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A COMPUTER PROGRAM FOR CALCULATING SYMMETRICAL AERODYNAMIC CHARACTERISTICS AND LATERAL-DIRECTIONAL STABILITY DERIVATIVES OF WING-BODY COMBINATIONS WITH BLOWING JETS

C. Edward Lan and Sudhir C. Mehrotra, University of Kansas
and Charles H. Fox, Jr., NASA Langley Research Center

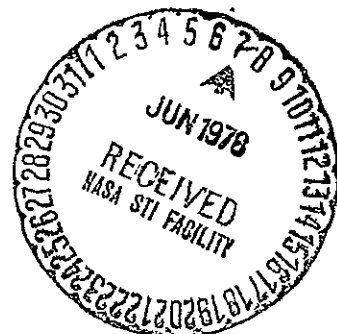
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A COMPUTER PROGRAM FOR CALCULATING SYMMETRICAL AERODYNAMIC CHARACTERISTICS
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WITH BLOWING JETS

By

C. Edward Lan

Sudhir C. Mehrotra
University of Kansas

and

Charles H. Fox, Jr.
NASA Langley Research Center

INTRODUCTION

This document describes in detail the necessary information for using a computer program to calculate the aerodynamic characteristics under symmetrical flight conditions and the lateral-directional stability derivatives of wing-body combinations with upper-surface-blowing (USB) or over-wing-blowing (OWB) jets. This program is an updated version of that described in NASA TM X-73987 (reference 1). In addition to the features and restrictions described in reference 1, the following new features have been added to the program: (1) A fuselage of arbitrary body of revolution has been included. The effect of wing-body interference can now be investigated. (2) All nine lateral-directional stability derivatives can be calculated.

The program is written in Fortran language and runs on CDC Cyber 175 and Honeywell 66/60 computers. It is available from COSMIC of the University of Georgia, Athens, Georgia.

SYMBOLS

A_j	cross sectional area of the jet
C_T	thrust coefficient = thrust/ qS_w
M_j	Mach number of the jet
M_∞	Mach number of the freestream
P_{tj}	jet total pressure
P_∞	static pressure
q	freestream dynamic pressure
$r(x)$	fuselage radius as a function of x
S_w	wing area
T_j	static temperature of the jet in °R or °K
T_∞	freestream static temperature in °R or °K
V_j	jet velocity
V_∞	freestream velocity
AR	wing aspect ratio
L.E.	leading edge
T.E.	trailing edge

ρ_j	jet density
ρ_∞	freestream density
γ	ratio of specific heats

Description of New Program Features

The program can be run without the fuselage, in exactly the same manner as described in reference 1. Therefore, all instructions concerning the preparation of wing-jet geometry in reference 1 are still applicable. When a fuselage is present, the coordinate origin should be assumed on the fuselage axis, with the positive x-axis coincident with the fuselage axis and pointing downstream. The wing and jet geometry should be defined accordingly. The jet is not allowed to wash the fuselage in the present program. Some restrictions in preparing the fuselage geometry are described below.

- (1) The fuselage must be a body of revolution; but otherwise, arbitrary axial distribution of cross-sectional area is allowed. No fuselage camber effect is included. For arbitrary bodies, their equivalent bodies of revolution may be used.
- (2) The wing chord along the wing-body juncture is best to be parallel to the freestream. The wing planform as described by the input data should not penetrate into the fuselage.
- (3) The fuselage geometry can be described to the program by providing $r(x)$ analytically to the function subprogram FUR(X) and $r \frac{dr}{dx}$ to the function subprogram SLOP(X). Alternatively, the radii at a finite number of stations (restricted to be 21 or less) can be input.

Since the fuselage aft body is greatly influenced by the displaced wake, and since the wake displacement is not accounted for in the program, the fuselage contribution to lift and pitching moment may not be accurate. However,

the fuselage lift is known to be small in most cases and can therefore be neglected.

When the lateral-directional stability derivatives are to be calculated, the program will always start to compute the symmetrical aerodynamic characteristics first, as some of these derivatives depend on the symmetrical flight conditions. Therefore, it is not possible for the program to calculate these derivatives only, without calculating the symmetrical loading at the same time. As has been shown previously (reference 2), the fuselage contribution to forces and moments is very much affected by the viscous effect. More accurate evaluation of the fuselage contribution to the derivatives can be made if some last portion of the fuselage is not included in the force and moment integrations (reference 2). This is done in the present program by providing a value to the input variable "X1" which is related empirically to the last station to be included in the force and moment integrals. If it is not exactly clear from the geometry of the equivalent body of revolution what value of "X1" should be input, a value of 0.75 - 0.85 for fuselages with upswept after body and 1.0 for others should provide reasonable results under usual circumstances.

The total number of vortices representing the wing can be determined with the following equation:

$$LPANEL = [NW(1) + NW(2) + NW(3)] \times \left[\sum_{I=1}^{NC} (ML(I) - 1) \right]$$

where the input variables appearing on the right hand side are defined in

the section under Input Data Format. Since the wing-body interference is accounted for through the matching of Fourier components of the induced velocities on the fuselage surface, the number of additional unknowns due to the presence of the fuselage is equal to the product of the number of Fourier components "NT" used and the number of stations "NF" at which the body boundary condition is to be satisfied. Therefore, the total number of unknowns to be solved for the wing-body alone without the jet is

$$LWF = LPANEL + NT \times NF$$

LPANEL is limited to 100 and LWF to 130. For good results, NT can be set to 2 and NF to 12-14.

The number of vortex elements used to represent the outside (or inside) of the jet surface can be computed as follows:

Centered Jet

$$JPANEL = \left[\sum_{I=1}^{NNJ} NCJ(I) \right] \times [NSJ-1]$$

Outboard Jet

$$JPANEL = \left[\sum_{I=1}^{NNJ} NCJ(I) \right] \times [NSJ+1]$$

For wing-body configurations, the jet should be considered as non-centered. The number of unknowns to be solved without the fuselage is, again, (reference 1)

$$LTOTAL = LPANEL + 2 \times JPANEL$$

With the fuselage included, the total number of unknowns becomes

$$LWFJ = LWF + 2 \times JPANEL$$

where JPANEL is limited to 100, or such that LPANEL + JPANEL is less than 200. LTOTAL is limited to 300 and LWFJ to 330. LWFJ is the number to be used to calculate the array size for GAMMA(I) to be mentioned later.

