

Defense Standardization Program Journal

April/June 2013



Standardization Stars

- New Standardized Armor Materials
- New Military Coatings
- New NATO STANAG
- The FACE Technical Standard
- A Lower Concentration of FSII in JP-8
- New Adapter Fittings



- 1 Director's Forum**
3 New Standardized Armor Materials Cut Costs and Improve Safety



- 11 New Military Coatings Enhance the Durability of DoD Assets**
18 New NATO STANAG Addresses Retrograde of Materiel
24 The FACE Technical Standard Enables a Common Operating Environment
31 A Lower Concentration of FSII in JP-8 Reduces Procurement Costs
38 New Adapter Fittings Dramatically Reduce Leaks



Departments

45 Program News 46 Events 48 People

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Director's Forum



Each year, we recognize individuals and teams who, through their standardization efforts, have significantly improved technical performance, increased operational readiness, enhanced safety, or reduced costs.

Individuals and teams are nominated for standardization awards. For FY12, we identified six as being particularly deserving of recognition. Through their efforts, sometimes taking several years, the six winners have played an integral part in keeping our men and women in uniform safe and in providing them the tools they need to get the job done.

The winners are as follows:

- Army team from the Weapons and Materials Research Directorate at the U.S. Army Research Laboratory (ARL), for developing three stringent specifications incorporating new, high-performing composite armor materials for use on armored vehicles and platforms.
- Army team from ARL, for developing, validating, and implementing (through 10 specifications) a suite of superior coating products, for use on all DoD tactical equipment, that enhance durability and are environmentally friendly.
- Thomas Kozlowski, from the Packaging, Storage, and Containerization Center at the U.S. Army Materiel Command, Logistics Support Activity, for improving and harmonizing the retrograde processes used by NATO nations supporting coalition operations.
- Navy-led team, for developing the technical standard for an open architecture initiative—Future Airborne Capability



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Environment—to establish a common operating environment that can support portable software components across multiple DoD aviation platforms.

- Air Force team, for determining that the concentration of Fuel System Icing Inhibitor (FSII) in JP-8 aviation fuel could be lowered 32 percent without affecting airworthiness, but significantly reducing procurement costs and the number of incidents of fuel tank top-coat peeling (caused by FSII).
- Team from Defense Logistics Agency Land and Maritime, for developing two new families of military specifications and one new family of non-government standards. These documents represent a major infusion of new spherical technology into the mechanical connector stock class, Federal Supply Class 4730.

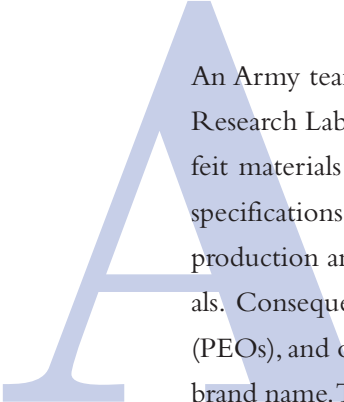
Congratulations to all of our award winners. I know that DoD leadership appreciates your work. These awards help call attention to the significant contributions that standards and standardization make to supporting our men and women in uniform, helping to multiply capability through interoperability, and saving money for the taxpayer.

Standards and standardization link common solutions to common problems across all services and frequently across nations. This issue of the DSP Journal showcases the accomplishments of the FY12 award winners. I hope that reading about their accomplishments will pique your interest and might even inspire you to submit an award nomination on the good work you are doing in standardization.

New Standardized Armor Materials Cut Costs and Improve Safety

Award Winner: Army Team





An Army team from the Weapons and Materials Research Directorate at the U.S. Army Research Laboratory (ARL) led an effort to reduce the possibility of inferior or counterfeit materials being used on armored vehicles and platforms. The reliance on outdated specifications using obsolete or inadequate manufacturing technologies was hindering production and could have limited the use of newly developed composite armor materials. Consequently, armor designers, program managers (PMs), program executive offices (PEOs), and original equipment manufacturers (OEMs) ordered armor materials by their brand name. The Army has made a considerable investment in the evaluation and qualification of vehicle designs using these materials. However, procurement specialists lack the expertise to determine if one material can be substituted for another or if variants of identical material from another manufacturer will function equivalently. As a result, past procurements introduced materials into the supply chain that were imitations of the actual design materials, with negative implications on vehicle performance. The solution was to develop stringent detailed specifications. By utilizing the specifications on 5,000 Army and Marine Corps Mine Resistant Ambush Protected (MRAP) vehicles, plus perhaps 45,000 future vehicles, the military could realize cost savings on the order of \$50 million. In addition, use of the proper materials has an unquantifiable value in terms of reduced deaths and injuries.

Background

Many companies began developing what they thought were improved armor materials and wanted the government to procure and incorporate them into the current and future fleet. These companies began offering brand-name materials known as Shield-Strand® S, Goldshield-2016, ThermoBallistic® A, Tensylon®-09A, Spectrashield-II SR3124, and Dyneema-HB26. Future or variant materials include Goldflex; Goldshield-20182112; Spectrashield-SR1214/SR3136; Dyneema® HB30, HB50, and HB80; Tegrin 4600/1400/4000; and ThermoBallistic S&E. The ballistic performance of these materials showed great promise, so the government designed armor packages with these new materials. Since the onset of Operation Iraqi Freedom, more than 4,000 tests were conducted and more than 1,500 rocket-propelled grenades were shot to ensure armor system durability. To protect the investment of many millions of dollars spent on laminated armor already in the design database, the suitable commercial materials that would best protect soldiers had to be specified more clearly.

Problem/Opportunity

Although the new armor materials showed superior performance, production lot-to-lot variations and environmental effects were largely unknown. Therefore, the government

needed to develop various acceptance criteria. Another problem was that many of the variants offered did not perform equivalently when used on armored vehicle platforms. A means of differentiating among the variants and identifying the minimum acceptable properties was lacking. Also, due to the procurement system's lack of expertise on armor materials, substitute materials with inferior properties were being purchased for future systems. To address those problems, the Army team undertook an effort to develop or revise the armor specifications.

Approach

At the outset of the project, the Army team established a multistep process to be used on all new products or materials that will be added to new or existing specifications:

- Obtain a written endorsement from a sponsor (PM, PEO, or OEM) that has an ongoing or future military platform in production now (or in the near future) or repair. Specifically, before developing or revising armor specifications to include a particular product or material, it is required that the manufacturer obtain the endorsement from a sponsor that has indicated that it will utilize the material if it passes all the full-scale tests. Funding from the sponsor or the manufacturer must be made available for all the full-scale testing, including ballistics, flammability, structural capacity, toxicity, chemical compatibility, thermal stability, and material properties for a specific explosively formed penetrator (EFP) application. Once accepted, specification funds are used to develop the accept/reject criteria that will be listed in the specification.
- Define/detail all the specific requirements for each material. To accomplish this, the team met with industry personnel to obtain details about the new and improved materials. The team needed each manufacturer to specify its material design requirements in as much detail as possible to prevent the inclusion of imitation, counterfeit, or inferior materials in any government contracts or purchase orders. The use of such materials can have a high cost. For example, a contractor tried to use Chinese fiberglass in the fill/weft direction to hybridize with MIL-DTL-65154B-related fibers. The contractor was able to reduce its costs by about 43 percent, while maintaining its selling price and increasing its profit margin. However, the overall performance of the fabric was reduced by up to 20 percent. Due to the specific detailed requirements in the specification, this attempt to use inferior materials was identified and the material was rejected.
- Develop bench-level quality assurance tests, including accept/reject criteria, for ballistic acceptance, minimum mechanical properties, chemistries, intermediate forms of materials (prior to molding), etc. The purpose of these tests is to evaluate the materi-

als, independent of the manufacturer, for performance, durability, toxicity, flammability, compatibility, longevity, and acceptability.

■ Write or revise three armor specifications, coordinate the drafts for comments, and finalize the specifications. The team wrote each document to include new classifications, as well as the testing and acceptance requirements for each new class and type. The three specifications are as follows:

- ❖ MIL-DTL-64154B, “Laminate: Fiberglass-Fabric-Reinforced, Phenolic,” Amendment 1, January 2012
- ❖ MIL-DTL-32378, “Laminate: Unidirectional, Reinforced, Cross-Plied, Aramid Fiber, Plastic Armor Material,” April 2012
- ❖ MIL-DTL-32398, “Laminate: Cross-Plied Ultra-High Molecular Weight Polyethylene (UHMWPE) Unidirectional Reinforced Plastic Armor,” May 2013.

MIL-DTL-64154B Amendment 1

The team added Amendment 1 to Revision B of MIL-DTL-64154 to include a new material from Owens Corning named ShieldStrand® S. The amendment allows an alternate source of high-performance glass fiber (Owens Corning ShieldStrand® S fabric) that can be used in armor designs for EFP kits and spall liners. The fabric was introduced following an MRAP production that had encountered shortages of the similar Class A material known as S-2 fiberglass, manufactured by AGY.

In accordance with the above-mentioned approach, Owens Corning, in coordination with the OEM (Navistar) and the Joint Program Office MRAP, arranged to have full-scale improvised explosive device (IED) testing with this new variant of glass phenolic armor material. Upon successful validation, the Army team amended the specification to include the material as a separate class, which could then be selected for future vehicle or kit production. The team also added an appendix on testing thermal shock.

The Army team coordinated the draft for comments and performed all the required administrative duties. Among other tasks, the team collected ballistic and mechanical properties of newer material samples and conducted independent tests in ARL laboratories to confirm the claimed properties.

This new class of material will be used primarily on MaxxPro Plus MRAP vehicles. Another potential platform is Lockheed Martin’s Littoral Combat Ship. In addition, two OEMs—Navistar and General Dynamics Land Systems—Force Protection, Inc. (FPI)—have indicated that they will use this material for replacement parts for currently fielded vehicles and for new production vehicles.

MIL-DTL-32378

This specification incorporates Honeywell's Goldshield-2016 (Class A) and Polystrand's ThermoBallistic A (Class B). Both classes of these distinctly different materials were used in earlier expedient MRAP armor evaluations by both the government (ARL) and industry (OEMs). Several armor recipes using these particular materials were identified and the designs validated. Any of these validated designs may be selected for future vehicles without repeating the expensive and time-consuming full-scale testing, as long as the hull configuration and threat specification are identical, in other words, as long as the same materials used in the tests are used in the future armor assemblies. The specification helps to ensure this will happen. The specification also introduced requirements for thermal shock resistance as a means of ensuring some level of durability for this relatively new class of materials. Some recent experience with thermoplastic matrix laminates used on some current vehicles suggests that delamination, blistering, and mechanical fatigue on this class of materials may degrade the ballistic performance over time, especially through exposure to thermal cycling. Because of thickness growth, especially on cut edges, as well as the potential for water absorption over time at these same edges, the team included requirements for edge treatments on the finished laminates. These requirements were adapted from the earlier phenolic-based specifications that have provided very durable composite materials over the past 30 years of use as spall liners in combat vehicles.

