municipal Construction Div.
VALUE ENGINEERING WORKBOOK FOR CONSTRUCTION GRANT PROJECTS
Jul. 1976 70 p refs Sponsored in part by Culp, Wesner and Culp, Eldorado Hills, Calif.
(PB-258040/5; EPA/MCD-29; EPA-430/9-76-008) Avail: NTIS HC A04/MF A01 CSCL 13B

Procedures for applying Value Engineering (VE) techniques to wastewater treatment projects are described. The relationships between VE analyses and the EPA construction Grant Program are discussed. Information on organization of VE study plan and selection of a VE Team Coordinator is presented. Typical VE ideas and results for wastewater projects are presented. GRA

N77-20971# Environmental Protection Agency, Cincinnati, Ohio. Office of Technology Transfer.
CHOOSING THE OPTIMUM FINANCIAL STRATEGY FOR POLLUTION CONTROL INVESTMENTS
C. Marshall (JACA Corp.) and J. Commins (JACA Corp.) Jun. 1976 65 p refs
(PB-259443/0; EPA-625/3-76-005) Avail: NTIS HC A04/MF A01; also available from Environmental Protection Agency, Office of Technology Transfer, Cincinnati, Ohio 45268 CSCL 13B

This publication was designed to alert industry to qualifications for and availability of financial assistance from Federal, state and local governments, and will illustrate that it is well worth the time to analyze the special methods of financing pollution control expenditures and the available tax treatments. GRA

N77-21110*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
THE DEEP SPACE NETWORK Progress Report, Jan. - Feb. 1977
15 Apr. 1977 226 p refs
(Contract NAS7-100)
(NASA-CR-152647; PR-42-38) Avail: NTIS HC A11/MF A01 CSCL 22D

The various systems and subsystems are discussed for the Deep Space Network (DSN). A description of the DSN is presented along with mission support, program planning, facility engineering, implementation and operations. For individual titles, see N77-21111 through N77-21135.

N77-21266# National Bureau of Standards, Washington, D. C.
DIMENSIONS (NBS). VOLUME 60, NUMBER 10: WEIGHTS AND MEASURES: NEW CHALLENGES IN TODAY'S MARKETPLACE Monthly Report
Oct. 1976 27 p refs
(PB-248904/10; NBS-DIM-60-10-Vol-60-No-10; LC-25-26527) Avail: NTIS MF A01; SOD HC as C13 CSCL 05B

The monthly magazine features short summaries of major technical developments, highlights of work in progress, major speeches and statements by bureau management, and a listing of NBS publications. The table of contents for the current issue is: weights and measures--new challenges in today's marketplace; the money side of the lead paint problem; the consumer comes face-to-face with the computer; a primer on temperature scales--centrigrade/Celsius, fahrenheit, Kelvin; monitoring the exchange of power--new calibration system for electrical industries; highlights; two new glass standards; and computer program for heating/cooling loads in buildings available. GRA

N77-21542# Oklahoma Univ., Norman. Bureau of Water Resources Research.
A COARSE SORT SYSTEM FOR PRELIMINARY WATER RESOURCES MANAGEMENT ALTERNATIVES
George W. Reid and Nancy Safarik Jul. 1976 182 p refs
(Contract DI-14-34-0001-6037)
(PB-260491/6; W77-01055; OWRT-A-054-OKLA(1)) Avail: NTIS CSCL 13B

The Coarse Sort System is a non-mathematical model which provides a method for easily evaluating both quantitative and non-quantitative data and selecting a viable plan from among alternatives at the preliminary planning level. The Coarse Sort System requires that after alternative plans are developed, they be ranked according to how close they come to meeting the goals of the project. GRA

N77-21705# Rice Inst., Houston, Tex. Dept. of Mathematical Sciences.
STRATEGIC STUDIES FOR ENERGY PLANNING AND MANAGEMENT Final Report
Jun. 1976 88 p
(Grant NSF SIA-75-04329)
(PB-260364/5; NSF/RA-760272) Avail: NTIS HC A05/MF A01 CSCL 10A

Game theory, the mathematical modeling of conflict between various players, has great potential in analyzing the many different strategies and outcomes of the energy situation. This theory forms the basis for the four reports included in this document: (1) Roles for Game Theory in Energy Planning and Management, (2) A game Theoretic Analysis of Alternate Source Development, (3) Maximizations of Total Profits Attending Exploitation of Finite Resources, and (4) A Note on Intertemporal Game Models of Energy, Exchange, and Economic Growth. GRA

N77-21720# National Association of Counties, Washington, D.C.
A GUIDE TO REDUCING ENERGY USE BUDGET COSTS
Nov. 1976 95 p refs Prepared in cooperation with National League of Cities
(Contracts FEA-CO-12-60505-00; FEA-CO-12-60509-00)
(PB-260632/5; FEA/E-76/451) Avail: NTIS HC A05/MF A01 CSCL 10A

City and county governments are provided with straightforward, practical information needed to reduce energy costs and save taxpayers money. Local government officials will find the basic 'whys,' 'how-to's,' and 'by whoms' of successful energy management carefully spelled out, so that specific programs can be selected and tailored to a specific community. GRA

N77-21728# National Conference of State Legislatures, Denver, Colo.
STATE POLICIES FOR GEOTHERMAL DEVELOPMENT. UNCOVERING A MAJOR RESOURCE Final Report
Douglas M. Sacarto Nov. 1976 105 p refs
(Grant NSF ISR-74-1152)
(PB-261744/7; NSF/RA-760230) Avail: NTIS HC A06/MF A01 CSCL 08I

Research results from numerous specialists are summarized, and present state and Federal policies affecting the geothermal industry are outlined. Key policy areas are identified, and several specific actions suggested for the states. Six appendixes are included: (1) state laws and regulations regarding geothermal resources; (2) Federal geothermal leasing and development regulations; (3) Federal geothermal lease summary; (4) Federal geothermal steam act; (5) Federal geothermal energy research, development, and demonstration act; and (6) regulations for the geothermal loan guaranty program. GRA

N77-21870# Logicon, Inc., Dayton, Ohio.
MANAGEMENT GUIDE TO AVIONICS SOFTWARE ACQUISITION. VOLUME 1: AN OVERVIEW OF SOFTWARE DEVELOPMENT AND MANAGEMENT Final Report, Jan. 1975 - May 1976
Jun. 1976 51 p refs 4 Vol.
(Contract F33657-76-C-0234; AF Proj. 2257)
(AD-A030591; R:RW-75002-1-Vol-1; ASD-TR-76-11-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 01/3

An Overview of Software Development and Management. This volume is a summary of the avionics software acquisition process, its major milestones and decision points, and the terminology most frequently encountered. GRA

N77-21871# Logicon, Inc., Dayton, Ohio.
MANAGEMENT GUIDE TO AVIONICS SOFTWARE ACQUISITION. VOLUME 2: SOFTWARE ACQUISITION PROCESS Final Report, Jan. 1975 - May 1976

Jun. 1976 120 p
(Contract F33657-76-C-0234; AF Proj. 2257)
(AD-A030592; R:RW-75002-2-Vol-2; ASD-TR-76-11-Vol-2)
Avail: NTIS HC A06/MF A01 CSCL 01/3

Software Acquisition Process. This volume discusses the details of the avionics software acquisition process, its major milestones and decision points, pertinent Air Force technical and management activities, and software verification and validation.
Author (GRA)

N77-21985*# Ross (S.) and Co., Boston, Mass.
IMPLEMENTATION AND TESTING OF A NEIGHBORHOOD OFFICE CENTER (NOC) AND INTEGRATION OF THE NOC WITH AN ADMINISTRATIVE CORRESPONDENCE MANAGEMENT INFORMATION SYSTEM Final Report
7 Feb. 1977 42 p ref
(Contract NASw-2889)
(NASA-CR-152645) Avail: NTIS HC A03/MF A01 CSCL 05A

The application of telecommunications and telecomputing was investigated as a means of reducing NASA's consumption of natural resources and the proliferation of paper copies of correspondence. The feasibility, operational advantages, and limitations of decentralized (remote) neighborhood offices (NOC)

N77-21986# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
AN ANALYSIS OF EXISTING ETHICAL GUIDELINES AND THE DEVELOPMENT OF A PROPOSED CODE OF ETHICS FOR MANAGERS M.S. Thesis
Randolph K. Adams Sep. 1976 181 p refs
(AD-A032387; GSM/SM/76S-1) Avail: NTIS HC A09/MF A01 CSCL 05/1

Recent disclosures of questionable behavior on the part of leaders of many American institutions have left people disillusioned with professions which once commanded deep respect. The primary objective of this study is to develop a proposed universal code of ethics for managers in response to public demand for a clearer picture of the ethical responsibilities of today's leaders. After reviewing current literature, the author develops the nature, need, widespread use, value, and key contents of ethical codes. Information of currently existing ethical codes, creeds, and related policy was solicited from presidents of 201 large industries selected from the 1975 'Fortune 500' listing. Inquiries were made to executive directors of 24 professional associations, to 44 small industries, and to the ethics committees of both the House of Representatives and the Senate. The proposed Code of Ethics for Professional Managers which this thesis develops is modeled on the information gathered regarding contents, format, scope of coverage, and criteria contained in the aggregation of collected codes. Responsibilities of a manager are classified and addressed in terms of key interest groups as follow: customers, investors, employees, employer, the public, and professional associates. The proposed code is presented as a separate unit within the thesis so it may be extracted for review, discussion, and use. GRA

N77-21987# British Library Lending Div., Boston Spa (England).
THE SHEFFIELD MANPOWER PROJECT: A SURVEY OF STAFFING REQUIREMENTS FOR LIBRARIANSHIP AND INFORMATION WORK Final Report
R. Sergean, J. R. McKay, and C. M. Corkhill 1976 497 p refs
(BLL-BLRD-5302-(2113.56F); Publ-8) Copyright. Avail: British Library Lending Div., Boston Spa, Engl.

The questionnaire is an attempt to devise a standard means of collecting job information in a form which will permit coverage of, and comparison within, a wide and varied population, this information being provided by jobholders themselves. Description is in terms of the behavior called for by the work, and of varying factors in the working environment to which the jobholder must adapt, rather than purely in terms of the job's technical or library characteristics. At the same time, the questionnaire examines the characteristics of the jobholder and how far these match up with those called for by the job. Author

N77-21988# California Univ., Berkeley. Lawrence Berkeley Lab.
INTERACTIVE MATRIX DISPLAYS AND MANAGEMENT INFORMATION REPORTING: A FEASIBILITY ASSESSMENT Ph.D. Thesis
Bernard Kitous Jun. 1976 291 p refs
(Contract W-7405-eng-48)
(LBL-5310) Avail: NTIS HC A13/MF A01

Graphic methods for the display of numerical management information were investigated. A specific class of graphic representations, called matrix displays, is defined as the direct mapping of data tables into two-dimensional graphic matrices. Each data item is represented by variations in the sizes of dots or bars, or in the density of grey shadings. A three-step research methodology is chosen to assess the feasibility of matrix displays for management information reporting: findings in other fields relevant to the thesis of feasibility are identified, a theory of the usefulness of matrix displays and a corresponding model are proposed, and the practical utility of the matrix display model is assessed in a real-life managerial environment. Two different fields of research provide strong evidence that matrix displays are technically feasible, experimental results on human visual performance and multidimensional analytic research. Author

N77-22015# Metropolitan Council of the Twin Cities Area, St. Paul, Minn.
THE POLITICS AND PLANNING OF A METROPOLITAN GROWTH POLICY FOR THE TWIN CITIES/AN EXECUTIVE SUMMARY Final Report
Sep. 1976 18 p refs Sponsored by HUD
(PB-260604/4; TCDF-76/1) Avail: NTIS HC A02/MF A01 CSCL 13B

The Metropolitan Council's political and technical experience in developing a growth management policy plan and a framework for its development in the 7-county Twin Cities Metropolitan area is described. Insights gained during the process that may be of use to regional planners and politicians in other areas are discussed. GRA

N77-22104# Naval Air Engineering Center, Lakehurst, N.J. Ground Support Equipment Dept.
SUPPORT EQUIPMENT PROGRAM FOR AVIONICS READINESS: INTITIAL PLANNING
John Bauer and Robert Staples 2 Dec. 1976 62 p refs
(WF41461408)
(AD-A033585; NAEC-GSED-104) Avail: NTIS HC A04/MF A01 CSCL 01/5

The Support Equipment Program for Avionics Readiness has been developed to provide greater reliability and improved maintainability of avionics and support equipment than has been achieved thus far. These goals can be achieved by properly developing the necessary technology for incorporating a high degree of readiness into the design of new equipment and for providing the specialized support equipment required to maintain this equipment. In order to attain the high degree of readiness required in future avionics systems, the Support Equipment Program for Avionics Readiness must now be instituted to insure that new technology be included when ready. In order to provide industry with definitive specifications for improved avionics systems, the Navy must have the capacity to define readiness problems and goals, to conduct research in weak or high technological risk areas, and to apply new techniques in systems designs. These efforts must be directed toward both the new primary avionics systems and the secondary support equipment systems, which are a vital part of avionics readiness. Advanced weapons systems are of limited value without the proper advanced support equipment required to maintain them. Proposals to accomplish these tasks for achieving avionics readiness have been incorporated into the Support Equipment Program for Avionics Readiness. The plan includes proposals for the development of management guidelines and techniques for demonstration of equipment support features as part of the primary equipment acceptance criteria and for determining the resulting influence on the cost of future systems. Author (GRA)

N77-22681# Gordian Associates, Inc., New York.
UCAN TECHNICAL IMPLEMENTATION MANUAL Final Report
Aug. 1976 192 p refs
(Contract FEA-CO-04-60448-00)
(PB-261094/7; FEA/D-76/387) Avail: NTIS HC A09/MF A01 CSCL 10A

The methods available to utility companies, public service commissions and public interest organizations to ensure the successful implementation of utility rate reform, load management, insulation programs, energy efficiency promotion, interior environment consultation services, building code revisions, energy audit programs and elimination of master metering are presented. It highlights the differences in implementation strategies for gas and electric utilities. GRA

N77-22832# Defence Research Information Centre, Orpington (England).
BIBLIOGRAPHY ON MICROPROCESSORS AND THEIR APPLICATIONS
R. H. Oseman, comp. and R. C. Sloan, comp. (EMI Electronics, Hayes, Engl.) *In* AGARD Microprocessors and Their Applications

Avail: NTIS HC A08/MF A01

This bibliography has been compiled to provide literature references on microprocessors and their application. The purpose of this lecture series is to: (1) enable systems designers to appreciate the potential and applicability of the technology in military and commercial fields; (2) enable designers responsible for system implementation to appreciate hardware and software design; (3) provide a current update in microprocessor technology for those working in this field both in industry and universities; and (4) provide an update of the techniques and potential for managers. Author

N77-22994# Michigan Univ Ann Arbor. Inst. for Social Research.
FUTURE PERFORMANCE TREND INDICATORS: A CURRENT VALUE APPROACH TO HUMAN RESOURCES ACCOUNTING. REPORT 2: INTERNAL CONSISTENCIES AND RELATIONSHIPS TO PERFORMANCE IN ORGANIZATION VI
Patricia A. Percorella and David G. Bowers Oct. 1976 105 p refs
(Contract N00014-76-C-0362)
(AD-A033608) Avail: NTIS HC A06/MF A01 CSCL 05/1

This report describes analyses preparatory to construction of a suitable file for generating a system of future performance trend indicators. Such a system falls into the category of a current value approach to human resources accounting. It requires that there be a substantial body of data which: (1) Uses the work group or unit, not the individual, as the analysis unit, and which contains standard measures of the human oragnization and dollar-convertible performance measures, both with high internal consistency; and (2) Displays a high frequency of statistically significant relationships of human organization to performance measures. The report describes analyses which were conducted on data from 3 plants of a multi-location manufacturing organization. Internal consistency reliabilities of both human organization (survey) data and performance (total variable expenses and absence rate) were shown to be high, and a pattern of human organization-to-performance correlations resulted which are quite useable. With this data, the authors now have a base of 5 organizational data sets from which they should be able to take the next steps: multiple regression, time lag and magnitude estimation, and value attribution. GRA

N77-22995# Pennsylvania Univ., Philadelphia. Dept. of Decision Sciences Management.
A MODEL INTERFACE FOR THE DECISION AIDING INFORMATION SYSTEM Interim Report
Ralph M. Mitchell, Jr. Sep. 1976 71 p refs
(Contract N00014-75-C-0440)
(AD-A033416; Rept-76-09-11) Avail: NTIS HC A04/MF A01 CSCL 05/1

Under the sponsorship of the Office of Naval Research, the Decision Aiding Information System is being developed at the Wharton School to provide a vehicle to assist the tactical level decision maker in bringing together available data, models and programs, and through and active role in user/system interactions improve the manager's decision making activities. In today's complex systems, models have the capacity to play an ever-expanding role in the decision environment, but a system was required that would provide the decision maker with information which will (a) lead the decision maker to the proper model for the situation, (b) automatically find and transfer the required data to the model, and (c) transfer results back to the decision maker in an easy to use form. This paper explains the development and implementation of a Model Interface Program to meet these requirements in order to provide a bridge to enable the manager to integrate mathematical models into his own decision processes. Author (GRA)

N77-23000# Mitre Corp., McLean, Va. METREK Div.
SCIENTIFIC AND TECHNICAL INFORMATION: OPTIONS FOR NATIONAL ACTION
Bruce G. Whalen and Charles C. Joyce, Jr. Nov. 1976 74 p refs
(Contract NSF-76-SP-1002)
(PB-261863/5; M76-82) Avail: NTIS HC A04/MF A01 CSCL 05B

The National Science and Technology Policy, Organization and Priorities Act of 1976 (P.L. 94-282) was analyzed to determine major issues related to scientific and technical communication. Past reviews and studies were used as the basis for the analysis. Options for action were developed to provide specific approaches for the Office of Science and Technology Policy. GRA

N77-23003# Pennsylvania Univ., Philadelphia. Dept. of Decision Sciences Management.
DECISION ENVIRONMENT: A PROPOSED PHYSICAL INSTALLATION Interim Report
Thomas H. Johnson Sep. 1976 23 p
(Contract N00014-75-C-0440)
(AD-A033520; Rept-76-09-10) Avail: NTIS HC A02/MF A01 CSCL 05/10

The Decision Aiding Information Systems Project (DAISY), developed at the Decision Sciences Department of the Wharton School and sponsored by the Office of Naval Research, is constructing an environment to train managers to make tactical decisions more effectively and efficiently. The laboratory space will be used by several different types of decision makers, from individuals to classroom groups. It is intended for operational use assisting in the actual performance of decision making tasks, for educational use to instruct students and professionals in decision aiding methodology, and in research for extending the decision makers capabilities. The Decision Environment will be located in room E13 of Dietrich Hall and will be staffed by graduate researchers and teaching personnel. Author (GRA)

N77-23008# Committee on Public Works and Transportation (U. S. House).
AVIATION ECONOMICS
Washington GPO 1976 600 p refs Joint hearings before Subcomm. on Investigations and Review and the Subcomm. on Aviation of the Comm. on Public Works and Transportation, 94th Congr., 2d Sess., 1-2, 4, 8, 10-11 Mar. and 27-29 Apr. 1976
(GPO-73-830) Avail: Subcomm. on Investigations and Review

Recommendations for government action to improve economic conditions in the air transportation industry are presented by officials of commercial airlines and members of the Civil Aviation Board. The impact of inflation on expenditures for fuel and replacement aircraft is discussed, as well as on return on investment. A.R.H.

N77-23015# Minnesota Univ., Minneapolis. Water Resources Research Center.
PROBLEM IDENTIFICATION AND RANKING. A SELECTED REVIEW OF TECHNIQUES USED BY PUBLIC AGENCIES

Arnold Harris, ed. (Illinois Univ., Urbana-Champaign), Lachlan F. Blair (Illinois Univ., Urbana-Champaign), W. Thomas Lamm (Wisconsin Univ., Madison), Herman Felstehausen (Wisconsin Univ., Madison), T. A. Austin (Iowa State Univ. of Science and Technology), Gregory Clites (Iowa State Univ. of Science and Technology), Richard L. Gardner, and John J. Waelti Sep. 1976 106 p refs
(OWRT Proj. B-057-IA(1))
(PB-261391/7; W77-02080; Ser-1) Avail: NTIS HC A06/MF A01

Three aspects of water and related land resource problem identification and ranking procedures are investigated: (1) past approaches to problem identification and ranking in the Upper Mississippi River Basin; (2) an overview of present identification/ranking activities in eight selected agencies and governmental levels; and (3) a detailed investigation of identification/ranking procedures as developed within a single federal agency. GRA

N77-23017# Mitre Corp., McLean, Va. METREK Div.
DEMAND RESPONSIVE TRANSPORTATION PLANNING GUIDELINES (1976)
Cady C. Chung and John R. Ferrantino Oct. 1976 81 p refs Revised
(Contract DOT-UT-50016)
(PB-261314/9; MTR-7360; UMTA-VA-06-0024-76-6) Avail: NTIS HC A05/MF A01 CSCL 13B

Demand Responsive Transportation (DRT) is a type of transit operation providing 'on-demand,' door-to-door service with small buses. More than forty DRT services are now operating in the U.S. These systems provide the data base for a set of relationships which can be used for planning and design of new DRT systems. In addition, the experience of active operators emphasizes a number of important steps in developing successful DRT services. GRA

N77-23026# California Univ., Davis. Water Resources Center.
MUNICIPAL WASTEWATER RECYCLING: A STRATEGY FOR MEETING THE ZERO DISCHARGE GOAL OF PL 92-500
Albert Herson (California Univ., Los Angeles) Feb. 1976 139 p refs
(PB-261912/0; UCAL-WRC-W-503; W77-02620) Avail: NTIS HC A07/MF A01 CSCL 13B

The shortage of water for irrigation, the development of efficient technology for removing pollutants from municipal effluents, and concern for the environment in general promote increased interest in reusing municipal waste water. The relationship between the Federal Water Pollution Control Act Amendments of 1972 (PL 92-500) and the implementation of waste water reuse projects is reviewed. GRA

N77-23034# Dallas Dept. of Urban Planning, Tex.
URBAN DESIGN ROLE IN LOCAL GOVERNMENT
Weiming Lu Sep. 1976 75 p refs Conf. held at Dallas, 25-27 Jun. 1976
(Grant NSF GAPR-76-18500)
(PB-262370/0; NSF/RA-760215) Avail: NTIS HC A04/MF A01 CSCL 13B

The viability and increasing importance of urban environmental design in solving the problems of cities was explored. Three categories of urban design legislation, in addition to performance standards and environmental impact statements were outlined. Topics discussed include: mechanisms for implementing urban design in local government, deficiencies in urban design research today,tentative models for describing the urban design field, and alternative approaches to urban design research. GRA

N77-23036# Williams (Charles W.), Inc., Alexandria, Va.
STRATEGY FOR THE NSF INTERGOVERNMENTAL SCIENCE AND PUBLIC TECHNOLOGY/INDUSTRIAL PROGRAM TO ENHANCE TECHNOLOGICAL INNOVATION FROM AND CAPACITY OF THE SMALL BUSINESS COMMUNITY
Charles Williams and Kendall Simmons Oct. 1976 69 p
(Grant NSF 76-SP-0907)
(PB-261951/8; NSF/RA-760306) Avail: NTIS HC A04/MF A01 CSCL 05A

The role of the National Science Foundation in meeting national objectives for the small business community is assessed. It is shown that a policy gap exists for encouraging technological innovations from this sector. GRA

N77-23048# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
THE MAGNITUDE OF INTERNAL REWORK ON THE F-4 AIRCRAFT DURING DEPOT LEVEL MAINTENANCE AT OGDEN AIR LOGISTICS CENTER M.S. Thesis
John B. Berry and Raymond M. Hines Sep. 1976 85 p refs
(AD-A032458; SLSR-11-76B) Avail: NTIS HC A05/MF A01 CSCL 15/5

In May 1975, Mr. J. Turk, Office of the Secretary of Defense, expressed a desire to estimate the magnitude of rework cost within AFLC to determine if it was of sufficient magnitude to warrant special attention in all services. Ogden ALC was selected as a test area for this research. The primary objectives of the research were: (1) determine the magnitude of rework cost for the F-4 aircraft during depot level maintenance, (2) identify the major areas of rework, their primary causes, and their cost magnitudes, (3) develop a standard methodology for identifying and classifying rework in terms of maintenance areas, causes, and cost magnitudes, and (4) stimulate interest for conducting similar research at other ALCs and TRCs with the major emphasis on reducing rework cost. Author (GRA)

N77-23088*# Virginia Univ., Charlottesville. School of Engineering and Applied Science.
DEVELOPMENT OF A RESEARCH PROJECT SELECTION MODEL: APPLICATION TO A CIVIL HELICOPTER RESEARCH PROGRAM Final Report
Michael B. Schoultz and Ira D. Jacobson May 1977 227 p refs
(Grant NsG-1274)
(NASA-CR-152701; UVA/528051/ESS77/102) Avail: NTIS CSCL 01C

A model is described for planning and decision making in research project selection. Evaluations of each project's direct and indirect benefits, uncertainty in achieving these benefits, and schedule priority with resource budget and program balance constraints are considered. The combination of the interactive effect of project selection, resource allocation and scheduling considerations into one model permits tradeoff alternatives to be studied. Clients' value judgments are used in evaluating the benefits from each proposed project. The model is applied to the NASA Civil Helicopter Technology Program. Research project priorities for this program are established, strengths and weaknesses of the model are discussed, and areas of future development are recommended. Author

N77-23176# Defense Systems Management School, Fort Belvoir, Va.
SPACE SHUTTLE: A CASE STUDY IN ECONOMIC ANALYSIS
Byron Theurer Apr. 1976 44 p refs
(AD-A033871) Avail: NTIS HC A03/MF A01 CSCL 22/2

This case study reports on an application of economic analysis; provides examples of the methods; and draws conclusions and comments on lessons learned. It was developed from NASA and contractor primary references and from the author's experiences. In 1971, NASA was faced with a dilemma. The Space Shuttle Program, which had been established to substantially reduce the cost of space operations, was being designed to reduce principally transportation cost. Issues were surfacing which established that this transportation cost emphasis did not account for Shuttle development cost and the great bulk of the costs of a satellite program. OMB, furthermore, was imposing a peak funding ceiling which precluded developing the then baselined configuration. Economic analysis performed by MATHEMATICA, Inc., succeeded in establishing the economic worth of

Shuttle and pinpointing the most economical configuration. Of particular interest are the explicit treatment of uncertainty in the data base and the innovative methods used to graphically portray results. GRA

N77-23518# Massachusetts Inst. of Tech., Cambridge. Energy Lab.
FEDERAL SUPPORT FOR THE DEVELOPMENT OF ALTERNATIVE AUTOMOTIVE POWER SYSTEMS: THE GENERAL ISSUE AND THE STIRLING, DIESEL, AND ELECTRIC CASES Final Report, 1 Nov. 1974 - 30 Nov. 1975
Lawrence H. Linden, John B. Heywood, H. D. Vacoby, and Howard Margolis Mar. 1976 406 p refs
(Grants NSF OEP-74-21320; NSF EN-44166)
(PB-263523/3; MIT-EL-76-014; NSF/PRA-7421320-1-6) Avail: NTIS HC A18/MF A01 CSCL 21G

The federal government's role in supporting alternative automotive powerplant R and D for the explicit purpose of advancing the state-of-the-art is examined. An examination of the process by which major product technology changes occur in the automotive industry is reviewed. The automotive market is then examined for divergences between private and social costs and benefits, especially with respect to air pollution and fuel economy. Next the nature of the cost benefit analysis problem is discussed. Finally, three specific technologies are examined in detail and recommendations made as to government supported R and D for each. GRA

N77-23520# Danish Research Center for Applied Electronics, Hoersholm.
PRODUCT ASSURANCE PROGRAMME PLAN FOR HIGH RELIABILITY PRODUCTS
E. Andersen Feb. 1976 68 p refs
(ECR-59) Avail: NTIS HC A04/MF A01

The product assurance provisions pertinent to the design, fabrication, test, and delivery of high reliability equipment are established and presented. Author

N77-23616# National Bureau of Standards, Washington, D. C. Office of Energy Conservation.
ENERGY MANAGEMENT GUIDE FOR LIGHT INDUSTRY AND COMMERCE. EPIC ENERGY MANAGEMENT SERIES Final Report
W. J. Kelnhofer (Catholic Univ. of America, Washington, D. C.) and L. A. Wood Dec. 1976 31 p refs
(PB-263121/6; NBS-HB-120; LC-76-608281) Avail: NTIS HC A03/MF A01 CSCL 13A

Methods by which the manager of a small business can analyze his energy use, and determine the areas in which energy savings can be made are reported. The magnitude of the possible cost savings is estimated. A check list suggests some seventy items which might be important cost saving opportunities to an individual business. Eight of these opportunities are expanded in the appendix into miniature case studies illustrating simple methods for estimating savings. A listing of sources of assistance is included as a guide to obtaining consulting advice. GRA

N77-23992 George Washington Univ., Washington, D.C.
A GENERAL SYSTEMS MODEL FOR MEASURING ORGANIZATIONAL EFFECTIVENESS Ph.D. Thesis
Willis Harold Martin, Jr. 1976 164 p
Avail: Univ. Microfilms Order No. 77-6006

Selected functions of general systems theory were used to develop a model to measure organizational effectiveness as determined by managers in selected organizations. Prior to developing the model, a taxonomy for structuring organizational activities was developed. Three hierarchical structures were examined for applicability. These structures are referred to by the strategy used in their development and are identified as (1) reductionist, (2) temporal, and (3) morphological structure. A modification of the morphological structure led to the categorization by the functioning characteristics of an organization. Viewing an organization as an adaptive system and applying general systems theory led to the definition of the generalized functioning characteristics of (1) adaptive self-stabilization, (2) adaptive self organization, (3) growth, (4) differentiation, (5) control, and (6) competition. Dissert. Abstr.