INPUT DATA FORMAT

Group 1. Format 13A6 1 card

Any title identifying the cases to be run.

Group 2. Format 3(6X,I4) 1 card

ICASE Number of cases to be run.

NG = 0 if all cases have the same geometry other than
the angle of attack.

= 1 if new configurations or different freestream-
jet velocity ratios are to be treated.

ISYM = 0 for a centered jet

= 1, otherwise.

LAT = 0 for symmetrical aerodynamic characteristics only.

= 1 for lateral-directional stability derivatives in
addition to symmetrical aerodynamic characteristics.

Group 3. Format 8F10.5 1 card

AM1 Mach number of the freestream

AM2 Mach number of the jet flow

VMU Freestream velocity divided by jet velocity.

TEMP Jet static temperature divided by freestream static
temperature. Assumed to be the same as ratio of
freestream density and jet density.

ALP Angle of attack in degrees.

XEL X-coordinate of the wing L.E. at the jet centerline.

XET X-coordinate of the wing T.E. at the jet centerline.

Note: If the thrust coefficient is given, VMU may be computed as

$$\frac{V_j}{V_\infty} = \frac{1}{2} \left\{ 1 + \left[1 + \frac{2C_T (S_w/2)}{A_j (\rho_j/\rho_\infty)} \right]^{1/2} \right\}$$

$$VMU = V_\infty/V_j$$

where C_T = thrust coefficient

S_w = wing area used to define C_T .

A_j = jet cross-sectional area

When the thrust coefficient is computed with the static thrust, the following formula for V_j/V_∞ is preferred:

$$\frac{V_j}{V_\infty} = \left[\frac{C_T (S_w/2)}{2A_j (\rho_j/\rho_\infty)} \right]^{1/2}$$

If the nozzle pressure ratio, $p_{t,j}/p_\infty$, is given, the following isentropic relations may be used.

$$M_j^2 = \frac{2}{\gamma-1} \left[\left(\frac{p_{t,j}}{p_\infty} \right)^{\frac{\gamma-1}{\gamma}} - 1 \right]$$

$$\frac{T_j}{T_\infty} = \frac{1 + \frac{\gamma-1}{2} M_\infty^2}{1 + \frac{\gamma-1}{2} M_j^2}$$

$$\frac{V_\infty}{V_j} = VMU = \frac{M_\infty}{M_j} \frac{1}{\left(\frac{T_j}{T_\infty}\right)^{1/2}}$$

Group 4. Format 2(6X, I4) 5F10.5

NFP Number of flap sections, including the jet span.

A maximum of five flap sections may be input.

NJP Numerical order of the jet span among the NFP sections.

DF(I) Flap deflection angles in degrees for the flap sections.

I=1, NFP

Group 5. Format 7F10.5 1 card

HALFSW One half of the reference wing area.

CREF Reference chord

TWIST Difference in angles of attack at the tip and the root
in deg. Negative for washout.

TWISTR Incidence angle of the root chord in degrees.

XJ X, Y, and Z-coordinates of the midpoint of the jet cross-

YJ section at the exit. ZJ is referred to the wing plane.

ZJ

RJ Jet radius.

Note: The last four variables are needed only for over-wing-blowing applications. They may be any non-zero numbers for USB applications, unless the rectangular jet is not on the wing surface and the entrainment effect is to be accounted for. For the latter case, these variables are used to define the equivalent circular jet.

Group 6. Format 7F10.5 1 card

TEANGL Trailing-edge half angle of the airfoil at the jet center-line in deg. For USB applications, it may be arbitrary.

PTIAL = 0. for clean or full-span flap configuration
= 1. for partial-span flap deflection.

USB = 1. for USB applications
= 0. for OWB applications

CAMLER L.E. camber slope at the root leading edge

CAMLET L.E. camber slope at the tip leading edge.

CAMTER T.E. camber slope at the root trailing edge

CAMTET T.E. camber slope at the tip trailing edge.

Note: For USB applications, TEANGL may be any value. If the camber ordinates are to be read in, the leading edge and trailing edge camber slopes may be arbitrary numbers.

Note: The following card must be omitted for OWB applications.

Group 7 Format 3F10.5 1 card

CMU Jet thrust coefficient

DFJ Jet deflection angle in degrees at the trailing edge relative to the chord line. At small flap angles, it may be taken as

the sum of flap angle and the airfoil trailing edge half angle. At large flap angles, experimental values should be used.

TNJ = 0. if the entrainment is not to be accounted for. Usually this is the case if the jet is on the wing surface.
= 1. if the entrainment due to an equivalent round jet is to be accounted for when a rectangular jet is not on the wing surface.

Group 8 Format 8(6X, I4) 1 card

NC Number of spanwise sections. A natural way of dividing a planform into sections is to follow lines of discontinuity, such as edges of partial-span flap, jet boundaries, wing edge discontinuities, etc. See Figure 1. NC is limited to 8.

M1(I) Number of vortex strips in each spanwise section, plus one.

I=1,NC Minimum value for each is 3. Maximum for each M1(I) is 31.

The total number of spanwise strips is limited to 30.

NWING Numerical order of last wing spanwise section.

Group 9 Format 5(6X, I4) 1 card

NJW(I) The numerical order of the flap and jet spans among

I=1,NFP the spanwise sections.

Group 10 Format 5(6X, I4) 1 card

NW(1) Number of chordwise vortex elements in each chordwise section.

NW(2) The planform is divided into chordwise sections according

NW(3) to such lines of discontinuity as jet exit, flap hinge, etc.

If there is only one section, SET NW(2) = NW(3) = 0. For 2 sections, SET NW(3) = 0.

ICAM = 1 if the camber ordinates of the airfoils are to be read in.
= 0, otherwise. In this case, the camber functions $\left(\frac{dz}{dx}\right)$ in close-form expressions are to be inserted manually into subprograms ZCR(x) and ZCT(X), the root chord and tip chord camber functions, respectively.