These new materials offer increased armor mass efficiency compared to older armor laminate specifications, such as MIL-DTL-62474, "Laminate Aramid-Fabric-Reinforced Plastic," and MIL-DTL-64154, "Laminate Fiberglass-Fabric-Reinforced Phenolic." As vehicle components, these legacy materials are subjected to many additional requirements for fitness in end use and have proven to provide durable protection in a variety of vehicle armor applications.

The team met with the manufacturers of all the classes of material and requested detailed descriptions and requirements so it could precisely document each material. The goal was to ensure that no other material would be able to pass all the tests and be substituted as a candidate material. In other words, stringent requirements ensure that the purchased product will indeed be the same as the brand name material tested in the original full-scale system evaluations.

These cross-ply reinforced plastic armor materials will be used on IMG's MAX Pro and on multiple BAE vehicles, such as the Caiman, MRAP All-Terrain Vehicle, Heavy Expanded Mobility Tactical Truck demonstrator, Heavy Equipment Transporter (HET), Stryker, and Family of Medium Tactical Vehicles demonstrator.

MIL-DTL-32398

This specification defines three relatively new armor materials: BAE's Tensylon® Gen II or HTBD-09A, which was purchased by DuPont and redesigned as Tensylon® HSBD-30A (Class A); Honeywell's Spectrashield II-SR3124 (Class B); and DSM's Dyneema HB26 (Class C). The organic matrices of the three materials use different chemistries, and the fibers, although of similar UHMWPE molecular makeup, have different crystal structures and mechanical properties. The materials also differ with respect to ballistic performance. The three materials cannot be used interchangeably in any armor design.

All have been evaluated in full-scale armor designs, and some have been validated, procured, and implemented on actual vehicles. The specification will preclude the substitution of a lower performance variant, which often is cheaper, for a higher performance product that was used in the validation tests. It will limit counterfeit materials that fail to meet any of the detailed requirements.

The UHMWPE reinforcement materials have the same issues as the aramid unidirectional materials (MIL-DTL-32378).

As it did for MIL-DTL-32378, the team met with the manufacturers of all the classes of UHMWPE material and requested detailed descriptions and requirements so it could precisely document each material. The goal was to ensure that no other material would be able to pass all the tests and be substituted as a candidate material. Again, stringent requirements ensure that the purchased product will be the same as the brand name material tested in the original full-scale system evaluations.

Outcome

The products covered by the three specifications apply to many systems across the services. Having these specifications available allows both the government (U.S. Army Tank Automotive Research, Development and Engineering Center and U.S. Army Tank-Automotive and Armaments Command) and industry (OEMs like Oshkosh, General Dynamics, BAE, FPI, and IMG) to order specific panel materials with controls in place to ensure that troop survivability would be provided at the same level as was qualified during government testing.

Ballistic laminates (MIL-DTL-64154B) have been recently applied to the outside and inside portions of the structural hulls of tactical vehicles now used in theaters of operation. Quality assurance parameters are defined within the specifications and are easily adapted to the purchase documents. Approximately 500 external vehicle kits were produced for the M1114/M1151 vehicles, which increased their survivability and reduced warfighter injuries and deaths.

The laminated armor materials used on MRAP vehicles were either “S” or “R” glass fiber reinforced/phenolic or laminated aramid/polyvinyl butyral phenolic systems. ARL qualified IED protection on many variants of these vehicles for up to six manufacturers. More than 10,000 MRAP vehicles were manufactured, of which perhaps 30 percent included external IED kits built with composite materials called out in two of the specifications. At one point in MRAP production, approximately 100,000 pounds per month of both aramid and high-strength glass laminates were being consumed. Over a million pounds of these materials have been implemented in theater. Heavy tactical vehicles, including the Oshkosh® HET A1 and M915/M916 Line Hauler, have had IED kits qualified and have gone through differing levels of system evaluation.

Users and designers can now order these materials for the immediate procurement of armor materials for both repair or replacement programs for legacy vehicles: M1114, M1151, Stryker, Expeditionary Fighting Vehicle, Armored Security Vehicle, MRAP-I and MRAP-II vehicles, Armored Multi-Purpose Vehicle, Amphibious Combat Vehicle, Marine Personnel Carrier, Joint Light Tactical Vehicle, and Ground Combat Vehicle.

Current Status

The revision of the three highly utilized armor specifications is complete. The new classes at least double the amount of materials available and better reflect current industrial practices. This ensures that the Army can get an adequate supply of high-quality composite armor that is produced by the most effective processing available today. Implementation of the products specified in these specifications is ongoing. It is likely that the existing external kits will be mounted on other legacy or future vehicles.

Now that material specifications are ready for immediate production, the reduction of imitations and substitute/counterfeit materials is enabled. The specifications will be modified further as these products evolve within the armor materials industry. Additional specifications are being developed to define even newer materials—like polypropylene, glass fiber unidirectionally reinforced plastic armor, and structural glass fiber—being produced by industry (Honeywell, DuPont, Polystrand, Milliken, etc.).

Challenges

The class of material added to MIL-DTL-64154B via Amendment 1 required full-scale testing, in accordance with our specified approach. The purpose of the testing was to characterize the material and to determine whether it met all the full-scale requirements, including ballistic performance, flammability, and toxicity limits. Additional funding was needed to carry out the testing. The cost of testing (about \$185,000, including material) was incurred by the manufacturer, Owens Corning. The testing, plus our requirement

for a sponsor to sign off on the product, ensured that the product could be produced and utilized on production platforms.

Publication of MIL-DTL-32398 was delayed, for two reasons:

■ *DuPont's purchase of the Tensylon business from BAE.* Although DuPont's purchase of Tensylon® Gen II or HTBD-09A did not in itself cause any delays in the publication of MIL-DTL-32398, the situation changed when DuPont informed the team that it changed part of the processing of Tensylon, which, in turn, changed some of the material's properties. DuPont renamed the redesigned material Tensylon HSBD-30A. Although this new material had not been used in the validated designs, DuPont requested a waiver that the new material was equivalent to the older material. The team denied this request, primarily to avoid setting a precedent that material that had been validated but subsequently changed could be used without having to undergo full-scale testing. Therefore, as required by our specified approach, DuPont had to obtain a sponsor for its new Tensylon HSBD-30A product. General Dynamics Land Systems-Force Protection (FPI) became the sponsor for the new Tensylon HSBD-30A product. Full-scale testing of Tensylon HSBD-30A was initiated during November/December 2012, and the costs were incurred by the sponsor, FPI. The new Tensylon HSBD-30A material passed the required full-scale tests, allowing this material to be added to the specification.

■ *Late receipt of in house funding.*

These delays allowed the team to continue evaluating new quality assurance test methods for incorporation into the specification, as well as carrying out other tests to further document and detail the classes of material.

About the Award Winner

The Army team consisted of Richard Squillacioti and Brian Scott. Both team members held numerous meetings (including teleconferences) with all the manufacturers of the above-mentioned products—including weavers, molders, suppliers, and PMs—to obtain the detailed requirements for each of the materials in the specifications.

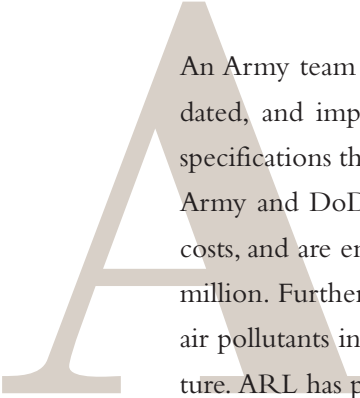
Richard Squillacioti, leader of the Specifications and Standards Office, led the standardization effort. He drafted the specifications, coordinated multiple drafts of each document, and addressed all comments received from various coordination reviews, which included writing the justifications for each document's modifications and documenting the implementation of the changes. Mr. Squillacioti also did all the statistical analysis required to develop the accept/reject criteria for ballistic acceptance for all three documents. In addition, he oversaw the final review and publication of the documents.

Brian Scott, a materials engineer, took the lead and was responsible for the technical aspects of the documents, including the creation of a distribution list of reviewers and potential users. Dr. Scott collected mechanical and ballistic data from the industry (material suppliers, etc.), performed ballistic confirmation testing, and worked with the industry to define optimum constructions for the newest materials. ✨

New Military Coatings Enhance the Durability of DoD Assets

Award Winner: Army Team





An Army team from the U.S. Army Research Laboratory (ARL) developed, validated, and implemented a suite of coating products through the revision of 10 specifications that affect weapons platforms and support equipment throughout the Army and DoD. The new coatings provide enhanced durability, reduce life-cycle costs, and are environmentally friendly, and they result in a cost avoidance of \$999 million. Furthermore, they eliminated an estimated 700,000 pounds of hazardous air pollutants in FY12 and will continue to do so each year for the foreseeable future. ARL has populated the qualified products database (QPD) for each specification and has supported the approval of nearly 1.2 million gallons of chemical agent resistant coating (CARC) for FY12 that go directly onto all DoD tactical equipment requiring CARC. CARC is the camouflage coating used on all Army and Marine Corps assets. This effort has enabled equipment manufacturers, depots, and painting facilities to maintain asset readiness by applying superior-quality coatings that meet federal and state regulatory requirements, while eliminating counterfeit and nonconforming paints through a rigorous validation and approval process. The scope and magnitude of this effort affects every piece of tactical equipment used by the Army, Marine Corps, and other services using these coatings and involves nearly 2 million gallons of paint for DoD use.

Background

ARL's CARC Commodity Office, which resides within the organic coatings team, is the research and development lead for the Army and the approving and validating authority for DoD with regard to CARCs, primers, ammunition coatings, and organic pretreatments. This responsibility includes preparing specifications and managing each associated qualified product list (QPL) and QPD, as stated in AR 750-1, "Army Materiel Maintenance Policy."

Problem/Opportunity

DoD needed coatings, for use in a variety of applications, that would meet current and upcoming national emission standards and, specifically, would eliminate volatile hazardous air pollutants (VOHAPs). At the same time, the coatings needed to meet all current specification requirements (such as infrared signature, low gloss, and corrosion resistance) to support the aircraft, ground vehicles, ammunition, and related support equipment that utilize these coatings. The ARL team took on this work. The scope was unprecedented, due to the technical complexity and large number of coatings to be validated and the inherent challenges of revising or rewriting the associated technical specifications to enable the implementation and direct access of the products by the user community.