N77-23993# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
INNOVATION AND PRODUCTIVITY IN RESEARCH AND DEVELOPMENT: SOME ASSOCIATED INDIVIDUAL AND ORGANIZATIONAL VARIABLES
Michael J. Stahl May 1976 283 p refs
(AD-A032273; AFIT-TR-76-10) Avail: NTIS HC A13/MF A01 CSCL 05/10

The relationships of organizational variables with innovation and productivity of scientists and engineers in R and D laboratories were explored. Peer ratings of innovation (original and useful output) and productivity (quantity of output) were utilized as criterion. Information was obtained on 154 scientists/engineers in 35 work groups in three Air Force R and D laboratories. Significant relationships found between organizational variables and innovation and productivity included: rewards for innovation, communication on technical matters with other scientists/engineers within the work group, and an age-education demographic group of variables. Level of participation in goal setting and group leader's level of empathy were also consistently related to level of productivity. GRA

N77-23994# Army Materiel Development And Readiness Command, Alexandria, Va.
A PROPOSED R AND D MANAGEMENT MODEL
Robert F. Chaillet and Herman W. Mies Dec. 1976 46 p
(AD-A033099) Avail: NTIS HC A03/MF A01 CSCL 05/2

This report describes a proposal that would account for the resources used to perform basic research and exploratory development within the Department of Defense. It describes a means by which research and development managers can determine the output being derived from the resources expended. The proposed system could be implemented with minor changes to existing regulatory reporting requirements. No new DOD reporting forms would be required for the proposed system. Author (GRA)

N77-23995# Defense Systems Management School, Fort Belvoir, Va.
LIFE CYCLE MANAGEMENT OF ARMY TACTICAL MANAGEMENT INFORMATION SYSTEMS (TACMIS)
Mack C. Ward 13 May 1976 28 p refs
(AD-A032499) Avail: NTIS HC A03/MF A01 CSCL 05/1

The purpose of this study is to examine the life cycle management of Army Tactical Management Information Systems with particular emphasis on integration of the requirements of the Life Cycle System Management Model (LCSMM) for Army Systems, DA Pam 11-25, and the Army Management Information System (AMIS) AR 18-1. Considerable attention, both in the literature and in practice, has been given to the systems acquisition process for inception through development into production. The principal thrust of this attention, however, has been directed towards RDT and E and acquisition of weapons systems to counter a perceived threat. This study focuses on areas in the present AMIS Model that appear to be weak and attempts to correlate some of the more significant activities and documentation requirements with the LCSMM. The end result of this effort is the determination of the feasibility of developing a single Army TACMIS model with the detail of the LCSMM. Author (GRA)

N77-23996# Naval Postgraduate School, Monterey, Calif.
THE USE OF INSIGHT IN MANAGEMENT DECISIONS M.S. Thesis
Sorrell Berman Sep. 1976 54 p refs
(AD-A033696) Avail: NTIS HC A04/MF A01 CSCL 05/10

This thesis hypothesizes that insight is the key element in effective decision-making. It approaches this position by developing a basic model of the environment in which the manager functions, showing the resources at his disposal. It then describes the contributions of the technologies which form the knowledge base for decision-making. Next, it distinguishes between intuition and insight, and demonstrates that it is insight which is the basis for the effective manager's art. GRA

N77-23997# Defense Systems Management School, Fort Belvoir, Va.
INDEPENDENT RESEARCH AND DEVELOPMENT ISSUES AND ALTERNATIVES
Michael F. Salata 16 May 1976 59 p refs
(AD-A033954) Avail: NTIS HC A04/MF A01 CSCL 05/1

Independent research and development (IR/D) is contractor technical effort not sponsored by or required in the performance of a Government contract. DoD Directive 5100.66 states the policy for recovery of contractors costs and outlines the procedures for administration of contractor initiated R/D effort. Controversy over the DOD policy centers around 2 points: (1) the value of IR/D to the Government considering the expenditure involved; and (2) the appropriateness of the present method of recovery of costs considering other possible alternatives. This report seeks: to determine what was perceived as the value of the DOD IR/D program; and, with some knowledge of the current administrative policy for IR/D, to determine the proposed alternatives and how they are perceived. This report includes a discussion centering around the benefits of IR/D definition of various proposed alternative recovery methods for IR/D costs, and an evaluation of these methods by the parties involved in this controversial program. GRA

N77-23998# Defense Systems Management School, Fort Belvoir, Va.
A SYSTEMS APPROACH TO INTEGRATING FUTURE MANUFACTURING TECHNOLOGY WITH THE MUNITIONS PRODUCTION BASE MODERNIZATION PLANNING
Douglas T. Mears May 1976 34 p refs
(AD-A033817) Avail: NTIS HC A03/MF A01 CSCL 05/1

The report is the result of interviews with key U.S. Army agencies involved in manufacturing methods technology planning and forecasting. The result was an interactive on-line computer system that integrates a projected U.S. Army Development and Readiness Command Manufacturing Technology Plan with the existing U.S. Army Project Manager for Munitions Production Base Modernization and Expansion Integrated Engineering Plan. The system would provide the latest as well as known and projected Manufacturing methods and technology projects categorized by technology areas. GRA

N77-24005# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
AIRCRAFT AIRFRAME COST ESTIMATION UTILIZING A COMPONENTS OF VARIANCE MODEL M.S. Thesis
Ronald C. Marcotte Oct. 1976 99 p refs
(AD-A032627; GOR/SM/76D-10) Avail: NTIS HC A05/MF A01 CSCL 05/1

Previous studies into airframe acquisition cost estimation do not explicitly recognize the existence of correlation in the historical data. If one believes this data problem exists, then it is possible to develop a components of variance model that takes the problem into account. It is a more general model that recognizes two sources of error: (1) error due to different types of airframes and (2) overall or ordinary regression error. The variance of these two errors can be estimated and then can be utilized along with the technique of generalized least squares to obtain a cost estimating relationship which explicitly accounts for the data correlation. This modeling technique, when compared to techniques presently in service, shows that present estimating relationships underestimate the variance of the cost prediction of a new type airframe and overestimate the variance of the cost prediction of a follow-on airframe. Also, those existing techniques which implicitly recognize data correlation do not make use of all the data information available and therefore produce estimates with poor confidence prediction intervals. GRA

N77-24014# Naval Postgraduate School, Monterey, Calif.
UTILIZATION OF TECHNOLOGY TRANSFER CONCEPTS AS AN AID FOR ENGINEERING MANAGEMENT IN A TEST AND EVALUATION ORGANIZATION M.S. Thesis
Jack A. Grubber Sep. 1976 135 p refs
(AD-A033697; NPS-54CF76093) Avail: NTIS HC A07/MF A01 CSCL 05/2

This thesis addresses Technology Transfer as it might be applied in a Test and Evaluation (T and E) activity for weapons systems and components within the Federal Government. Factors associated with the technology transfer process, aids and barriers to technology transfer, the innovative and creative processes, and managerial requirements for technology transfer are related to the job of an engineering manager in a T and E organization. From the relationships, a paradigm for action for middle management engineers to improve technical capability by utilizing technology transfer concepts is formulated. GRA

N77-24079# Simat, Helliesen and Eichner, Inc., Washington, D. C.
AN ANALYSIS OF THE EFFECTS OF ROUTE RESTRICTION REMOVAL AND DISCRETIONARY AUTHORITY: THE TRANSITION TO A LESS-REGULATED ENVIRONMENT, VOLUME 1
Jan. 1977 147 p refs 3 Vol.
(Contract DOT-OS-60155)
(PB-263685/0; DOT/RAD-12-Vol-1) Avail: NTIS HC A07/MF A01; also available in set of 3 reports, PB-263684-SET, HC E21 CSCL 01B

The consequences to be expected during a transition to greater competition in scheduled interstate air transportation are considered. The conditions studied included the removal of all the certificate restrictions the CAB has placed on existing carriers and, simultaneously, a limited discretionary expansion of carriers' existing route structures. A profile of each trunk line and local service carrier was developed. The consequences of probably entry and exit scenarios were projected for each carrier, for each of the markets it serves, in terms of load factors, ASM', PRM's, and flight frequencies. GRA

N77-24080# Simat, Helliesen and Eichner, Inc., Washington, D. C.
AN ANALYSIS OF THE EFFECTS OF ROUTE RESTRICTION REMOVAL AND DISCRETIONARY AUTHORITY: THE TRANSITION TO A LESS-REGULATED ENVIRONMENT. VOLUME 2: TRUCK AIRLINE Final Report
Jan. 1977 508 p refs 2 Vol.
(Contract DOT-OS-60155)
(PB-263686/8; DOT/RAD-12-Vol-2) Avail: NTIS HC A22/MF A01; also available in set of 3 reports, PB-263684-SET, HC C21 CSCL 01B

The consequences to be expected during a transition to greater competition in scheduled interstate air transportation is discussed. Profiles identify, by market, each carrier's vulnerability to entry on its routes by other carriers, and the corresponding opportunities it in turn has to enter new markets. Profiles of trunk line carriers are reported. GRA

N77-24081# Simat, Helliesen and Eichner, Inc., Washington, D. C.
AN ANALYSIS OF THE EFFECTS OF ROUTE RESTRICTION REMOVAL AND DISCRETIONARY AUTHORITY: THE TRANSITION TO A LESS-REGULATED ENVIRONMENT. VOLUME 3: LOCAL SERVICE CARRIER PROFILES Final Report
Jan. 1977 327 p refs 3 Vol.
(Contract DOT-OS-60155)
(PB-263687/6; DOT/RAD-12-Vol-3) Avail: NTIS HC A15/MF A01; also available in set of 3 reports, PB-263684-SET, HC E21 CSCL 01B

Competition, traffic profiles, productivity, and market relations of local service air carriers are studied. GRA

N77-24121# Air Force Flight Test Center, Edwards AFB, Calif. Systems Engineering Branch.
OVERALL AIRCRAFT SYSTEMS EVALUATION
Frank N. Lucero and Charles E. Adolph *In* AGARD Flight Test Tech. Apr. 1977 13 p
15-05)
Avail: NTIS HC A18/MF A01

The managerial and test procedures used by personnel at the Air Force Flight Test Center to plan, conduct, and report on overall aircraft systems test programs are described. Author

N77-24978*# Battelle Columbus Labs., Ohio.
ANALYSIS OF THE EFFECTIVENESS OF INDUSTRIAL R AND D Final Report
W. Halder Fisher, Herbert S. Kleiman, John L. Moore, and Mark B. Triplett Oct. 1976 87 p refs
(Contract NASw-2800)
(NASA-CR-153001; BCL-OA-TFR-76-8) Avail: NTIS HC A05/MF A01 CSCL 05A

The criteria used by private industry in evaluating and selecting proposed research and development projects for implementation, and also in determining which R and D facilities are to be acquired were investigated. Conceptual and practical issues inherent in any quantitative analysis of the contribution of R and D to economic growth were identified in order to assist NASA in developing approaches for analzying the economic implication of its own R and D efforts. Author

N77-24979*# Battelle Columbus Labs., Ohio.
OPTIONS FOR ORGANIZATION AND OPERATION OF SPACE APPLICATIONS TRANSFER CENTERS Final Report
A. C. Robinson and J. A. Madigan 14 Jun. 1976 39 p
(Contract NASw-2800)
(NASA-CR-153005) Avail: NTIS HC A03/MF A01 CSCL 05A

The benefits of developing regional facilities for transfer of NASA developed technology are discussed. These centers are designed to inform, persuade, and serve users. Included will be equipment for applications and demonstrations of the processes, a library, training facilities, and meeting rooms. The staff will include experts in the various techniques, as well as personnel involved in finding and persuading potential users. Author

N77-24982# National Science Foundation, Washington, D. C.
SCIENCE AT THE BICENTENNIAL: A REPORT FROM THE RESEARCH COMMUNITY. REPORT OF THE NATIONAL SCIENCE BOARD/1976
1976 165 p refs
(NSB-76-1) Avail: NTIS MF A01; SOD HC $2.95 as 038-000-00280-5

The views of over 600 representatives of the research community in universities, industry, government, and independent research institutes throughout the United States are provided on conditions affecting research or likely to affect it in the near future. Specifically they describe critical issues or problems they believe will decrease the effectiveness of research unless properly addressed. Emphasis was placed upon dependability of funding for research, the vitality of the research system, freedom in research choices, and attitudes toward science and technology. Author

N77-24983# Stanford Univ., Calif. Dept. of Statistics.
OPTIMIZATION OF RECURRENT CAPACITY EXPANSION MODELS AND GENERALIZATION TO A NON-RECURRENT MODEL
R. Scott Shipley 11 Oct. 1976 84 p refs
(Contract N00014-75-C-0561; NR Proj. 042-002)
(AD-A033429; SU-TR-180) Avail: NTIS HC A05/MF A01 CSCL 12/2

The determination of optimal expansion sizes $X^*(K)-1$, for recurrent capacity expansion strategies of the form (X,K) where X-1 represents the expansion size undertaken whenever excess demand reaches the value K-1 is considered here, for fixed values K. A Policy Improvement algorithm is derived to determine optimal expansion sizes for general expansion functions. For a certain class of expansion functions, which includes discrete convex functions, it is shown that the expected discounted costs are unimodal in the expansion size and that the optimal expansion size $X^*(K)-1$ increases monotonically with K; an Interval-Bisection algorithm is given to determine $X^*(K)$ for this case. The monotonicity of the optimal expansion size is also demonstrated, prior to integer-truncation, for important classes of concave expansion functions which are continuously differentiable; a simple Function Iteration algorithm is derived to determine optimal expansion size for this case. GRA

N77-24984# Stanford Univ., Calif. Dept. of Operations Research.
A RENEWAL DECISION PROBLEM
C. Derman, Gerald J. Lieberman, and S. Ross 15 Aug. 1976 19 p refs
(Contract N00014-75-C-0561)
(AD-A033777; SU-TR-177) Avail: NTIS HC A02/MF A01 CSCL 12/2

Given a system which operates for t units of time and a certain component is essential for its operation and must be replaced, when it fails, with a new component. The class of spare components is grouped into n categories with components of the ith category costing a positive amount Ci and functioning for an exponential length of time with rate lambda(i). The main problem of interest is, for a given t, to assign the initial component and subsequent replacements from among the n categories of spare components so as to minimize the expected cost of providing an operative component for t units of time. GRA

N77-24985# Wisconsin Univ., Madison. Dept. of Computer Sciences.
THE FORMAL DESIGN AND ANALYSIS OF DISTRIBUTED DATA PROCESSING SYSTEMS Special Report, 1 Jul. - 30 Oct. 1976
Donald R. Fitzwater 30 Oct. 1976 172 p refs
(Contract DASG60-76-C-0080)
(AD-A033888; CSTR-279) Avail: NTIS HC A08/MF A01 CSCL 09/2

The research proposal is to support the development of the 'science' behind software engineering in order to ensure required system properties, to compare current software engineering techniques, to develop specification for new design and analysis tools, and to demonstrate the practicality of the 'science'. A hierarchical design schema will be developed within which formal representations and analyses can be defined and the required solutions can be found. Since 'worst case' problems are generally impossible to solve, sufficient design laws or constraints will be developed to ensure solvability of the critical problems. Author (GRA)

N77-24986# Harry Diamond Labs., Adelphi, Md.
RECALL: A MANAGEMENT INFORMATION RETRIEVAL SYSTEM FOR THE WANG 2200
Howard M. Bloom Nov. 1976 59 p
(AD-A034427; HDL-TM-76-36) Avail: NTIS HC A03/MF A01 CSCL 05/2

A data-base language called RECALL has been implemented on the Wang 2200 programmable desk calculator. The language was patterned after RETRIEVE, developed by Tymshare, Inc., for its time-sharing network. Differences between the two implementations are very minor. The report describes each command in the language and gives a comprehensive example to illustrate how the entire system can be used. The listing of the program allows the reader to make modifications, if necessary. The RECALL system is implemented on a 2200C calculator with 16k bytes of memory and a model 2230 disk used for temporary storage of the overlay segments needed for running the program. The system assumes that the data bases will be permanently saved on tape cassette. Author (GRA)

N77-24988*# Operations Research, Inc., Silver Spring, Md.
UNITED STATES DATA COLLECTION ACTIVITIES AND REQUIREMENTS, VOLUME 1 Final Report
S. Hrin and D. McGregor Jan. 1977 248 p refs
(Contract NAS5-22467)
(NASA-CR-152523; TR-1124-Vol-1) Avail: NTIS HC A11/MF A01 CSCL 05B

The potential market for a data collection system was investigated to determine whether the user needs would be sufficient to support a satellite relay data collection system design. The activities of 107,407 data collections stations were studied to determine user needs in agriculture, climatology, environmental monitoring, forestry, geology, hydrology, meteorology, and oceanography. Descriptions of 50 distinct data collections networks are described and used to form the user data base.

The computer program used to analyze the station data base is discussed, and results of the analysis are presented in maps and graphs. Information format and coding is described in the appendix. Author

N77-24989*# Operations Research, Inc., Silver Spring, Md.
UNITED STATES DATA COLLECTION ACTIVITIES AND REQUIREMENTS, VOLUME 2 Final Report
S. Hrin and D. McGregor Jan. 1977 196 p refs
(Contract NAS5-22467)
(NASA-CR-152524; TR-1124-Vol-2) Avail: NTIS HC A09/MF A01 CSCL 05B

A listing of the entire data collection station data base is presented. Author

N77-25001# Air Force Contract Management Div., Kirtland AFB, N.Mex.
A METHODOLOGY FOR ESTIMATING JET ENGINE COSTS EARLY IN WEAPON SYSTEM ACQUISITION
Michael A. Yanke 1 Aug. 1976 38 p ref
(AD-A033667) Avail: NTIS HC A03/MF A01 CSCL 21/5

The Department of Defense (DOD) is deeply conerned about developing accurate initial estimates for weapon system production costs. An area of particular interest is providing estimates of future production costs for jet engines. Current parametric models used by the Air Force identify engine cost as a function of output variables. Other DOD agencies consider relating input variables as well as output variables to production costs. This study was designed to find a better way to estimate engine production costs. The results of this research include the following findings: (1) current Air Force cost-estimating models are operationally ineffective; (2) raw materials-related variables are highly correlated with cost and should be considered in developing future cost-estimation models; (3) statistical validation of cost models should incorporate confidence interval testing at a specified alpha level for each prediction; and (4) the use of confidence intervals is the correct statistical approach for developing cost estimates which may be used in decision making. Author (GRA)

N77-25007# Commerce Dept., Washington, D.C. Patent and Trademark Office.
TECHNOLOGY ASSESSMENT AND FORECAST
Mar. 1977 218 p refs
(Rept-7) Avail: NTIS HC A10/MF A01

A historical perspective of patents and trademarks is presented along with a description of international patenting patterns. Recent activity is assessed in chemical, electrical, and mechanical engineering, and developments in telemetry, cardiography, optical waveguides, and prostagladins are evaluated. Computer memory components and antipollution patenting are explored in depth. U.S. patent activity since 1790 is given in tabular form. Instructions for obtaining additional information or special reports are included. A.R.H.

N77-25015# Voorhees (Alan M.) and Associates, Inc., McLean, Va.
STUDY OF FUTURE PARATRANSIT REQUIREMENTS: SCENARIO REPORT Interim Report
Nov. 1976 233 p
(Contract DOT-UT-50023)
(PB-262629/9; UMTA-IT-06-0104-77-1) Avail: NTIS HC A11/MF A01 CSCL 13B

The future dimensions and characteristics of paratransit and the requirements for testing innovative transportation services for the development of new vehicles, and for ways to overcome legal and institutional constraints, are defined. The analysis is based on urban scenarios projected into the 1980-95 time frame and representative of a large number of locations. The report describes how these scenarios were constructed and evaluated and how the findings were aggregated for the entire U.S. GRA

N77-25031# Urban Inst., Washington, D.C.
USING AN IMPACT MEASUREMENT SYSTEM TO EVALUATE LAND DEVELOPMENT Final Report
Phillip S. Schaenman Sep. 1976 111 p refs
(Contract DC-PD-51)
(PB-263780/9; URI-15500; LC-76-43199; ISBN-87766-172-3) Avail: NTIS HC A06/MF A01 CSCL 13B

Practical ways for urban planners to assess th. impacts of land development on a local economy, the environment, public and private services, and aesthetic, cultural and social conditions of a community are identified. Where possible, impacts are described in terms of end results to people. The state of the art of practical measurement procedures available are identified, and an illustrative system of measures for assessing impacts of proposed developments is set forth, identifying data collection and analyses procedures for each measure. GRA

N77-25167# Army Aviation Systems Command, St. Louis, Mo. Systems Analysis Office.
THE EFFECT OF THE OPERATIONAL READINESS OF THE FLOAT ON THE OPERATIONAL READINESS OF THE ENTIRE FLEET Final Report
D. Frank Fox Jan. 1977 26 p refs
(AD-A035748; DRSAV-D-77-1; USAAVSCOM-TR-77-1) Avail: NTIS HC A03/MF A01 CSCL 01/3

In general, for a fleet of aircraft, the operational readiness of the float is much lower than that of the rest of the fleet. The inclusion of the float in the calculation of the operational readiness for the fleet causes the operational readiness to be lower than it would otherwise be. Formulas are derived which show the magnitude of the decrease in the operational readiness and the relationships between the operational readiness rates of the fleet and its float. GRA

N77-25369*# ECON, Inc., Princeton, N.J.
THE PLAN FOR THE ECONOMIC EVALUATION OF THE PUBLIC SERVICE COMMUNICATION SATELLITE SYSTEM Final Report
2 May 1977 64 p
(Contract NASw-3047)
(NASA-CR-153007; Rept-77-263-4) Avail: NTIS HC A04/MF A01 CSCL 17B

A plan for the economic evaluation of the Public Service Communications Satellite (PSCS) within domestic markets is presented. It extends through the planning, performance and evaluation of economic experiments following the launch of the PSCS in 1982, and includes the consideration of how the results of these experiments impact the transfer from demonstration to operations. The implementation of this plan will provide information needed to understand and manage the economic and social impacts of the PSCS program. Author

N77-25612*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
PROGRAM DEFINITION FOR THE DEVELOPMENT OF GEOTHERMAL ENERGY. VOLUME 1: BACKGROUND AND PROGRAM DEFINITION SUMMARY
29 Aug. 1975 59 p refs Sponsored in part by ERDA
3 Vol.
(Contract NAS7-100)
(NASA-CR-15322; PB-263833/6; NSF/RA/N-75-338A-Vol-1; JPL-5040-6-Vol-1) Avail: NTIS HC A04/MF A01; also avail. in set of 3 reports HC E10, PB-263832-SET CSCL 08I

Federal Government actions proposed to facilitate a significant acceleration in the commercial utilization of the nation's valuable geothermal energy resources, in an environmentally acceptable manner, are reported. The utilization level that might be achieved by 1985 and beyond, as a result of an effective Federal Government program to facilitate industrial development of geothermal energy, is projected. Existing barriers to that development are discussed, and the three basic steps to development are presented. Development strategy adopted and detailed requirements for growth are included. GRA

N77-25613*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
PROGRAM DEFINITION FOR THE DEVELOPMENT OF GEOTHERMAL ENERGY. VOLUME 2: PROGRAM

DEFINITION DEVELOPMENT RATIONALE AND SUBPROGRAM DESCRIPTIONS
29 Aug. 1975 250 p refs Sponsored in part by ERDA 3 Vol.
(Contract NAS7-100)
(NASA-CR-153222; PB-263834/4;
NSF/RA/N-75-338B-Vol-2; JPL-5040-6-Vol-2) Avail: NTIS HC A11/MF A01; also avail. in set of 3 reports HC E10, PB-263832-SET CSCL 08I

The objectives and the goal of the program are defined, and the expected sequence for commercialization of various resource types is presented. Needed technology demonstrations are outlined, and the major problems associated with obtaining rapid growth in utilization of these resources are identified. The scope of actions readily available to the government are specified. Basic strategy for program development as an effort to get the private sector moving, and to sustain it until it gathers sufficient momentum to become self-sustaining is outlined. The overall subprogram descriptions and the detailed rationale for each of the recommended actions is provided. Author

N77-25614*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
PROGRAM DEFINITION FOR THE DEVELOPMENT OF GEOTHERMAL ENERGY. VOLUME 3: APPENDIXES
29 Aug. 1975 411 p Sponsored in part by ERDA 3 Vol.
(Contract NAS7-100)
(NASA-CR-153223; PB-263835/1;
NSF/RA/N-75-338C-Vol-3-App; JPL-5040-6-Vol-3) Avail: NTIS HC A18/MF A01; also avail. in set of 3 reports HC E10, PB-263832-SET CSCL 08I

The following appendixes are provided; Implications of the 1985 Goal and Updated Sensitivity Analysis; Geothermal Development Timelines; Leasing and Exploration; Research and Development; Electric Utilities; Nonelectric Geothermal Market; Geopressured Resource Research and Development; Community Planning; Summary of ERDA Patent Policy Relevant to Geothermal Energy; Factors Affecting the Development of Known Geothermal Prospects; Environmental Laws and Regulations; An Elementary Treatment of Economics of Geothermal Power Production; Conversion Cycle Analysis; Projection of Attainable Geothermal Energy Development and Use; and Geothermal Energy Research, Development, and Demonstration Act of 1974. GRA

N77-25856# Defense Systems Management School, Fort Belvoir, Va.
CONFIGURATION MANAGEMENT FOR THE DEVELOPMENT OF COMPUTER SYSTEMS
Mark D. Anway Nov. 1976 41 p refs
(AD-A036782) Avail: NTIS HC A03/MF A01 CSCL 05/1

This study examines configuration management as defined in Department of Defense publications for major defense systems and applies configuration management to the development of computer systems. DOD Directives, DOD Instructions, Military Standards, and Air Force publications provide the primary source of configuration management principles and functions. Configuration management has had limited application to embedded computer systems and even less to general purpose computer systems. The study discusses configuration management principles in the computer system environment and concludes that these principles can be and should be applied to the development of computer systems. To demonstrate that conclusion, the principles are applied to a specific Air Force program, the Base Level Data Automation Program (Phase 4). Author (GRA)

N77-26000# Committee on Science and Technology (U. S. House).
PROGRAM PLANNING AND CONTROL WITH NASA AND THE GAO, PART 1
Washington GPO 1976 30 p Hearing before Subcomm. on Space Sci. and Applications of Comm. on Sci. and Technol., 94th Congr., 2d Sess., No. 62, 18 Mar. 1976
(GPO-70-420) Avail: Subcomm. on Space Science and Applications CSCL 05A

A comprehensive review of NASA program planning and control was undertaken. The data base generated by NASA and under review by GAO was examined. The structure and development of the data base and the plans of action to analyze the large volume of data generated are described. S.M.