IM Number of camber ordinates to be read in. (Limited to eleven).
Arbitrary if ICAM = 0.

Note: Group 11 must be deleted if ICAM = 0.

Group 11. Format 8F10.5 4 or 8 cards

XF(J,J), J=1,IM Non-dimensional x-coordinates to define root camber.

ZC(1,J), J=1,IM Non-dimensional camber ordinates of the root chord.

XT(2,J), J=1,IM Non-dimensional x-coordinates to define tip camber.

ZC(2,J), J=1,IM Non-dimensional camber ordinates of the tip chord.

Group 12. Format 6F10.5 1 card for each wing section.

XXL(1) x-coordinate of the leading edge of the inboard boundary chord of a given spanwise section.

XXT(1) x-coordinate of the trailing edge of the inboard boundary chord of the same spanwise section.

YL(1) y-coordinate of the inboard boundary chord.

XXL(2) x-coordinate of the leading edge of the outboard boundary chord of the same spanwise section.

XXT(2) x-coordinate of the trailing edge of the outboard boundary chord
YL(2) y-coordinate of the outboard boundary chord.
ZS z-coordinate of the wing panel relative to the fuselage
centerline.

Group 13. Format 6(6X, I4) 1 card

NNJ Number of jet sections.

Note. The jet region above or on the wing must be divided into streamwise sections by following the divided planform pattern. It is important to start the jet sections always from the wing leading edge even if the jet exit is downstream of the leading edge. The only exception is when the jet exit is at the trailing edge. In this case, NNJ=1 and the jet section starts from the trailing edge. NNJ is limited to 4. For the configuration of Figure 1, NNJ=4.

NSJ = Number of jet circumferential strips minus one for a non-centered jet (always use odd numbers).

= Number of jet circumferential strips on the half jet plus one for a centered jet (always use even numbers). See figure 3 of ref. 1.

NCJ(I), No. of streamwise vortex elements in each section. There
I=1, NNJ should be NNJ numbers. For those jet sections above the wing, these numbers should agree with the corresponding numbers of wing vortices. See NW(1), NW(2), NW(3) in Group 10.

Note: Group 14 must be deleted for USB applications

Group 14. Format 6F10.5 NNJ cards

XXL(1)

XXT(1)

YL(1)

XXL(2) Coordinates of bounding chords of the jet section

XXT(2) projected on the x-y plane. For definition, see Group 12.

YL(2)

Note. Group 15 is to be deleted for OWB applications.

Group 15. Format 4F10.5 (4xNNJ) cards.

XXL(I) Coordinates of the bounding lines defining the

XXT(I) rectangular jet sections in USB applications.

YL(I) They are the x-coordinates of the leading and

ZL(I) trailing edges, the y-coordinate and the z-

I=1,...,4 coordinate of the bounding line. The 4 stream-

wise edges of each section are defined in the

order illustrated in figure 2. There are 4

cards for each jet section. The jet section be-

hind the trailing edge, (trailing jet section),

should be at least one local chord in length.

Group 16 Format 2(6X, I4) 1 card

NDG Number of sections in which the dihedral is to be

defined. It does not have to be the same as NC

defined in Group 8. NDG must be at least 1 and limited to 5.

MDG = 1 if the dihedral angle of any section is not zero.
= 0 if no dihedral exists.

Group 17 Format 8F10.5

SNG(1) Dihedral angle in degrees of the first section. Negative for anhedral.

YG(1) the outboard y-coordinate of the first dihedral section.

Repeated NDG times.

Group 18 Format 6(6X, I4) 1 card

KF = 1 if the fuselage is present
= 0, otherwise

NT Number of Fourier components used to satisfy the fuselage surface boundary condition (excluding the zero-order component). Limited to 5. Normally, NT = 2 should provide good results. If NT of more than 2 is to be used, care should be taken as NT*NF is limited to 30 in the present array dimension specifications

NCUM Number of fuselage circumferential locations at which the pressure loading is to be computed. For midwing configurations, use even numbers. Normally, 7 or 8 should be sufficient. Limited to 10.

NF Number of control stations along the fuselage axis at which the fuselage surface boundary condition is to be satisfied.

Normally, 12~14 should be sufficient. Limited to 20.

KW Set to 1 always.

NKF(I) Set to be equal to NF.

Note. If no fuselage is present, all input variables can be zero in Group 18.

Note: The following input data, Groups 19, 20, and 21 must be omitted if no fuselage is present.

Group 19 Format 6F10.5 1 card

XAS(1) x-coordinate of the fuselage nose.

XAS(2) x-coordinate of the fuselage tail.

FUSIND = 0. if the fuselage geometry (i.e., $r(x)$) is to be defined analytically in subprograms FUR(X) and SLOP(X), where $FUR(X) = r(x)$ and $SLOP(X) = r \, dr/dx$.
= 1. if $r(x)$ is to be defined numerically in Groups 20 and 21.

FUSNO = number of fuselage stations to be input to define $r(x)$ if FUSIND = 1. Limited to 21.
= 0., otherwise

X1 Body station in fraction of body length at which the rate of change of cross-sectional area with body length first reaches maximum negative value. See the section under Description of New Program Features.

XJF = 1. if the lower inboard edge of the USB jet is on the fuselage. Note. This situation should be avoided as much as possible.

= 0., otherwise.

Note. Groups 20 and 21 should be omitted if FUSIND = 0.

Group 20 Format 8F10.5

XFF(I) Fuselage x-stations referred to the coordinate origin to define $r(x)$. Total number of stations is defined by FUSNO.

Group 21 Format 8F10.5

RFF(I) Fuselage radii corresponding to the x-stations XFF(I).

Group 22 Format F10.5 (ICASE-1) cards

ALP angles of attack in degrees. These cards are to be included only if additional angles of attack for the same configuration and VMU (NG=0) are to be run.

Note: The read statements for the input data in group 3 thru group 21 can be seen in subroutine "GEOMTY" of the program listing along with a short definition of the parameters to be read in. The read statements for groups 1, 2, and 22 along with the corresponding parameter definitions can be seen near the beginning of the program listing in the main routine.