Approach

To obtain funding, the team submitted five proposals to the DoD Corrosion Forum, Sustainable Painting Operations for the Total Army, and Strategic Environmental Research and Development Program. All five of the proposals were successful and enabled the team to establish a fully funded, multiyear effort to support the technical research, development, and validation of the products and to revise or rewrite the specifications. Once the funding was obtained, it was further leveraged through collaborations with the Marine Corps, Naval Air Systems Command (NAVAIR), General Services Administration, raw material suppliers, and paint vendors.

The effort involved multiple individuals who worked as a team to develop, formulate, and test new coatings and to revise or rewrite 10 specifications to capture the technical content and technology. The 10 specifications are as follows:

1. *MIL-P-14105E, "Paint, Heat-Resisting (for Steel Surfaces)," Revision E, November 2011.* This specification resulted in multiple samples being evaluated and tested to conformance of high heat exposure. The coatings are used on visible exhaust components and places where temperatures exceed 400°F. This effort resulted in approved products, assigned national stock numbers (NSNs), and improved performance and corrosion resistance. QPL-14105 for Revision E was completed in December 2011 and transformed into a QPD in February 2012.
2. *MIL-DTL-53030D, "Primer Coating, Epoxy, Water Based, Lead and Chromate Free," Revision D, December 2011.* This specification resulted in multiple samples being evaluated and tested with enhanced corrosion performance. The technology enhancement allowed ARL to increase the requirement by 300 percent, from 336 hours to 1,000 hours. This effort resulted in approved products, assigned NSNs, and improved performance and corrosion resistance.
3. *MIL-DTL-53022D, "Primer, Epoxy Coating, Corrosion Inhibiting Lead and Chromate Free," Revision E, January 2012.* Similar to the 53030 technology, this specification resulted in multiple samples being evaluated and tested with enhanced corrosion performance. The technology enhancement allowed ARL to increase the requirement by 300 percent, from 336 hours to 1,000 hours. This effort resulted in approved products, assigned NSNs, and improved performance and corrosion resistance.
4. *MIL-DTL-11195H, "Enamel, Lusterless, Fast Dry, Volatile Organic Content (VOC) Compliant (for Use on Ammunition and Other Metals)," Revision H, November 2011.* This specification was very demanding due to its rapid cure-time requirements and corrosion resistance needed for ammunition rounds. The work required attention to modifying the formulas without creating any potential residue after live-round firing. This was

successfully accomplished and the result was approved products, assigned NSNs, and improved performance and corrosion resistance for our munitions.

5. *MIL-DTL-64159B, "Camouflage Coating, Water Dispersible Aliphatic Polyurethane, Chemical Agent Resistant," Revision B, January 2011.* This coating is used on all aircraft, land vehicles, and related support equipment. It is ARL's camouflage topcoat in a water-dispersible version. ARL continues to update this specification with regard to colors being offered and new requirements being requested as new threats emerge. The impact included supporting non-VOHAP formulations, low solar-type pigmentation, and inclusion of recoat and adhesion requirements.
6. *MIL-DTL-53039, "Coating, Aliphatic Polyurethane, Single Component, Chemical Agent Resistant," Revision D, January 24, 2011, and Revision E (near completion).* Similar to the water-dispersible topcoat, this coating is used on all aircraft, land vehicles, and related support equipment. It is ARL's camouflage topcoat in a solvent-based version. ARL continues to update this specification with regard to colors being offered and new requirements being requested as new threats emerge. The impact included supporting non-VOHAP formulations, low solar-type pigmentation, and inclusion of recoat and adhesion requirements.
7. *MIL-DTL-53084, "Primer, Cathodic Electrodeposition, Chemical Agent Resistant," Revision B, February 2011.* This coating system is the base primer used for many military chassis and component parts. ARL eliminated all regulated solvents, and the corrosion requirements based on our technology development are 1,000 hours. This represents some of the highest corrosion-resistant technology and requirements. Like the other specifications, this effort resulted in approved products, assigned NSNs, and enhanced corrosion resistance.
8. *MIL-PRF-32348, "Powder Coating, Camouflage Chemical, Agent Resistant Systems," New, November 2010.* This new coating specification captures several technologies: interior and exterior primers, ammunition grade powder for munitions canisters, and CARC powder topcoats. ARL has been successful in populating all these types and is working with vendors to populate the CARC topcoat. The significant accomplishment is that the technology has zero solvent content. It represents the best technology for corrosion resistance: Type I and Type II have a 1,500-hour and 3,000-hour requirement for steel and aluminum substrates, respectively, while the first-generation technology had only a 336-hour requirement. This effort resulted in approved products, assigned NSNs, and enhanced corrosion resistance.
9. *MIL-PRF-22750, "Coating, Epoxy, High-Solids," Revision G, September 2011.* This specification was transferred to ARL, in coordination with NAVAIR, to permit ARL to retain NAVAIR Type I and introduce three new types, all free of VOHAPs, with Types III and IV having a VOC of 2.8 pounds per gallon. This effort resulted in approved

products, assigned NSNs, and enhanced corrosion resistance. The Type IV products were introduced to provide touch-up kits to end users.

10. *MIL-DTL-53072, "Chemical Agent Resistant Coating (CARC) System Application Procedures and Quality Control Inspection," Revision D with Amendment 1, May 2011.* This specification is the basis for all DoD use of CARC-type products. It is an application document that provides specific details on substrate selection and pretreatment options, as well as guidance on selecting and using the best coating system. It references all the above specifications. The impact and accomplishment in regard to this document was a totally new format with a table of contents for rapid use and identification of particular scenarios for product use. This document is referenced in every contract DoD uses to procure tactical assets.

In addition to revising or rewriting the 10 specifications, ARL, through the team's effort, canceled one document, MIL-PRF-4556, "Coating Kit, Epoxy, for Interior of Steel Fuel Tanks," as well as the associated QPL. However, because this technology is suited for acquisitions under MIL-PRF-23236D, "Coating Systems for Ship Structures," the team held a discussion with its counterparts at the Naval Sea Systems Command. Subsequently, the approved products were moved to MIL-PRF-23236D, eliminating duplication of work, while still providing the products to the field.

Outcome

The pinnacle of the team's work was MIL-DTL-53072, which unifies all the documents for CARC and provides the end user with clear processes and details.

The program resulted in a cost avoidance of \$999 million. The standardization actions and specifications transitioned products to the end user that could use these products and avoid costly air filtration systems. This cost avoidance is significant, because the Army did not need to program funding for numerous facilities for installations to purchase, install, and operate air scrubbers. This analysis was validated through the Army Research, Development and Engineering Command's Cost Analysis Activity at Aberdeen Proving Ground, MD. The benefit-to-investment-ratio was calculated at 24 to 9.

The effort by the coatings team was collaborative and complementary, and it relied on focused determination to deliver quality products and publish technically accurate documents to convey the requirements. The team's work has touched every tactical asset of the Army and Marine Corps, which includes ground, air, and related support equipment for all of DoD. The total volume of the CARC topcoat for FY12 was 1,177,813 gallons and that of related primers was approximately 588,906 gallons. The results have been a significant reduction in overall VOC and the elimination of VOHAPs for topcoats,

which provide distinct advantages for environmental compliance for air and related waste streams. VOC values dropped from an average of 2.72 pounds per gallon to 2.26 pounds per gallon in FY12. The reduction of VOHAPs for FY12 given these VOC values is 541,794 pounds for the topcoats alone and 700,000 pounds for the total products combined. In addition, these products enhance durability, extending the amount of time between repainting by as much as 20 percent. This has positioned the Army in the forefront in high-performance coatings for tactical equipment.

Cost avoidance due to lower VOCs and elimination of VOHAPs has been determined to be in the millions of dollars for each of the major 18 facilities and depots using these products. The reductions in VOCs and VOHAPs are continuing, because the older products have been eliminated or replaced.

Current Status

ARL has successfully implemented and transitioned 10 specifications. These documents directly support DoD and provide the most current technologies and environmental compliance available. Members of the team continue to test and validate all samples submitted and provide approval letters, and they have populated all QPD rosters as appropriate. The DoD CARC Commodity Office fully supports these specifications and the products associated with them, and it will continue to do so.

ARL requires every initial submission to have a notarized statement of composition, a technical data sheet, and safety data sheets. These records include manufacturer codes and a specific unique identification for each product. Combined with individual batch validation and paperwork to track each product, ARL ensures the quality of products in the field and virtually eliminates the possibility of counterfeit or noncompliant material being used. ARL retains records for 6 years on all batches submitted and retains original submission information indefinitely. In addition, our approval letters do not permit any minor or major change in the formulation without ARL concurrence and approval. In summary, ARL has established robust checks and balances and ensures that the most current technology is available.

Challenges

The ARL team's effort—establishing a new inventory of products and revising or rewriting specifications—was a huge, high-risk undertaking. One of the largest hurdles was funding, which ARL obtained through five successful proposals. This enabled the team to convert the knowledge and technical content into specifications.

Another barrier was coordinating activities so the team could leverage work done by the other services, industry, and academia. The team accomplished this by providing updates—via conferences, workshops, and teleconferences—and memorandums about its intent and requesting suggestions regarding types of products and attributes. In short, the team addressed concerns, focused its research efforts, collaborated with paint vendors, and provided the basis for the language needed within the specifications to clearly delineate each technology. The team also established buy-in by the community and end users of these technologies.

The specifications represent a hybrid of technology that leads the way in environmental stewardship, providing the highest quality in durability and directly supporting fighters and their assets to ensure they can meet their requirements on the battlefield. The ARL team had 100 percent support by the program managers and program executive offices for all DoD assets being coated and painted. This enabled an effective and efficient transitioning of the technology for the entire DoD.

About the Award Winner

The Army team consisted of Fred Lafferman, John Escarsega, Bernard Hart, William Lum, and Daniel Pope.

Fred Lafferman and John Escarsega submitted the proposals to secure funding to support the work required. They then directed and guided every effort to meet milestones, complete deliverables, and maximize the return on investment for each document published. Mr. Lafferman and Mr. Escarsega also reviewed all data, coordinated test plans and protocols, and ensured seamless integration with NAVAIR, the Marine Corps, and vendors submitting products.

Bernard Hart translated all technical content into completed specifications. His efforts included coordinating the drafts, revisions, and amendments and completing the final submission for final publication.