N77-26001# European Space Agency, Paris (France). Project Control Div.
PROJECT CONTROL REQUIREMENTS AND PROCEDURES FOR MAJOR PROCUREMENT ACTIONS. PHASE B: SYSTEM DEFINITION
3 Jan. 1977 53 p
(ESA-PSS-32-Issue-1) Avail: NTIS HC A04/MF A01

Requirements and procedures relating to Phase B are stipulated, based on discussions and agreements reached during a series of working group meetings between ESA and EUROSPACE on project control, held during 1975 and 1976. These requirements and procedures take into account the experience gained with project control methods applied to satellite procurement actions during recent years. Author (ESA)

N77-26002# European Space Agency, Paris (France). Project Control Div.
PROJECT CONTROL REQUIREMENTS AND PROCEDURES FOR MAJOR PROCUREMENT ACTIONS. PHASE C/D: SYSTEM DEVELOPMENT AND PRODUCTION
3 Jan. 1977 84 p
(ESA-PSS-33-Issue-1) Avail: NTIS HC A05/MF A01

Requirements and procedures relating to Phase C/D are stipulated, based on discussions and agreements reached during a series of working group meetings between ESA and EUROSPACE on project control, held during 1975 and 1976. These requirements take into account the experience gained with the project control methods applied to satellite procurement actions during recent years. Author (ESA)

N77-26003# Boise Center for Urban Research, Idaho.
MINICOMPUTERS: AN ALTERNATIVE APPROACH TO MUNICIPAL INFORMATION SYSTEMS Final Report
Bill DeGroff, Larry Blanchard, and Mike Bliss Jul. 1976 128 p Sponsored in part by National League of Cities/U.S.S. Conference of Mayors, Washington, D. C.
(Contract HUD-H-2196R)
(PB-263775/7; UO-LCCM-BOI-76-004) Avail: NTIS HC A07/MF A01 CSCL 05A

The advantages and disadvantages of the use of minicomputers in management information systems is presented. Boise City concluded that the minicomputer approach to managing data has very distinct and identifiable cost savings over traditional alternatives without sacrificing efficiency and effectiveness. Boise City's decision as a direct result of this research project was to acquire a minicomputer, accept this risk of the current state of minicomputer technology as minimal, and to take advantage of the cost savings. GRA

N77-26005# National Science Foundation, Washington, D. C. Div. of Science Resources Studies.
RESEARCH AND DEVELOPMENT IN INDUSTRY, 1974. FUNDS, 1974. SCIENTISTS AND ENGINEERS, JANUARY 1975 Final Surveys of Science Resources Series
John R. Chirichiello, Paul M. White, Robert O. Santos, Wayne M. McCaughey, and Paul Beasley Sep. 1976 91 p Sponsored in part by Bureau of Census
(PB-263779/1; NSF-76-322) Avail: NTIS HC A05/MF A01 CSCL 05A

Data on the dollar volume of research and development performed in the industrial sector, sources of financing, numbers of R and D scientists and engineers, and other economic characteristics of the industrial R and D effort are presented. GRA

N77-26006# National Science Foundation, Washington, D. C. Div. of Science Resource Studies.
NATIONAL PATTERNS OF R AND D RESOURCES: FUNDS AND MANPOWER IN THE UNITED STATES, 1953 - 1976
Apr. 1976 38 p ref
(PB-263778/3; NSF-76-310) Avail: NTIS HC A03/MF A01 CSCL 05A

Trends in the allocation of funds and manpower for basic and applied research by the federal government, industries, universities and colleges, and other nonprofit organizations are discussed, and statistically analyzed. Data presented in tabular form show the dollar volume of research and development performed in each sector, sources of financing, number of R and D scientists and engineers, international comparisons, and other economic characteristics of the nation's R and D effort. GRA

N77-26007# Decisions and Designs, Inc., McLean, Va.
RAPID SCREENING OF DECISION OPTIONS
Judith Selvidge Oct. 1976 107 p refs
(Contract N00014-76-C-0074)
(AD-A035386; TR-76-12) Avail: NTIS HC A06/MF A01 CSCL 05/1

Decision analysis is a formal method for dealing with decision making under uncertainty that takes into account the decision maker's many options, the possible uncertain events that may occur, the probabilities of occurrence of various outcomes of these events, and the decision maker's utility or value for consequences of different combinations of options and outcomes. By means of the format of decision trees or diagrams, the decision situation can be presented graphically and, in particular, the possible decisions and events clearly enumerated and the sequential nature of the decision process shown. This paper discusses a method, applicable to some decision problems, for reducing the analysis to a small, rather manageable set of simple options and a limited number of uncertain outcomes. This technique is called rapid screening of decision options. GRA

N77-26008# Decisions and Designs, Inc., McLean, Va.
ON USING SCENARIOS IN THE EVALUATION OF COMPLEX ALTERNATIVES
Michael F. OConnor and Ward Edwards (Univ. Southern Calif., Los Angeles) Dec. 1976 72 p refs
(Contract N00014-76-C-0074; ARPA Order 3052)
(AD-A035387; TR-76-17) Avail: NTIS HC A04/MF A01 CSCL 05/1

The deployment of large military (or social) systems will occur in an uncertain future, and decisions concerning the design of and choice among alternative systems must therefore involve projections of the expected outcomes of system deployment in such uncertain futures. An attempt to represent the large number of potential alternative futures using an event diagram will result in the bushy-mess problem, often encountered in applications of decision analytic techniques, in which the number of different branches in a probability (or decision) tree is prohibitively large. An alternative to attempting to exhaustively characterize the future in a system evaluation is to evaluate the alternative systems in a reasonable number of hypothetical scenarios. This report is intended as a general discussion of the problem of the use of such scenarios in system evaluation. GRA

N77-26009# California Univ., Berkeley. Operations Research Center.
OPTIMAL DESIGN OF A MANPOWER SYSTEM
Richard C. Grinold Jan. 1977 24 p refs
(Contract N00014-75-C-0619; NR Proj. 047-120)
(AD-A035434; ORC-77-1) Avail: NTIS HC A02/MF A01 CSCL 05/1

An equilibrium model of a manpower system is developed based on the notion of a career flow. Institutional constraints and measures of system performance are linear functions of the career flow. A typical optimal design problem is formulated and a solution procedure is developed. The optimization problem is a generalized linear program in which columns are generated by solving a shortest path problem. Upper and lower bounds on the optimal value function can be developed at each stage of the calculations. Author (GRA)

N77-26010# Naval Ship Research and Development Center, Bethesda, Md.
NAVY LOGISTICS INFORMATION SHARING (NAVLIS) PROJECT Final Report, Jan. 1973 - Jun. 1976
Jun. 1976 469 p ref
(AD-A035847; DTNSRDC-76-0120) Avail: NTIS HC A02/MF A01 CSCL 09/2

The primary objective of the NAVLIS Project was application of computer networking and data base accessing technology to the current Navy automated logistics environment. The program was terminated in December 1975. This report describes the computer software developed during the construction of a pilot model and the capabilities of that software to extract data from distributed data bases on non-homogeneous computers at geographically dispersed sites. The major technical interests and contributions of the project were Distributed Data Directory concept, Generalized parameter-driven data base interface, Synonym resolution capability and Secondary hit resolution capability. The major recommendations of this report are that NAVLIS Technology be reviewed for its relevance to on-going university level projects, NAVLIS Technology be considered for its potential benefits to other logistics system developments, such as WWMICS and NAICOMMIS, and consideration be given to utilizing the NAVLIS Technology in networking the Navy Data Processing Service Centers. GRA

N77-26011# Defense Systems Management School, Fort Belvoir, Va.
PROTOTYPING: A STRATEGY FOR THE ACQUISITION OF NAVAL AIRCRAFT
Michael Alton Pearce 10 Nov. 1976 80 p refs
(AD-A035357) Avail: NTIS HC A05/MF A01 CSCL 15/5

This study examines the historical uses of the aircraft prototype in the acquisition process, and identifies conditions and events which warrant the use of a prototype strategy in naval aircraft development. Prototyping is evaluated considering service compliance with Department of Defense Directive 5000.1. Prototyping is additionally investigated as an adjunct in meeting current design to cost and life cycle cost objectives. The study concludes that competitive aircraft prototyping can provide significant risk reduction in cost, schedule, performance and source selection. The study recommends that the Naval Air Systems Command adopt and implement a prototype acquisition strategy employing a competitive, critical subsystems prototype during the validation and full scale development phases of future aircraft development. Author (GRA)

N77-26012# Defense Systems Management School, Fort Belvoir, Va.
SUBCONTRACT MANAGEMENT AND LESSONS LEARNED
Ernest W. Rousseau Nov. 1976 29 p refs
(AD-A037074) Avail: NTIS HC A03/MF A01 CSCL 05/1

For a number of years, a major Air Force space program was faced with the problem of having to procure a critical subsystem from a sole source subcontractor. The primary reason for his monopoly was a proprietary process used in his commercial business. The cost associated with meeting the vendor's ever increasing demands was unacceptable and dictated management action. A prototype competition was conducted and resulted in the selection of a new vendor. Associated with this was improved technology, lower cost and better response to schedule requirements. The original subcontractor sued the government and lost. The litigation did however, provide some important 'lessons learned.' Described in the report is the evolution of the problems, relation between the prime contractor and the government in arriving at a solution, the litigation and lessons that were provided. Author (GRA)

N77-26022# National Science Foundation, Washington, D. C. Div. of Science Resource Studies.
THE 1985 R AND D FUNDING PROJECTIONS Progress Report, 1953 - 1985
Jun. 1976 36 p refs
(PB-263856/7; NSF-76-314) Avail: NTIS HC A03/MF A01 CSCL 05C

Data are presented on the dollar volume of research and development performed within each sector of the economy, by source of financing for 1985. Also presented are forecasts of the gross national product and sales. GRA

N77-26024# Committee on Commerce, Science, and Transportation (U. S. Senate).
NASA AUTHORIZATION FOR FISCAL YEAR 1978, PART 2
Washington GPO 1977 648 p refs Hearings on S. 365 before Subcomm. on Sci., Technol., and Space of the Comm. on Commerce, Sci., and Transportation, 95th Congr., 1st Sess., 25 Feb., 1 and 3 Mar. 1977
(GPO-86-914) Avail: Subcomm. on Sci., Technol., and Space
The testimony of witnesses and additional articles, letters, and statements are presented in support of NASA budget requests. A.R.H.

N77-26025 Committee of Conference (U. S. Congress).
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION, FISCAL YEAR 1978
Washington GPO 1977 12 p Conference rept. to accompany H.R. 4088 from Comm. of Conference, 95th Congr., 1st Sess., 21 Jun. 1977
(S-Rept-95-281; GPO-89-010) Avail: US Capitol, Senate Document Room
An amendment is presented for resolving disagreeing votes of the House and Senate on the Senate amendment to H.R. 4088. Appropriations to be authorized for NASA research and development, construction of facilities, and research and program management are presented and discussed. A.R.H.

N77-26030# International Road Federation, Washington, D.C.
THE 1976 WORLD SURVEY OF CURRENT RESEARCH AND DEVELOPMENT ON ROADS AND ROAD TRANSPORT Annual Road, 1976
Dec. 1976 503 p
(Contract DOT-FH-11-8893)
(PB-264430/0; FHWA/RD-77-12) Avail: NTIS HC A22/MF A01 CSCL 13B
There are 5,430 projects listed, classified in accordance with the subject area classification system of the Transportation Research Board. GRA

N77-26039# Gellman Research Associates, Inc., Jenkintown, Pa.
INDICATORS OF INTERNATIONAL TRENDS IN TECHNOLOGICAL INNOVATION Final Report, 1953 - 1973
Stephen Feinman and William Fuentevilla Apr. 1976 329 p refs
(Contract NSF C-889)
(PB-263738/7; NSF/SIU-76-1) Avail: NTIS HC A15/MF A01 CSCL 05A
Indicators of the international trends in technological invention and innovation were developed. A qualitative data base for 500 technological innovations introduced into the marketplace between 1953 and 1973, in any one of six countries was evaluated. The factors explored included: (1) the industry which introduced the innovation in terms of three digit SIC numbers; (2) the country of market introduction; (3) the date of market introduction; (4) the market addressed by the innovator; (5) the size of the firm in terms of employees and sales; (6) the structure of the company; and (7) the background of senior management. GRA

N77-26071# Office of Management and Budget, Washington, D. C.
AIRCRAFT INDUSTRY CAPACITY STUDY
Jan. 1977 73 p
(AD-A037837; DW-77-1) Avail: NTIS HC A04/MF A01 CSCL 05/3
A joint agency study group was formed to examine the capacity and capacity utilization of the aircraft industry. The study group evaluated existing and planned capacity against present and future military, commercial and foreign market demands. The costs to DoD of maintaining extra capacity were estimated, and the contributions of this extra capacity to national surge and mobilization needs, furthering competition and advancing the technology base were assessed. GRA

N77-26073# Cornell Univ., Ithaca, N.Y. Dept. of Operations Research.
SPAERS: SIMULATION FOR THE PERFORMANCE AIRCRAFT ENGINE REPAIR SYSTEMS M.S. Thesis
Henry Givray and Robert Slon May 1976 194 p refs
(Contract N00014-75-C-1172; NR Proj. 042-335)
(AD-A035737) Avail: NTIS HC A06/MF A01 CSCL 21/5
The allocation of spare aircraft engines is critical to the U.S. Naval aircraft operation's performance. An aircraft in this system becomes inoperative in the event of an engine failure and remains in that state until it is replaced by a serviceable engine. An engine is removed upon failure and subsequently is recovered by repairing it at the location's repair facilities or elsewhere. However, the availability of a spare engine at the location could reduce the amount of time an aircraft spent in an inoperative state due to engine repair time. Analytical models have been developed by the DOD to calculate spare engine requirements throughout the system. The models require assumptions to be made about certain parts of the system. A *Simulation for the Performance of Aircraft Engine Repair System* SPAERS was developed to simulate different configurations of an aircraft repair system. The analysis section of this report shows a comparison between two situations, namely the analytical rendering of the repair system, and a situation more closely resembling the real system dynamics. GRA

N77-26128# Defense Systems Management School, Fort Belvoir, Va.
PROJECT MANAGEMENT OF ARMY AIRCRAFT SURVIVABILITY EQUIPMENT
William A. Allen Nov. 1976 47 p refs
(AD-A036785) Avail: NTIS HC A03/MF A01 CSCL 01/3
Efforts by the U.S. Army to improve the survivability characteristics of its combat aircraft resulted in a proliferation of modifications ranging from simple airframe changes to the development of extremely complex electronic countermeasures. To effect centralized management of the development, procurement, and deployment of survivability enhancing equipment, it was necessary to establish the Aircraft Survivability Project Manager's Office within the U.S. Army Aviation Systems Command. This report addresses the policies, regulations, missions, responsibilities, and management concepts employed by the Project Manager and supporting organizations in the realization of this goal. Author (GRA)

N77-26485# California Univ., Berkeley. Lawrence Berkeley Lab.
INSTRUMENTATION MAINTENANCE
Dick A. Mack Sep. 1976 26 p refs Presented at the Conf. on Management of Lab. Instr., Cairo, 5-14 Nov. 1976
(Contract W-7405-eng-48)
(LBL-5505; Conf-761105-4) Avail: NTIS HC A03/MF A01
The organization, staffing and operation of a facility for instrument repair is described. Maintenance policy should be based on studies of (1) preventive vs. catastrophic maintenance, (2) records indicating when equipment should be replaced rather than repaired and (3) priorities established to indicate the order in which equipment should be repaired. Upon establishing a workable maintenance policy, the staff should be instructed so that they may provide appropriate scheduled preventive maintenance, calibration and corrective procedures, and emergency repairs. The education, training and experience of the maintenance staff are discussed along with the organization for an efficient operation. The layout of the various repair shops is described in the light of laboratory space and financial constraints. ERA

N77-26525# Defense Systems Management School, Fort Belvoir, Va.
THE EFFECT OF RELIABILITY AND MAINTAINABILITY ON THE F-14A TF30P412A ENGINE
Bruce N. Erickson Nov. 1976 82 p refs
(AD-A037985) Avail: NTIS HC A05/MF A01 CSCL 01/3
This report covers a brief history of the TF30P412A Engine and the F-14A's capabilities, the present military specification for aircraft engine testing, analysis of major components of the TF30P412A reliability and maintainability (RAM) and their

affect on availability and the logistics support system. It can be concluded from the report that our present system for developing and testing aircraft engines needs to be improved and that the TF30P412A is a result of the inadequate process. The low operational readiness of the F-14A can in part be blamed on the TF30P412A engine's low RAM. The supply problem has grown due to a proliferating parts problem resulting from numerous Engineering Change Proposals (ECP's). It is recommended that the Navy: continue to place more emphasis on reliability in the future; establish a Joint Engine Program Office with the Air Force; establish a 1,000 hour mission test for engine development; should give reliability priority over increased technical performance in the development of a new engine; and compare RAM figures for all the turbofan engines. Author (GRA)

N77-26806# Defense Systems Management School, Fort Belvoir, Va.
HUMAN FACTORS CONSIDERATIONS IN NEW GENERATION ARMY AIRCRAFT SYSTEMS
Carl A. Weaver, Jr. Nov. 1976 30 p refs
(AD-A037992) Avail: NTIS HC A03/MF A01 CSCL 01/3

This study is useful to project managers, decision makers and users alike, particularly those interested in rotary-wing system acquisition. It is also useful to behavioral scientists and human factors engineers as an aid to becoming sensitive to user requirements and changes in the operational environment. Purpose, scope and limitations are established. The issues are placed in perspective through a discussion of projected man-machine relationships with respect to the anticipated future operational environment of helicopters. Basic Army aviation systems of the future are described in relation to aviation missions. Projected human factors problems are examined as a function of system performance and operational trends. Human factors are related to life cycle costing by suggesting a relationship between the manager's decision flexibility and a commitment to a final system configuration. It is concluded that a departure from traditional cockpit design is necessary. Recommendations are made concerning decision criteria and human factors-acquisition cycle interface. Author (GRA)

N77-26807# Defense Systems Management School, Fort Belvoir, Va.
HUMAN FACTORS PROGRAMS IN NAVY SYSTEMS ACQUISITION
Stephen C. Merriman Nov. 1976 61 p refs
(AD-A037775) Avail: NTIS HC A04/MF A01 CSCL 05/5

This report examined the role that human factors programs play in Navy systems acquisition. It focused upon the conceptual and validation (advanced development) phases of the acquisition process since it is during this period when the great majority of system design decisions are made. Based upon previous analyses, interview data and the author's personal experience, human factors program activities appropriate to the conceptual and validation phases were identified and discussed relative to key acquisition process milestones; e.g., Development Proposal (DP) and Decision Coordination Paper (DCP) preparation, Defense Systems Acquisition Review Council (DSARC) preparation. Department of Defense and Navy systems acquisition policy was briefly reviewed in terms of its effects on the conduct of human factors programs. Past and present human factors programs were reviewed and critiqued. Current trends and major problem areas were identified and discussed. GRA

N77-26903 British Library Lending Div., Boston Spa (England).
ESTABLISHMENT OF LINEAR SEQUENCES
K. Okamara and H. Yamashina Jan. 1977 29 p Transl. into ENGLISH from Seimitsu Kikai (Japan), v. 35, no. 8, 1969 p 25-32
(BLL-RTS-10323) Avail: British Library Lending Div., Boston Spa, Engl.

Sequencing problems in mechanical engineering where high productivity is desirable are described. Main features of such problems are given and various methods in relation to linear sequences are listed as the following: (1) box method; (2) fixing method; (3) reverse arrow method; and (4) grouping method. Author

N77-27020*# Battelle Columbus Labs., Ohio.
FACTORS AFFECTING THE CORPORATE DECISIONMAKING PROCESS OF AIR TRANSPORT MANUFACTURERS Final Report
R. G. Ollila, J. D. Hill, B. R. Noton, M. A. Duffy, and M. M. Epstein 15 Dec. 1976 118 p refs
(Contract NASw-2970)
(NASA-CR-154618) Avail: NTIS HC A06/MF A01 CSCL 05A

Fuel economy is a pivotal question influencing the future sale and utilization of commercial aircraft. The NASA Aircraft Energy Efficiency (ACEE) Program Office has a program intended to accelerate the readiness of advanced technologies for energy efficient aircraft. Because the decision to develop a new airframe or engine is a major financial hazard for manufacturers, it is important to know what factors influence the decision making process. A method is described for identifying and ranking individuals and organizations involved at each stage of commercial air transport development, and the barriers that must be overcome in adopting new technologies. A.R.H.

N77-27021*# Gellman Research Associates, Inc., Jenkintown, Pa.
ANALYSIS OF FLIGHT EQUIPMENT PURCHASING PRACTICES OF REPRESENTATIVE AIR CARRIERS Final Report
Jan. 1977 81 p ref
(Contract NASw-2969)
(NASA-CR-154619) Avail: NTIS HC A05/MF A01 CSCL 05A

The process through which representative air carriers decide whether or not to purchase flight equipment was investigated as well as their practices and policies in retiring surplus aircraft. An analysis of the flight equipment investment decision process in ten airlines shows that for the airline industry as a whole, the flight equipment investment decision is in a state of transition from a wholly informal process in earliest years to a much more organized and structured process in the future. Individual air carriers are in different stages with respect to the formality and sophistication associated with the flight equipment investment decision. Author

N77-27022# California Univ., Berkeley. Lawrence Berkeley Lab.
LABORATORY EQUIPMENT PROCUREMENT
Dick A. Mack Aug. 1976 23 p refs Presented at the Conf. on Management of Lab. Instr., Cairo, 5-14 Nov 1976
(Contract W-7405-eng-48)
(LBL-5504; Conf-761105-3) Avail: NTIS He A02/MF A01

As the emphasis of a research organization changes or its facilities are modernized it is important that the instrumentation supporting such research keep abreast of the current needs of the institution. Before acquiring new equipment one must consider the tradeoff between modifying old units and acquiring new, the obsolescence of old technologies in the light of new techniques, and the maintenance costs of older units contrasted with the cost of acquisition of new models. If a decision has been reached that new equipment is required, many factors must be considered before the actual purchase is undertaken. Considerations in translating an experimental need into the completed delivery of an instrument are discussed. ERA

N77-27023# Stanford Research Inst., Menlo Park, Calif.
ACS. 1: AN EXPERIMENTAL MANAGEMENT TOOL
Marshall C. Pease, III 1976 35 p refs
(Contract N00014-71-C-0210)
(AD-A037311; SRI-TR-13) Avail: NTIS HC A03/MF A01 CSCL 05/1

This paper describes the current state of a program of research on systems providing automated support for high level managers. The program seeks to apply some of the techniques of knowledge-based inference that have been developed by the artificial intelligence community, and to develop means for their application is decision-making environments. GRA

N77-27024# Stanford Research Inst., Menlo Park, Calif.
RESEARCH ON LARGE FILE MANAGEMENT INFORMATION SYSTEMS Annual Report
Marshall C. Pease, III, Jack Goldberg, and Daniels Sagalowicz Jan. 1977 20 p refs
(Contract N00014-71-C-0210)
(AD-A037161) Avail: NTIS HC A02/MF A01 CSCL 05/2

This is an annual summary of SRI's program of research on Large File Management Information Systems. In this report will be described the present status of the research and our plans for the immediate future, our past accomplishments, and give a general description of ACS. 1, an operational, experimental system currently being developed. GRA

N77-27025# Defense Systems Management School, Fort Belvoir, Va.
ASSESSMENT OF THE UTILITY/UTILIZATION OF THE AIR FORCE LABORATORIES BY THE SYSTEM PROGRAM ORGANIZATIONS
Charles E. Payne 10 Nov. 1976 39 p refs
(AD-A037758) Avail: NTIS HC A03/MF A01 CSCL 15/5

The purpose of this report is to provide a summary tool for both the laboratory and the System Program Organization (SPO) to assess the current status of the interactive processes between those organizations. The report was developed through reference to several prior studies related generally to the same topic area including several interviews with laboratory and SPO personnel. A considerable number of suppositions are subsequently made regarding the likely affects of several current and planned changes in the laboratory mission and organizational structure. GRA

N77-27028# Adjutant Generals Office (Army), Washington, D. C.
STUDY OF US ARMY LIBRARIES. VOLUME 2: DIRECTORY Final Report, Sep. 1975 - Jul. 1976
Vernon E. Palmour, Marcia C. Bellassai, and Louise Nyce Jul. 1976 139 p
(AD-A036002; LS76-1-Vol-2) Avail: NTIS HC A07/MF A01 CSCL 05/2

This directory is composed of the address list compiled for the Army Library Study, September 1975 - July 1976. The address list was assembled from lists provided by the staff librarians of the various major commands, and by the chief librarians for headquarters agencies. It was then checked against the listing for the Federal Library Survey, 1972, and against Army accountability listings. Several addresses were listed later from information uncovered during the study. Service outlets indicated refer to the total number of libraries within the system, and include the main libray. The names of library director/operating official who responded to the questionnaire, which was part of the Army Library Study, are listed, and current insofar as possible. Further listing of all GS-1410 series librarians is presented as of July 1976. Operating director of librarians who are in other than the GS-1410 series are noted and identified with an asterisk (*). Their series or classification is listed where known. Arrangement of this directory is by type of library, then by Command/Agency. Telephone numbers are AUTOVON unless otherwise indicated. Numbers shown in the left column are the Army Library Study's identifying number. GRA

N77-27030# RAND Corp., Santa Monica, Calif.
RAND LIBRARY EVALUATION SURVEY
Cecily J. Surace, Marilyn Schoen, and Donald P. Trees Jun. 1976 63 p
(AD-A037917; P-5667) Avail: NTIS HC A04/MF A01 CSCL 05/2

A Rand Library user survey was conducted in February 1975. The basic objective involved the collection of sufficient baseline data describing user characteristics, usage, and satisfaction parameters to enable specific library policy alternatives to be evaluated. The codebook gives a brief overview of the survey instrument design, the data collection methodology, the data reduction process and the structure and distribution of the data, including actual response frequencies. The preliminary analysis is included to provide the policy context for the survey and some additional interpretive information. Author (GRA)

N77-27033# Adjutant Generals Office (Army), Washington, D. C.
STUDY OF US ARMY LIBRARIES, VOLUME 1 Final Report, Sep. 1975 - Jul. 1976
Vernon E. Palmour, Marcia C. Bellassai, and Louise Nyce Jul. 1976 240 p refs
(AD-A036004; LS76-1-Vol-1) Avail: NTIS HC A11/MF A01 CSCL 05/2

This report addresses the development of programs for increasing efficiency in operation of Army libraries to meet expanding demands for services with static budgets. Army libraries are descibed in terms of type, resources and expenditures. Problems of current operational patterns are identified. The report recommends establisment of an Army Libraries Management Office (ALMO) which would determine goals, objectives, and priorities for Army libraries, develop uniform standards for operation and support, and develop and coordinate cooperative programs in sharing resources, shared cataloging, and centralized procurement of materials. An Army Libraries Advisory Council (ALAC) is also recommended to maintain continuous two-way communications between the ALMO and operational libraries. Author (GRA)

N77-27045# Texas Municipal League, Austin.
MANAGEMENT ASSISTANCE FOR TEXAS CITY GOVERNMENTS. VOLUME 1: APPENDICES A-C Final Report, 1974 - 1976
May 1976 136 p Prepared in cooperation with Texas A and M Univ., College Station
(Contract HUD-H-2182)
(PB-264866/5) Avail: NTIS HC A07/MF A01 CSCL 13B

During an 18-month period beginning in 1974, eight projects tested approaches to improving the overall policy development and management capacity of local elected and appointed officials. The demonstration had a dual thrust--making changes at the local level and organizing resources for assistance. The conceptualization, organization, and implementation of the Texas Management Assistance Project are discussed. Technical aspects of assistance to 13 cities in management development and reporting, citizen communications, personnel system design, budgeting performance, and productivity measurement are described. Of particular interest are the development methods for transfer of assistance to twelve additional cities. Diagnostic tools and work planning techniques are detailed. GRA

N77-27064# Committee on the Judiciary (U. S. Senate).
CIVIL AERONAUTICS BOARD PRACTICES AND PROCEDURES
Washington GPO 1975 263 p refs Rept. of the Subcomm. on Administrative Practice and Procedure of the Comm. on the Judiciary, 94th Congr., 1st Sess., 1975
(GPO-60-316) Avail: Subcomm. on Administrative Practice and Procedure

The recommendations, conclusions, and analyses arising from the comprehensive 1975 investigation of the Civil Aeronautics Board's practices and procedures are presented. Topics discussed include: competition, route policy, fare policy, capacity restricting agreements, enforcement, consumer protection, and required legislation. Author

N77-27066# Committee on Science and Technology (U. S. House).
THE FUTURE OF AVIATION
Washington GPO 1976 738 p refs Hearings before Subcomm. on Aviation and Transportation on R and D of the Comm. on Sci. and Technol., 94th Congr., 2d Sess., no. 82, 4-6, 11-13, 18 and 20 May 1976
(GPO-74-177) Avail: SOD HC $5.90

A national policy for aeronautical research and development is considered in view of increased foreign government subsidized competition. Factors discussed include: (1) government assistance in private enterprise efforts, without diminishing competition; (2) aeronautical technological capabilities, as compared to foreign competitors; (3) aeronautical research and development capabilities and facilities; (4) areas of possible government sponsored research and development; (5) implementation of aircraft noise

control technology; (6) energy conservation in the form of reduced fuel consumption through design modification and weight reduction; (7) increased safety; and (8) airline industry economics (regulation vs deregulation). J.M.S.