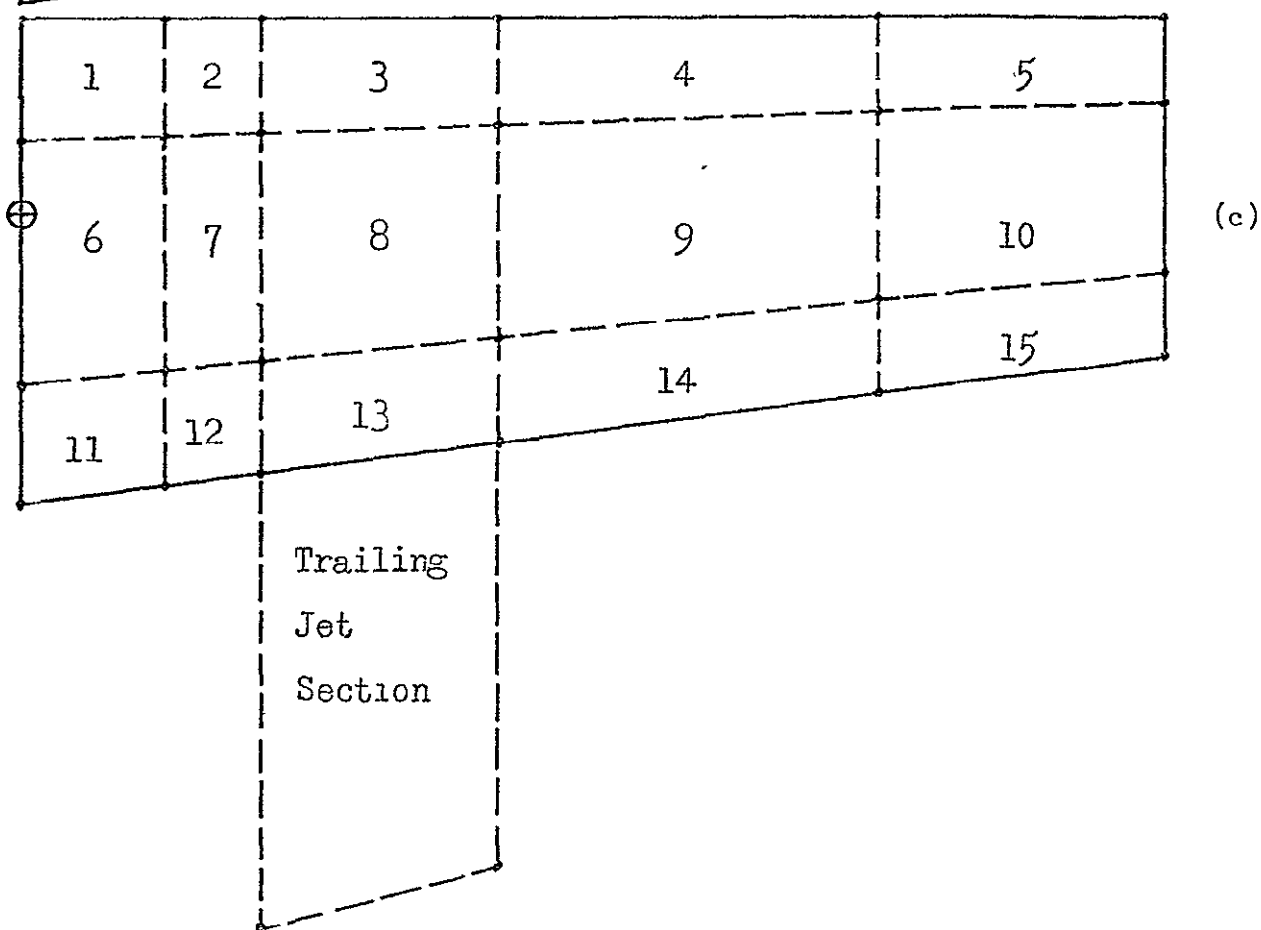
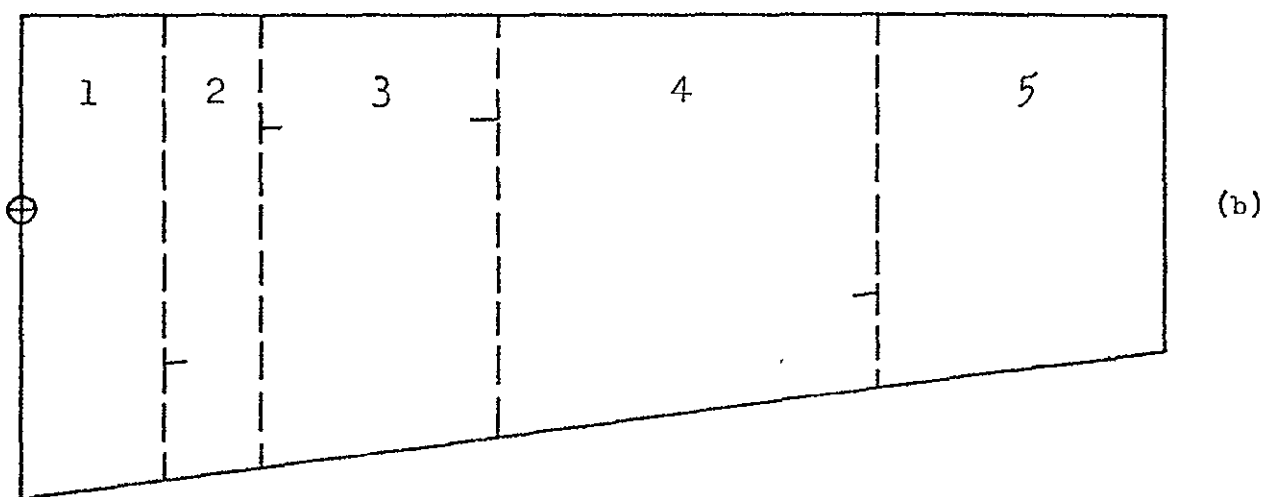