William Lum assisted Mr. Hart and also conducted in-house research and evaluation for MIL-P-14105E. Mr. Lum also supported testing and evaluation of 64159, 53039, 53030, and 4556 coatings.

Daniel Pope supported Mr. Hart's and Mr. Lum's efforts by testing 11195, 53084, and 32348 coatings and performing extensive work with 22750 coatings.✱

New NATO STANAG Addresses Retrograde of Materiel

Award Winner: Thomas Kozlowski



Thomas Kozlowski, from the Packaging, Storage, and Containerization Center (PSCC) at the U.S. Army Materiel Command (AMC) Logistics Support Activity, undertook a bottom-up initiative to improve and harmonize the retrograde processes used by NATO nations supporting coalition operations, such as the International Security Assistance Force (ISAF) in Afghanistan. Once the NATO Military Committee Land Standardization Board (MC LSB) approved the initiative, PSCC, as NATO custodian, expedited the development, harmonization, and finalization of a standardization agreement (STANAG) to provide timely support to ISAF. The first edition of the agreement, STANAG 2613, “Retrograde of Materiel” and the associated Allied Procedural Publication 17 (APP-17)—has been submitted for ratification. STANAG 2613 provides the doctrine for NATO land forces on the proper return of stores and equipment to designated storage, repair, recycling, supply, or disposal points. It also provides a set of instructions and guidelines to help ensure the systematic and responsible retrograde of stores and equipment from an area of responsibility (AOR) or joint operational area (JOA). The use of retrograde doctrine will preclude duplication of capabilities brought to an AOR/JOA to conduct retrograde, and it will streamline lines of communications, improve predictability of requirements, and reduce the overall logistics footprint.

Background

NATO forces conducting unified land operations in complex environments, and across extended distances, require effective, standardized sustainment. Sustainment facilitates operational adaptability, provides distributed support at all echelons, and ensures freedom of movement and action for commanders. However, at a meeting of the NATO Combat Service Support (CSS) Supply Panel, which is part of the MC LSB’s CSS Working Group (WG), Mr. Kozlowski, the U.S. representative to the panel, found that the NATO coalition’s sustainment operations in Iraq and Afghanistan do not include standardized procedures for retrograde operations, one of the components of effective sustainment. Instead, each nation was using its own approach to retrograde. Further, NATO as a whole had no standardized doctrine on retrograde operations.

Problem/Opportunity

Mr. Kozlowski recognized that NATO land forces need consistent principles and guidelines on the retrograde of materiel. A standard retrograde doctrine would provide NATO nations a common basis of information to ensure the systematic and responsible retrograde of stores and equipment from an AOR/JOA during and after contingency operations. He therefore proposed an initiative to harmonize retrograde

operations among nations. The use of standardized sustainment procedures and practices would address several issues, such as the following:

- Each nation's use of its own retrograde processes, rather than harmonized NATO retrograde processes, makes it difficult to optimize workloads and throughputs, particularly in areas such as Afghanistan where facilities and access routes are limited.
- When proper retrograde processes and procedures are not followed, personnel are put at risk of injury or loss of life through careless handling of equipment and hazardous materials.
- Retrograde materials frequently are not repackaged and transported according to proper processes and procedures, which results in delays, damage to shipments and transportation assets, and unnecessary transportation, processing, and handling costs.
- Lack of retrograde consolidation causes unpredictable workloads at transportation nodes and national depots.
- Failure to organize and conduct an orderly end of an operation can result in a loss of money, equipment, morale, public support, and goodwill.
- Failure to retrograde damaged or excess materiel during operations increases costs and complicates and prolongs drawdown operations.

Approach

Mr. Kozlowski surfaced the initiative through the Army chain of command for approval and, via his role as the U.S. representative to the CSS Supply Panel, surveyed nations about their supply issues to identify the 10 most important areas of interest. According to the survey results, retrograde was the top priority, which led to his proposed initiative to harmonize NATO retrograde operations.

When Mr. Kozlowski proposed the initiative to the nations of the CSS WG and CSS Supply Panel, several nations, most notably Germany, maintained that retrograde was a national responsibility. Mr. Kozlowski was able to obtain consensus for the harmonization initiative by articulating a clear basis of requirements for nations.

Once Germany agreed with the requirement to harmonize retrograde operations, the CSS WG approved the release of the proposal to the NATO Standardization Agency (NSA) for approval. While waiting for that approval, Mr. Kozlowski reviewed DoD doctrine on retrograde and contacted subject matter experts (SMEs) to obtain additional information and guidance.

Once NSA allocated the study, Mr. Kozlowski, as the NATO custodian, prepared the preliminary study draft, first study draft, final draft, and ratification draft in harmony with DoD doctrine. He staffed the drafts to DoD organizations and NATO nations for review

and comments. He worked with Army packaging SMEs, as well as with SMEs from a number of DoD organizations, including AMC, Office of the Army Deputy Chief of Staff for Logistics (Army G-4), Joint Staff Directorate for Logistics, Defense Packaging Policy Group, standardization offices of the military services and Defense Logistics Agency, and Army Hazardous Materials Transportation Focal Point. In addition, he partnered with NATO representatives to the Asset Tracking WG, Inter-service Ammunition WG, Transport of Dangerous Goods Committee (British representative), and U.S. International Standardization Program, as well as with the chair of the CSS WG (French army), representatives of Headquarters Allied Command Transformation (ACT) (French and German armies), and national representatives to the CSS WG and CSS Supply Panel.

Mr. Kozlowski adjudicated the nations' and DoD's comments on each draft and expedited the preparation and submission of the next level of drafts to the nations' and DoD's SMEs for review and comments.

The first edition of STANAG 2613 contains seven chapters and eight annexes in support of retrograde operations and provides commonality/interoperability with DoD retrograde operations. APP-17 addresses the concept of operations (a four-step process of consume, redistribute, transfer, and dispose) and command and control. It also contains information (by class of supply) on the retrograde of materiel, including disposal (if warranted), environmental considerations, customs requirements, cost-effectiveness indicators, packaging requirements for general supply and dangerous goods, and unitization, palletization, and containerization of retrograde materiel. Criteria within APP-17 align with various DoD, Joint Staff, Army, and Marine Corps documents (regulations, manuals, procedures, etc.). APP-17 also references numerous STANAGs. In addition, APP-17 supports an emerging NATO concept: Operations Logistics Chain Management (OLCM). Mr. Kozlowski briefed nations that OLCM is formally defined as a capability designed to optimize the prioritization and coordination of the flow of logistics resources and provision of services into, within, and out of a JOA. Collective responsibility for logistics is essential to supporting deployed forces effectively and efficiently.

Outcome

Mr. Kozlowski submitted the ratification draft to NSA 14 months after the initiative's inception. Subsequently, he conducted the DoD technical review of the ratification draft and, on the basis of positive results, submitted the recommendation for U.S. ratification to the Army Deputy Chief of Staff for Operations and Plans.

The use of standardized retrograde doctrine by NATO planners and commanders in operational areas is expected to provide tremendous cost savings. Those savings will come

through the elimination of duplicated capabilities brought to a JOA to conduct retrograde, streamlining/combining of lines of communications, improved predictability of requirements, better use of backhaul, and reduction in the overall logistics footprint. Furthermore, because the improper packaging and movement of dangerous materials have resulted in the loss of human life in Operation Enduring Freedom and Operation Iraqi Freedom, the use of standardized retrograde doctrine has the potential to save lives and prevent injury by providing all nations with information on training and standards of safety.

In short, when ratified by nations and promulgated by NSA, STANAG 2613 will provide an overall quantitative and qualitative benefit to all NATO operations. Cost savings, safety improvements, and more efficient and effective use of resources will be achieved at a very minimal cost through the publication and utilization of this important document. In addition, the STANAG directly supports an Army G-4 and AMC priority.

Current Status

NATO ratification responses were due to the MC LSB by February 2013. As of this writing, 15 nations, including the United States, have ratified the STANAG, and the MC LSB voted to proceed with promulgation. STANAG 2613 is now in the process of being translated into French, at which point it will be forwarded to the NSA director for publication.

Challenges

Mr. Kozlowski faced three key challenges:

- *Overcoming Germany's position that retrograde is a national responsibility.* Mr. Kozlowski persuaded and influenced Germany through consensus building. He pointed out that NATO policy MC 319/2, "NATO Principles and Policies for Logistics," formalizes the principle that the provision of logistics support of NATO's multinational operations is a collective responsibility of nations and NATO authorities. Collaboration with ACT and Supreme Headquarters Allied Powers Europe in the development of OLCM also helped influence Germany to agree with the proposal to harmonize retrograde operations.
- *Building consensus among multiple nations.* Mr. Kozlowski's knowledge of and experience in the politics of NATO partnering enabled him to overcome the significant challenges of building a consensus among nations.

- *Quickly moving the agreement forward as a proposal to NSA.* Once it approved the standardization proposal and allocated a study, NSA directed that the study be given top priority to ensure timely support to ISAF. Within a 14-month period (October 2010 to December 2011), Mr. Kozlowski developed the preliminary study draft, first study draft, and final draft; submitted the drafts to nations and DoD SMEs for review and comments; and adjudicated all comments. The STANAG was submitted to nations for ratification in April 2012.

About the Award Winner

Thomas Kozlowski is an industrial engineer at PSCC. He serves as U.S. representative to the NATO CSS Supply Panel and was responsible for the bottom-up initiative from its inception to the development and submission of the STANAG into the ratification process. Mr. Kozlowski was the key to the successful development of the agreement and involved in every aspect from inception to finalization. ✨

The FACE Technical Standard Enables a Common Operating Environment

Award Winner: Navy-Led Team



A Navy-led team developed the technical standard for an open architecture initiative known as the Future Airborne Capability Environment (FACE). The core team—consisting of personnel from the Naval Air Systems Command (NAVAIR); the Army Aviation and Missile Research, Development and Engineering Center; and CRL Technologies, Inc.—developed the reference architecture, in cooperation with the FACE Consortium. The team documented the reference architecture that establishes a common operating environment to support portable software components across multiple DoD aviation platforms. The technical standard for the FACE reference architecture will enable the acquisition of affordable software systems that promote rapid integration of portable capabilities across global defense programs. The FACE team is also addressing business practices and associated processes needed for FACE-conformant acquisitions. This reuse will reduce duplicate development costs and speed the integration of software-based capabilities. As a result, the Navy and other services will gain the ability to adapt to changing requirements, threats, and technologies at a faster rate and continue to provide the warfighter with best-in-class capabilities.