N77-27086# Select Committee on Small Business (U. S. Senate).
THE DECLINE OF SUPPLEMENTAL AIR CARRIERS IN THE UNITED STATES, PART 1
Washington GPO 1976 404 p refs Hearings before Subcomm. on Monopoly of the Select Comm. on Small Business, 94th Congr., 2d Sess., 6-8 Oct. 1976
(GPO-78-955) Avail: Subcomm. on Monopoly

Testimony on airline deregulation is given in detail as a means to introduce competition into the air transportation industry. Evidence was presented supporting the necessity for carriers operating large aircraft to routinize their operations. B.B.

N77-27157*# Martin Marietta Corp., Denver, Colo.
ORBITAL CONSTRUCTION SUPPORT EQUIPMENT Final Report
Jun. 1977 437 p refs
(Contract NAS9-15120)
(NASA-CR-151460; MCR-77-234) Avail: NTIS HC A19/MF A01 CSCL 22A

Approximately 200 separate construction steps were defined for the three solar power satellite (SPS) concepts. Detailed construction scenarios were developed which describe the specific tasks to be accomplished, and identify general equipment requirements. The scenarios were used to perform a functional analysis, which resulted in the definition of 100 distinct SPS elements. These elements are the components, parts, subsystems, or assemblies upon which construction activities take place. The major SPS elements for each configuration are shown. For those elements, 300 functional requirements were identified in seven generic processes. Cumulatively, these processes encompass all functions required during SPS construction/assembly. Individually each process is defined such that it includes a specific type of activity. Each SPS element may involve activities relating to any or all of the generic processes. The processes are listed, and examples of the requirements defined for a typical element are given. Authc

N77-27248*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
HANDBOOK OF ESTIMATING DATA, FACTORS, AND PROCEDURES
Leonard M. Freeman Apr. 1977 140 p refs
(NASA-TM-X-73397) Avail: NTIS HC A07/MF A01 CSCL 13H

Elements to be considered in estimating production costs are discussed in this manual. Guidelines, objectives, and methods for analyzing requirements and work structure are given. Time standards for specific specfic operations are listed for machining, sheet metal working, electroplating and metal treating; painting; silk screening, etching and encapsulating; coil winding; wire preparation and wiring; soldering; and the fabrication of etched circuits and terminal boards. The relation of the various elements of cost to the total cost as proposed for various programs by various contractors is compared with government estimates.
Author

N77-27499# Committee on the Judiciary (U. S. House).
ENERGY INDUSTRY INVESTIGATION. PART 1: JOINT VENTURES
Washington GPO 1976 621 p refs Hearings before Subcomm. on Monopolies and Commercial Law of the Comm. on the Judiciary, 94th Congr., 1st and 2d Sess., 30 Jul., 4 Sep. 1975
(GPO-72-530) Avail: Subcomm. on Monopolies and Commercial Law

The Subcommittee on Monopolies hearing on recent gasoline price increases and antitrust commercial laws are presented.I.M.

N77-27500# Committee on the Judiciary (U. S. House).
ENERGY INDUSTRY INVESTIGATION. PART 2: INDUSTRY STRUCTURE
Washington GPO 1977 638 p refs Hearings before Subcomm. on Monopolies and Commercial Law of the Comm. on the Judiciary, 94th Congr., 1st Sess., 31 Jul., 10-11 Sep. 1975
(GPO-83-695) Avail: Subcomm. on Monopolies and Commercial Law

For Abstract, see N77-27499.

N77-27509# Illinois Univ., Urbana. Center for Advanced Computation.
ENERGY USE FOR BUILDING CONSTRUCTION Progress Report, 1 Mar. - 1 Aug. 1976
B. M. Hannon, R. G. Stein, B. Segal, D. Serber, and C. Stein Aug. 1976 83 p refs
(Contract E(11-1)-2791)
(COO-2791-2) Avail: NTIS HC A05/MF A01

Total (direct and indirect) energy requirements of the construction industry were determined in order to examine the potential for energy savings. The Energy Input/Output Model developed was expanded to include a detailed breakdown of the industry and energy intensities of 49 building construction (new and maintenance) sectors and of the overall building construction industry were determined. ERA

N77-27511# Brookhaven National Lab., Upton, N. Y.
ENERGY MANAGEMENT IN RESIDENTIAL AND SMALL COMMERCIAL BUILDINGS Annual Report
John Batey, V. Gazerro, F. J. Salzano, and A. L. Berlad Jul. 1976 54 p refs
(Contract EY-76-C-02-0016)
(BNL-50576) Avail: NTIS HC A04/MF A01

Efficiency measurements performed on conventional residential oil-fired hot water heating equipment, including both steady state and cyclic (part load) efficiency determinations are described. A list of preliminary recommendations for retrofit actions to improve efficiency is provided. A summary of work carried out in the areas of thermal storage media, fenestration, and building thermal dynamics is also presented. ERA

N77-27728# Defense Systems Management School, Fort Belvoir, Va.
GENERAL PURPOSE COMPUTER ACQUISITION
Francis C. Marr Nov. 1976 102 p refs
(AD-A037757) Avail: NTIS HC A06/MF A01 CSCL 09/2

The paper is divided into four major chapters, each of which takes the reader through a series of steps which are essential to the task of evaluating and selecting a computer system. Report concentrates on general purpose commercially available (non-embedded) computers. The inquiry was conducted by means of library research. The emphasis on topic selection is that of the author and is by no means either all-inclusive or exhaustive. The attempt was to review current literature pertaining to ADP acquisition process. Computers are pervasive. Project managers (PM) cannot ignore them. Typical managers prefer to delegate the subject of computers to specialist groups for detailed actions. A manager must be aware of such subjects as benchmarking, simulation, cost-value/scores-weights approach, etc., as they apply to computer evaluation/selection. This paper discusses these aspects and many more. In essence, it serves as an overview of methods in the above subject area, which a PM can use to pick and choose from as his particular rules, regulations, and circumstances permit. Author (GRA)

N77-27767# Mitre Corp., McLean, Va.
SOFTWARE ACQUISITION MANAGEMENT GUIDEBOOK: LIFE CYCLE EVENTS
J. B. Glore Mar. 1977 72 p refs
(Contract F19628-77-C-0001)
(AD-A037115; MTR-3355; ESD-TR-77-22) Avail: NTIS HC A04/MF A01 CSCL 09/2

This report is one of a series of guidebooks for software acquisition management. The guidebooks are being prepared for use by Air Force Program Office personnel responsible for planning and managing the development of software. This guidebook explains the Major Defense System Acquisition Life Cycle and the Computer Program Life Cycle as they apply to Electronic Systems that include software. Author (GRA)

N77-27796# RAND Corp., Santa Monica, Calif.
A MANAGEMENT APPROACH TO THE DEVELOPMENT OF COMPUTER-BASED SYSTEMS
R. Turn, M. R. Davis, and R. N. Reinstept Jul. 1976 9 p refs
(AD-A037895; P-5686) Avail: NTIS HC A02/MF A01 CSCL 09/2

Many organizations have experienced serious difficulties in developing complex computer-based systems, especially their software components. The problems include large cost overruns, schedule slippages, inadequate performance, and inability to use the system as originally envisioned. One major reason for such lack of success has been the inability of the management of the organization or the development effort to understand the need for a total-system management approach. In particular, acquisition of software and hardware separately with the hope of integrating them later does not work in complex systems. This paper outlines a management approach to acquiring computer systems which encompass the whole system, with emphasis on the software, from the initial concept formulation to the support of the operational system. Expected improvements in the development process and organizational implications of this management approach are discussed. Author (GRA)

N77-28022* National Aeronautics and Space Administration, Washington, D. C.
LABOR-MANAGEMENT RELATIONS
Jul. 1977 58 p
(NASA-TM-74763; NHB-3711-9) Avail: NASA Headquarters, Washington, D.C., Management Issuances and Information Branch CSCL 05A

Requirements, responsibilities, and procedures for the implementation of Executive Order 11491 are described. Emphasis is placed on the guidance of labor-management relations practitioners and management officials who carry out NASA's relationships with labor organizations as defined in the Order.
J.M.S.

N77-28023# California Univ., Berkeley. Operations Research Center.
PLANNING AND CONTROL UNDER RISK Final Report
William S. Jewell Aug. 1976 30 p refs
(Grant DAGC04-75-G-0163)
(AD-A037013; ARO-12549.17-M) Avail: NTIS HC A03/MF A01 CSCL 12/2

This report describes work in the modelling of stochastic phenomena and the development of decision-making techniques under risk and uncertainty. Research areas which received major emphasis were (1) basic risk decision models, with emphasis on determining the structure of optimal policies and examining the implications of different risk objectives; (2) problems of data collection, estimation, and updating for realistic decision models.
Author (GRA)

N77-28024# Decisions and Designs, Inc., McLean, Va.
STEP-THROUGH SIMULATION: A METHOD FOR IMPLEMENTING DECISION ANALYSIS
Jacob W. Ulvila (Harvard Univ.), Rex W. Brown, and L. Scott Randall Nov. 1976 68 p refs
(Contract N00014-75-C-0426)
(AD-A036969; TR-76-18) Avail: NTIS HC A04/MF A01 CSCL 12/2

This report describes the initial development of the step-through variant of Monte Carlo simulation, a new procedure for implementing decision analysis or for training decision makers. Like regular Monte Carlo simulation it involves sampling possible aftermaths of an initial action, and generating a distribution of outcome values for it. However, the detailed structure and/or assessments of the decision model are elicited as called for in the execution of each trial. It therefore permits substantial economy of elicitation if there are few trials. The step-through procedure also offers economy of elicitation and calculation over a traditional extensive-tree decision-analytic model without requiring simplifications or aggregations in the model's conceptualization. GRA

N77-28025# Cornell Univ., Ithaca, N.Y. School of Operations Research and Industrial Engineering.
OPTIMAL POLICY FOR DATABASE BATCH OPERATIONS: BACKUP, CHECKPOINTING, AND BATCH UPDATE
John A. Muckstadt and Guy M. Lohman Sep. 1976 24 p refs
(Contract N00014-75-C-1172)
(AD-A037233; TR-312) Avail: NTIS HC A02/MF A01 CSCL 09/2

The purpose of this paper is to present a general model for determining the optimal frequency of batch operations. Specifically, optimal backup, checkpointing, and batch updating policies are derived. Our approach exploits inventory parallels, by seeking the optimal number of items--rather than a time interval--to trigger a batch. The Renewal Reward Theorem is used to find the average long run costs for backup, recovery, and item storage, per unit time, which is then minimized to find the optimal backup policy. This approach allows us to make far less restrictive assumptions about the updata arrival process than did previous models, as well as to include storage costs for the updates. The optimal checkpointing and batch updating policies are shown to be special cases of this optimal backup policy. The derivation of previous results as special cases of this model, and an example, demonstrate the generality of the methodology we develop.
Author (GRA)

N77-28026# Air Force Geophysics Lab., Hanscom AFB, Mass. Technical Programs Branch.
AFGL FISCAL YEAR 1978, AIR FORCE TECHNICAL OBJECTIVES DOCUMENT
Oct. 1976 29 p Supersedes AFGL-TR-76-0002
(AD-A039054; AFGL-TR-76-0266; AFGL-SR-199; AFGL-TR-76-0002) Avail: NTIS HC A02/MF A01 CSCL 05/1

This report comprises the Air Force Geophysics Laboratory Fiscal Year 1978 Technical Objectives Document, and describes the five Technical Planning Objectives in environmental technology. The environmental areas of concern include optical and space physics, meteorology, aeronomy and terrestrial sciences.
Author (GRA)

N77-28028# New York Univ., N. Y. Div. of Applied Science.
MANAGEMENT STUDY OF A MERGED LARGE-SCALE FLUID DYNAMICS LABORATORY: A JOINT UNIVERSITY-INDUSTRY VENTURE Final Report
John R. Ragazzini Jul. 1976 47 p refs
(Grant NSF NM-44395)
(PB-264979/6; NYU-AS-75-06) Avail: NTIS HC A03/MF A01 CSCL 05A

In order to maintain an expensive large scale fluid dynamics laboratory facility at a high level of utilization, the sharing of its equipment and its operating personnel by a number of organizations is desirable. A unique feature of the merged laboratory under study is that it brings together the fluid dynamics laboratories belonging to an industrial corporation (GASL) and an educational institution (NYU) with provisions for further increase of the number of participating institutions. Management problems such as organizational structure, equipment transfer and use, financial arrangements, personnel policies and legal questions are considered. Comparisons with existing consortia are made and certain common features with the NYU/GASL merged laboratory are described. General recommendations for the management of the NYU/GASL facility are described. The applicability of these recommendations to the general class of industry-university joint laboratories is pointed out. GRA

N77-28029# California Univ., Berkeley. Research Management Improvement Project.
CRITICAL ISSUES INVOLVED IN THE REVIEW OF RESEARCH PROPOSALS AT UNIVERSITIES. ONE OF A SERIES OF RESEARCH STUDIES UNDER THE RESEARCH MANAGEMENT IMPROVEMENT PROJECT Final Report
Arthur B. Jebens, Eugene J. Millstein, and David A. Wearley Dec. 1975 56 p refs
(Grant NSF NM-39538)
(PB-264969/7) Avail: NTIS HC A04/MF A01 CSCL 05A

Critical decision points and responsibilities in the research proposal review process within a university are discussed to assure that commitments being made in the proposal to use

the university's resources can be carried out. The detailed characteristics of the UC San Diego and UCLA review processes are outlined in workflow and linear responsibility charts. Alternative procedures for considering some of these issues are identified and evaluated, and suggestions are made as to the factors that institutions should consider in developing or improving their systems of internal review and related organizational assignments of responsibility. GRA

N77-28030# California Univ., La Jolla. Research Management Improvement Project.
PROPOSAL PREPARATION, NEGOTIATION AND AWARD. ONE OF A SERIES OF ANALYSES AND IMPACT REPORTS ON MAJOR FEDERAL REQUIREMENT AREAS Final Report
Arthur B. Jebens Sep. 1974 95 p refs
(Grant NSF NM-39538)
(PB-264980/4) Avail: NTIS HC A05/MF A01 CSCL 05A

Federal agency requirements relating to proposal preparation, negotiation and award are characterized by the excessive volume of material used to describe the requirements and the extent of minor variations among and within agencies on the same basic theme. Tables summarize twenty-two requirements of nine Federal agencies involved in proposal preparation, negotiation and award to document the extent of these variations. A number of unique and significantly burdensome requirements of individual agencies are identified and their impact on universities analyzed. An extensive list of findings is included as well as discussions of the impact of these requirements in terms of cost, effort, delays, introduction of conflict, academic issues, nonstandardized requirements and recordkeeping. GRA

N77-28031# California Univ., Berkeley. Research Management Improvement Project.
FEDERAL PROCUREMENT REQUIREMENTS. ONE OF A SERIES OF ANALYSES AND IMPACT REPORTS OF MAJOR FEDERAL REQUIREMENT AREAS Final Report
William E. Moser, Jr. Jul. 1975 51 p refs
(Grant NSF NM-39538)
(PB-264982/0) Avail: NTIS HC A04/MF A01 CSCL 05A

The philosophy which calls for minimal federal requirements consistent with responsible stewardship is demonstrated in a case study. Within the area of procurement requirements, two models for rebudgeting - the Agency Approval system and the Institutional Approval system are identified. The federal requirements associated with the two systems are described, and the Berkeley campus process for implementing the requirements is reviewed. The impact on the University of the requirements is then analyzed in terms of the advantages and disadvantages of each model. Five selected areas of the procurement function as they operate on the Berkeley campus and have been affected by federal requirements are discussed. GRA

N77-28032# National Association of Coll. and Univ. Business Officers, Washington, D. C.
REVIEW AND ASSESSMENT OF RESEARCH MANAGEMENT IMPROVEMENT PROGRAM PROJECT Final Report, 16 Jul. - 31 Dec. 1976
Steven C. Hychka and D. F. Finn 14 Mar. 1977 14 p
(PB-265012/5; NACUBO-1) Avail: NTIS HC A02/MF A01 CSCL 05A

An assessment by college and university business officers of 18 research projects is presented. Ten of these projects contributed to the understanding of the burdensome problem on federal agencies and institutions of federal regulatory requirements which contribute to lack of uniformity in meeting federal accountability needs and to increasing the paperwork burden on both institutions and the federal government. Six of the projects appear to make substantial contributions to individual institutions in addressing their own research management problems and in finding new approaches and new solutions. Two of the projects provided general services designed to be available to all institutions; these two appear to be a very successful service. GRA

N77-28033# National Academy of Sciences - National Research Council, Washington, D. C. Urban Information Systems Inter-Agency Committee (USAC) Support Panel.
AN INFORMATION SYSTEMS RESOURCE CENTER FOR LOCAL GOVERNMENTS
Nov. 1976 18 p
(Contract HUD-H-1221)
(PB-264643/8) Avail: NTIS HC A03/MF A01 CSCL 05B

The mission, organization, programs, operating principles and priorities of an Information Systems Resource Center are described. The study was conducted by the Urban Information Systems Inter-Agency Committee (USAC) Support Panel under the National Research Council. The Support Panel recommended the establishment of a nonprofit information systems resource center. The center would provide local governments with reliable advice on the potential of information systems and keep them informed on public policy issues related to computer usage. The Federal Government would provide seed money to get the center started, but local government organizations would guide its policies.GRA

N77-28036 Kansas Univ., Lawrence.
THE DEVELOPMENT OF COSTS RECOVERY SCHEME: SUGGESTED APPROACHES FOR MUNICIPAL OR REGIONAL WASTEWATER TREATMENT PLANTS Ph.D. Thesis
Alexander Aristotelis Thomopulos 1976 137 p
Avail: Univ. Microfilms Order No. 77-2289

Various cost allocations and user charge methods for services provided by municipal or regional wastewater treatment plants are examined, and a reasonable approach to costs recovery for financing treatment systems is developed under some of the guidelines of the 1972 Federal Water Pollution Control Act Amendments, PL 92-500. Some of the basic conclusions are: (1) charge method based on treatment costs of a treatment plant provides a more visible basis for levying charges without any implications, such as the problems of measuring damages in a stream; and (2) the federal government's proposal that a municipality recover a portion of the federal construction grant from only industrial dischargers defies the principle of economics - the burden of costs must be placed on all dischargers. Dissert. Abstr.

N77-28041# National Academy of Sciences - National Research Council, Washington, D. C. Urban Information Systems Inter-Agency Committee (USAC) Support Panel.
LOCAL GOVERNMENT INFORMATION SYSTEMS: A STUDY OF USAC AND THE FUTURE APPLICATION OF COMPUTER TECHNOLOGY
Jun. 1976 62 p refs
(Contract HUD-H-1221)
(PB-264577/8) Avail: NTIS HC A04/MF A01 CSCL 13B

An assessment of the Urban Information Systems Inter-Agency Committee (USAC) Program indicates that the potential of computer systems for improving local government management is not being exploited widely by local government. The uses of computer systems in six USAC cities were studied from the standpoint of cost benefit relationship, transferability of experience between cities, interfaces between computer systems, and privacy-security implications. Recommendations on the improved utilization of computer systems by local governments are included. GRA

N77-28047# Peat, Marwick, Mitchell and Co., Washington, D.C.
A STUDY OF URBAN MASS TRANSPORTATION NEEDS AND FINANCING
Washington DOT Jul. 1974 154 p refs
(Contract DOT-OST-40064)
(PB-265242/8; DOT-TPI-10-77-04) Avail: NTIS HC A08/MF A01 CSCL 13B

Urban mass transportation needs are analyzed for the long-range (1990) and mid-range (1980) future in terms of capital investments, level of service, passenger demand, and operating and maintenance costs. Historical trends in fare structures and levels are analyzed for 36 typical urbanized areas in four population categories. Relationships between performance and cost are explored, with special attention given to a comparison of rail and bus performance and cost characteristics. GRA

N77-28064# Naval Aviation Integrated Logistic Support Center, Patuxent River, Md.
PROCEDURE FOR THE DEVELOPMENT OF NAVAL AVIATION MAINTENANCE OBJECTIVES
William F. Lavallee, Philip Seidenberg, Walter J. Light, Brian P. Sneade, and James E. Ervin 18 Feb. 1977 34 p refs
(AD-A038201; NAILC-03-47X) Avail: NTIS HC A03/MF A01 CSCL 15/5

This document describes a methodology for developing Naval Aviation Maintenance Objectives. These objectives, when accomplished, are intended to provide for an effective aviation maintenance establishment in support of naval aviation and the Chief of Naval Operations' objective of fleet readiness through the 1977-1985 time frame. GRA

N77-28101*# Michigan Univ., Ann Arbor. Graduate School of Business Administration.
EVALUATION OF NASA-SPONSORED RESEARCH ON CAPITAL INVESTMENT DECISION MAKING IN THE CIVIL AVIATION INDUSTRY
David J. Donovan Mar. 1977 27 p refs
(NASA Order W-14258)
(NASA-CR-154620) Avail: NTIS HC A03/MF A01 CSCL 05C

Significant findings of three studies undertaken to provide the NASA Aircraft Energy Efficiency (ACEE) Office with information regarding how aircraft manufacturers and commercial airlines make investment decisions concerning the acquisition of new and derivative technology are analyzed and their general implications explored. Topics discussed include: the market for airline aircraft, factors affecting the corporate decision making process of air transport manufacturers, and flight equipment purchasing practices of representative air carriers. Author

N77-28177# Defense Systems Management School, Fort Belvoir, Va.
OPERATIONS MANAGEMENT OF DOD SPACE MISSIONS IN THE SHUTTLE ERA
Charles A. Tringali Nov. 1976 106 p refs
(AD-A038673) Avail: NTIS HC A06/MF A01 CSCL 22/2

This report presents a history of the development of the Space Transportation System (STS) to date between the National Aeronautics and Space Administration (NASA) and the executive agency acting for the Department of Defense, the United States Air Force. The STS consists of the NASA-developed space shuttle orbiter, the USAF-developed upper stage, the communications networks and launch base complexes of both agencies, and the satellite payloads developed by many user agencies to be placed in space. The program development is traced chronologically in terms of key joint-agency agreements, management interfaces, and compromises made as implementation of early proposals was accomplished. A proposal is made to develop a joint-agency STS operation authority responsive to national command/policy channels. Author (GRA)

N77-28343# Minnesota Univ., Minneapolis.
METRIC TRANSITION IN THE UNITED STATES
John E. Wertz Dec. 1976 234 p
(Grant NSF GI-40445)
(PB-266868/9; NSF/RA-760492) Avail: NTIS HC A11/MF A01 CSCL 14B

The possible consequences of decisions to substitute the international System of Units (SI), or metric system, for those of the customary system of 'English' system, in the private and public sectors are discussed. The objectives of the project were: to investigate the consequences of independent conversions; to examine the motivations and limitations of voluntary conversion; to examine the issues apparent in domestic conversion and those in recent or ongoing foreign conversions; to identify major impediments to conversion; to identify options for dealing with the major metric issues in the public and the private sectors; and to identify mechanisms for overcoming major impediments and minimizing public apprehension. GRA

N77-28406# Motorola, Inc., Phoenix, Ariz. Semiconductor Products Div.
MANUFACTURING METHODS AND TECHNOLOGY PROGRAM FOR BEAM LEAD SEALED JUNCTION SEMICONDUCTOR DEVICES Quarterly Progress Report, 21 Aug. - 21 Nov. 1976
Dale Buhanan, Jim Parch, Joe Wise, Gerhart Zenner, and Bill Armbruster Nov. 1976 58 p
(Contract DAAB07-75-C-0033)
(AD-A038681; QPR-6) Avail: NTIS HC A04/MF A01 CSCL 09/1

Because of the number of integrated circuits processed to date, along with the favorable probe yield results, the 5400 and 54LS processes have been well established. Results on the discrete devices, however, have not been as promising. Additional lots of each device type are being processed in an attempt at further improving yields. Packages for all of the devices have been designed for use in satisfying the qualification test requirements. Author (GRA)

N77-28418# Varian Associates, San Carlos, Calif. EIMAC Div.
MANUFACTURING METHODS AND TECHNOLOGY (MMTE) MEASURE FOR FABRICATION OF LOW VOLTAGE START SEALED BEAM ARC LAMPS Quarterly Progress Report, 1 Jun. - 31 Aug. 1976
Edwin T. Chan and Gordon E. Liljegren Sep. 1976 36 p
(Contract DAAB07-76-C-0034)
(AD-A036189; QPR-1) Avail: NTIS HC A03/MF A01 CSCL 13/1

A program is in progress to establish a production capability for the purpose of meeting estimated military needs for the X6335, a 1-kw sealed beam xenon arc lamp with low voltage starting mechanism. Parts for five (5) lamps were fabricated. These parts were ordered for the First Engineering Sample Phase of the contract. Lamp part drawings are complete for the First Engineering Sample. Short run welding and brazing fixtures have been fabricated. A reflector mandrel has been machined and polished. Author (GRA)

N77-28507# Bendix Corp., Kennedy Space Center, Fla.
APPLICATION AREAS FOR STATISTICAL METHODS
R. L. Kirkpatrick Apr. 1976 22 p
(Contract E(29-1)-0613)
(BDX-613-1600) Avail: NTIS HC A02/MF A01

Factors which affect product quality can be divided into two major categories: technological and human. Effective control over these factors requires controls at all important stages of production. Facilities selected for machining and processing and for assembly and packaging are an important determinant of the cost and quality. If selected measuring equipment, processes, machines and materials are sufficiently accurate to provide an in-tolerance part, resonable costs and acceptable quality can be expected. ERA

N77-28566# National Environmental Satellite Service, Washington, D. C.
NOAA PROGRAM DEVELOPMENT PLAN FOR SEASAT-A RESEARCH AND APPLICATIONS
Mar. 1977 97 p refs
(PB-265414/3; NOAA-77030210) Avail: NTIS HC A05/MF A01 CSCL 22B

A program development plan is written for marine applications of NASA's SEASAT-A spacecraft, designed for launch in 1978. SEASAT-A is the first space research platform dedicated to ocean science and application. Specific objectives are: (1) explore, map, and chart the global ocean and its living resources; (2) manage, use, and conserve those resources; (3) describe, monitor, and predict conditions in the atmosphere, ocean, sun, and space environment;(4) issue warnings against impending destructive natural events; (5) develop beneficial methods of environmental modification; and (6) assess the consequences of inadvertent environmental modification over a period of time. GRA

N77-28595# California Univ., Berkeley. Lawrence Berkeley Lab.
STRATEGIC PLANS FOR ENERGY RESEARCH AND DEVELOPMENT, FY 1976 - FY 1981
Sep. 1976 66 p refs
(Contract W-7405-eng-48)
(TID-27291) Avail: NTIS HC A04/MF A01

This guidance charts the course for the future direction for the Lawrence Berkeley Laboratory (LBL). ERDA approves the following institutional aspects for LBL: (1) LBL would maintain its strong capability in present basic science programs, but redirect and expand its activities on a selective basis into applied research and technology-developed programs with a goal of achieving a level of activity in these new programs comparable to those of the basic program, and (2) these applied programs would provide a basis of support for ERDA project management teams managing engineering development and demonstration projects. Three important actions that the Lawrence Berkely Laboratory must undertake as it evolves into this new role are delineated, namely: to collaborate with engineering colleges and various social science departments at the Univ. of California Berkeley Campus; increase its contacts with industry, utilities, and state governments; and participate with the San Francisco ERDA Operations Office and ERDA Program offices in project management responsibilities. Developmental work being performed at LBL is described for the various areas and disciplines. GRA