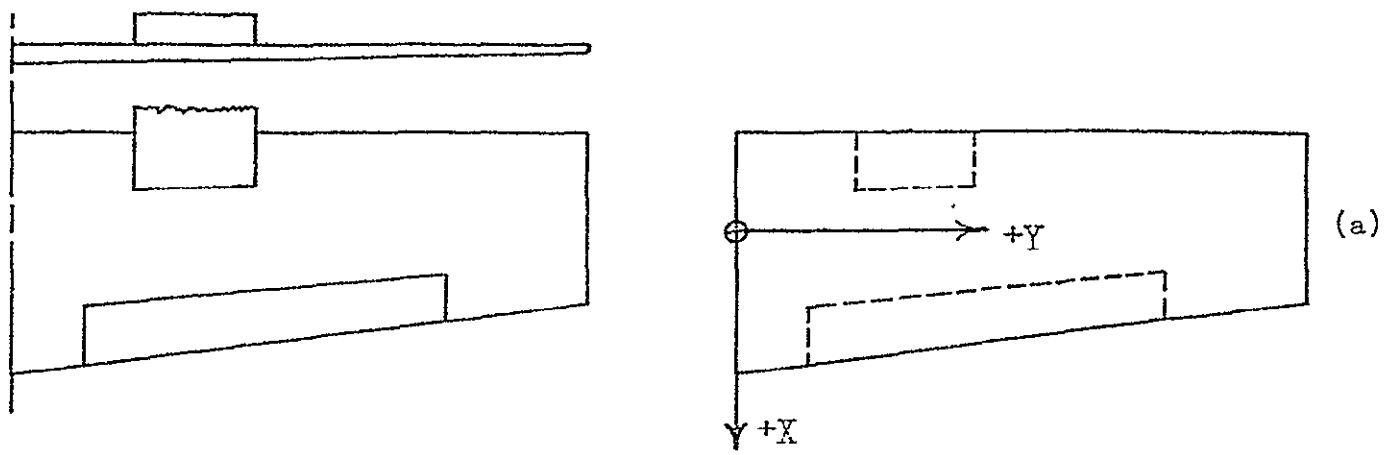
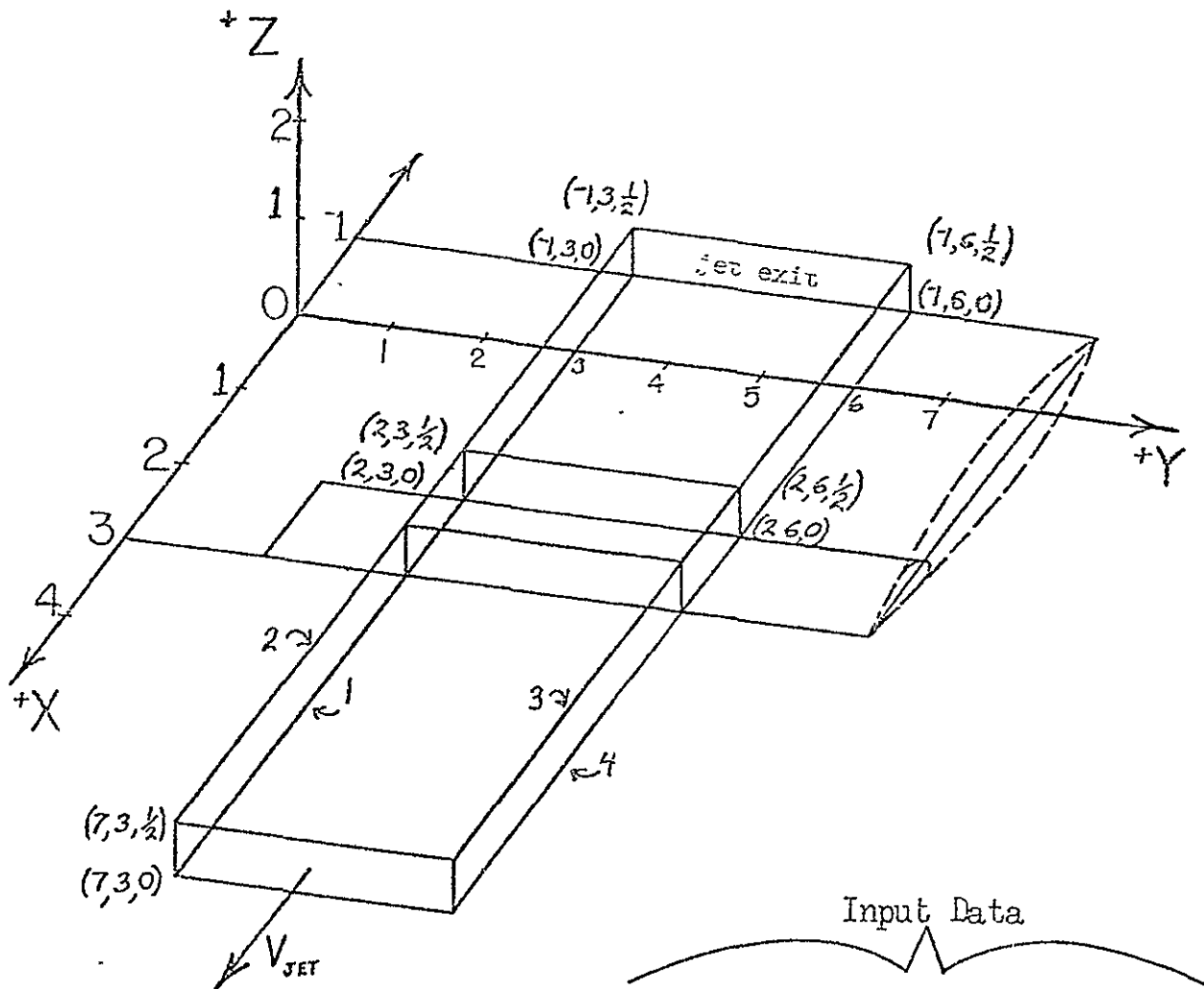