Background

Historically, embedded avionics software systems have been developed, procured, and implemented with platform-specific designs. This has resulted in tightly coupled systems with proprietary or unique interfaces that inhibit reuse and adversely affect interoperability. However, it is now widely acknowledged throughout the DoD aviation community that advancing integrated warfare capabilities will mostly come from software-intensive systems. The FACE team recognized the need for a technical standard that defines the infrastructure for open systems and key interfaces required to support application-based avionics capabilities.

Problem/Opportunity

The FACE team supports the establishment of a FACE technical standard across all DoD services as an opportunity to increase interoperability and realize significant cost avoidance. The FACE team's objectives in establishing the FACE technical standard were to address several issues that plague modern avionics and the aviation community:

- *Lack of common and compatible systems and enforceable standards, which limits the portability and reuse of capabilities across aircraft platforms.* The FACE team's concept was to develop a technical standard that would enhance portability and reuse of software components by identifying and standardizing key application programming interfaces. Products are verified and certified as conformant to the FACE technical standard. This conformance process helps ensure that FACE-conformant components can be reused on other FACE platforms.

- *Lack of open competition, which limits options.* The advantages of implementing the standard interfaces and basing procurement on preference for certified FACE-conformant products would provide the government with a wider range of choices that enable competition down to the component level. The FACE abstraction layers isolate hardware and software changes, which increases competitive opportunities for both hardware and software and opens the market to additional suppliers. This allows the government to procure from a wider supplier base to ensure the warfighter gets best-in-class systems.
- *Economic climate in which less funding is likely to be available for defense programs.* The FACE technical standard enables the leveraging of software developed for other platforms and systems. The potential cost savings would allow program offices to take advantage of additional upgrades that would not be possible under current funding constraints and also allow the upgrades to be acquired at a faster pace.

Approach

The FACE team used a two-part strategy to establish a path to success: contract with academia and engage with industry. The team contracted with two academic institutions: Georgia Tech Research Institute and Vanderbilt's Institute for Integrated Software Systems. The FACE academia team researched the FACE concept, developed prototypes and proofs of concept, conducted simulations, and served as technical experts to the FACE team.

The FACE team participated in the formation of a voluntary, consensus-based FACE Consortium managed by The Open Group and including member organizations from government, industry, and academia. The FACE team effectively leveraged unique technical, business, and process expertise from all the FACE Consortium members to create consensus-based solutions for numerous technical and business issues.

The FACE technical standard expands upon existing modular open system architecture, integrated modular avionics, and open architecture principles, and it uses widely adopted industry standards for distributed communications, programming languages, graphics, and operating systems. With significant support from the FACE team, the Consortium published Edition 1.0 of the FACE technical standard in January 2012, providing a framework for developing software capabilities that are portable, reusable, and inherently more affordable. Edition 2.0 of the technical standard was published in February 2013 and included significant updates, such as horizontal interfaces, additional support functionality, a more robust data model, and the addition of run-times and frameworks.

In contrast to other open architecture initiatives, which offer only general guidance on designing open systems, the FACE technical standard clearly describes the reference ar-

architecture and specifies the key interfaces that will ensure an enforceable product line approach to software development, resulting in increased portability and reuse of software capabilities. The FACE architecture supports general-purpose, safety-critical, or secure avionics capabilities to handle the differing requirements imposed by the security and safety domains of avionics.

In addition to developing the technical standard, the FACE team documented current business practices and associated processes that would change under the technical standard. This business guide detailed how to achieve high degrees of software reuse and reduce the cost of software development through open standards and a modular, product-line approach. The guide describes the business practices and associated processes needed for FACE-conformant acquisitions. The team also developed guides for setting up a FACE library/repository system, establishing a FACE conformance certification program, and developing a FACE contract guide. The contract guide contains sample contracting language and licensing agreements that can be utilized in the development and acquisition of software-centric capabilities. The library requirements document was completed in August 2012, and draft versions of the conformance requirements, conformance program guide, and contract guide were reviewed during 2012, with final publication dates expected in summer 2013.

The FACE team developed proofs of concept and demonstrated that integration risks and interoperability issues can be minimized through conformance to the interfaces codified in the FACE technical standard. The FACE team also produced a candidate suite of FACE software tools to verify conformance to the FACE technical standard and to aid developers and systems integrators. The team released beta versions of a software developer kit, integrator toolkit, and conformance tool suite in August 2012.

To promote use of the FACE technical standard and business practices, members of the team conducted more than 100 DoD leadership briefings and technical interchanges. They worked together to educate program managers on the benefits of standardizing key interfaces and urged users to develop capability requirements that can span multiple platforms. Their extensive outreach efforts have included reaching out to organizations not only within NAVAIR, but across service boundaries.

Outcome

The main objective of the FACE team was to reduce life-cycle costs and time to field warfighting capabilities by developing a common operating environment to support portable software components across multiple aviation platforms. The FACE technical standard provides the environment that will sustain the platforms and systems in use today and keep them technically relevant, so they will safely and effectively bridge the

gap until future aviation platforms are delivered. Platforms hosting the FACE software infrastructure will be able to leverage FACE-conformant applications acquired by other programs and services without modifying application code or creating a proprietary interface, both of which adversely affect interoperability. As a result, the Navy and other services will gain the ability to adapt to changing requirements, threats, and technology at a faster rate and to continue to provide the warfighter with best-in-class capabilities.

The FACE team used two approaches to determine the potential cost savings:

- To gauge the potential cost benefits of FACE, the FACE team supported a NAVAIR Cost Department rough order of magnitude (ROM) cost estimate using typical software development costs versus actual software costs from a product-line architecture analogous to the FACE approach. The cost estimate for typical software development processes was \$54.1 million. The cost of implementing that same software on a different platform using the FACE approach was \$25 million. For efforts of a similar size and complexity, the ROM cost estimate projects that program managers can see a \$29.1 million cost avoidance each time the capability is reused on a different platform.
- To estimate the effect of the FACE technical standard on acquisitions, cost models are being developed. Initial results from a Delphi study done by the Georgia Tech Scheller College of Business point to an initial increase in cost to modify legacy software interfaces to be FACE conformant. That cost is recouped when reused on two or more platforms, even at reuse rates as low as 30 percent. The study also showed that compared with the government, software suppliers were more optimistic about the cost savings.

Current Status

The consortium continues to address the business practices and associated processes needed for FACE acquisitions, including setting up a FACE library/repository system, establishing a FACE conformance certification program, and developing a FACE contract guide. Milestones are being established for the publication of Edition 3.0 of the technical standard, which will focus on continued refinement of configuration services, transport services, and the data model.

The government is looking toward the future by releasing multiple requests for information and requests for proposals that include FACE conformance in the requirements. With the establishment of the FACE conformance certification program, products developed under these contracts—as well as products developed by industry in internal research and development programs—will be able to claim FACE conformance. A Sources Sought notice was released in March 2013 by the Navy and Army to determine industry interest in demonstrating FACE products in a government lab.

Industry is already developing and aligning product lines with the FACE technical standard. The FACE Consortium has hosted three Technical Interchange Meetings (TIMs) in conjunction with the Navy, Army, and Air Force. The most recent TIM was held in April 2013 and hosted by the Air Force at Wright-Patterson Air Force Base, OH, where more than 300 attendees and 21 organizations showcased their applications, systems, and tools that are aligned to the FACE technical standard.

Challenges

The FACE team had to address and overcome cultural, political, technical, and monetary barriers. To achieve portable avionics application, the first barrier to overcome was the current development practices and culture that have generally resulted in stovepiped, tightly coupled systems. Defining an open standard and educating programs on the benefits of the FACE approach have helped overcome this barrier.

The FACE team determined the second barrier to success would be lack of industry involvement and adoption. To ensure industry buy-in for what promised to be a major change to the status quo, the FACE team helped facilitate the formation of the FACE Consortium in June 2010. The Consortium provided a collaborative environment for participants from the Navy, Army, Air Force, and more than 50 diverse, competitive companies.

Since its inception, the FACE team has operated under a limited budget with limited manpower. The team aligned with multiple program offices to fund FACE prototypes and demonstrations and worked with the Army to secure funding for Army-specific tool development and demonstrations.

The FACE team is anticipating the potential conflicts regarding licensing and intellectual property and will continue to work alongside industry and government representatives to create solutions in these areas. Familiarity with intellectual property matters will be essential to new software acquisition opportunities that the FACE approach will yield.

About the Award Winner

The Navy-led team consisted of Robert Matthews, Robert Sweeney, Scott Dennis, Marcell Padilla, and Deborah Mooradian.

Robert Matthews, the FACE team lead, is also the elected chairman of the FACE Consortium's Steering Committee and oversees the activities of the Technical Working Group, Business Working Group, and Enterprise Architecture Committee. He was instrumental in the completion of the FACE business guide, contract guide, library/repository, and conformance certification program. He played a key role in educating the aviation community on the benefits of portable software components and in promoting industry support of the FACE product-line approach for software-intensive systems.

Robert Sweeney is the FACE team's lead software engineer and is the elected chairman of the Technical Working Group of the FACE Consortium. He built a cohesive technical team from more than 50 diverse, competitive companies and all three military services; steered the team to a consensus-based solution for an avionics open architecture; and led the Consortium to accelerate the release of the technical standard. Mr. Sweeney also oversaw the technical activities of the FACE academia team. In addition, he managed the development of a hardware proof of concept and beta versions of development and conformance tool suites.

Scott Dennis was essential in expanding the FACE effort from a NAVAIR effort into a truly collaborative effort with the Army. He actively solicited and cooperated with NAVAIR and Army communities of interest to educate program managers and the acquisition workforce on the benefits of incorporating FACE into upcoming upgrades and future platforms.

Marcell Padilla coordinated the efforts of the FACE Consortium and FACE academia team to develop the technical and business best practices to support software portability and reuse across Navy and DoD aviation platforms. He was a key contributor to the FACE technical standard and FACE business guide, and he contributed significantly to the development of requirements and delivery of the FACE prototypes and tool suites.

Deborah Mooradian assisted with the development of new business practices and associated processes needed for FACE-conformant acquisitions. She was essential to the development of the FACE business guide and the FACE contract guide.