N77-28606# ICF, Inc., Washington, D.C.
PROJECT INDEPENDENCE EVALUATION SYSTEM (PIES) DOCUMENTATION. VOLUME 6: METHODOLOGY FOR IMPROVING THE PRICE SENSITIVITY OF THE PIES OIL AND GAS SUPPLY CURVES
Washington FEA Sep. 1976 51 p refs
(Contract FEA-CO-05-50301-00)
(PB-264069/6; FEA/N-76/416-Vol-6) Avail: NTIS HC A04/MF A01 CSCL 10A

A methodology for improving the price sensitivity of the oil and gas supply models used in Project Independence analyses is examined. Emphasis is placed on the question of improving the responsiveness of supply from currently existing proved reserves to changes in output prices. GRA

N77-28615# Federal Energy Administration, Washington, D. C. Office of Finance and Environment.
FEA ENERGY FINANCING WORKSHOPS. SECTION 1: SUMMARIES OF PROCEEDINGS. SECTION 2: BACKGROUND PAPERS
Jan. 1977 701 p refs
(PB-265706/2; FEA/G-77/011) Avail: NTIS HC A99/MF A01 CSCL 10A

During 1976, the Federal Energy Administration sponsored a series of workshops on the financing of different energy sources. The workshops are: (1) Eastern Coal; (2) Western Coal; (3) Socioeconomic Impacts of Western Energy Development; (4) Electric Utilities; (5) Supplemental Gas Projects. This combined collection of Summaries and workshop background papers provides a significant compilation of background and views concerning several of the most important energy finance issues currently facing the Nation. GRA

N77-28633# Environmental Protection Agency, Chicago, Ill. Office of Great Lakes Coordinator.
BEST MANAGEMENT PRACTICES FOR NON-POINT SOURCE POLLUTION CONTROL SEMINAR. (GUIDANCE FOR SECTION 208 PLANNERS AND IMPLEMENTING AGENCIES)
Ralph G. Christensen and Carl D. Wilson Dec. 1976 341 p refs Proc. held at Rosemont, Ill., 16-17 Nov. 1976
(Grants EPA-G-005103; EPA-G-005140; EPA-G-005139; EPA-Y-005141)
(PB-265731/0; EPA-905/9-76-005) Avail: NTIS HC A15/MF A01 CSCL 13B

A collection of technical papers was presented at the 'Best Management Practices for Non-point Source Pollution Control' Seminar held in Rosemont Illinois, on November 16 and 17, 1976. The principal investigators of four Section 108(a) demonstration projects present their data and interpretation thereof, that has been collected on their respective projects through September of 1976. These projects include sediment/erosion control, land management, and urban runoff activities. Federal, State and County officials give their agency views on Section 208 planning. GRA

N77-28738# Purdue Univ., Lafayette, Ind. Purdue Lab. for Applied Industrial Control.
A UNIT TASK SIMULATOR FOR THE EVALUATION OF INTERACTIVE MAN-COMPUTER SYSTEMS M.S. Thesis
Edwin C. Alford and James R. Buck Dec. 1976 225 p refs
(Grant NSF APR-73-07822)
(PB-265097/6; NSF/RA-760457) Avail: NTIS HC A10/MF A01 CSCL 13H

The UTS (Unit Task Simulator) methodology was developed to assist the systems analyst in modelling the proposed interactive process or production control systems so that he could obtain data for use in evaluating and improving these systems. The UTS program allows simulation activities to be timed to occur in units of real time, and, therefore, the collected data accurately describes the behavior of the man and the process throughout the simulation. A survey of literature relevant to the analysis of man-computer systems is provided. GRA

N77-28796# Pennsylvania Univ., Philadelphia. Wharton School of Finance and Commerce.
CHARGING FOR COMPUTER SERVICES Final Report
Dan Bernard, James C. Emery, Richard L. Nolan, and Robert H. Scott Feb. 1977 119 p refs
(Contract N00014-75-C-0462)
(AD-A038082; Rept-77-02-06) Avail: NTIS HC A06/MF A01 CSCL 09/2

Charging internally for the use of computer facilities is now a common organizational practice. A charge-out policy can play a major role in promoting effective and efficient utilization of computing resources. In practice, charging all too often fails to have a significant beneficial impact, and indeed can be a source of tensions and user dissatisfaction. A charge-out system is most likely to be successful when it is based on an understanding of the purposes underlying charging and the requirements for it to be effective. This monograph is intended to contribute to such an understanding. Author (GRA)

N77-28819# National Bureau of Standards, Washington, D. C. Systems Architecture Section.
AUTOMATIC DATA PROCESSING RISK ASSESSMENT Interim Report
Susan K. Reed Mar. 1977 36 p refs
(PB-265950/6; NBSIR-77-1228) Avail: NTIS HC A03/MF A01 CSCL 09B

A technique for conducting a risk analysis of an ADP facility is described. For the purpose of clarity, the ADP facility of a hypothetical Federal agency is used for an example. The characteristics and attributes which must be known in order to perform a risk analysis are described, and the process of analyzing some of the assets is demonstrated, showing how the problem of risk analysis can be reduced to manageable proportions. GRA

N77-28838# Mitre Corp., Bedford, Mass.
SOFTWARE ACQUISITION MANAGEMENT GUIDEBOOK: SOFTWARE DEVELOPMENT AND MAINTENANCE FACILITIES
D. R. Peterson Apr. 1977 88 p refs
(Contract F19628-77-C-0001; AF Proj. 5720)
(AD-A038234; MTR-3330; ESD-TR-77-130) Avail: NTIS HC A05/MF A01 CSCL 09/2

This document is one of a series of guidebooks covering important aspects of software acquisition. The guidebooks are prepared for use by Air Force program office personnel responsible for the management and planning of software development. This guidebook focuses on the management decisions and technical issues related to planning and acquisition of software development and maintenance facilities. Author (GRA)

N77-28851# Mathematics and Computation Lab., Washington, D. C. Vulnerability Analysis Div.
AGGREGATE: INTERINDUSTRY INPUT-OUTPUT TABLE AGGREGATION PROGRAM Final Report
Tatsuo Okamoto Mar. 1977 27 p Sponsored in part by Federal Preparedness Agency
(PB-265945/6; Program-MR-39) Avail: NTIS HC A03/MF A01 CSCL 05C

Aggregate, a FORTRAN program which enables the user to aggregate the 369-industry level input-output transaction table, to a smaller level table is described. The program is designed to be operated through a standard batch terminal using the Univac 1100 Series Operating System. GRA

N77-28870# Rice Univ., Houston, Tex. Aero-Astronautics Group.
SOME PHILOSOPHICAL VIEWS OF ALGORITHMS AND COMPUTING METHODS IN APPLIED MATHEMATICS
Angelo Miele Sep. 1976 28 p refs Presented at the Workshop on Decision Inform. for Tactical Command and Control, Airlie, Va., 22-25 Sep. 1976
(Grant AF-AFOSR-3075-76; AF Proj. 2304)
(AD-A038921; AAR-136; AFOSR-77-0516TR) Avail: NTIS HC A03/MF A01 CSCL 12/1

This paper summarizes some of the work done by the Aero-Astronautics Group of Rice University in the area of numerical methods and computing methods. It describes some of the philosophical thoughts that have guided this work throughout the years. Recommendations are offered concerning allocation of funds and distribution of funds. Additional recommendations are offered in order to bridge the gap between the top management of government agencies and the academic community.
Author (GRA)

N77-28899# Naval Postgraduate School, Monterey, Calif.
A GENERALIZED MAXIMUM ENTROPY PRINCIPLE FOR DECISION ANALYSIS
Marlin U. Thomas Apr. 1977 26 p refs
(AD-A039926; NPS55-77-20) Avail: NTIS HC A03/MF A01 CSCL 12/2

A generalized maximum entropy principle is described for dealing with decision problems involving uncertainty but with some prior knowledge about the probability space corresponding to nature. This knowledge about the probabilistic structure is expressed through known bounds on event probabilities and moments, which is incorporated into a nonlinear programming problem. The solution provides a maximum entropy distribution which is then used in treating the decision problem as one involving risk. An example application is described that involves the selection of oil spill recovery systems for inland harbor regions. Other areas of application are identified and tables of some maximum entropy distributions resulting from a variety of moment constraints are provided. GRA

N77-28971 Alabama Univ., Huntsville.
A RISK MINIMIZATION APPROACH TO MULTIPLE CRITERIA DECISION ANALYSIS Ph.D. Thesis
Pat Reynolds Odom 1976 135 p
Avail: Univ. Microfilms Order No. 77-2713

Applications of a risk minimization approach to analysis of management decision problems involving multiple goals and constraints with uncertainties in problem input-data, are investigated. The analysis concept, termed multirisk programming, is based on determination of the alternative decision solutions which minimize probabilities that the decision maker's goals and constraints will not be satisfied. The baseline type of problem considered is that of selecting the best subset of m decision entities from a candidate set of n entities, such that specified multiple goals and constraints are satistied with minimum risk. The multirisk programming method, model, and computer implementation are presented. A series of case studies performed using the computer model is summarized to illustrate the broad range of potential applications of the analysis concept.
Dissert. Abstr.

N77-28972# Committee on Science and Technology (U. S. House).
NASA PROGRAM PLANNING AND CONTROL, PART 2
Washington GPO 1976 21 p Hearing before Subcomm. on Space Sci. and Applications of the Comm. on Sci. and Technol., 94th Congr., 2d Sess., no. 84, 1 Jul. 1976
(GPO-76-106) Avail: Subcomm. on Space Sci. and Applications CSCL 05A

Data bases compiled by NASA for ten field centers are analyzed by GAO representatives and inconsistencies found are discussed. Data base information included: (1) research and development program descriptions and manpower data; (2) facilities data; and (3) a description of management planning and control techniques. Problems with the implementations of NASA's planning guidelines are identified, and recommendations for improvement are made. A.R.H.

N77-28973# Joint Economic Committee (U. S. Congress).
PRIORITIES AND EFFICIENCY IN FEDERAL RESEARCH AND DEVELOPMENT
Washington GPO 1976 119 p refs Papers submitted to Subcomm. on Priorities and Economy in Govt. of the Joint Economic Comm., 94th Congr., 2d Sess., 29 Oct. 1976 Prepared by the Library of Congr., Congresional Res. Service
(GPO-70-801) Avail: SOD HC $1.40 CSCL 05A

Procedures followed by the executive and legislative branches of the government in the determination of research and development priorities, policies, programs, and project levels were assessed by independent experts to determine how decisions are made, the relative priorities of different types of activities, the results of federally supported programs, and their effects on the economy. Topics discussed include: (1) the relationship between defense-related and civilian-oriented R and D priorities; (2) Senate procedures for authorizing military R and D; (3) the effectiveness of federal civilian-oriented R and D programs; (4) the relationship between federal, state, and local governemnt support for R and D; and (5) federal support of R and D activities in the private sector. A.R.H.

N77-28974# Texas Univ., Austin. Center for Cybernetic Studies.
MEASURING THE EFFICIENCY OF DECISION MAKING UNITS WITH SOME NEW PRODUCTION FUNCTIONS AND ESTIMATION METHODS.
A. Charnes, W. W. Cooper, and E. Rhodes 8 Oct. 1976 54 p refs
(Contract N00014-75-C-0616)
(AD-A038211; CCS-276) Avail: NTIS HC A04/MF A01 CSCL 12/1

A new series of linear programming models is used to clarify and extend a measure of efficiency introduced by M.J. Farrell. Multiple output as well as single output versions are provided which relate this efficiency to ordinary Pareto-Koopmans optimality conditions. Their duals supply numerical estimates of production coefficients. This duality, from mathematical programming, is distinguished from another in the theory of production and then used to provide new nonlinear duals which open contacts with other mathematical programming developments in areas like fractional programming, etc. GRA

N77-28975# Intermetrics, Inc., Cambridge, Mass.
LANGUAGE REQUIREMENTS REPORT Interim Report, Oct. 1975 - Apr. 1976
Benjamin M. Brosgol and James L. Felty Jul. 1976 112 p refs
(Contract DAHC26-76-C-0006; DA Proj. SX7-62725-D-Y10)
(AD-A038214; IR-179-2; USACSC-AT-76-06) Avail: NTIS HC A06/MF A01 CSCL 09/2

The main purpose of this report is to identify the programming language requirements for the implementation of Army tactical data systems. In addition, language facilities needed for business-oriented management information systems are derived, and are compared with the requirements for tactical systems. The methods employed to identify the needed features include a review of Army responses to questionnaires concerning language

requirements; interviews with Army personnel knowledgeable in various tactical systems; and examination of system specifications documents and secondary material. The fundamental result of this study is that, despite some special requirements for programming tactical and MIS systems, there is no inconsistency between the basic language facilities needed for general purpose vs. tactical or MIS programming. In particular, the features described in the DoD High Order Language Working Group's Tinman document are consistent with the needs of tactical and MIS functions, especially with respect to the language goals of reliability and maintainability. Author (GRA)

N77-28976# Logistics Management Inst., Washington, D. C.
OSCR SYSTEM APPLICATIONS ANALYSIS
Joseph S. Domin and Craig A. Webster Dec. 1976 95 p ref Sponsored by DOD
(AD-A038477; LMI-76-15) Avail: NTIS HC A05/MF A01 CSCL 14/1

The Operating and Support Cost Reporting System, a management information system developed by the U.S. Air Force, is analyzed to determine how well the cost information needs of specific decisions and analytical processes are satisfied by output from the OSCR system. The capabilities and limitations of the present OSCR system are identified and a plan for implementing a series of recommended improvements is presented. Author (GRA)

N77-28977# California Univ., Berkeley.
FINANCIAL MANAGEMENT: BUDGETING AND REPORTING UNDER FEDERAL CONTRACTS AND GRANTS. ONE OF A SERIES OF ANALYSES AND REPORTS ON THE IMPACT OF FEDERAL REQUIREMENTS ON RESEARCH MANAGEMENT Final Report
Phyllis Trudeau and Norman H. Gross Jun. 1976 119 p refs (Grant NSF NM-39538)
(PB-265166/9) Avail: NTIS HC A06/MF A01 CSCL 05A

Financial management, encompasses primarily budgeting, rebudgeting, reporting, and record-keeping, with special emphasis on their interrelationship. Main attention is focused on the proposal budget, the award budget, adherence and control aspects of the budget, rebudgeting philosophies, systems and controls, and expenditure reporting as it relates to various budgetary aspects. Grants are emphasized, and contracts are discussed only to illustrate specific problems. GRA

N77-28978# California Univ., San Diego. Research Management Improvement Project.
THE ORGANIZATION, MANAGEMENT AND SUPPORT SERVICES FOR A LARGE ORGANIZED RESEARCH UNIT WITHIN A UNIVERSITY: SCRIPPS INSTITUTION OF OCEANOGRAPHY. ONE OF A SERIES OF RESEARCH STUDIES UNDER THE RESEARCH MANAGEMENT IMPROVEMENT PROGRAM Final Report
Arthur B. Jebens and H. D. Johnson, ed. Sep. 1976 43 p (Grant NSF NM-39538)
(PB-264973/9) Avail: NTIS HC A03/MF A01 CSCL 05A

The organization management and administrative and technical support services for Scripps Institution of Oceanography within the environment of the University of California, San Diego campus and System-wide Administration were examined. The initial findings and recommendations of the reconnaissance survey are summarized. Emphasis is placed on the more limited administrative and management factors that may provide insights for other institutions grappling with related management issues. Management problems studied include: (1) planning and direction of the large-scale research programs; (2) management and coordination of large-scale research projects; (3) academic and student affairs; (4) indirect cost recovery issues; and (5) restructuring of the administrative and technical services. GRA

N77-28979# California Univ., Los Angeles. School of Engineering and Applied Science.
PROJECT MANAGEMENT THROUGH SIMULATION
A. M. Feiler Dec. 1976 44 p refs
(Contract N00014-76-C-0112)
(AD-A036335; UCLA-ENGR-76-119) Avail: NTIS HC A03/MF A01 CSCL 05/1

The role of critical path network analysis in project management is discussed. Specific shortcomings of conventional, deterministic network analysis techniques are outlined and examples are given of the individual factors which contribute to the overall optimism of deterministic analysis. Computer simulation is offered as means of developing realistic schedules, budgets and resource requirements for projects where uncertainty and performance variability are of significance. Author (GRA)

N77-28980# Defense Systems Management School, Fort Belvoir, Va.
RETURNING RDT AND E ASSETS (AIRCRAFT) TO OPERATIONAL USAGE Student Project Report
David M. Sjuggerud Nov. 1976 36 p refs
(AD-A036484) Avail: NTIS HC A03/MF A01 CSCL 05/1

The purpose of this study report is to review past aircraft programs to gain insight as to what aircraft utilization and program management techniques can be considered in the recovery and continued service utilization of RDT and E aircraft after reconfiguration. GRA

N77-28981# California Univ., Berkeley. Research Management Improvement Project.
THE IMPACT OF FEDERAL REGULATIONS ON RESEARCH MANAGEMENT IN COLLEGES AND UNIVERSITIES: OVERVIEW AND SUMMARIES Final Report
John A. Perkins, Herman D. Johnson (Calif. Univ., San Diego), and Robert F. Kerley Jul. 1976 64 p ref
(Grant NSF NM-39538)
(PB-265169/3) Avail: NTIS HC A04/MF A01 CSCL 05A

Basic principles regarding the relations between universities performing federally supported research and other projects and federal sponsoring agencies are considered. Cash flow, environmental health and safety, and federal procurement requirements are discussed along with financial management: budgeting and reporting under federal contracts and grants, indirect and direct cost recovery under federal contracts, and grants, and property management. Proposal preparation, negotiation and award, protection of human subjects, and time and effort reporting are included. GRA

N77-28982# National Bureau of Standards, Washington, D. C. System and Software Div.
THE CODASYL DATA BASE APPROACH: A COBOL EXAMPLE OF DESIGN AND USE OF A PERSONNEL FILE Final Report
Edgar H. Sibley Feb. 1974 81 p
(PB-265694/0; NBSIR-74-500) Avail: NTIS HC A05/MF A01 CSCL 05A

Examples of the use of the proposed CODASYL Data Definition Language and Data Base Language extensions to COBOL are given. The needs and data base elements which can be expected for a set of simple personnel applications are discussed. A few of the processes (programs) which are required by typical personnel departments, and their implementation (in outline) in three COBOL programs are described. GRA

N77-28983# Virginia Univ., Charlottesville. Dept. of Engineering Science and Systems.
A MODEL FOR ANALYSIS AND DESIGN OF UNIVERSITY RESEARCH SUPPORT SERVICES SYSTEMS Final Report, 1 Jul. 1975 - 31 Dec. 1976
S. R. Vemuri, R. N. Zapata, and A. R. Kuhlthau Mar. 1977 161 p refs
(Grant NSF NM-44250)
(PB-265137/0; UVA/526066/ESS77/102) Avail: NTIS HC A08/MF A01 CSCL 05A

A typical research support service system (RSSS), a simulation model was developed to analyze the effect on the productivity of research effort caused by procedural requirements on the system, and to examine ways in which technical support services

can be provided effectively. RSSS effectiveness is defined in terms of three basic measures: principal investigator (pi) productivity; service timeliness; and cost. A simulation model of the University of Va. RSSS is construc'ed. The mechanic. of the simulation are explained and instructions are provided to enable it to be adpated to the particular needs of any user.GRA

N77-28984# Pennsylvania State Univ., University Park.
THE ACADEMIC ADMINISTRATION OF RESEARCH: A DESCRIPTIVE ANALYSIS Final Report, 1 Jul. 1973 - 31 Jun. 1975
William E. Toombs, Renee Friedman, and Henry W. Sams 20 Mar. 1975 302 p refs
(Grant NSF NM-39530)
(PB-265149/5) Avail: NTIS HC A14/MF A01 CSCL 05A

Evaluation within universities of research in its proposals, project, and publication stages, of the agencies by which judgments are made, of relationships among these agencies, of criteria which pertain, and of the effective sanctions was studied. Focus is primarily on practices at the Pennsylvania State University, but some comparisons with other universities and with extra-academic research agencies are included. Range is over all fields of professional research, including the humanistic and social as well as scientific. Emphasis is on institutional address to administrative problems, but with due regard to all participating members of the research community. GRA

N77-28986# National Science Foundation, Washington, D. C. Industry Task Force.
RESEARCH IN INDUSTRY: ROLES OF THE GOVERNMENT AND NATIONAL SCIENCE FOUNDATION
Dec. 1976 173 p refs
(PB-265904/3) Avail: NTIS HC A08/MF A01 CSCL 05A

A review of the role of scientific research in non-academic institutions is reported with particular attention to NSF programs and policies related to private industry. The report presents a brief review of how that policy has evolved over the years with several areas noted where new Federal initiatives might be appropriate. GRA

N77-28991# Forecasting International Ltd., Arlington, Va.
AN APPLICATION OF MARKET RESEARCH TECHNIQUES TO THE DISSEMINATION OF SCIENTIFIC AND TECHNICAL INFORMATION Interim Report
Ethelyn Bishop and Norman Wisenoff Feb. 1977 182 p
(Grant NSF DS-175-13211-A01)
(PB-265130/5) Avail: NTIS HC A09/MF A01 CSCL 05B

A methodology which will improve user access to STI by enabling producers and distributors of STI to better target their product design, distribution and promotion efforts is described. An analysis of the data gathered through a pilot survey of 402 electrical engineers and chemists identified six 'segments' in each discipline whose members have similar STI needs and other common characteristics including demographics, sources used to satisfy STI needs, and perceptions of current STI sources. GRA

N77-28995# Benson and Benson, Inc., Princeton, N. J.
STUDY OF NATIONWIDE ON-LINE ACCESS TO EVALUATED ENGINEERING DESIGN DATA. SURVEY 1: FOCUS GROUP STUDY Interim Report
Dec. 1976 55 p Prepared in cooperation with Engineering Index, Inc., New York
(Contract NSF DSI-76-16654)
(PB-264981/2) Avail: NTIS HC A04/MF A01 CSCL 05B

Bench engineers from various commercial, government and academic institutions located in Philadelphia, Los Angeles, and Chicago were questioned to determine how information is obtained in their work, the problems they have in obtaining information, their awareness of data centers as an information source, their likelihood of using on-line data retrieval, and their projected reasons for use or non-use. The survey was conducted to determine which, if any, new information products and services, including on-line interactive access, based on the Center for Information and Numerical Data Analysis and Synthesis (CINDAS) data collections would be accepted on a sustainable basis by the engineering community. GRA

N77-29000# Army Electronics Command, Fort Monmouth, N. J. Product Assurance Directorate.
OPTIMAL SYSTEM SPARE CONFIGURATION BASED ON THE PRESENT WORTH OF OPERATIONAL COSTS UNDER A POLICY OF CANNIBALIZATION Final Research Report, Aug. 1973 - Aug. 1976 Ph.D. Thesis - Texas A and M Univ.
John P. Solomond Feb. 1977 203 p refs
(AD-A038110; ECOM-4477) Avail: NTIS HC A10/MF A01 CSCL 15/5

An economic model is developed for determining optimal spare provisioning requirements when a system is subject to cannibalization; in this context, cannibalization is defined as the process of using the good components of a terminally failed unit as a source of replenishment spares for future component failures in other units. The model analyzes four components of a system's net operational costs: the manufacturing or procurement costs, the repair/replacement costs, the cannibalization costs, and a compensating revenue or return function, which is treated as a negative cost. The net cost is explicitly a function of the number of multi-component units deployed, the spare configuration for each component type, the time period over which the system is to be used, and the continuous annual interest rate. The model is representing a worth analysis, which reduces all future costs and revenue to a single equivalent present value. Consequently, alternative spare configurations must be compared over the same period of time. The author develops a stochastic analysis of the repair/replacement and cannibalization processes, and derives general formulas for the time dependent repair/replacement, and cannibalization probability; the expressions are based upon general failure and replacement density functions. GRA

N77-29001# Massachusetts Inst. of Tech., Cambridge. Energy Lab.
OPEC AND THE MONOPOLY PRICE OF WORLD OIL (WORLD OIL PROJECT)
Jacques Cremer and Martin L. Weitzman Apr. 1976 22 p refs
(Grant NSF SIA-75-00739)
(PB-265015/8; MITEL76-015WP; NSF/RA-760476) Avail: NTIS HC A02/MF A01 CSCL 21D

A dynamic model is presented of the behavior of OPEC viewed as a monopolist sharing the world oil market with a competitive sector. In order to study the influence of long term considerations on the price of oil, a dynamic model of the capital theoretic type was built. GRA

N77-29006# Texas Municipal League, Austin.
MANAGEMENT ASSISTANCE FOR TEXAS CITY GOVERNMENTS. VOLUME 2 APPENDICES D-E: BUILDING CITIZEN SUPPORT IN TEXAS CITIES. A HANDBOOK FOR CITY OFFICIALS AND AN ASSISTANCE GUIDE Final Report, 1974-1976
May 1976 233 p refs Prepared in cooperation with Texas A and M Univ., College Station
(Contract Hud-H-2182)
(PB-264865/7) Avail: NTIS HC A11/MF A01 CSCL 13B

During an 18-month period beginning in 1974, eight projects tested approaches to improving the overall policy development and management capacity of local elected and appointed officials. The demonstration had a dual thrust-making changes at the local level and organizing resources for assistance. The citizen support documents were produced to facilities the transfer of capacity-building methods from one city to another. The Handbook for City Officials provides in depth introduction to public information and citizen participation. It is intended to serve as a text for training and a tool for officials and administrators to use in building effective citizen communications programs. The Assistance Guide provides a step by step approach to identifying communication factors in a city organization. It can be used by either assistance organizations or city officials to guide organizational analysis and to plan a specific work plan for improvement. GRA

N77-29009# Michigan Univ., Ann Arbor. Inst. of Public Policy Studies.
TOWARD A THEORY OF INNOVATION Final Report
George W. Downs, Jr. and Lawrence B. Mohr Feb. 1977 41 p refs
(Grant NSF PRA-76-19803)
(PB-264908/5; Discussion-Paper-92; NSF/PRA-7619803-1-7) Avail: NTIS HC A03/MF A01 CSCL 05A

A particular subset of innovations suitable for initial empirical studies is examined. A set of explanatory variables, operational measures of these variables, and the alternative variables considered are described. Emphasis is placed on technological innovation in government organizations. GRA

N77-29011# Federal Highway Administration, Washington, D.C. Office of Highway Planning.
APPLICATIONS OF NEW TRAVEL DEMAND FORECASTING TECHNIQUES TO TRANSPORTATION PLANNING. A STUDY OF INDIVIDUAL CHOICE MODELS
Bruce D. Spear Mar. 1977 163 p refs
(PB-265718/7; FHWA/PL-77012) Avail: NTIS HC A08/MF A01 CSCL 13B

Individual choice (disaggregate) travel demand models in urban transportation planning are applied to: (1) the traditional travel demand process; (2) short range transportation systems management evaluation; and (3) patronage and revenue forecasting for new transportation systems. For each application the suitability of the model is discussed, recent applications are summarized, and two detailed case studies are presented to demonstrate how the models were used. A short primer on individual choice models is included to provide the planner with enough information to understand how the models work and their differences from more conventional planning models. References are given for those who would like to know more about individual choice models. GRA

N77-29015# Public Technology, Inc., Washington, D. C.
URBAN TECHNOLOGY SYSTEM (UTS). PHASE 3: OPERATIONS. SUPPLEMENT TO ANNUAL REPORT Annual Report, 1 Jul. 1974 - 30 Jun. 1975
15 Mar. 1976 43 p
(Contract NSF C-834)
(PB-265140/4; NSF/RA-760466) Avail: NTIS HC A03/MF A01 CSCL 13B

A nationwide experiment designed to test technology innovation in local government is described. The program objectives are outlined, and the results of the first year are summarized. The specific areas of innovation are defined, and the problems encountered during the first year are presented. The methods of data collection and analysis including the elements of data collected, initial survey results, and the status of system data collection are also presented. Budget information is included as well. Finally, a first year assessment is given, along with the objectives for the second operational year. GRA

N77-29023# Mitre Corp., Bedford, Mass.
WRAP: A MODEL FOR REGIONAL SOLID WASTE MANAGEMENT PLANNING: USERS GUIDE
Edward B. Berman Feb. 1977 130 p
(Contract EPA-68-01-2976)
(PB-266220/3; EPA-530/SW-573) Avail: NTIS HC A07/MF A01 CSCL 13B

A user's guide is presented to assist individuals or groups of individuals using the WRAP computer program for the decision making process in planning regional solid waste disposal. The model is fully described in terms of its makeup and equation structure to familiarize the users with its capabilities. The kinds of data required for its use are described as well as their preparation and utilization. Examples of prepared data inputs are provided as well as a guide to the design and operation of the model. GRA

N77-29025# Association of Montery Bay Area Governments, Calif.
A TECHNIQUE TO ASSIST CITIZEN GROUPS IN DECISION MAKING
Harold Chatland 1976 45 p
(Grant NSF GI-35995-1)
(PB-265742/7; NSF/RA-760263) Avail: NTIS HC A03/MF A01 CSCL 13B

A method to help interested citizens take part in the resolution of issues confronting them is described and applied to the problem of urban core revitalization, (although it may be tailored to fit other issues). The elements of this technique include: (1) an impact analysis worksheet that lists factors likely to be affected by suggested solutions to the problem to be resolved; (2) a suggested procedure for employing the technique; (3) directions for the preparation of an impact analysis worksheet to suit the particular situation; (4) the types of information necessary to evaluate the side effects and how this information may be acquired; and (5) some ways to stimulate elected officials to take action on the recommendations resulting from the analysis. GRA

N77-29026# Wendell Associates, McLean, Va.
FEDERAL ASSISTANCE PROGRAMS AND ENERGY DEVELOPMENT-IMPACTED MUNICIPALITIES
Washington FEA Feb. 1976 112 p refs
(Contract FEA-CO-04-60431-00)
(PB-265804/5; FEA/D-77/039) Avail: NTIS HC A06/MF A01 CSCL 13B

Federal assistance programs which do or could provide aid for small communities impacted by major energy development are identified. It is also intended to analyze other programs of assistance to local governments to show why they are not presently suitable for use by these communities, and to indicate what kinds of changes would be necessary to make them useful to such communities. GRA

N77-29120# Stanford Research Inst., Menlo Park, Calif.
ADVANCED PRODUCTIVITY ANALYSIS METHODS FOR AIR TRAFFIC CONTROL OPERATIONS Final Report, Jan. 1974 - Dec. 1976
Paul L. Tuan, H. Steven Procter, and George J. Couluris Dec. 1976 199 p refs
(Contract DOT-TSC-1128)
(AD-A035095; DOT-TSC-FAA-76-27; FAA-RD-76-164) Avail: NTIS HC A09/MF A01 CSCL 17/7

A description of the air traffic control productivity analysis methods is reported. The relative capacity estimating process models the traffic handling capabilities of individual sectors in terms of routine, surveillance, and conflict processing workloads. The air traffic flow model simulates a multisector network by tracing aircraft flows from sector to sector and measuring traffic loadings, workload requirements, and delays under given sets of traffic input parameters and congestion relief strategy. Author

N77-29139*# Operations Research, Inc., Silver Spring, Md.
AVIATION AND PROGRAMMATIC ANALYSES; VOLUME 1, TASK 1: AVIATION DATA BASE DEVELOPMENT AND APPLICATION
28 Mar. 1977 114 p refs 3 Vol.
(Contract NAS5-23477)
(NASA-CR-152581) Avail: NTIS HC A06/MF A01 CSCL 01C

A method was developed for using the NASA aviation data base and computer programs in conjunction with the GE management analysis and projection service to perform simple and complex economic analysis for planning, forecasting, and evaluating OAST programs. Capabilities of the system are discussed along with procedures for making basic data tabulations, updates and entries. The system is applied in an agricultural aviation study in order to assess its value for actual utility in the OAST working environment. A.R.H.