Figure 1 Preparation of the Wing Planform Geometry



Input Data

Card	Jet Section	Edge (I)	YXL(I)	XXT(I)	YL(I)	ZL(I)
1	1st	1	-1	2	3	0
2		2	-1	2	3	.5
3		3	-1	2	6	.5
4		4	-1	2	6	0
5	2nd	1	2	3	3	0
6		2	2	3	3	.5
7		3	2	3	6	.5
8		4	2	3	6	0
9	3rd	1	3	7	3	0
10		2	3	7	3	.5
11		3	3	7	6	.5
12		4	3	7	6	0

Figure 2 Input Coordinates For USB Jet Sections

Pre-Run Check List

Before the program is run, the following checklist should be completed:

- (1) The array, GAMMA, defined in the subroutine "SOLUTN", should be dimensioned to have at least $(N+1)^2/4$ elements, where N is the total number of unknowns (=LTOTAL or LWFJ).
- (2) For $N = 256$, the minimum memory needed is 48K (decimal). For any other N , the required memory can be computed accordingly, based on the change in GAMMA array.
- (3) The root and tip camber slope functions should be defined manually in the subprograms ZCR(X), ZCT(X) respectively, otherwise the root and tip camber ordinates should be read in. The camber slope function, dz_c/dx , is defined with respect to a unit chord length. Similarly, the fuselage shape $r(x)$ and $r dr/dx$ should be defined manually in the subprograms FUR(X) and SLOP(X), respectively. Otherwise, $r(x)$ should be read in numerically.
- (4) Seven temporary files or tapes must be provided, being designated as (01) through (04) and (07) through (09).
- (5) Check input data.

OUTPUT DATA FORMAT

First the title of the job and the input data will be printed in the same format as it was input. If the job is an over-wing blowing configuration the computed jet entrainment will be printed after the fourth line of input data as follows:

XJET Downstream distance of a given cross-section from the
 jet exit divided by the jet radius at the exit (r_0).

RJET the radius of the jet cross section divided by the original
 jet radius (r_0).

$\frac{DM}{DX}$ Values printed are actually the nondimensionalized en-
 trainment function $E(\bar{x})$ (see equation 33 of reference 3)

HALF SW the reference half-wing area

CREF the reference chord

LPANEL the number of wing vortices

JPANEL the number of outer (or inner) jet vortices

LWFJ total number of unknowns to be solved.

$$LWFJ = LPANEL + JPANEL*2 + NT*NF$$

If the job is an OWB configuration a note will be printed at this time indicating the shape of the equivalent jet cross-section used for the interaction computations along with 3 parameters defined below.

1. x-coordinate where the equivalent jet properties are evaluated.

2. Equivalent Jet Radius: the radius of the jet at the
x location listed above
3. $\frac{V_o}{V_j}$ the velocity ratio of the equivalent jet.

Vortex Element Endpoint Coordinates

(X_1, Y_1, Z_1) coordinates for the inboard endpoint of a bound vortex
element

(X_2, Y_2, Z_2) coordinates for the corresponding outboard endpoint.

Wing elements are listed first and then jet elements.

The number of elements listed should equal (LAST).

Control Point Coordinates

2 columns of control point coordinates, one point for each vortex element. Number of points listed should equal LPANEL + JPANEL.

Sectional Pressure and Force Data

XV	Percent chord location
YV	Percent half span location
CP	the total ΔC_p at the given (XV, YV) point due to both wing-body and jet induced circulation
CPW	The ΔC_p that would occur at that same point for the wing-body alone case
Y/SP	the y-coordinate of the chord in question divided by the half-span
CL	The sectional lift coefficient due to circulation (jet on), nondimensionalized with $q_\infty c$.
CM	The sectional pitching moment coefficient about the Y-axis, nondimensionalized with $q_\infty c^2$.
CT	The sectional leading edge thrust coefficient, nondimensionalized with $q_\infty c$.
CDI	The sectional induced drag coefficient, nondimensionalized with $q_\infty c$.
CLW	The sectional lift coefficient for the wing-body alone case
CMW	The sectional pitching moment about the Y-axis for the wing-body alone case

CDW The sectional induced drag coefficient for the wing-body alone case.

Total Force and Moment Data

The lift Co-efficient - The total circulation lift coefficient due to the wing, wing-jet interaction and entrainment (if any).
Fuselage lift is not included.

Total Induced Drag Coefficient Total induced drag coeff. for the jet on case

Induced drag =
parameter $\frac{C_{D_I}}{C_L}$ or $\frac{1}{\pi eAR}$

Total Pitching Moment Coefficient = Pitching moment coefficient due to all circulation forces, about the Y-axis. Nondimensionalized with CREF. Fuselage moment is not included.

Note: In the case of OWB jobs, these coefficients reflect the total jet-on forces and moments, but for USB jobs the Coanda force and moment coefficients must be added to these; see below.

USB Jobs

Coanda Lift Coefficient - The lift coefficient due to the lift component of the jet reaction force

Coanda Drag Coefficient - Drag coefficient due to the drag component of the jet reaction. Jet thrust is included.

The Coanda Moment Coeff. - Pitching moment coefficient due to the pitching moment caused by the jet reaction force (about Y-axis).

O.W.B. Jobs

In the case of O.W.B. jobs the next three coefficients listed have the same definitions as the first three except that the effects of wing-jet interaction have been omitted from the computation.

All Jobs

The next four coefficients printed are due to aerodynamic forces and moments with jet off.

The fuselage lift and pitching moment coefficients are printed next.

If the lateral-directional stability derivatives are to be computed, they will be printed last, both based on the body axes and the stability axes. It should be noted that additional side force at the engine inlet, and therefore additional yawing moment, would occur due to yawed flow conditions, such as in side slip. These effects are not included in the output. For more details, see ref. 4, for example. The β -derivatives are in per radian.

Example Input and Output

Test Case 1 is for an upper-surface blowing configuration of a wing with zero camber.

Test Case 2 is for the wing-body configuration of ref. 5.

Test Case 3 is for a wing-body configuration of zero camber with over-wing blowing.