Numerous other individuals, including military and civilian personnel, contract support personnel, industry employees, and academicians, contributed to the success of this project. ✨

A Lower Concentration of FSII in JP-8 Reduces Procurement Costs

Award Winner: Air Force Team



An Air Force team—led by the Air Force Petroleum Agency (AFPA) and including personnel from the Air Force Research Laboratory (AFRL) and Air Force Life Cycle Management Center (AFLCMC)—evaluated the potential benefits of reducing the concentration of Fuel System Icing Inhibitor (FSII) in JP-8 aviation fuel and in F-24 aviation fuel (described by the ASTM International standard, D1655, “Standard Specification for Aviation Turbine Fuels,” and containing the same additive package required in the JP-8 specification). The concentration was the same as that used in JP-4, but the chemical used as FSII had changed. The team’s focus was twofold: reduce FSII procurement costs and mitigate Fuel Tank Topcoat Peeling (FTTP) caused by FSII. The team determined that the concentration of FSII could be lowered 32 percent without affecting airworthiness. The team also determined that reduced FSII levels should reduce the number of incidents of FTTP, reducing maintenance costs. The 32 percent reduction in FSII concentration in JP-8 and F-24 will result in procurement savings of \$5.3 million annually for DoD. If the Navy reduces FSII levels in its JP-5 specification, DoD will realize an additional procurement savings of over \$1 million/year. In addition, DoD will realize a reduced logistical footprint, because more than 2,000 fewer 55-gallon drums will be needed in theater, resulting in substantially reduced shipping, storage, and handling costs. This 8-year study culminated with the September 2012 publication of the JP-8 specification with lower FSII limits.

Background

In 2011, more than 2.3 million gallons of FSII were purchased by the Defense Logistics Agency (DLA) to additize JP-8. FSII is a mandatory additive required in MIL-DTL-83133, “Turbine Fuel, Aviation, Kerosene Type, JP-8 (NATO F-34), NATO F-35, and JP-8+100 (NATO F-37).” The purpose of FSII is to keep any free water, which can form in aviation fuel during flight, from freezing and forming ice crystals that can block fuel flow through aircraft engine filters. Its usage began in the 1960s following an aircraft mishap attributed to ice formation. The original chemical used as FSII was ethylene glycol monomethyl ether (EGME), which was later changed to diethylene glycol monomethyl ether (DiEGME) due to toxicity and flammability issues with EGME. The effective concentration of FSII in jet fuel was originally determined using the EGME concentration in MIL-DTL-5624, “Turbine Fuel, Aviation, Grades JP-4 and JP-5,” and was set at a concentration of 0.10–0.15 percent by volume EGME. When the Air Force transitioned from the use of EGME to DiEGME in the 1980s and went from using JP-4 to JP-8 as its primary fuel in the 1990s, it did not change the concentration of FSII; the concentration of DiEGME in JP-8 remained the same as the concentration of EGME in JP-4. The required limits were 0.10–0.15 percent by volume FSII, with a target injection of 0.125 percent.

Problem/Opportunity

When the new additive and new fuel type were introduced, no testing was done to determine if the FSII level could be adjusted. In 2004, the Science and Technology Division of AFPA, the preparing activity for MIL-DTL-83133, and AFRL recognized that changing the additive used would likely change the amount required for protection against icing. Further supporting this theory was the fact that when the FSII limits were established in the 1960s, the ability to control the amount of water in jet fuel was not nearly as effective as it is today. Less water in jet fuel equates to less FSII required. Also, both the Navy and the Federal Aviation Administration had recognized that FSII concentrations at levels as low as 0.03 percent and 0.035 percent, respectively, could effectively control fuel system icing. The Air Force had required a minimum level of 0.07 percent FSII, but, in MIL-DTL-83133, set higher levels of 0.10–0.15 percent FSII to allow for the loss of additive as JP-8 travels through the supply chain. If it could be proven that the minimum level could be lowered to 0.04 percent FSII, the procurement amounts of FSII could be lowered accordingly.

With \$1.2 million in funding from DLA Aviation, AFPA and AFRL developed an extensive program to determine the minimum concentration of DiEGME that would still provide effective anti-icing performance. Originally, the project was envisioned to be a procurement cost saving measure. However, during the research effort, FSII was implicated in FTTP being encountered by several Air Force aircraft platforms. FTTP led to grounded aircraft and millions of dollars in wing tank repair. Therefore, updating MIL-DTL-83133 with a reduced FSII concentration had the potential not only to substantially reduce procurement costs, but also to potentially reduce aircraft maintenance costs, as well as improve the readiness of aircraft platforms affected by elevated FSII concentrations in jet fuel.

Approach

To determine whether FSII concentrations in JP-8 could be safely lowered, the team undertook the following evaluations:

- *FSII loss through the supply chain (AFPA)*. AFPA evaluated the loss of FSII as fuel moves through pipelines, bulk tanks, filtration housings, and aircraft. FSII is typically removed with the water as it is drained from the fuel system sumps.
- *FSII partitioning test (AFRL)*. For FSII to be effective, it needs to preferentially dissolve in free water as it forms in flight. AFRL did the testing necessary to understand the rates of reaction and the additive's solubility limits in water and fuel with respect to temperature.
- *Small-scale icing test (AFRL)*. AFRL subjected a B-52 strainer assembly to tests of fuel with a very high water concentration (288 ppm) and with a lower water concentra-

tion (125 ppm) to determine if ice formation would block fuel flow.

- *Large-scale component test (AFRL)*. AFRL used a B-52 fuel strainer housing to mimic what occurs in flight on a B-52. AFRL chose that housing because it is the component most vulnerable to fuel icing in the B-52 fuel system.
- *Estimation of total water content of fuel on Air Force aircraft, as well as sump sampling at real-world locations to verify estimates (AFRL)*. Because the amount of water in fuel directly affects the amount of FSII required to prevent fuel system icing, AFRL determined the worst-case amount of water in fuel.
- *Investigation of antimicrobial activity in reduced FSII concentrations (AFRL)*. In addition to preventing icing, FSII controls microbial growth on aircraft and ground vehicles. Therefore, AFRL studied whether lower FSII concentrations continue to inhibit microbial growth.
- *B-52 flight test (AFLCMC)*. AFLCMC conducted a flight test at Edwards Air Force Base with the lower FSII limits to ensure the team's small-scale and large-scale icing predictions were correct.
- *FSII measurement accuracy at lower limits (AFPA and AFRL)*. DoD uses ASTM D5006, "Standard Test Method for Measurement of Fuel System Icing Inhibitors (Ether Type) in Aviation Fuels," as its guide to measure FSII concentration in jet fuel. Before the measurement method could be updated, AFPA and AFRL needed to conduct research to prove that the measurement method would work with the proposed lower limits.

Outcome

Testing proved that FSII specification limits could be safely lowered to 0.07–0.10 percent and that aircraft use limits could be lowered to 0.04 percent without affecting airworthiness. The new limits also were proven effective in inhibiting microbial growth. In addition to substantial procurement savings, savings will accrue from the reduced logistical footprint associated with the shipping, handling, and storage of 2,000 fewer drums in the area of responsibility (AOR). Further, a reduced FSII concentration should reduce FTTP on the B-52 and other platforms, leading to improved reliability through standardization efforts and scientific due diligence. AFRL determined that a concentration of 0.085 percent FSII led to less FTTP damage to the coatings. NATO allies are awaiting the publicly releasable version of the FSII reduction study to use as justification for reducing FSII limits in their international implementing documents for F-34 (JP-8).

To calculate procurement savings, the team used 2011 data from DLA Energy's Petroleum Quality Information System:

- | | |
|----------------------------|-----------------------|
| ■ Amount of JP-8 procured: | 1.826 billion gallons |
| ■ Amount of F-24 procured: | 55 million gallons |

■ Jet fuel total subject to reduction:	1.881 billion gallons
■ Amount of FSII required under old limits:	2,351,250 gallons
■ Amount of FSII required under new limits:	1,598,850 gallons
■ Difference:	752,400 gallons.

The calculation itself is complex, because FSII is delivered to DoD both in bulk tanks (truck and train) and in 55-gallon drums. Bulk purchases of FSII cost \$5.92/gallon. The cost of a 55-gallon drum, which contains 50 gallons of FSII, is \$700, which translates to \$14.02/gallon. The new limits reduce the target additive injection limit from 0.125 percent to 0.085 percent, a 32 percent reduction. The Air Force team calculated procurement savings as follows:

■ Amount of FSII procured in drums:	320,000 gallons (6,400 drums)
■ Amount of bulk FSII procured:	2,031,250 gallons (2,351,250 – 320,000)
■ Cost of FSII procured in drums:	\$4,486,400 (320,000 × \$14.02)
■ Cost of FSII procured in bulk:	\$12,025,000 (2,031,250 gallons × \$5.92)
■ Total 2011 procurement cost:	\$16,511,400 (\$4,486,400 + \$12,025,000)
■ Total 2011 procurement savings:	\$5.3 million (\$16,511,400 × 32%).

As the calculation shows, the 32 percent reduction in FSII concentration in JP-8 and F-24 will result in an estimated procurement savings of \$5.3 million annually for DoD. The AOR will realize a reduced logistical footprint, because more than 2,000 fewer 55-gallon drums will be needed in theater, resulting in substantially reduced shipping, storage, and handling costs. The cost of the smaller logistical footprint cannot be quantified but is thought to be significant. The B-52 Program Office (PO) spends \$2.8 million/year and the C-130 PO spends \$1.0 million/year on FTTP mitigation. Reduced FSII levels in military jet fuels should reduce the number of incidents of FTTP, reducing maintenance costs. The B-52 PO has test aircraft prepared to monitor FTTP into the future to gauge the effect of lower FSII limits on FTTP. If the Navy reduces FSII levels in its JP-5 specification, DoD will realize an additional procurement savings of over \$1 million/year.

Current Status

MIL-DTL-83133H with Amendment 1, the JP-8 revision incorporating the lower FSII limits, was released for use in September 2012. As DLA Energy's contracts come up for renewal, the new limits will take effect in those contracts. It will likely take a year to fully implement the lower limits. This will allow for a phased approach, which will help suppliers and allies make adjustments to the supply chain.

The B-52 PO has test aircraft that it is monitoring to determine the effect on FTTP of the new lower limits for FSII. The savings from reduced maintenance due to FTTP are

expected to equal or eclipse procurement savings in cost avoidance. However, it may take several years to collect enough data to quantify the benefit.

NATO code numbers for F-24 and F-27 (F-24 with the +100 additive) were assigned by the NATO Fuels and Lubricants Working Group in summer 2012. A new revision of NATO standardization agreement (STANAG) 3747, "Guide Specifications (Minimum Quality Standards) for Aviation Turbine Fuels (F-34, F-35, F-40, and F-44)," written by AFPA, is on track to be promulgated in mid-2013.

ASTM is discussing changes to ASTM D1655 with respect to FSII limits, and AFPA and AFRL are coordinating with ASTM to update ASTM D5006 with repeatability and reproducibility data developed by the Air Force.