N77-29140*# Operations Research, Inc., Silver Spring, Md.
AVIATION AND PROGRAMMATIC ANALYSES. VOLUME 2, TASK 2: IDENTIFICATION OF PLANNING FACTORS AND ACTIVITIES Final Report

28 Mar. 1977 250 p refs 3 Vol.
(Contract NAS5-23477)
(NASA-CR-152582) Avail: NTIS HC A11/MF A01 CSCL 01C

For abstract, see N77-29139.

N77-29141*# Operations Research, Inc., Silver Spring, Md.
AVIATION AND PROGRAMMATIC ANALYSES. VOLUME 3, TASK 3: DEVELOPMENT OF SPECIAL ISSUE PAPERS Final Report
28 Mar. 1977 204 p refs 3 Vol.
(Contract NAS5-23477)
(NASA-CR-152583) Avail: NTIS HC A10/MF A01 CSCL 01C

For abstract, see N77-29139.

N77-29180# Naval Postgraduate School, Monterey, Calif.
AVIATION COMMON GROUND SUPPORT EQUIPMENT REPLACEMENT POLICY INVESTIGATION M.S. Thesis
Ronald Gilbert Patterson and Fred H. Bardley, Jr. Mar. 1977 65 p refs
(AD-A039160) Avail: NTIS HC A04/MF A01 CSCL 05/1

A detailed examination of the existing Naval Air Systems Command Common Ground Support Equipment replacement model is presented. Basic existing equipment replacement models are discussed and the Annual Cost Model is selected as being most applicable to Navy needs. Model inputs, consisting of both empirical data and assumptions are critically examined to determine the reasons for the observed limited program utility. Several areas for future research are also suggested to improve the program viability. Author (GRA)

N77-29185# Centre National de la Recherche Scientifique, Marseilles (France). Lab. d'Astronomie Spatiale.
PROPOSALS FOR SPACE RESEARCH IN 1977 [PROPOSITIONS DE RECHERCHE SPATIALE POUR 1977]
Mar. 1976 114 p refs In FRENCH
(LAS-PG-76-01) Avail: NTIS HC A06/MF A01

Proposals include the astronomical satellite D2B AURA, the program Skylab S183, the program Faust, projects of French and Soviet international collaboration, balloon sounding experiments, widefield spectrophotometry of the interstellar medium (groundbased experiments), and TV by photon counting. Some research projects not sponsored by CNES are also included. Cost of the abovementioned projects for 1977 is tabulated. ESA

N77-29210# Technische Univ., Berlin (West Germany). Inst. fuer Luft- und Raumfahrt.
PROSPECTS: DESIGN OF A PROJECT PLAN FOR A REUSABLE CARRIER SYSTEM FOR HEAVY CARGO TRANSPORTATION IN SPACE [PROSPECTS. ENTWURF EINES PROJEKTPLANES FUER EIN WIEDERVERWENDBARES TRAEGERSYSTEM FUER SCHWERLAST-TRANSPORTE IN DEN WELTRAUM]
D. Bosin, D. Ehlers, I. Johannessen, D. Kassing, H. H. Koelle, A. Mielcarec, J. Petersen, R. Ress, and W. Westphal Jul. 1976 112 p refs In GERMAN; ENGLISH summary
(ILR-Mitt-33) Avail: NTIS HC A06/MF A01

The space project described concerns a reusable space transportation system (STS) for the transport of heavy cargo payloads in the order of 100 tons into geostationary orbit and energy equivalent space missions. It is intended to become the backbone of a global space program. This STS is expected to supplement the space shuttle STS and any remaining expendable carrier vehicles on or about 1990. The anticipated market situation for such a vehicle and the economical and political environment are considered in the form of two possible scenarios. Possible vehicle concept alternatives are indicated and typical selection criteria to arrive at the best possible configuration are listed. One of the possible configurations is selected for illustrative purposes and described in some detail with respect to dimensions, masses, performance, and cost. This description is complemented by a representative time, financial, and organizational plan. Potential benefits are evaluated and presented. Author (ESA)

N77-29325# ICF, Inc., Washington, D.C.
PROJECT INDEPENDENCE EVALUATION SYSTEM (PIES) DOCUMENTATION. VOLUME 9: ALLOCATION OF EXPLORATORY ACTIVITY TO OIL AND NATURAL GAS IN THE FEA OIL AND GAS SUPPLY MODEL
Sep. 1976 70 p refs
(Contract FEA-CO-05-50301-00)
(PB-265772/4; FEA/N-76/419-Vol-9) Avail: NTIS HC A04/MF A01 CSCL 10A

The methodology used to associate the finding of oil or gas with specific exploratory drilling activity is described. Numerous price specific drilling profiles are included. Each of these drilling profiles is constructed on the basis of the economics of the particular hydrocarbon and its relationship to the drilling effort. GRA

N77-29366# Hawker Siddeley Dynamics Ltd., Stevenage (England). Space Div.
LIDAR DEVELOPMENT COST STUDY REPORT. VOLUME 1: TECHNICAL
G. W. Cocks, A. F. Cole, and K. Hecks Aug. 1976 64 p
(Contract ESA-2705/76-NL).
(HSD-TP-7594; ESA-CR(P)-929) Avail: NTIS HC A04/MF A01

The results of a cost and program estimate for a Spacelab-borne lidar facility are presented. Various model philosophies were examined and a single flight model with identified spares backing was selected to meet program constraints and provide an optimum cost/risk ratio. A program is given which will meet the required launch date, identifying predicted problem areas. A budgetary cost estimate for the identified project is given, detailed down to unit level. Several areas where lack of requirements gives rise to cost uncertainty are described. Author (ESA)

N77-29545# Naval Postgraduate School, Monterey, Calif.
DECISION VERIFICATION AS AN ELEMENT OF NAVY QUALITY ASSURANCE PROGRAMS M.S. Thesis
Wayne L. Chadwick Mar. 1977 58 p refs
(AD-A039158) Avail: NTIS HC A04/MF A01 CSCL 05/1

Decision verification in quality assurance is simply the Government's determination of whether or not a contractor's inspection decisions are correct. This paper discusses procedures for accomplishing decision verification both as prescribed by directives and as actually done. It examines reasons why decision verification does not appear to be a viable element in current quality assurance programs even though this procedure is still prescribed in Navy directives for use by contract administrators. The use of operating characteristic curves as a managerial aid to determine whether or not to use decision verification is also discussed. Author (GRA)

N77-29801*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
PACE 2: PRICING AND COST ESTIMATING HANDBOOK
Rodney D. Stewart and Tom Shepherd Jul. 1977 61 p
(NASA-TM-78121) Avail: NTIS HC A04/MF A01 CSCL 09B

An automatic data processing system to be used for the preparation of industrial engineering type manhour and material cost estimates has been established. This computer system has evolved into a highly versatile and highly flexible tool which significantly reduces computation time, eliminates computational errors, and reduces typing and reproduction time for estimators and pricers since all mathematical and clerical functions are automatic once basic inputs are derived. Author

N77-29841# Gaertner (W. W.) Research, Inc., Stamford, Conn.
IMPACT OF STRUCTURED PROGRAMMING STANDARDS ON SMALL GOVERNMENT CONTRACTORS, VOLUME 1 Final Technical Report, Aug. 1976 - Feb. 1977
Wolfgang W. Gaertner Griffiss AFB, N. Y. RADC May 1977 52 p refs
(Contract F30602-76-C-0390)
(AD-A040771; RADC-TR-77-162-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 05/1

A study of the impact of the structured programming standards on small government contractors. How they can reasonably meet

such requirements within the normal environment of the small contractor. Author (GRA)

N77-29842# Gaertner (W. W.) Research, Inc., Stamford, Conn.
IMPACT OF STRUCTURED PROGRAMMING STANDARDS ON SMALL GOVERNMENT CONTRACTORS, VOLUME 2 Final Technical Report, Aug. 1976 - Feb. 1977
Wolfgang W. Gaertner Griffiss AFB, N. Y. RADC May 1977 240 p refs
(Contract F30602-76-C-0390)
(AD-A040828; RADC-TR-77-162-Vol-2) Avail: NTIS HC A11/MF A01 CSCL 05/1

Volume II contains the detailed comments prepared during a line-by-line review of the entire Structured Programming Series. Analyses, clarifications and recommendations are provided wherever the original text is not self-explanatory. In addition, examples for the implementation of the various requirements in the Structured Programming Series are presented in all cases where the effort required was minimal. GRA

N77-30013# Rowland and Co., Haddonfield, N. J.
IN SUPPORT OF TECHNICAL DEVELOPMENT PLAN 43-03X, EDUCATION AND TRAINING Final Report, 1 Dec. 1969 - 15 Nov. 1976
Edward Marlowe and George E. Rowland 15 Nov. 1976 54 p refs
(Contract N00014-74-C-0269; NR Proj. 154-353)
(AD-A038346; R/C-76-12-124) Avail: NTIS HC A04/MF A01 CSCL 05/9

This is the final technical report on a five-phase program to develop a Data Management System and a Student Management System. These findings pertain to the naval air training system features that impact on the enhancement of individualized student pilot training treatment and on student training success prediction capabilities and options. The Data Management System (DMS) was designed and implemented on to a Nova 800 minicomputer to demonstrate the feasibility of operation. This DMS is a user-oriented online system which permits non-programmer or non-computer type personnel to create data base files, update these files, search single or multiple files, and to secure hard copy printouts of search results. A unique feature is provided which permits users to execute certain descriptive and analytic statistics on records located by the search. The Student Management System consists of a description and specification of the concept, products and records required to enhance and individualized student naval pilot training treatment program. These student profiles form the quantitative bases from which administrative training personnel can select individualized treatment options. GRA

N77-30014# Naval Postgraduate School, Monterey, Calif.
DESIGN CONSIDERATIONS AND CRITERIA FOR A MANAGEMENT INFORMATION AND CONTROL SYSTEM FOR THE SIDEWINDER PROGRAM OFFICE, NAVAL WEAPONS CENTER, CHINA LAKE, CALIFORNIA
John Franklin McClain, III and Ronald Wayne Doucette Mar. 1977 144 p refs
(AD-A039773) Avail: NTIS HC A07/MF A01 CSCL 05/1

This thesis examines, specifically, the needs and criteria for a Management Information and Control System (MICS) to adequately fulfill the control and planning aspects of the program management process at the Sidewinder Program Office at NWC (SPO/NWC). The authors discuss the considerations and criteria appropriate for a viable MICS in general application and examine the existing SPO/NWC environment and MICS. Roles, responsibilities, information flows, and controls with respect to the SPO/NWC are identified. The authors stipulate the information and control requirements necessary to ensure successful SPO/NWC accomplishment of responsibilities and conclude that the current system is inadequate. They present a conceptual model of a MICS which would provide the planning and control capabilities required. GRA

N77-30015# University of Southern Calif., Los Angeles.
INTERDISCIPLINARY RESEARCH MANAGEMENT IMPROVEMENT Final Report, Jul. 1973 - Dec. 1974
Zohrab A. Kaprielian and Jack M. Nilles Jul. 1975 201 p refs
(Grant NSF NM-39528)
(PB-265011/7) Avail: NTIS HC A10/MF A01 CSCL 05A

An understanding of the extent, variety, and commonality of interdisciplinary research management problems, approaches and alternatives in major universities within the United States; a forum, by means of a workshop, for discussion of these issues; and dissemination of information concerning recommended techniques for interdisciplinary research management in various institutional settings are reported. GRA

N77-30016# American Univ., Washington, D.C. Center for Technology and Administration.
INDIRECT COSTS IN UNIVERSITY RESEARCH. PRELIMINARY FINDINGS FROM THE RESEARCH MANAGEMENT IMPROVEMENT PROGRAM
Lowell H. Hattery Apr. 1977 278 p refs
(Grant NSF DS-176-08847)
(PB-266621/2) Avail: NTIS HC A13/MF A01 CSCL 05A

The issue of indirect cost allowances for federally-sponsored university research is addressed in five research management improvement projects conducted at American University. The text of each study is presented along with a list of the principal findings. A topical index is provided. GRA

N77-30017# Decisions and Designs, Inc., McLean, Va.
TESTING PROCEDURES IN THE DESIGN OF MANAGEMENT SYSTEMS: SOME METHODOLOGICAL REFLECTIONS
R. V. Brown and S. R. Watson (Cambridge Univ, Engl.) Feb. 1977 38 p refs
(Contracts N00014-76-C-0074; N00014-74-C-0263)
(AD-A040630; DT/TR-77-1) Avail: NTIS HC A03/MF A01 CSCL 05/1

The introduction (or modification) of a management system in an organization is often preceded by an effort to gather data from which it can be evaluated. The data may come from some kind of experiment, a conceptual simulation, or some more informal analysis of relevant past experience. This paper discusses how such alternative testing procedures can themselves be evaluated by paying particular attention to analogous testing paradigms in the more established fields of science and engineering. Decision-aiding systems for naval command control are used as an illustrative case. Author (GRA)

N77-30023# Oak Ridge National Lab., Tenn. Finance and Materials Div.
COMMITMENT INFORMATION SYSTEM: USER GUIDE
Ada F. Misek Feb. 1977 33 p
(Contract W-7405-eng-48)
(ORNL-TM-5408) Avail: NTIS HC A03/MF A01

A user guide is presented for a management information system which includes project scheduling, status, and reporting in its finance and materials data base. The operation of the system is described along with a disscussion of the types of information input, the reports issued, options available, computer programs used, and the timing of update. Procedures are given for protecting the data base, and for deleting records. ERA

N77-30027# Brookhaven National Lab., Upton, N. Y.
INPUT-OUTPUT CAPITAL COEFFICIENTS FOR ENERGY TECHNOLOGIES
R. G. Tessmer, Jr. Dec. 1976 32 p refs
(Contract EY-76-C-02-0016)
(BNL-50608) Avail: NTIS HC A03/MF A01

Input-output capital coefficients are presented for five electric and seven nonelectric energy technologies. They describe the durable goods and structures purchases (at a 110 sector level of detail) that are necessary to expand productive capacity in each of twelve energy source sectors. Coefficients are defined in terms of 1967 dollar purchases per million Btu of output from new capacity, and original data sources include Battelle Memorial Institute, the Harvard Economic Research Project, The

Mitre Corp., and Bechtel Corp. The twelve energy sectors are coal, crude oil and gas, shale oil, methane from coal, solvent refined coal, refined oil products, pipeline gas, coal combined-cycle electric, fossil electric, LWR electric, HTGR electric, and hydroelectric. ERA

N77-30028# Committee of Conference (U. S. Congress).
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION ACT, 1978
Washington GPO 1977 6 p H.R. 4088 enacted into law by the 95th Congr., 30 Jul. 1977
(Pub-Law-95-76; GPO-89-139) Avail: US Capitol, Senate Document Room

The text of the public law authorizing appropriations to NASA for research and development, construction of facilities, and research and program management is presented. A.R.H.

N77-30030 Johns Hopkins Univ., Baltimore, Md.
A METHOD FOR EVALUATING MANAGEMENT OPTIONS FOR AN URBANIZING WATERSHED Ph.D. Thesis
Robert M. Hirsch 1977 267 p
Avail: Univ. Microfilms Order No. 77-7733

The effectiveness of eight different management options for the Holmes Run watershed (Fairfax County, Virginia) was tested with a year 2000 land use projection. An eleven year record of twenty storm events from the Holmes Run watershed was simulated under each of the eight management options and the simulated flood discharges under each of the options at various locations in the watershed were compared. A multi-objective decision making technique, robust effectiveness analysis (REA), is applied to the problem of selecting a management option. The REA relies on three metrics of performance: flood damage; channel enlargement; and construction cost. Two simple value judgements are elicited from the decision makers. With this information, the analyst identifies the preferred option from among the eight. Dissert. Abstr.

N77-30038# General Accounting Office, Washington, D.C. Community and Economic Development Div.
REPORT TO THE CONGRESS BY THE COMPTROLLER GENERAL OF THE UNITED STATES. BETTER DATA COLLECTION AND PLANNING IS NEEDED TO JUSTIFY ADVANCED WASTE TREATMENT CONSTRUCTION
21 Dec. 1976 86 p refs Sponsored in part by EPA
(PB-266452/2; CED-77-12; B-166506) Avail: NTIS HC A05/MF A01 CSCL 13B

The Federal Water Pollution Control Act Amendments of 1972 require that comprehensive area-wide and basin plans be prepared for determining the best course of action to follow for improving water quality. The U.S. Geological Survey was successful in gathering adequate water quality data on the Willamette River in Oregon and, as a result, was able to identify more effective and efficient methods for achieving Oregon's water quality standards than through treatment, as originally planned. The potential benefits which may be realized from gathering good water quality data may result in savings of several millions of dollars in Federal, State and local construction funds. GRA

N77-30039# Environmental Protection Agency, Washington, D.C. Municipal Construction Div.
MANUAL OF REFERENCES (REGULATIONS, GUIDANCE, PROCEDURES). MUNCIPAL WASTEWATER TREATMENT WORKS CONSTRUCTION GRANTS PROGRAM, SUPPLEMENT NUMBER 3
Jan. 1977 36 p
(PB-266731/9; EPA-MCD-02.3) Avail: NTIS HC A03/MF A01 CSCL 13B

This handbook contains the replacement pages and policy directives issued after the Manual of References, MCD-02, was published. This represents the third in a series of Program Requirements Memoranda. GRA

N77-30073# Army Aviation Systems Command, St. Louis, Mo. Systems Analysis Office.
FLYING, MAINTENANCE, AND THE SALE OF PARTS TO THE FIELD: INTERACTIVE MODELS FOR AH-1 AND CH-47 SYSTEMS Final Report
Valentin C. Berger and Blaine T. Stone Apr. 1977 61 p refs
(AD-A039193; DRSAV-D-77-6; USAVSCOM-TR-77-24) Avail: NTIS HC A04/MF A01 CSCL 01/3

Computer-generated graphic displays are used to investigate the relationships of AH-1 and CH-47 fleet flying hours, and of maintenance occurences of short and long duration during selected peacetime and wartime (RVN) periods. The rationale for observed relationships is explored in detail, and the discussion is supported with the results of correlation analyses. A similar approach is used to explore the relationships existing between monthly gross sales of stock-funded airframe parts to the field and the number of short and long duration maintenance events, and between those sales and monthly fleet flying hours. The AH-1 and CH-47 fleets are examined during a peacetime period of 1-1/2 fiscal years. The two elements of the study are shown to be complementary and suitable for the construction of interactive models of operations and supply support. A probable connection is postulated between managed field maintenance support activities and the cost-effectiveness of On Condition Maintenance (OCM) world-wide team visits. GRA

N77-30132*# Systems Technology, Inc., Hawthorne, Calif.
DEVELOPMENT OF AN INTEGRATED CONFIGURATION MANAGEMENT/FLIGHT DIRECTOR SYSTEM FOR PILOTED STOL APPROACHES Final Report
Roger H. Hoh, Richard H. Klein, and Walter A. Johnson
Washington NASA Aug. 1977 90 p refs
(Contract NAS2-6441)
(NASA-CR-2883; TR-1015-4) Avail: NTIS HC A05/MF A01 CSCL 01C

A system analysis method for the development of an integrated configuration management/flight director system for IFR STOL approaches is presented. Curved descending decelerating approach trajectories are considered. Considerable emphasis is placed on satisfying the pilot centered requirements (acceptable workload) as well as the usual guidance and control requirements (acceptable performance). The Augmentor Wing Jet STOL Research Aircraft was utilized to allow illustration by example, and to validate the analysis procedure via manned simulation. Author

N77-30161# Office of the Comptroller of the Army, Washington, D. C. Directorate of Cost Analysis.
ARMY LIFE CYCLE COST MODEL FOR MISSILE SYSTEMS Final Report
Mitchell L. Mayer, Michael M. Kishiyama, and Gene R. Farmelo
Sep. 1976 225 p
(AD-A040143) Avail: NTIS HC A10/MF A01 CSCL 16/4

This document describes the methodology and rationale used by the Directorate of Cost Analysis, Comptroller of the Army, for developing an estimate for all or part of the life cycle cost of a tactical missile weapon system. The model reflects the cost analysis discipline which has been established Army-wide with the implementation of DA Pamphlets 11-2 through 11-5 and AR 11-18. It is intended for use by cost analysts as a guide for developing an Independent Parametric Cost Estimate. Current costing procedures and technical data are included. Updates to this document will be made as revision or additions to the data base and methodology are made. Author (GRA)

N77-30608*# Barry (Theodore) and Associates, Los Angeles, Calif.
A REVIEW OF THE SOLAR ARRAY MANUFACTURING INDUSTRY COSTING STANDARDS
Jul. 1977 134 p Sponsored in part by ERDA Prepared for JPL
(Contract NAS7-100; JPL-954800)
(NASA-CR-153401; ERDA/JPL-954800-77/1) Avail: NTIS HC A07/MF A01 CSCL 10A

The solar array manufacturing industry costing standards model is designed to compare the cost of producing solar arrays using alternative manufacturing processes. Constructive criticism

of the methodology used is intended to enhance its implementation as a practical design tool. Three main elements of the procedure include workbook format and presentation, theoretical model validity and standard financial parameters. Author

N77-30636# Federal Energy Administration, Washington, D. C. Office of Regulatory Programs.
CONTINUATION OF THE ADJUSTMENT AS A PRODUCTION INCENTIVE TO THE MAXIMUM WEIGHTED AVERAGE FIRST SALE PRICE FOR DOMESTIC CRUDE OIL (ENERGY ACTION NO. 11)
15 Mar. 1977 150 p refs
(PB-266841/6; FEA/H-77/176) Avail: NTIS HC A07/MF A01 CSCL 21D

Energy consideration measures dealing with amendment to the regulations; historical summary of the implementation of section 8 of the Emergency Petroleum Allocation Act of 1973 and projects prices for domestic crude oil with and without the adjustment as a production incentive are presented. GRA

N77-30716*# National Aeronautics and Space Administration, Washington, D. C.
NASA OCCUPATIONAL MEDICINE PROGRAMS: OUR OBLIGATION TO MANAGEMENT
Louis B. Arnoldt and Jean Mockbee *In its* Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic., and Med. Program Advisors 1975 p 1-42

Avail: NTIS HC A13/MF A01 CSCL 06E

Factors to be considered in forming policies for managing NASA's health maintenance program to provide optimum arrangement for quality medical care are discussed. Topics include scheduling routine physical examinations, job related stress, prevalence of chronic diseases, additions to the PROM data system, and disease trends among personnel. A.R.H.

N77-30721*# National Aeronautics and Space Administration. Wallops Station, Wallops Island, Va.
REVIEW OF HEALTH MAINTENANCE PROGRAM FINDINGS, 1960-1974
Edward S. White *In its* Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic., and Med. Program Advisors 1975 p 119-138
Avail: NTIS HC A13/MF A01 CSCL 06E

A preliminary analysis of the employee's examination records of the automated medical data base at the NASA Wallops Flight Center, Va., with an emphasis on the primary mission of the program-the early detection and control of cardiovascular disease, is presented. I.M.

N77-30733*# National Aeronautics and Space Administration, Washington, D. C.
DEVELOPMENT AND APPLICATION OF FUNCTIONAL MANNING STANDARDS IN THE NATIONAL AERONAUTICS AND SPACE AND SPACE ADMINISTRATION
Walter A. Maull *In its* Proc. of the Ann. Conf. of NASA Clinic Directors, Environ. Health Offic., and Med. Program Advisors 1975 p 293-298
Avail: NTIS HC A13/MF A01 CSCL 06E

Regression analysis was applied to obtain a mathematical equation to determine a workload indicator in relation with the manpower required at the NASA. The equation thus derived was used to construct the requirements tables in the manning standards to improved management methods. Manning standards were discussed at a national conference. I.M.