Listing of Input Data Cards for Test Case 1

Card	*** TEST CASE 1. WING ONLY ***							
1								
2		1	0	1	1			
3	0.	0.	0.1865	1.	5.	0.028275	0.46827	.
4		1	1	0.				
5	0.455	0.3662	0.	3.	0.22961	0.269	0.	1.
6	0.	0.	1.	0.	0.	0.	0.	
7	1.8	10.	0.					
8		3	3	4	9	3		
9		3						
10		3	4	0	0	0		
11	-0.127	0.07462	0.	-0.03405	0.16757	0.161	0.161	
12	-0.03405	0.16757	0.161	0.0906	0.29222	0.3769	0.161	
13	0.0906	0.29222	0.3769	0.65023	0.81783	1.3462	0.161	
14	0.07462	0.381	0.	0.16757	0.43324	0.161	0.161	
15	0.16757	0.43324	0.161	0.29222	0.5033	0.3769	0.161	
16	0.29222	0.5033	0.3769	0.81783	0.81783	1.3462	0.161	
17		3	7	3	4	4		
18	-0.03405	0.16757	0.161	0.161				
19	-0.03405	0.16757	0.161	0.227				
20	0.0906	0.29222	0.3769	0.227				
21	0.0906	0.29222	0.3769	0.161				
22	0.16757	0.43324	0.161	0.161				
23	0.16757	0.43324	0.161	0.227				
24	0.29222	0.5033	0.3769	0.227				
25	0.29222	0.5033	0.3769	0.161				
26	0.43324	0.90053	0.161	0.161				
27	0.43324	0.90053	0.161	0.227				
28	0.5033	0.916	0.3769	0.227				
29	0.5033	0.916	0.3769	0.161				
30		1	1					
31	5.	1.3462						
32		0	0	0	0	0	0	

ORIGINAL PAGE IS
OF POOR QUALITY

*** TEST CASE 1, WING ONLY ***

1 0 1 1

Output for Test Case 1

XXXXXXXXXXXXXXXXXXXXXXXXXX

CASE NUMBER = 1

XXXXXXXXXXXXXXXXXXXXXXXXXX

INPUT DATA

0.00000	0.00000	.19650	1.00000	5.00000	.02828	.46827	
1	1	0.00000					
.45500	.36630	0.00000	3.00000	.22961	.26900	0.00000	1.00000
0.00000	0.00000	1.00000	0.00000	0.00000	0.00000	0.00000	
1.80000	10.00000	0.00000					
3	3	4	9	3			
2							
3	4	0	0	0			
-.12700	.07462	0.00000	-.03405	.16757	.16100	.16100	
-.03405	.16757	.16100	.09060	.29222	.37690	.16100	
.09060	.29222	.37690	.65023	.81783	1.34620	.16100	
.07462	.38100	0.00000	.16757	.43324	.16100	.16100	
.16757	.43324	.16100	.29222	.50330	.37690	.16100	
.29222	.50330	.37690	.81783	.81783	1.34620	.16100	
3	7	3	4	4			
-.03405	.16757	.16100	.16100				
-.03405	.16757	.16100	.22700				
.09060	.29222	.37690	.22700				
.09060	.29222	.37690	.16100				
.16757	.43324	.16100	.16100				
.16757	.43324	.16100	.22700				
.29222	.50330	.37690	.22700				
.29222	.50330	.37690	.16100				
.43324	.90053	.16100	.16100				
.43324	.90053	.16100	.22700				
.50330	.91600	.37690	.22700				
.50330	.91600	.37690	.16100				
1	1						
5.00000	1.34620						
0	0	0	0	0	0		

29

HALF SW= .45500E+00

CREF= .36630E+00

LPANEL,JPANEL,LWFJ=

91 88 267

VORTEX ELEMENT ENDPOINT COORDINATES=

X1	X2	Y1	Y2	Z1	Z2
-.11349	-.06702	0.00000	.08050	.16100	.16100
-.02619	.02028	0.00000	.08050	.16100	.16100

ORIGINAL PAGE IS
OF POOR QUALITY

.06111	.10759	0.00000	.08050	.16100	.16100
-.06702	-.02054	.08050	.16100	.16100	.16100
.02028	.06676	.08050	.16100	.16100	.16100
.10759	.15406	.08050	.16100	.16100	.16100
-.02054	.01793	.16100	.22764	.16100	.16100
.06676	.10523	.16100	.22764	.16100	.16100
.15406	.19254	.16100	.22764	.16100	.16100
.01793	.06563	.22764	.31026	.16100	.16100
.10523	.15294	.22764	.31026	.16100	.16100
.19254	.24024	.22764	.31026	.16100	.16100
.06563	.10411	.31026	.37690	.16100	.16100
.15294	.19141	.31026	.37690	.16100	.16100
.24024	.27871	.31026	.37690	.16100	.16100
.10411	.14144	.37690	.44183	.16100	.16100
.19141	.22776	.37690	.44183	.16100	.16100
.27871	.31408	.37690	.44183	.16100	.16100
.14144	.20365	.44183	.55002	.16100	.16100
.22776	.28833	.44183	.55002	.16100	.16100
.31408	.37300	.44183	.55002	.16100	.16100
.20365	.28747	.55002	.69579	.16100	.16100
.28833	.36993	.55002	.69579	.16100	.16100
.37300	.45238	.55002	.69579	.16100	.16100
.28747	.38278	.69579	.86155	.16100	.16100
.36993	.46272	.69579	.86155	.16100	.16100
.45238	.54266	.69579	.86155	.16100	.16100
.38278	.47809	.86155	1.02731	.16100	.16100
.46272	.55551	.86155	1.02731	.16100	.16100
.54266	.63293	.86155	1.02731	.16100	.16100
.47809	.56191	1.02731	1.17308	.16100	.16100
.55551	.63711	1.02731	1.17308	.16100	.16100
.63293	.71232	1.02731	1.17308	.16100	.16100
.56191	.62412	1.17308	1.28127	.16100	.16100
.63711	.69768	1.17308	1.28127	.16100	.16100
.71232	.77124	1.17308	1.28127	.16100	.16100
.62412	.65722	1.28127	1.33884	.16100	.16100
.69768	.72991	1.28127	1.33884	.16100	.16100
.77124	.80259	1.28127	1.33884	.16100	.16100
.08628	.13198	0.00000	.08050	.16100	.16100
.16919	.20938	0.00000	.08050	.16100	.16100
.28643	.31884	0.00000	.08050	.16100	.16100
.36934	.39623	0.00000	.08050	.16100	.16100
.13198	.17768	.08050	.16100	.16100	.16100
.20938	.24957	.08050	.16100	.16100	.16100
.31884	.35124	.08050	.16100	.16100	.16100
.39623	.42313	.08050	.16100	.16100	.16100
.17768	.21551	.16100	.22764	.16100	.16100
.24957	.26284	.16100	.22764	.16100	.16100
.35124	.37806	.16100	.22764	.16100	.16100
.42313	.44539	.16100	.22764	.16100	.16100