Challenges

The amount of coordination involved in this project was the biggest hurdle to overcome. Coordination was required with each weapon system PO, Army Ground and Aviation, the Navy, NATO and Air and Space Interoperability Council (ASIC) allies, and DLA, each with their own unique requirements and concerns that needed to be resolved. NATO Single Fuel in the Battlefield Policy, which is implemented by the JP-8 specification, complicated the issue further.

JP-8 is also used in ground vehicles and support equipment, so the FSII must be effective at inhibiting microbial growth at the proposed lower concentrations. It was hard to overcome limits that were established over 40 years ago, because none of the original engineers were available to consult. In many cases, what was originally done needed to be recreated. Fortunately, reports of the early work were still available.

The long-term project saw turnovers in personnel at AFPA and the POs, which required educating new people as they joined the team.

From a standardization viewpoint, the FSII concentration changes made to the JP-8 specification had a ripple effect leading to revisions of MIL-STD-3004, "Quality Assurance/Surveillance for Fuels, Lubricants and Related Products," and STANAGs 3747 and 1135, "Interchangeability of Fuels, Lubricants and Associated Products used by the Armed Forces of NATO." The project also will likely lead to the revision of ASTM D5006 and of FSII concentrations in D1655.

About the Award Winner

The Air Force team consisted of Cheryl McCormick, Benet Curtis, Thomas Burris, Dr. Donald Phelps, and Capt Daniel DeVirgilio.

Cheryl McCormick, an AFPA chemist, assumed the role of project manager. She provided on-site testing and support for the B-52 0.04 percent FSII flight test at Edwards Air Force Base and obtained support from the Tri-Service Petroleum, Oils, and Lubricants (POL) Users Group for a procurement limit as low as 0.07–0.10 percent by volume FSII in JP-8. Ms. McCormick contacted Air Force aircraft POs to determine if any aircraft would have operational, safety, suitability, or effectiveness issues with a use limit of 0.04 percent by volume FSII. She coordinated the testing between AFRL and AFPA for determining if ASTM D5006 would still be applicable at lower FSII concentrations. Ms. McCormick is working with the ASIC allies to obtain support for the lower limits from an interoperability standpoint.

Benet Curtis, chief of AFPA's Science and Technology Division, was the senior technical advisor. He facilitated the update to MIL-DTL-83133 through coordination with headquarters. He is working with NATO allies to gather support for lowering FSII requirements in NATO STANAGs. Through his work with the Tri-Service POL Users Group, Mr. Curtis convinced the Navy to pursue additional research to determine if the FSII limits in JP-5, MIL-DTL-5624, could also be lowered.

Thomas Burris, a technical order manager at AFPA, is the point of contact for updating all AFPA standard documents. He submitted the latest version of MIL-DTL-83133 for coordination in ASSIST and harmonized changes from users. Once coordination was complete, Mr. Burris ensured the document was quickly published in ASSIST so that cost savings could begin as soon as possible.

Donald Phelps, a senior research chemist at AFRL, was instrumental in leading the AFRL research on FSII reduction. Through that research, Dr. Phelps demonstrated that a 0.04 percent use limit would provide adequate anti-icing and antimicrobial protection down to the temperature at which the freezing point of JP-8 would itself become an issue. Dr. Phelps also reviewed ASTM D5006 to determine its suitability for measuring FSII content at lower concentrations and was actively involved in the design of the B-52 flight test demonstration.

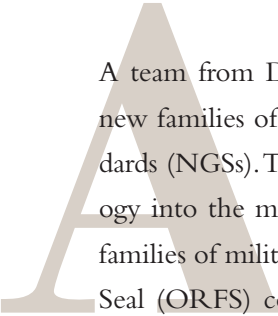
Daniel DeVirgilio is a fuel systems engineer in AFLCMC's B-52 PO. The B-52 office was a huge proponent of the FSII reduction program because of its potential to eliminate FTTP. Capt DeVirgilio is overseeing a rigorous monitoring program that will measure the reduction in FTTP that results from lower FSII limits, allowing additional cost savings to be further quantified, or determine if lower FSII limits may be necessary.

Innumerable other people contributed to the success of this 8-year project. Among them are Major Andrew Pittman, Mel Regoli, Dr. Steven Shaeffer, Rex Cash, Dr. Matthew DeWitt, Anthony Fisher, Dave Benson, Abdeel Roman, and Gordon Walker. ✨

New Adapter Fittings Dramatically Reduce Leaks

Award Winner: DLA Land and Maritime Team





A team from Defense Logistics Agency (DLA) Land and Maritime developed two new families of military specifications and one new family of non-government standards (NGSs). These documents represent a major infusion of new spherical technology into the mechanical connector stock class, Federal Supply Class 4730. The new families of military specifications address adapter fittings for spherical to O-Ring Face Seal (ORFS) connectors (MIL-DTL-32371) and adapter fittings for National Pipe Thread Fuel (NPTF) to ORFS connectors (MIL-DTL-32372). The new NGS family, published by SAE International, addresses fittings to flared tube ends and flared sleeves (SAE-AS6075). This effort was the culmination of 2 years of work, which involved negotiating with fitting manufacturers and coordinating with the Army, Navy, Air Force, Marine Corps, National Aeronautics and Space Administration (NASA), and Coast Guard to select the best possible component configurations that would reduce leaks and allow retrofitting of new fluid, hydraulic, and pneumatic controls without having to redesign existing aerospace, land, and maritime systems. Use of the new fittings will avoid costs of more than \$2 million each year, lower procurement costs, shorten procurement lead-times, increase operational readiness, and reduce the logistics footprint.

Background

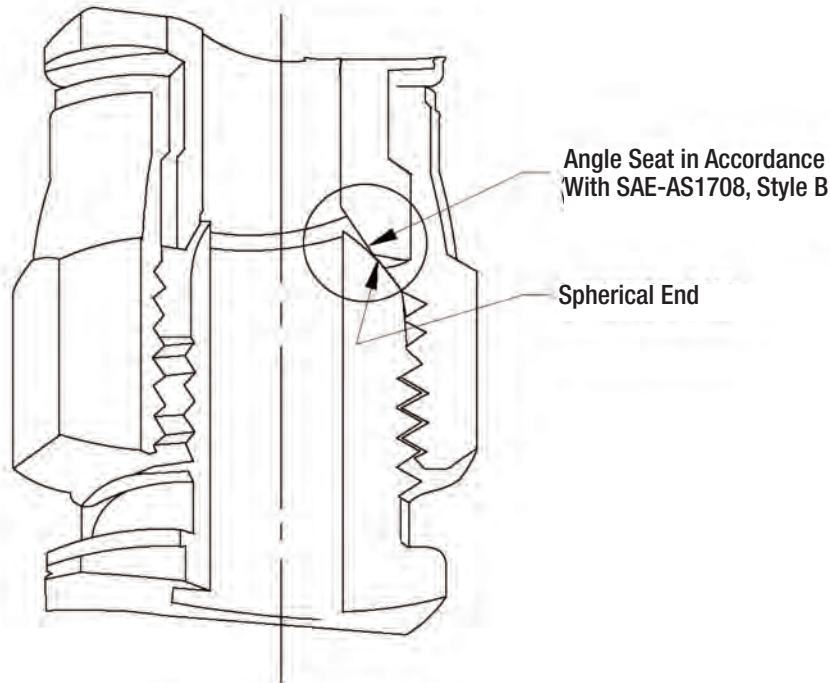
Throughout the fluid-flow industry, leak-resistant systems have been an elusive goal. Leak paths occur at the mating interfaces of nonsmooth mechanical surfaces. According to basic mechanical engineering theory, it is easier to repeatedly obtain a smooth surface at the interface when the load is concentrated at one point than it is when the load is spread uniformly over a wide surface. Spherical technology is based on concentrated loading. Concentrated loading is obtained by machining a partial spherical end that transfers mechanical loads to a point on a circumference of the sphere when mating to a flared tube end. (See Figure 1.) Adaptor fittings incorporating the spherical design have been shown to dramatically reduce the chance of a leak in a fluid flow system.

The spherical technology was first developed and implemented by General Electric Aviation. The spherical design is also being adopted for use by original equipment manufacturers (OEMs) such as Boeing, Lockheed-Martin, Air Bus, and others.

Problem/Opportunity

Many aging weapon systems are kept in service beyond their original intended service life. These systems are constantly being updated via the injection of modern technology. However, replacing much of the original technology has been hampered by the inaccessibility of fuel, hydraulic, and pneumatic lines, which are often buried in the bulkhead or framework of the equipment. Gaining access to the otherwise inac-

Figure 1. Adapter with a Spherical Design



The Adapter Opposite End is:

- ❖ Traditional 37° Flare
- ❖ NPT
- ❖ SAE J1453

cessible areas required a major overhaul of the weapon system, a costly and time-consuming process.

To address that problem—and to support DoD policy to advance standardization, especially when it relates to supporting the military services and the warfighters on critical weapon systems—DLA Land and Maritime undertook a standardization project to develop military specifications and NGSs for adapters using spherical technology. The objective of this project was twofold: introduce connectors into the DLA inventory that would reduce leak paths that have plagued fluid flow technologies for years and enable the use of new technology in existing equipment. The ability to mate newer design spherical adapters to older design connectors, which are currently installed on existing military equipment, will, at a reasonable cost, increase quality and reliability by allowing for refitting of older weapon systems without tearing into floorboards, walls, and bulkheads.

Approach

The team's objective and intent was to use adapters to interface three old adaptor technologies—ORFS, NPTE, and spherical 37-degree flared tube—with the new spherical

technology. At the same time, the team wanted to keep costs down by not requiring extra machine shop processes, such as polishing and fitting selection.

The 2-year process to develop the standards for the new adapter fittings was a massive effort, largely because the spherical technology itself was far from standard. Instead, the configurations of the components existed as individual technologies, and the team wanted to create a single fitting to replace similar single technologies in existing designs.

The team began the project with extensive market research. It also held detailed conversations with industry partners, who provided drawings.

To develop the standardization documents, the team brought together the expertise of various fitting manufacturers sitting side by side with the military services and OEMs. During these meetings, design alternatives were debated, information was shared, and compromises reached to settle on the optimum design configurations for standardization. The team was instrumental in bringing these parties together, mediating disputes, recognizing rival marketing agendas, and gaining consensus among opposing parties.

Two military specifications were completed through a DoD forum, and an NGS was completed through the SAE committee's NGS forum. The three standards for spherical adapter fittings developed by the team are as follows:

- MIL-DTL-32371 (and 10 subordinate documents), "Fittings, Adapter, Hydraulic and Pneumatic, Spherical to ORFS Connectors, 1500 to 3000 PSI," April 2012
- MIL-DTL-32372 (and 12 subordinate documents), "Fitting, Adapter, Hydraulic and Pneumatic, NPTF to ORFS Connectors, 1500 to 3000 PSI and -65°F to 250°F ," December 2011
- SAE-AS6075 (and 11 subordinate NGS documents), "Fitting, Bolt, Flared, 37 Degrees Spherical," January 2012.