N77-30796# Purdue Univ., Lafayette, Ind. Krannert Graduate School of Management.
AIDING DECISION MAKERS WITH A GENERALIZED DATA BASE MANAGEMENT SYSTEM: AN APPLICATION TO INVENTORY MANAGEMENT
Robert H. Bonczek, Clyde W. Holsapple, and Andrew B. Whinston Aug. 1976 32 p refs
(Contract DI-14-34-0001-6076; OWRT Proj. B-080-IND(1))
(PB-267306/9; W77-07814) Avail: NTIS HC A03/MF A01 CSCL 13B

The attributes of a generalized data base management system are examined with respect to its impact on managerial decision-making. Primary considerations are: the organization of data within data base such that all intricate relationships are represented; and the utilization of a facile method for nonprogramming users to interrogate the data base. Examples drawn from the field of material requirements planning are used to illustrate the concepts and potential of the generalized data base management system. GRA

N77-30819# Boeing Computer Services, Inc., Seattle, Wash.
BCS SOFTWARE PRODUCTION DATA Final Technical Report, Feb. 1976 - Feb. 1977
Rachael K. Black, Robert Katz, Malcolm D. Gray, and Richard F. Curnow Griffiss AFB, N. Y. RADC Mar. 1977 197 p
(Contract F30602-76-C-0174)
(AD-A039852; BCS-40151; RADC-TR-77-116) Avail: NTIS HC A09/MF A01 CSCL 09/2

This report contains the results of work accomplished by Boeing Computer Services for AF RADC. The purpose of this study was to assess the impact of modern software development techniques on the cost of developing computer software. The five in-house projects selected for study varied in size, type of application, and computing environment. The collection of practices found to have the most beneficial impact on software development are, in order of their impact: Project Organization and Management Procedures, Testing Methodology, Configuration Management and Change Control, and Design Methodology. Existing military standards and specifications are sufficiently comprehensive to encourage the use of beneficial practices; however, certain standards and specifications may require modification to make their applicability to software procurements more pertinent. Author (GRA)

N77-30897# Massachusetts Inst. of Tech., Cambridge. Operations Research Center.
ON THE SOLUTION OF CONVEX KNAPSACK PROBLEMS WITH BOUNDED VARIABLES
Gabriel R. Bitran and Arnold C. Hax Apr. 1977 18 p refs
(Contract N00014-75-C-0556)
(AD-A039164; TR-129) Avail: NTIS HC A02/MF A01 CSCL 12/2

In this paper, a recursive method is presented to solve separable differentiable convex knapsack problems with bounded variables. The method differs from classical optimization algorithms of convex programming and determines at each iteration the optimal value of at least one variable. Applications of such problems are frequent in resource allocation and recently have shown to be useful in hierarchical production planning. Computational results are presented. GRA

N77-30899# Rochester Univ., N. Y. Graduate School of Management.
OPTIMAL MANAGEMENT POLICY FOR THE M/G/ QUEUE WITH HETEROGENEOUS USERS Final Report
Robert J. Dolan (Chicago Univ., Ill.) Dec. 1976 25 p refs
(Grant NSF NM-44241)
(PB-267075/0) Avail: NTIS HC A02/MF A01 CSCL 12B

The administrator of a service facility must specify the rule which determines the order of service to waiting users. The total delay cost to users can be minimized only if the system administrator takes the per unit time delay cost and service requirement into account. Specifically, for the M/G/1 queue with nonpreemptive service, the total expected delay cost to users is minimized by serving users in descending order of the true per unit time delay cost divided by the expected service requirement. A priority pricing mechanism which structures a situation such that a user maximizes his individual welfare by revealing his true per unit time delay cost and expected requirement is developed. The user's objective function is formalized, the priority pricing algorithm specified, and then it is proven that the stated aim is accomplished. An example of the process is also given and future extensions are noted. GRA

N77-31006# Committee on Science and Technology (U. S. House).
NASA-PROGRAM PLANNING AND CONTROL
Washington GPO 1976 210 p Rept. by the Subcomm. on *Space Science and Applications of the Comm. on Sci., and* Technol., 94th Congr., 2d Sess., Dec. 1976
(GPO-80-490) Avail: Subcomm. on Space Science and Applications

To provide a basis for better examination of the employment of resources of NASA, a review of program planning and control was undertaken. A data base was designed to examine manpower, dollars, facilities, and nature of programs underway and the planning and control process used to organize and direct resources to accomplish goals and objectives. Author

N77-31007# *Office of the Chief of Staff (Army), Washington,* D. C.
AUTOMATION MANAGEMENT STUDY, DIRECTOR OF ARMY AUTOMATION (DAA) Final Report
Miriam F. Levine 25 Feb. 1977 65 p refs
(AD-A039565) Avail: NTIS HC A04/MF A01 CSCL 05/1

The Automation Management Study was a 7-month study effort which produced the Charter and implementing documents for the central manager of Army Automation, the Director of Army Automation (DAA). The DAA organizationally and functionally replaced the Director, Management Information Systems, Office Chief of Staff Army. The Mission of the DAA is to manage automation by establishing automation policy, developing comprehensive, integrated automation plans, exercising broad resource management responsibilities, and evaluating the execution of plans and programs to employ automation technology within the Army. Army automation encompasses computer-based systems which support management or mission functions, and are configured for operations in combat or special environments, or are embedded within combat weapons systems. Operational functions associated with the life cycle management of automated systems will be decentralized to Army Staff agencies and major commands. Three new organizational structures to support the DAA are the Automation Management Offices, the Army Automation Steering Committee, and the Army Command and Control Management Structure. Author (GRA)

N77-31011*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AN AUTOMATED LIBRARY FINANCIAL MANAGEMENT SYSTEM
Sarah Dueker and Linda Gustafson (Technical Develop. Corp., Sunnyvale, Calif.) Aug. 1977 19 p
(NASA-TM-78424; A-6914) Avail: NTIS HC A02/MF A01 CSCL 05B

A computerized library acquisition system developed for control of informational materials acquired at NASA Ames Research Center is described. The system monitors the acquisition of both library and individual researchers' orders and supplies detailed financial, statistical, and bibliographical information. Applicability for other libraries and the future availability of the program is discussed. Author

N77-31024# Massachusetts Inst. of Tech., Cambridge. Operations Research Center.
OPTIMIZATION MODELS FOR PLANNING ECONOMIC DEVELOPMENT
Silvia Pariente Apr. 1977 64 p refs
(Contract N00014-75-C-0556; NR Proj. 347-027; MIT Proj. OSP-82491)
(AD-A039165; TR-130) Avail: NTIS HC A04/MF A01 CSCL 05/3

In recent years, more and more countries have experimented with quantitative methods as a way to design short term and long term plans, and to evaluate the impacts of investment and other policies on the future development of their economies. Optimization models have proved useful in several fields of economics, such as economic growth and development planning, urban and regional economics, agricultural and energy economics, etc. The purpose of this paper is to formulate optimization models that can be applied fruitfully for economy-wide planning, sectoral planning, and project evaluation. It is an attempt at synthesizing the different models encountered in the literature, and at describing some of the difficulties inherent to this approach. Author (GRA)

N77-31025# Texas Univ., Austin. Center for Cybernetic Studies.
MANAGERIAL ECONOMICS: PAST, PRESENT AND FUTURE
A. Charnes and W. W. Cooper (Harvard Univ.) Mar. 1977 52 p refs Presented at Southwestern Soc. Sci. Assoc. Meeting, Dallas, Tex., 31 Mar. 1977
(Contracts N00014-75-C-0569; Grant NSF SOC-76-156876; NR Proj. 047-021)
(AD-A040549; CCS-287) Avail: NTIS HC A04/MF A01 CSCL 12/2

In this paper the present state of managerial economics is portrayed against the backdrop of a still-continuing series of methodological developments which began to impact on the civilian management sector in the late 1950's. Historically these developments were associated with changes that were occurring in disciplines like Operations Research, Management Science, and Systems Sciences. The latter involved an orientation toward civilian (private enterprise) management in place of a previous almost exclusive focus on problems in military management. This, in turn, caused these disciplines to interact with and impact on developments in managerial economics. This paper suggests that managerial economics, and these other disciplines should (and will) expand their focus in the near future to include management problems in the public sector. This should increase the interactions between them and also improve their ability to deal with problems in private (and military) management as well. Examples of how this might be accomplished are suggested in this paper via PPBS formats for local government and private enterprise management, along with methods of measuring management performance directed to multiple objectives in private as well as public sector management. Author (GRA)

N77-31026# Committee on Science and Technology (U. S. House).
NASA AUTHORIZATION, 1978, VOLUME 3
Washington GPO 1977 770 p Hearing on H.R. 2221 (superseded by H.R. 4088) before Comm. on Sci. and Technol., 95th Congr., 1st Sess., No. 8, 1 Feb. 1977
(GPO-92-950) Avail: Comm. on Sci. and Technol.

A summary of the major highlights and new directions in NASA programs is presented along with the agency's operating plan for FY 1977. Other documentation includes questions and answers for the record requested by the House Committee, a review of NASA's equal employment opportunity program, a record of FY 1976 annual procurement, contractor selection for the TDRSS, the TDRSS contract, and Satellite Solar Power: Economic and Social Implications. A.R.H.

N77-31031# Federal Highway Administration, Washington, D.C. Office of Traffic Operations.
IMPROVING THE HIGHWAY SYSTEM BY UPGRADING AND OPTIMIZING TRAFFIC CONTROL DEVICES Final Report
Harold Lunenfeld Apr. 1977 77 p refs
(PB-266987/7; FHWA-TO-77-1) Avail: NTIS HC A05/MF A01 CSCL 13B

Upgrading and optimizing the highway information system was evaluated in terms of human factors, safety, benefit-cost, and traffic engineering. It was found that those portions of the highway system not in compliance with the Manual on Uniform Traffic Control Devices (MUTCD) would experience significant safety benefits and improved system efficiency through upgrading to current standards. Among the factors leading to this conclusion are: (1) Traffic control device deficiencies can lead to driver error and accidents; (2) roads with the lowest level of MUTCD compliance generally experience disproportionately high accident rates; (3) studies show significant positive safety and efficiency benefits and driver error reductions with traffic control devices improvements; (4) if optimizing the total information

system reduced accidents by 10 percent, a benefit-cost ratio of from 10:1 to 20:1 would be realized. It was recommended that emphasis be given to upgrading all traffic control devices to MUTCD standards and optimizing through positive guidance. GRA

N77-31035# Oklahoma State Univ., Stillwater.
TRANSFERRING ENVIRONMENTAL TECHNOLOGY TO LOCAL LEADERS
Robert Fite, Mark Gregory, and Herman Jones Jan. 1977 121 p refs
(Grant NSF RD-175-19607)
(PB-266838/2; NSF/RA-770052) Avail: NTIS HC A06/MF A01 CSCL 13B

A system was developed for delivering environmental research results to local government officials and other community leaders using the Cooperative Extension Service as a transfer vehicle. A slide-tape package dealing with the increasing problem of contaminants in public drinking water supplies and regulations established to correct this health hazard was shown in 77 counties. An educational package was developed to help cities and towns comply with the water pollution control requirements prescribed by Public Law 92-500, which encourages consideration of land application of municipal wastewaters as a means of disposal and treatment. GRA

N77-31139# Logistics Management Inst., Washington, D. C.
SENSITIVITY OF ARMY HELICOPTER OPERATING AND SUPPORT COSTS TO CHANGES IN DESIGN AND LOGISTIC PARAMETERS
John D. Forster May 1977 54 p refs
(Contract SD-321)
(AD-A040353; LMI-75-1/4) Avail: NTIS HC A04/MF A01 CSCL 01/3

This study assesses Army helicopter O and S costs and Support Investment (SI) costs in order to assure that the degree of hardware design and logistic parameter sensitivity included in cost estimates accurately reflects actual expenditure sensitivities. Army O and S cost data sources, methodology, and approaches are examined, and selected cost improvements isolated and evaluated. Strengths of the current costing structure are noted so that they can be carried forward and improved upon to assure accurate representation of new systems to the DSARC. O and S data sources reviewed include reliability, maintainability, and field reported cost data. The present methodology and approaches for both Baseline (Program Manager's) Cost Estimates (BCE) and Independent Parametric Cost Estimates (IPCE) are assessed. The dominant O and S costs are found to be Manpower, Replenishment Spares, and Initial Spares. For Manpower and Initial Spares, simplified models are discussed which give OASD visibility into the critical sensitivities of Army helicopter O and S costs. Of the parameters examined for the selected helicopters, O and S costs are most sensitive to the Mean Time Between Dynamic Component Removals (MTBRDC). The report concludes with a discussion of bounding values of Army helicopter O and S cost that can be expected if extreme values of critical O and S cost driving parameters, including those assumed in the cost estimate's approach, are encountered in actual practice. GRA

N77-31186*# Aerospace Corp., El Segundo, Calif. Advanced Orbital Systems.
ADVANCED SPACE PROGRAM STUDIES. OVERALL EXECUTIVE SUMMARY
M. G. Wolfe 30 Jun. 1977 54 p ref
(Contract NASw-2884)
(NASA-CR-154893; ATR-77(7379-01)-1) Avail: NTIS HC A04/MF A01 CSCL 22A

NASA and DoD requirements and planning data were used in multidiscipline advanced planning investigations of space operations and associated elements (including man), identification of potential low cost approaches, vehicle design, cost synthesis techniques, technology forecasting and opportunities for DoD technology transfer, and the development near-, mid-, and far-term space initiatives and development plans with emphasis on domestic and military commonality. An overview of objectives and results are presented for the following studies: advanced space planning and conceptual analysis, shuttle users, technology assessment and new opportunities, standardization and program practice, integrated STS operations planning, solid spinning upper stage, and integrated planning support functions. Author

N77-31199*# Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
LIFE-CYCLE COSTING: PRACTICAL CONSIDERATIONS
I. Eisenberger and G. Lorden *In its* The Deep Space Network 15 Aug. 1977 p 102-109 refs

Avail: NTIS HC A10/MF A01 CSCL 05C

The history and methodology of life-cycle costing are presented and analyzed, contrasting the potential benefits of the technique with the difficulties of its application. Examples and a short survey of the literature are given. Author

N77-31233*# TRW Defense and Space Systems Group, Redondo Beach, Calif.
STS PAYLOADS MISSION CONTROL STUDY CONTINUATION PHASE A-1. VOLUME 2-B: TASK 2. EVALUATION AND REFINEMENT OF IMPLEMENTATION GUIDELINES FOR THE SELECTED STS PAYLOAD OPERATOR CONCEPT
Final Report
Aug. 1976 163 p refs
(Contract NAS9-14484)
(NASA-CR-151027; TRW-26904-H019-RO-00-Vol-2B) Avail: NTIS HC A08/MF A01 CSCL 22B

The functions of Payload Operations Control Centers (POCC) at JSC, GSFC, JPL, and non-NASA locations are analyzed to establish guidelines for standardization, and facilitate the development of a fully integrated NASA-wide system of ground facilities for all classes of payloads. Operational interfaces between the space transportation system operator and the payload operator elements are defined. The advantages and disadvantages of standardization are discussed. A.R.H.

N77-31380# World Meteorological Organization, Geneva (Switzerland).
ON THE AUTOMATION OF METEOROLOGICAL TELECOMMUNICATION CENTRES
1977 106 p
(WMO-468; ISBN-92-63-10468-9) Avail: NTIS HC A06/MF A01; WMO, Geneva

To assist those contemplating the introduction of automation at their telecommunication center, the guide covers the following aspects: formulation of user requirements; project planning, definition, and control; system design concepts; tendering and contract action; production phase; acceptance testing and subsequent user commissioning; accommodation, installation, and maintenance; test equipment; possible technological trends in automated telecommunication system. ESA

N77-31812# Defense Systems Management School, Fort Belvoir, Va.
INTERACTIVE COMPUTER GRAPHICS: A RESPONSIVE PLANNING AND CONTROL TOOL FOR DoD PROGRAM MANAGEMENT
Joseph E. Callahan, Carlton F. Roberson, and George H. Perino, Jr. Jan. 1977 56 p refs
(AD-A041798; DSMC-RR-77.1) Avail: NTIS HC A04/MF A01 CSCL 09/2

This report summarizes the methodology, conduct and findings of the Defense Systems Management College (DSMC) research study of Interactive Computer Graphics (ICG) as a tool for program management planning and control. The study was conducted in four phases to meet four objectives: to determine the feasibility of representing and interrogating a program/project network on a graphics console; to determine the feasibility of developing an Interactive Computer Graphics Networking System (ICGNS) software prototype for program management planning and control; to examine the affordability of implementing an ICGNS in the PMO; and to assess the state-of-the-art in industry and DOD regarding existing and/or proposed ICG managerial applications. GRA

N77-31813# Logistics Management Inst., Washington, D. C.
DATA MANAGEMENT SYSTEMS ANALYSIS: FINDINGS AND RECOMMENDATIONS Final Task 3 Report
Robert K. Wood and Craig A. Webster Jun. 1977 66 p
(Contract SD-321)

The Office of Economic Adjustment (OEA) within the Office of the Assistant Secretary of Defense for Manpower, Reserve Affairs and Logistics (ASD(MRA and L)) serves as the staff arm of the President's Interagency Economic Adjustment Committee (EAC). The office is responsible for organizing and coordinating the Federal government's response to communities affected by Defense base closures, reductions, or buildups. The Logistics Management Institute (LMI) has a contract with OEA under Task Order SD-321-57 Revised (LMI Task 76-16) with two principal objectives: (1) to design a data management system that would allow OEA to respond rapidly to inquiries from the White House, Congress, State Governors and the press, as well as to improve internal management of project activities; and (2) to develop a project management manual to be used by OEA Project Managers and Regional Directors in carrying out their economic adjustment function. The study is divided into four tasks. Tasks 1 and 2 are to conduct a preliminary review of current OEA activities and reporting requirements and prepare a work plan. Task 3 is to design a data management system for OEA, specify requirements for alternative processing concepts, specify and evaluate the alternatives and recommend a preferred concept; Task 3A is to develop a project management manual. Task 4 is to develop system specifications necessary for OEA to proceed with the implementation of the data management system. GRA

N77-31822# Rochester Univ., N. Y. Graduate School of Management.
ECONOMICS OF MANAGEMENT OF UNIVERSITY COMPUTING RESOURCES Final Report
Michael C. Jensen Apr. 1977 59 p
(Grant NSF-NM-44241)
(PB-267107/1) Avail: NTIS HC A04/MF A01 CSCL 09B

The study focuses primarily on the budgeting, pricing, and organizational aspects of the problems and emphasizes the application of economics to their understanding and solution. The basic assumption underlying the approach taken in this report is that most of the major problems associated with the management of computing resources are 'organizational' or human problems. In solving them it is important to strive for the creation of a combination of pricing, budgeting, evaluation, and other organizational policies which create a system which contains strong incentives for people to make changes which are generally in the 'right' direction. To do so such a system must provide strong incentives for people to economize on the use of scarce resources. GRA

N77-31830# Texas Univ., Austin. Center for Cybernetic Studies.
IMPROVED COMPUTER-BASED PLANNING TECHNIQUES
Fred Glover, John Hultz, and Darwin Klingman Feb. 1977 54 p refs
(Contracts N00014-75-C-0616; N00014-76-C-0383)
(AD-A040592; CCS-283) Avail: NTIS HC A04/MF A01 CSCL 09/2

Management Science has responded recently to the needs of practitioners by contributing two new technologies. These are network computer implementation technology and NETFORM (network formulation) technology. In this paper we show how these new technologies have been used to model and solve real-world problems. In addition, we attempt to give the practitioner insights into how these important policy evaluation tools may be applied to his unique management problems.
Author (GRA)

N77-32009# DGS Associates, Inc., Washington, D. C.
THE REPORTING OF FEDERAL RESEARCH AND DEVELOPMENT RESOURCES APPLIED TO INNOVATION Final Report
Dave G. Soergel 18 Apr. 1977 32 p ref
(NSF Order 77-SP-0443)
(PB-266765/7) Avail: NTIS HC A03/MF A01 CSCL 05A

A system of reporting Federal funding of research and development (R&D) which is based on the design progression phases of the innovative process is presented. The study is limited to investigation of federally funded R&D resource expenditures in hardware production areas. The conceptual approach to design progression reporting is based on six supply-oriented design progression phases within the innovative process and a demand-oriented category of mission needs and goals which is delineated through six mission levels. Current Federal R&D resource data for the solar electric technology mission is realigned to this conceptual framework. GRA

N77-32010# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
STANDARDIZATION GUIDE FOR CONSTRUCTION AND USE OF MORT-TYPE ANALYTIC TREES
J. R. Buys Feb. 1977 34 p refs
(Contract EY-76-C-07-1570)
(ERDA-45/8; SSDC-8) Avail: NTIS HC A03/MF A01

A system is proposed to develop and teach the use and construction of MORT (Management Oversight and Risk Tree) diagrams and other analytic trees. The guide seeks to correct a problem in lack of standardization and is equally applicable to both success or positive trees, and failure, fault, or negative trees. Author

N77-32029# Committee on Commerce, Science, and Transportation (U. S. Senate).
NASA AUTHORIZATION FOR FISCAL YEAR 1978, PART 3
Washington GPO 1977 417 p refs Hearing on S. 365 before Subcom. on Sci., Technol., and Space of the Comm. on Commerce, Sci., and Transportation, 95th Congr., 1st Sess., 7, 9, 17-18 Mar. 1977
(GPO-86-914) Avail: Subcomm. on Sci., Technol., and Space

NASA programs in aeronautical research and development are described to justify budgetary requests for FY-1978. Included are statements on NASA programs and policies by members of the civil aviation industry. G.D.H.

N77-32073# Naval Postgraduate School, Monterey, Calif.
DEVELOPMENT OF PERFORMANCE MEASURES FOR ORGANIZATIONAL LEVEL AVIATION MAINTENANCE MANAGERS M.S. Thesis
Wayne H. Anderson Jun. 1977 51 p refs
(AD-A042295) Avail: NTIS HC A04/MF A01 CSCL 05/1

The development of objectives reflecting the functions of an entity together with the determination of appropriate measures to evaluate the accomplishment of those objectives are fundamental prerequisites for strategic planning and control. Following the guidelines of a systematic analysis model presented in this thesis, the assigned functions of the organizational level Maintenance Officer and Maintenance/Material Control Officer are evaluated to define their respective objectives and develop appropriate measures which reflect their efficiency and effectiveness in achieving those objectives. The use of these measures is intended to provide effective feedback data for planning and controlling functions as well as for objective performance appraisal. Author (GRA)

N77-32075# Perceptronics, Inc., Woodland Hills, Calif.
COMPARATIVE STUDIES OF ORGANIZATIONAL FACTORS IN MILITARY MAINTENANCE Progress Report, 1 Oct. 1976 - 31 Mar. 1971
Kenneth L. Drake, Mark S. Sanders, William H. Crooks, Barry L. Berson, and Gershon Weltman Apr. 1977 90 p refs
(Contract MDA903-77-C-0039; ARPA Order 3308)
(AD-A042847; PTR-1043-77-4) Avail: NTIS HC A05/MF A01 CSCL 05/1

This report describes a comparative analysis of organizational factors in maintenance. The analysis involves an investigation and comparison of U.S. military and U.S. civilian maintenance organizations, as well as Israeli military maintenance practices. The report includes: (1) an overview of the program, including a statement of the problem, background, objectives and technical

approach; (2) the description and formalization of a model of incentives and organizational effectiveness, a review of the psychological literature concerning the effects of organizational factors on maintenance personnel productivity and satisfaction forms the foundation of the effectiveness model; and (3) the findings of a preliminary maintenance systems analysis, which compares U.S. military and U.S. civilian maintenance practices. The next phase of work will focus on developing and administering questionnaires and interviews for obtaining detailed comparisons of military and civilian maintenance practices. An analysis of Israeli military practices will also be completed in the next work phase. Author (GRA)

N77-32351*# ECON, Inc., Princeton, N.J.
THE PLAN FOR THE ECONOMIC EVALUATION OF THE PUBLIC SERVICE COMMUNICATION SATELLITE SYSTEM
15 Aug. 1977 72 p refs Revised
(Contract NASw-3047)
(NASA-CR-155051; Rept-77-263-4-Rev-1) Avail: NTIS HC A04/MF A01 CSCL 17B

A total plan for the economic evaluation of the PSCS public service communication satellite program within domestic markets is presented. It extends from the present through the planning, performance and evaluation of economic experiments following the launch of the PSCS, and includes the consideration of how the results of these experiments impact the transfer from demonstration to operations. The implementation of this plan will provide NASA with information needed to understand and manage the economic and social impacts of the PSCS program. Author

N77-32370# Defense Systems Management School, Fort Belvoir, Va.
ELECTROMAGNETIC COMPATIBILITY: THE PROGRAM MANAGER'S CONSIDERATIONS
Albert B. Garcia May 1977 36 p refs
(AD-A042876) Avail: NTIS HC A03/MF A01 CSCL 09/3

This report seeks to provide insight into the configuration control problems that can occur after a competitive procurement. The author discusses the configuration control problems experienced by the 5-in./54 MK-45 Lightweight Gun System Program Office as a result of a competitive procurement. Specifically the problem areas include: configuration identification, change control and configuration status accounting. The configuration control procedures formulated and implemented to correct the problems identified are also discussed. The report concludes with the lessons learned and makes appropriate recommendations. The lessons learned were that competitive procurement: (1) can have a significant impact on program configuration control; (2) impacts the production baseline; and (3) affects change control procedures and configuration status accounting. GRA

N77-32484# Minnesota Univ., Minneapolis. Dept. of Electrical Engineering.
INFRARED DETECTORS AND LASER TECHNOLOGY Final Report, 1968-1975
R. J. Collins Aug. 1975 87 p refs
(Contract N00014-68-A-0141-0002)
(AD-A042140) Avail: NTIS HC A04/MF A01 CSCL 20/5

A summary of the work carried out under Project THEMIS as ONR Grant no. N00014-68-A-0141-0002 is presented. The emphasis in this report is the management and personnel aspects of the project. Only brief summaries of the research activities on the S-1 photosurface, self-mode locking of He-Ne lasers, optically-induced gratings, noise in optical mixing, and the optical properties of proustite are given since the work has already appeared in the literature and other technical reports. Author (GRA)

N77-32506# Martin Marietta Aerospace, Orlando, Fla. Technical Information Center.
PRODUCIBILITY: A SELECTED BIBLIOGRAPHY
Lucille McClure Feb. 1977 9 p
(AD-A041905; RB-332) Avail: NTIS HC A02/MF A01 CSCL 13/8

This bibliography consists of 84 unclassified titles on Producibility. The titles are arranged in alphabetical order by author. If no author is listed, then the citation is arranged by source. Author (GRA)

N77-32527# Naval Postgraduate School, Monterey, Calif.
RELIABILITY IMPROVEMENT WARRANTIES: GOVERNMENT BENEFITS, CONTRACTOR RISKS M.S. Thesis
Roland Franz Habicht Dec. 1976 119 p refs
(AD-A043166) Avail: NTIS MF A01 CSCL 05/1

Reliability Improvement Warranties illustrate a new contractual technique for improving reliability by providing a strong monetary incentive to the contractor. This incentive, however, also places additional monetary risk on the contractor. Industry has expressed mounting concerns over this risk. This thesis contains an examination of the relationship between government benefits and contractor risk. Existing and proposed RIW contracts are evaluated in regard to the type of equipment under warranty, the use of exclusions, penalties for non-compliance, and RIW price. The results of the analysis illustrate how RIW is being used by the government. Author (GRA)

N77-32573# Defense Systems Management School, Fort Belvoir, Va.
A NEW LOOK IN RELIABILITY: F-18 OPERATIONAL MISSION ENVIRONMENT
Douglas P. Dunbar, Jr. May 1977 40 p refs
(AD-A042781) Avail: NTIS HC A03/MF A01 CSCL 17/8

This study project examines the F-18 program's development of an expected operational mission environment (OME) of the airplane to tailor existing specifications for design and test requirements of systems and equipment. Based on F-18 contractor studies and reports plus interviews of contractor and Navy Project Management Office personnel, discussion is presented treating establishment of mission profiles/environments, expected reliability improvements and life cycle cost savings. Study results indicate that use of the OME concept will significantly increase F-18 operational reliability as compared to existing carrier-based aircraft. Analysis also indicates that a 'front end' investment cost of approximately three million dollars for OME design and test of selected mission-critical equipment will result in a savings of over 100 million dollars in operating and support costs through manpower, spares and rework reductions. Recommendations include establishment of a requirement for, and standard methodology of developing mission profiles early in the acquisition cycle of future systems. The expected operational environment derived from these profiles should then form the baseline for design and test requirements of system and equipment. Author (GRA)

N77-32736# Colorado Univ., Boulder. Computing Center.
CSC PLOTTING PACKAGE Final Report
J. R. Warner and K. I. Joy Nov. 1976 57 p
(Grant DAAG29-76-G-0095)
(AD-A041104; UCCC-76-21; ARO-13742.1-EL) Avail: NTIS HC A04/MF A01 CSCL 09/2