The team coordinated the initial and final drafts of these documents with industry and DoD users. Multiple iterations of each document were painstakingly compiled and reviewed to resolve hundreds of comments.

Outcome

The standard spherical design fittings mate with ORFS, NPTF, and 37-degree flared fittings and meet demanding operating pressures of 1,500 to 3,000 psi requirements and operating temperatures of -65°F to 250°F . The inclusion of the spherical technology in a military specification that mates with each of these technologies reduces procurement lead-time for both system manufacturers and future DoD procurements and provides system designers with consistent component characterization.

The key benefit of the new standardization documents is enhanced weapon system performance through the elimination of leaks in fuel systems, hydraulic systems, and pneumatic systems. For example, the air worthiness of aircraft will be enhanced through fewer leaks in aircraft fuel and hydraulic systems, which will result in higher reliability, thereby saving fuel and increasing the range and envelopes of operation. Similarly, with leak-resistant connections and interfaces in pneumatic systems, missiles will experience longer range, and gyros for flight control fins will experience better envelope control and response. In addition to enhancing performance, the new fittings will reduce pollution and possible spills of hazardous materials, will increase the operational life of the weapon system, and increase the time period between maintenance cycles.

Another significant benefit is the savings achieved during overhauls, because these adapters can mate with the old technology without extensive tear-outs. Further, the OEMs, military services, and depot-level repair facilities will have more flexibility in retrofitting modern hydraulic and pneumatic components of old equipment. In other words, they will be able to inject new technology without having to do a major overhaul of the weapon system to gain access to fuel, hydraulic, and pneumatic lines. This capability will enable the military services to take a major step forward in the utilization of modern weapon system components, because the main pneumatic and fluid systems can be adapted at the point of modernization without having to redesign the entire conveyance system.

Because the new specifications cover a family of new standard parts for use by the military services and their equipment contractors, they preclude a minimum of 100 nonstandard part types annually, which translates to a cost avoidance of over \$2 million each year, according to the DoD Parts Management Program Model. Also, these standard parts will facilitate lower procurement costs, shorter procurement lead-times, increased operational readiness, and a reduced logistics footprint. In addition, these specifications will facilitate competition among the connector manufacturers for the standard parts. Finally, standard parts that can be used across multiple platforms advance the goal of interoperability and interchangeability among the military services.

Current Status

The new military specifications for adapter fittings have been approved and are available from the Defense Automated Production Service through ASSIST. The SAE-AS6075 family of documents (part standards) is available from the Information Handling Service website or the SAE website.

Challenges

Every manufacturer strives for a competitive advantage over all others in the industry to maintain profits and market share. This business philosophy was a major stumbling block in the development of these adapters. It was necessary to get each manufacturer to share its design with its competition. These fittings solve a military-unique problem that is not common in private industry, because OEMs generally purchase new equipment rather than retrofit older equipment.

The specification development consensus process required a large-scale coordination effort with the Army, Navy, Air Force, Marine Corps, NASA, Coast Guard, connector manufacturers, equipment contractors, and SAE.

About the Award Winner

The DLA Land and Maritime team consisted of Earnest Brown, Maurice Womack, William Carpenter, and Mitchell Ranck.

Earnest Brown was the primary focal point for this project from its inception. He developed the initial concept, did the initial market research and market planning, and led the team, keeping the project on track and progressing to completion. Mr. Brown is a member of SAE and serves on SAE subcommittees.

Maurice Womack was tasked with developing and researching requirements and with verifying the spherical and 37-degree flared technology. He also wrote, coordinated, and finalized SAE-AS6075 and its counterpart documents, which included the procurement standard and the many part standards that accompany it. Mr. Womack is a member of SAE and serves on SAE subcommittees.

William Carpenter was tasked with developing and researching requirements and with verifying the spherical and ORFS technology. He also was responsible for drafting, coordinating, and finalizing MIL-DTL-32371 and the 10 subordinate documents.

Mitchell Ranck was tasked with developing and researching requirements and with verifying the spherical and NPTF technology. He also was responsible for drafting, coordinating, and finalizing MIL-DTL-32372 and the 12 subordinate documents. ✨

Defense Parts Management Portal–DPMP

The DPMP is a new public website brought to you by the Parts Standardization and Management Committee (PSMC) to serve the defense parts management community.

The DPMP is a new resource, a new marketplace, and a “one-stop shop” for parts management resources. It is a navigation tool, a communication and collaboration resource, and an information exchange. It gives you quick and easy access to the resources you need, saves you time and money, connects you to new customers or suppliers, and assists you with finding the answers you need.

This dynamic website will grow and be shaped by its member organizations. A new and innovative feature of the DPMP is its use of “bridge pages.” Organizations with interests in parts and components are invited to become DPMP members by taking control of a bridge page. Chances are good that your organization is already listed in the DPMP.

There is no cost.

Explore the DPMP at <https://dpmp.lmi.org>. For more information, look at the documents under “Learn more about the DPMP.” Click “Contact Us” to send us your questions or comments.



Program News

Topical Information on Standardization Programs

SAE International Completes Asset Purchase of TechAmerica Standards Program

SAE International announced the completion of an asset purchase of the TechAmerica Standards Program and IBIS Consortia.

TechAmerica is the leading voice for the Information and Communications Technology industry in the United States. Its membership comprises large, medium, and small technology companies that create a variety of products and deliver a multitude of services in the private sector and to governments at the state and national level.

Through the acquisition, TechAmerica's members will benefit from SAE International's core competency of technical standards and publications development. "TechAmerica, formally GEIA, has long been a global leader in Systems Engineering, business process, and management standards," Edward Manns, Aerospace Standards Business Unit Leader, SAE International said. "The acquisition of TechAmerica's standards program only enhances SAE International's strong complement of global technical documents."

Questions about the program can be directed to Chris Denham, by e-mailing cdenham@sae.org.

SAE International is a global association committed to being the ultimate knowledge source for the engineering profession.

By uniting over 138,000 engineers and technical experts, we drive knowledge and expertise across a broad spectrum of industries. We act on two priorities: encouraging a lifetime of learning for mobility engineering professionals and setting the standards for industry engineering. We strive for a better world through the work of our philanthropic SAE Foundation, including programs like A World in Motion[®] and the Collegiate Design Series[™].



Events

Upcoming Events and Information

September 16–20, 2013, Orlando, FL
***Fall 2013 SISO Simulation
Interoperability Workshop***

The Simulation Interoperability Workshop is a semiannual event sponsored by the Simulation Interoperability Standards Organization (SISO). The fall workshop will be held at the Florida Mall Conference Center. The SISO workshops encompass a broad range of model and simulation issues, applications, and communities. The workshops consist of a series of forums and special sessions addressing interoperability issues and proposed solutions; tutorials on state-of-the-art methods, tools, and techniques; and exhibits displaying the latest technological advances.

October 3, 2013, Washington, DC
***World Standards Day Exhibit
and Reception***

This year's U.S. Celebration of World Standards Day—Standards for a World at Work and Play—will focus on how standards bring confidence to businesses, governments, and consumers, affecting reliability from farm to table, manufacturer to retailer, and workplace to home. The event will be held at the Fairmont Hotel in Washington, DC. For more information, please go to www.wsd-us.org.



Events

Upcoming Events and Information

October 28–31, 2013, Arlington, VA
*16th Annual NDIA Systems
Engineering Conference*

This conference is sponsored by the National Defense Industrial Association (NDIA) Systems Engineering Division, with technical cosponsorship by the IEEE Aerospace and Electronic Systems Society, the IEEE Systems Council, and the International Council on Systems Engineering. To be held at the Hyatt Regency Crystal City, the conference will focus on improving acquisition and performance of defense programs and systems, including network-centric operations and data/information interoperability, systems engineering, and all aspects of system sustainment. The conference is supported by the Deputy Assistant Secretary of Defense for Systems Engineering, OUSD(AT&L), and the Office of the DoD Chief Information Officer.

December 2–5, 2013, Orlando, FL
*2013 DMSMS and Standardization
Conference and 2013 DMC*

This year, the Diminishing Manufacturing Sources and Material Shortages (DMSMS) and Standardization Conference and the Defense Manufacturing Conference (DMC) are being held at the same time and place (Marriott Orlando World Center) to enable attendees to take full advantage of their organizations' conference investment. Sponsored by DSPO, the DMSMS and Standardization Conference focuses on the need for DMSMS and standardization policies, procedures, guidance, and automated tools to support the warfighter. The 2013 conference will include activities required to attain those objectives, such as value engineering, total life-cycle management, and parts management. The DMC's focus is on manufacturing issues of interest to DoD and its industrial base.



People

People in the Standardization Community

Welcome

Jawad Abdeljawad of the General Services Administration (GSA) has been named acting director of Engineering and Cataloging, which is in GSA's Office of Supply Operations. In this capacity, he is responsible for developing and promulgating government-wide federal standardization program policies and procedures, as well as participating with Departmental Standardization Officers on DSP-related matters.

Farewell

Kathleen Baden retired from GSA on June 28, 2013, with 32 years of service. Since 2005, she has been the director of Engineering and Cataloging in the Office of Supply Operations. In this capacity, she was responsible for developing and promulgating government-wide federal standardization program policies and procedures. She previously worked as a market analyst in the Business Development Center of GSA Global Supply, as a supply cataloger in the Logistics Data Management Policy Division, and as a supply management representative in the Customer Liaison and Assistance Office.

Upcoming Issues Call for Contributors

We are always seeking articles that relate to our themes or other standardization topics. We invite anyone involved in standardization—government employees, military personnel, industry leaders, members of academia, and others—to submit proposed articles for use in the *DSP Journal*. Please let us know if you would like to contribute.

Following are our themes for upcoming issues:

Issue	Theme
July/September 2013	Interoperability
October/December 2013	Counterfeits
January/March 2014	Qualification/Conformity Assessment

If you have ideas for articles or want more information, contact Tim Koczanski, Editor, *DSP Journal*, Defense Standardization Program Office, 8725 John J. Kingman Road, STOP 5100, Fort Belvoir, VA 22060-6220 or e-mail DSP-Editor@dla.mil.

Our office reserves the right to modify or reject any submission as deemed appropriate. We will be glad to send out our editorial guidelines and work with any author to get his or her material shaped into an article.