The CSC plotting package is a computer software system for generating tabular graphs from United States Army personnel information. As input, the CSC plotting package accepts a sequential file of information built using the United States Army's SIR (Selective Information Retrieval) system. As output, the package generates an annotated histogram or pie chart derived from the sequential SIR file. SIR allows users to selectively define and build a retrieval file from an information data bank. The CSC plotting package synthesizes the retrieval file in generating a customized plot. The CSC plotting package accepts simple input commands for generating the tabular plots. Graphics output may be routed to any display device that supports line drawing capabilities. The plot package is functional in both batch and time-sharing environments. The CSC plotting package is written in ANSI Standard FORTRAN IV for compatibility among computing installations. The following sections of this report detail the general configuration of the package. Four appendices: describe the user interface (i.e., input commands);

detail a sequence of example plots; describe the device-dependent graphics routines; and provide the general system schematic. GRA

N77-32743# National Bureau of Standards, Washington, D. C. Systems and Software Div.
COMPUTER SCIENCE AND TECHNOLOGY: A DATA BASE MANAGEMENT APPROACH TO PRIVACY ACT COMPLIANCE
Elizabeth Fong Jun. 1977 37 p refs
(PB-268500/6; NBS-SP-500-10; LC-77-608106) Avail: NTIS HC A03/MF A01 CSCL 09B

The Privacy Act provisions on personal record handling present new issues concerning effective use of commercial data base management systems (DBMS) by Federal agencies. A technical approach is proposed to compliance with certain Privacy Act requirements through the use of a generalized data base management system. Requirements are translated into a set of computer data files and procedures. These procedures, incorporated at pivotal points of data base software, can implement those Privacy Act compliance procedures amenable to automation. The use of DBMS appears to be a viable and technologically feasible solution to the effective and efficient implementation of many Privacy Act provisions. GRA

N77-32761# Army Aviation Research and Development Command, St. Louis, Mo. Systems and Cost Analysis Div.
A MATHEMATICAL PROGRAMMING MODEL FOR AN AIRCRAFT MODIFICATION PROGRAM Final Report
D. Frank Fox Aug. 1977 33 p
(AD-A042813; DRDAV-BC-77-1; USAAVRADCOM-TR-77-1) Avail: NTIS HC A03/MF A01 CSCL 01/3

A large fleet of aircraft is to be modified by the installation on each aircraft in the fleet of a certain number of engineering change proposal (ECP) kits. The aircraft are deployed in smaller sub-fleets, called field units, at various locations around the world, and the kit installations are to take place at a single contractor facility. Therefore, each of the aircraft must be taken out of operation in the field and sent in to the contractor facility for modification. Each field unit has an authorized strength of aircraft with a specified operational readiness to maintain, permitting only a certain number of aircraft to be away from each field unit at a given time. Furthermore, ECP kits become available over a period of time. At the beginning of the program only certain types of kits are available, and the last type of kit doesn't become available until some time later. Therefore, an aircraft sent in for modification early in the program will not get all of the ECP kits and must be sent back at least a second time. In order to maintain operational readiness, the aircraft should be sent in as few times as possible and brought back as quickly as possible. An optimum solution to the problem of how many aircraft should be sent in and for how long they should remain can be developed using mathematical programming. GRA

N77-32766# Defense Systems Management School, Fort Belvoir, Va.
HIGH ORDER LANGUAGE CONTROL FACILITY
Benjamin D. Blood May 1977 39 p refs
(AD-A042943) Avail: NTIS HC A02/MF A01 CSCL 09/2

Recent DoD studies dealing with the problems of proper management of computer resources have made several recommendations. One is that high order languages (HOL) should be used to develop software so long as the number of different HOL is constrained and those remaining are carefully controlled. The purpose of this study is to specify the organization and functions of a HOL Control Facility and to discuss some of the issues involved in implementing such a facility for the DoD HOL Program. This study resulted from a synthesis of information available in the literature and from the author's experience as part of the DoD HOL Program. He concludes that: control facilities are necessary for all DoD approved HOL; control facilities for existing DoD approved HOL will remain separate entities under the various military departments; the control facility for the new DoD HOL should be jointly manned and supported and set up as soon as possible; and that the facility should use the ARPANET and become part of the National Software Works. GRA

N77-32779# California Univ., Los Angeles. Grad. School of Management.
A MULTISTAGE MODEL OF NETWORK USAGE
Jun. 1977 18 p refs
(Contract N00014-75-C-0266)
(AD-A041970) Avail: NTIS HC A02/MF A01 CSCL 09/2

The evolution of network service usage can be considered as being in three stages, constituting a usage life cycle. The first stage (inception) is that of initial low level usage. The second (expansion) is characterized by rapid growth in usage and is often unstable and uncontrolled. The third stage (stability) is a reaction to the second stage and imposes order on usage. Decision making, data collection, and measurement considerations are examined for this framework. Author (GRA)

N77-32960# Massachusetts Inst. of Tech., Cambridge. Operations Research Center.
ISSUES OF HIERARCHICAL PLANNING IN MULTI-STAGE PRODUCTION SYSTEMS
Dan Candea Jul. 1977 267 p refs
(Contract N00014-75-C-0556; NR Proj. 347-027)
(AD-A042559; TR-134) Avail: NTIS HC A12/MF A01 CSCL 05/3

The multi-stage production system is viewed as a production process in which component parts have to be obtained by manufacturing or by purchasing then assembled into subassemblies, assemblies, and finally into the finished good. At the aggregate level a new formulation for the aggregate planning model is given, in order to bring computational feasibility to situations in which older formulations went beyond the capabilities of current linear programming codes. The resulting aggregate model is a large scale system that lends itself to solution by column generation. A dynamic programming algorithm for the generation of columns is developed. Next, at the disaggregation level, the problem of computing optimal lot sizes in multi-stage systems is addressed and solved. Since exact solution procedures are found to be either very expensive or computationally infeasible, a heuristic approach is adopted and results are reported. For more complex situations, in which parts are common to several end products or where there is independent demand for parts, even the heuristics become infeasible; therefore it is suggested that myopic lot sizing policies be used. GRA

N77-32961# Defense Systems Management School, Fort Belvoir, Va.
ESTABLISHMENT OF THE PROGRAM MANAGER FOR AVIONICS
Mervyn W. Leavity May 1977 43 p refs
(AD-A043163) Avail: NTIS HC A03/MF A01 CSCL 05/1

This report establishes the background from which the concept of Program Management for common avionics emerged. The Carrier Aircraft Inertial Navigation System (CAINS) Program is used as a case study that ultimately developed the idea of the Program Manager for Avionics as a 'better way of doing things. The report also deals with what Program Management of common avionics is all about. The report delineates the mission, scope, operating relationships, organization and resources, authority, accountability and responsibility of the Program Manager for Avionics. Finally, the study reports on the actions that have taken place implementing the Program Manager for Avionics, and identifies actions that still need to be done with the author's recommendations for areas of further improvement. GRA

N77-32962# Defense Systems Management School, Fort Belvoir, Va.
THE ROLE OF OPERATIONAL TEST AND EVALUATION IN THE AIR FORCE AIRCRAFT ACQUISITION PROCESS
Michael John Butchko May 1977 60 p refs
(AD-A042774) Avail: NTIS HC A04/MF A01 CSCL 05/1

The purpose of this report was to assess the current role of operational test and evaluation (OT and E) and the Air Force Test and Evaluation Center (AFTEC) in the AF aircraft acquisition process. Additionally, it was intended to provide recommendations to the program manager (PM) on ways to ensure adequate coverage of OT and E requirements in his program. A trace of the OT and E policy in DOD and AF from 1970 until 1976

leads to an analysis of the new DOD draft Test and Evaluation Directive 5000.3, dated 7 March 77. This revision to DOD T and E policy emphasizes earlier operator involvement and combined development and operational testing in the acquisition process. A series of interviews with DOD and AF officials was used to compare the current perceptions of the role and effectiveness of IOT and E and AFTEC. The AFTEC view of itself is compared with the other viewpoints expressed in the interviews. Finally, the paper makes recommendations to the PM as to how he can better ensure that he includes all valid operational requirements in his test program. The areas covered are establishing the baseline, organizing and planning with primary emphasis on the latter. GRA

N77-32963# Army War Coll., Carlisle Barracks, Pa.
MANAGEMENT OF RESEARCH AND DEVELOPMENT FOR ELECTRONIC SYSTEMS
George L. Wooley 3 Jun. 1977 76 p refs
(AD-A042859) Avail: NTIS HC A05/MF A01 CSCL 05/1

The intent of this investigative research effort was to perform a critical appraisal of the Department of Defense technological innovation process in the light of recent research in private industry technological innovation. The study focuses specifically on Research and Development and technological innovations for electronic systems. The focus is directed toward electronic systems because of the thesis that electronic technology is progressing rapidly enough to make the life span of technologies less than the optimum DOD system acquisition cycle time. The study concludes that more DOD electronic systems will be fielded with obsolete computer subsystems unless changes are made in the military R and D approaches. The first recommendation is that Department of Defense establish a program of joint service evaluation of competing technologies as part of electronic systems development projects. The study also recommends the establishing of a more meaningful incentive program for government and contractor personnel that is unique to technological innovation. GRA

N77-32964# Defense Systems Management School, Fort Belvoir, Va.
ACQUIRING AFFORDABLE WEAPONS SYSTEMS
Robert A. Singer May 1977 89 p
(AD-A042777) Avail: NTIS HC A05/MF A01 CSCL 15/3

This project attempts to examine the approaches being taken to reduce the O and S cost implications of systems being acquired, and to examine the potential effectiveness of these approaches. The project was conducted by interviewing key people within OSD and the Services currently participating in outyear cost management, by researching recent available literature on the subject, and by integrating the results into a capsule summary and evaluation of current activities. A series of efforts are ongoing. New draft management directives have been prepared in OSD and the Services aimed at infusing affordability considerations more heavily throughout the acquisition process. O and S cost data banks are being constructed by the Services to provide weapon system and subsystem cost visibility. Innovative procurement procedures and affordability management techniques are being used successfully on some new system acquisitions. Considerably more effort is required before more affordable weapons systems become a reality. This includes integration and increasing responsiveness of diverse organizational units, improvements in cost estimation, building of a suitably detailed cost data base, joint consideration of logistics support, manpower planning with design variables, and development of a more rigorous affordability discipline. GRA

N77-32965# Defense Systems Management School, Fort Belvoir, Va.
MILESTONE ZERO: ITS CHANGES ON THE AIR FORCE ACQUISITION PROCESS
Larry R. Gross May 1977 40 p refs
(AD-A042770) Avail: NTIS HC A03/MF A01 CSCL 05/1

This project examines the changes caused by the addition of milestone-0 to the weapon system acquisition process, particularly with respect to the activities leading to a program initiation decision. Since the Air Force has not issued directives to implement this new DoD policy, the unresolved issues are examined. The author made a literature survey to obtain the background and historical focus of past concerns which eventually lead to the current policy; the results are summarized. In addition, structured interviews were conducted at DDRE, HQ USAF and HQ AFSC to obtain perspective on the intent of the new policy as well as insight on methods to implement it. As a result, this report provides some criteria which the Secretary of the Air Force could use in recommending that a major program be initiated. A possible set of mission areas is presented which could be the basis for mission area analyses. Finally, changes to the existing requirements documentation process are offered. GRA

N77-32966# Defense Systems Management School, Fort Belvoir, Va.
MANAGING TOTAL ACQUISITION TIME: A NEW PRIORITY FOR MAJOR WEAPON SYSTEMS
James B. Lincoln May 1977 33 p refs
(AD-A043164) Avail: NTIS HC A03/MF A01 CSCL 15/5

The report analyzes the background and evolutionary changes that led to the current weapons acquisition management environment that emphasizes cost controls over all other management controls. The resulting lack of emphasis on time has brought about significant increases in total acquisition time for major systems. Specific causes of increased acquisition time have been lengthy decision processes, contracting procedures and other indirect factors such as economic conditions and multinational considerations. Current conditions of rapidly advancing state of the art and improving enemy capabilities point out the need for reduced, not increased, acquisition time, from inception to operational capability. Author (GRA)

N77-32970# National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, Bethesda, Md.
DISCLOSURE OF RESEARCH INFORMATION UNDER THE FREEDOM OF INFORMATION ACT: REPORT AND RECOMMENDATIONS Final Report
Apr. 1977 55 p
(PB-268105/4; NCPHS/M-77/16) Avail: NTIS HC A04/MF A01 CSCL 05A

Two recommendations to Congress proposed by the National Commission for the Protection of Human Subjects for legislation to govern the release of information contained in research protocols, designs, and hypotheses are presented. Issues discussed include the interests for and against disclosure of research information and opening of meetings, and the investigation of requests for disclosure of information. GRA

N77-32996# Public Technology, Inc., Washington, D. C.
TRANSIT SYSTEM PRODUCTIVITY. AN INFORMATION BULLETIN OF THE TRANSPORTATION TASK FORCE OF THE URBAN CONSORTIUM FOR TECHNOLOGY INITIATIVES Final Report
Alinda C. Burke, Beth I. French, David J. Pearl, and Katherine A. Perry Mar. 1977 36 p
(Contract DOT-OS-60076)
(PB-268593/1; DOT/TST-77-8) Avail: NTIS HC A03/MF A01 CSCL 13B

An overview of issues and problems associated with transit productivity, indicators and techniques for its measurement, institutional perspectives, maintenance, organizational impacts, and purchasing is presented. A summary of DOT programs and contacts in this area, as well as an extensive annotated bibliography are included. GRA

N77-33001# American Society of Association Executives, Washington, D. C.
TECHNOLOGICAL OBJECTIVES AND FEDERAL POLICY, VOLUMES 1 AND 2
Jul. 1976 91 p refs
(Grant NSF APR-74-02152)
(PB-267971/0; NSF/RA-760568) Avail: NTIS HC A05/MF A01 CSCL 05A

Trade association executives representing a broad spectrum of industries were surveyed to determine what barriers, or

constraints retard or frustrate innovation and what policies or actions by the Federal Government, including actions requiring the cooperation of government, industry and other institutions, might enhance the development and utilization of new technologies in order to provide profitable and socially desirable products and services. Data obtained from the survey are analyzed and combined with workshop comments to form the basis for policy recommendations. Statistical data and a technical discussion of the methodology used are included. Findings involve profiles of characteristics of industries, technical objectives, constraints, and policy options. GRA

N77-33101# Boeing Vertol Co., Philadelphia, Pa.
PRODUCT IMPROVEMENT PROGRAM EVALUATION Final Report, 17 May 1976 - 17 Feb. 1977
Stephen J. Blewitt Jun. 1977 118 p refs
(DA Proj. 1F2-62209-AH-76)
(AD-A042134; D210-11146-2; USAAMRDL-TR-77-17) Avail: NTIS HC A06/MF A01 CSCL 01/3

This report presents the results of a study to develop an analysis technique for evaluating the cost and operational effectiveness of potential aircraft modifications that affect reliability and maintainability. Author (GRA)

N77-33238*# McDonnell-Douglas Astronautics Co., Huntington Beach, Calif.
SPACE STATION SYSTEMS ANALYSIS STUDY. PART 3: DOCUMENTATION. VOLUME 4: SUPPORTING RESEARCH AND TECHNOLOGY REPORT
Jul. 1977 81 p
(Contract NAS9-14958)
(NASA-CR-151521; MDC-G6922-Pt-3-Vol-4) Avail: NTIS HC A05/MF A01 CSCL 22A

A brief description of recommended supporting research and technology items resulting from the space station analysis study is provided. Descriptions include the title; the status with respect to the state of the art; the justification; the technical plan including objectives and technical approach; resource requirements categorized by manpower, specialized facilities, and funding in 1977 dollars; and also the target schedule. The goal is to provide high confidence in the solutions for the various functional system development problems, and to do so within a time period compatible with the overall evolutionary space construction base schedule. Author

N77-33239*# McDonnell-Douglas Astronautics Co., Huntington Beach, Calif.
SPACE STATION SYSTEMS ANALYSIS STUDY. PART 3: DOCUMENTATION. VOLUME 5: COST AND SCHEDULE DATA
Jul. 1977 96 p refs
(Contract NAS9-14958)
(NASA-CR-151520; MDC-G6922-Pt-3-Vol-5) Avail: NTIS HC A05/MF A01 CSCL 22A

Cost estimates for the space station systems analysis were recorded. Space construction base costs and characteristics were cited as well as mission hardware costs and characteristics. Also delineated were cost ground rules, the program schedule, and a detail cost estimate and funding distribution. Author

N77-33249*# Planning Systems and Sciences Co., Irvine, Calif.
NEW MODEL FRAMEWORK AND STRUCTURE AND THE COMMONALITY EVALUATION MODEL Final Report
26 Aug. 1977 145 p refs Prepared for JPL
(Contracts NAS7-100; JPL-954681)
(NASA-CR-155157; P21-R-001) Avail: NTIS HC A07/MF A01 CSCL 22A

The development of a framework and structure for shuttle era unmanned spacecraft projects and the development of a commonality evaluation model is documented. The methodology developed for model utilization in performing cost trades and comparative evaluations for commonality studies is discussed. The model framework consists of categories of activities associated with the spacecraft system's development process. The model structure describes the physical elements to be treated as separate identifiable entities. Cost estimating relationships for subsystem and program-level components were calculated. Author

N77-33381# Stanford Research Inst., Menlo Park, Calif. Transportation Center.
EVALUATION METHODOLOGY FOR FEDERAL MOTOR VEHICLE SAFETY STANDARDS. VOLUME 1: EXECUTIVE SUMMARY
R. L. Braun, R. H. Cronin, N. A. David, A. V. Fend, and J. R. Norman May 1977 29 p
(Contract DOT-HS-6-01519)
(PB-266936/4; DOT-802340-Vol-1) Avail: NTIS HC A03/MF A01 CSCL 13F

The results of a six month study to determine feasibility and appropriate evaluation schemes in a real world environment for four Federal motor vehicle safety standards are summarized: (1) fuel integrity; (2) occupant protection; (3) side door strength; and (4) exterior protection. Based on a review of the literature, background material, specifications, compliance tests, and available evaluation methodologies, feasibility was established for the evaluation of three safety standards. Within an augmented National crash severity study program, detailed evaluation plans for motor vehicle safety standards are described and recommended. GRA

N77-33382# Stanford Research Inst., Menlo Park, Calif.
EVALUATION METHODOLOGY FOR FEDERAL MOTOR VEHICLE SAFETY STANDARDS. VOLUME 2: TECHNICAL FINDINGS Final Report, 1 Sep. 1976 - 31 Mar. 1977
R. L. Braun, R. H. Cronin, N. A. David, A. V. Fend, and J. R. Norman May 1977 212 p refs
(Contract DOT-HS-6-01519)
(PB-266937/2; DOT-HS-802341-Vol-2) Avail: NTIS HC A10/MF A01 CSCL 13F

Overall study details are described and a thorough discussion of the evaluation plan developed for four federal motor vehicle safety standards is presented. After a statement of the problem and a description of each standard, applicable technical factors are discussed, alternative evaluation methodologies are reviewed and assessed, the recommended evaluation study design is presented, and finally a plan for implementing the evaluation is provided. GRA

N77-33384# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
SAFETY INFORMATION SYSTEM GUIDE
M. G. Bullock Mar. 1977 72 p refs
(Contract EY-76-C-07-1570)
(ERDA-76-45/9; SSDC-9) Avail: NTIS HC A04/MF A01

Guidelines for the design and evaluation of a working safety information system are presented. General design and evaluation requirements were established. Implementation and design of the data collection system are described with emphasis on the data base, and quick response systems. Hazard identification information was established. B.B.

N77-33664# Federal Energy Administration, Washington, D. C. Office of Coal, Nuclear and Electric Power Analysis.
SOLAR COLLECTOR MANUFACTURING ACTIVITY Semiannual Report, Jul. - Dec. 1976
Richard D. Stoll Apr. 1977 27 p
(PB-266985/1; FEA/B-77/135) Avail: NTIS HC A03/MF A01 CSCL 10A

A survey of private firms that have manufactured and sold solar collectors during the second half of calendar year 1976 was conducted for the purpose of obtaining descriptive statistics on economic activity in the solar heating and cooling area and identifying production growth in this industry. Results show that production during the second half of 1976 was 73 percent greater than during the first half of 1976; total production for 1976 was 168 percent greater than that of 1975. GRA

N77-34030# Perceptronics, Inc., Woodland Hills, Calif.
AN INTERACTIVE COMPUTER AIDING SYSTEM FOR GROUP DECISION MAKING

Steven Levin, Antonio Leal, and Joseph Saleh 27 Jun. 1977 112 p refs
(Contract MDA903-77-C-0184; ARPA Order 3344)
(AD-A041758; PQTR-1046-77-6) Avail: NTIS HC A06/MF A01 CSCL 09/2

This report describes progress on work centered on the demonstration of an interactive computer aid for group decision making. The report includes: (1) a preliminary description of the problem scenario that will be used in evaluating the aiding system, (2) the group/machine procedures and dialogues, (3) key algorithms in the elicitation program, (4) progress in installing and integrating computing and display resources. The next phase of the program will concentrate on the systems implementation and experimental evaluation. Author (GRA)

N77-34031# Michigan Univ., Ann Arbor.
INDUSTRIAL PRODUCTIVITY WORKSHOP EXECUTIVE SUMMARY
1 Mar. 1974 52 p Conf. held at Airlie, Virginia, 4-5 Feb. 1974
(Grant NSF GI-39924)
(PB-267299/6; NSF/RA/S-74-046) Avail: NTIS HC A04/MF A01 CSCL 05A

A closed workshop was held to solicit from industrial leaders an assessment of research required to enhance industrial productivity. Industries selected for study in the workshop were: (1) automotive; (2) electrical machinery; (3) machine tool; (4) household appliances; (5) food processing; (6) iron and steel. Productivity problems were assessed from the standpoint of their researchability with consideration being given to problem definition, quantification, measurement, and correlation of data necessary for scientific efforts. GRA

N77-34032# Naval Postgraduate School, Monterey, Calif.
AN APPLICATION OF MARKOVIAN CHAINS IN MANPOWER PLANNING M.S. Thesis
Rashad Abdulmohymen Abu-Alsamh Jun. 1977 67 p refs
(AD-A042304) Avail: NTIS HC A04/MF A01 CSCL 12/1

This thesis investigates the long run implications of short term policy making decisions. Manpower modeling techniques based on Markovian chains are applied to a small fast growing Navy organization. An interactive model is designed here to simulate policy changes and illustrate the interaction between flows, promotions and stocks, relative to a stable set of policy parameters over a period of time. Training and budget planning are addressed in some detail with a focus of the civilian population within the organization. Because real data is not available, the numerical examples are based on hypothetical data. The examples are presented to give the reader a feeling for how the model simulates various policy alternatives. Author (GRA)

N77-34033# Defense Systems Management School, Fort Belvoir, Va.
MAJOR SYSTEM ACQUISITION: IS A SEPARATE SPARES CONTRACT BETTER
Louis Keith Dumas May 1977 48 p refs
(AD-A042775) Avail: NTIS HC A03/MF A01 CSCL 15/5

This study seeks to focus attention on the support investment aspect of the weapon system acquisition process and to examine current views on the use of a separate spares contract for the initial provisioning and acquisition of spare/repair parts. The author contrasts historical and current approaches to contracting for initial spare/repair parts in support of aircraft acquisition programs. Historically, spare/repair parts have been provisioned by use of support element contract line items contained in the system production contract. Recently, separate spares contracts have been used to acquire spare/repair parts for major weapon systems such as the F-15, A-10, AWACS and the F-16. The purpose of this study is to describe differences between end item and spares line item relationships on conventional system contracts and separate spares contracts. The study reviews problems anticipated and encountered in contract separation, and reports current comments and evaluations regarding the effectiveness of separate spares contracts in achieving desired benefits. GRA

N77-34034# Defense Systems Management School, Fort Belvoir, Va.
IMPACT OF COMPETITIVE PROCUREMENT ON CONFIGURATION CONTROL
Fred Garza, Jr. May 1977 42 p refs
(AD-A042876) Avail: NTIS HC A03/MF A01 CSCL 05/1

This report seeks to provide insight into the configuration control problems that can occur after a competitive procurement. The author discusses the configuration control problems experienced by the 5-in./54 MK-45 Lightweight Gun System Program Office as a result of a competitive procurement. Specifically the problem areas include: Configuration identification, Change control and Configuration status accounting. The configuration control procedures formulated and implemented to correct the problems identified are also discussed. The report concludes with the lessons learned and makes appropriate recommendations. The lessons learned were that competitive procurement: (1) can have a significant impact on program configuration control; (2) impacts the production baseline; and (3) affects change control procedures and configuration status accounting. GRA

N77-34044*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
A PREDICTION MODEL TO FORECAST THE COST IMPACT FROM A BREAK IN THE PRODUCTION SCHEDULE
Leon M. Delionback Sep. 1977 37 p refs
(NASA-TM-78131) Avail: NTIS HC A03/MF A01 CSCL 05C

The losses which are experienced after a break or stoppage in sequence of a production cycle portend an extremely complex situation and involve numerous variables, some of uncertain quantity and quality. There are no discrete formulas to define the losses during a gap in production. The techniques which are employed are therefore related to a prediction or forecast of the losses that take place, based on the conditions which exist in the production environment. Such parameters as learning curve slope, number of predecessor units, and length of time the production sequence is halted are utilized in formulating a prediction model. The pertinent current publications related to this subject are few in number, but are reviewed to provide an understanding of the problem. Example problems are illustrated together with appropriate trend curves to show the approach. Solved problems are also given to show the application of the models to actual cases or production breaks in the real world. Author

N77-34047# National Bureau of Standards, Washington, D. C. Experimental Technology Incentives Program.
LIFE CYCLE COSTING: CASE STUDIES Final Report
1 May 1977 112 p Prepared by General Services Admin., Federal Service Supply, and Logistics Management Inst., Washington, D.C.
(PB-268182/5; NBS-GCR-ETIP-77-37) Avail: NTIS HC A06/MF A01 CSCL 15E

The use of life cycle cost procurements of window air conditioners, water heaters, refrigerator-freezers, and high-speed printer ribbons made by the Federal Supply Service (FSS), General Services Administration (GSA) was studied. These procurements were part of a program instituted by FSS to apply life cycle costing techniques to its procurement process. Details concerning the screening process used in selecting the products, the preparation of the invitation for bid document, the bids received and the evaluation, analysis and award process were covered. GRA

N77-34062# Integrated Enterprises, Inc., Huntsville, Ala.
APPROPRIATE TECHNOLOGY: A DIRECTORY OF ACTIVITIES AND PROJECTS
1977 75 p
(Grant NSF ERS-76-21350)
(PB-267970/2; NSF/RA-770064) Avail: NTIS HC A04/MF A01 CSCL 13B

A directory of United States activities in technology that incorporates a concern for maintenance of the ecological balance by increasing the use of renewable resources, extending recycling and diminishing waste, and fostering the resource independence of local areas is presented. The field was surveyed to learn

from individuals and groups about the scope of their activities, the legal and technical problems they are facing in moving from idea to application, and their recommendations for federal activity in support of appropriate technology. The directory is, in part, a compilation of the descriptions of activities of the survey respondents. GRA

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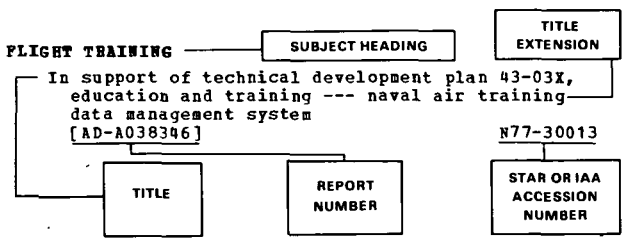

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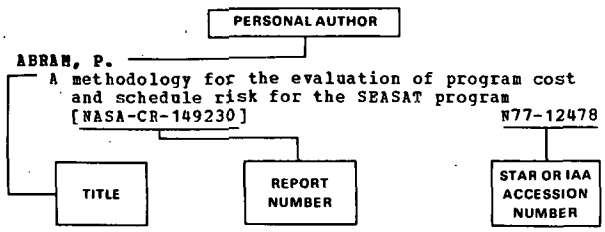
Typical Personal Author Index Listing



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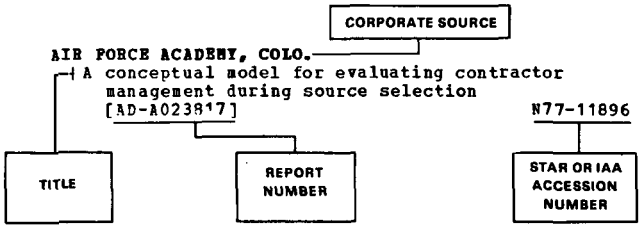

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