.21551	.26242	.22764	.31026	.16100	.16100
.28284	.32410	.22764	.31026	.16100	.16100
.37806	.41132	.22764	.31026	.16100	.16100
.44539	.47300	.22764	.31026	.16100	.16100
.26242	.30025	.31026	.37690	.16100	.16100
.32410	.35737	.31026	.37690	.16100	.16100
.41132	.43815	.31026	.37690	.16100	.16100
.47300	.49527	.31026	.37690	.16100	.16100
.30025	.33492	.37690	.44183	.16100	.16100
.35737	.38822	.37690	.44183	.16100	.16100
.43815	.46358	.37690	.44183	.16100	.16100
.49527	.51687	.37690	.44183	.16100	.16100
.33492	.39270	.44183	.55002	.16100	.16100
.38822	.43961	.44183	.55002	.16100	.16100
.46358	.50596	.44183	.55002	.16100	.16100
.51687	.55288	.44183	.55002	.16100	.16100
.39270	.47053	.55002	.69579	.16100	.16100
.43961	.50886	.55002	.69579	.16100	.16100
.50596	.56306	.55002	.69579	.16100	.16100
.55288	.60139	.55002	.69579	.16100	.16100
.47053	.55904	.69579	.86155	.16100	.16100
.50886	.58760	.69579	.86155	.16100	.16100
.56306	.62799	.69579	.86155	.16100	.16100
.60139	.65655	.69579	.86155	.16100	.16100
.55904	.64755	.86155	1.02731	.16100	.16100
.58760	.66634	.86155	1.02731	.16100	.16100
.62799	.69292	.86155	1.02731	.16100	.16100
.65655	.71171	.86155	1.02731	.16100	.16100
.64755	.72539	1.02731	1.17308	.16100	.16100
.66634	.73559	1.02731	1.17308	.16100	.16100
.69292	.75002	1.02731	1.17308	.16100	.16100
.71171	.76022	1.02731	1.17308	.16100	.16100
.72539	.78316	1.17308	1.28127	.16100	.16100
.73559	.78699	1.17308	1.29127	.16100	.16100
.75002	.79240	1.17308	1.28127	.16100	.16100
.76022	.79622	1.17308	1.28127	.16100	.16100
.78316	.81390	1.29127	1.33884	.16100	.16100
.78699	.81433	1.28127	1.33884	.16100	.16100
.79240	.81495	1.28127	1.33884	.16100	.16100
.79622	.81538	1.28127	1.33884	.16100	.16100
.02054	.02054	.16100	.16100	.16100	.22700
.06676	.15406	.16100	.16100	.16100	.22700
.15406	.15406	.16100	.16100	.16100	.22700
.02054	.01793	.16100	.22764	.22700	.22700
.06676	.10523	.16100	.22764	.22700	.22700
.15406	.19254	.16100	.22764	.22700	.22700
.01793	.06563	.22764	.31026	.22700	.22700
.10523	.15294	.22764	.31026	.22700	.22700
.19254	.24024	.22764	.31026	.22700	.22700

ORIGINAL PAGE IS
OF POOR QUALITY

.06563	.10411	.31026	.37690	.22700	.22700
.15294	.19141	.31026	.37690	.22700	.22700
.24024	.27871	.31026	.37690	.22700	.22700
.10411	.10411	.37690	.37690	.22700	.16100
.19141	.19141	.37690	.37690	.22700	.16100
.27871	.27871	.37690	.37690	.22700	.16100
.02054	.01793	.16100	.22764	.16100	.16100
.06676	.10523	.16100	.22764	.16100	.16100
.15406	.19254	.16100	.22764	.16100	.16100
.01793	.06563	.22764	.31026	.16100	.16100
.10523	.15294	.22764	.31026	.16100	.16100
.19254	.24024	.22764	.31026	.16100	.16100
.06563	.10411	.31026	.37690	.16100	.16100
.15294	.19141	.31026	.37690	.16100	.16100
.24024	.27871	.31026	.37690	.16100	.16100
.17768	.17768	.16100	.16100	.16100	.22700
.24957	.24957	.16100	.16100	.16100	.22700
.35124	.35124	.16100	.16100	.16100	.22700
.42313	.42313	.16100	.16100	.16100	.22700
.17768	.21551	.16100	.22764	.22700	.22700
.24957	.28284	.16100	.22764	.22700	.22700
.35124	.37806	.16100	.22764	.22700	.22700
.42313	.44539	.16100	.22764	.22700	.22700
.21551	.26242	.22764	.31026	.22700	.22700
.28284	.32410	.22764	.31026	.22700	.22700
.37806	.41132	.22764	.31026	.22700	.22700
.44539	.47300	.22764	.31026	.22700	.22700
.26242	.30025	.31026	.37690	.22700	.22700
.32410	.35737	.31026	.37690	.22700	.22700
.41132	.43815	.31026	.37690	.22700	.22700
.47300	.49527	.31026	.37690	.22700	.22700
.30025	.30025	.37690	.37690	.22700	.16100
.35737	.35737	.37690	.37690	.22700	.16100
.43815	.43815	.37690	.37690	.22700	.16100
.49527	.49527	.37690	.37690	.22700	.16100
.17768	.21551	.16100	.22764	.16100	.16100
.24957	.28284	.16100	.22764	.16100	.16100
.35124	.37806	.16100	.22764	.16100	.16100
.42313	.44539	.16100	.22764	.16100	.16100
.21551	.26242	.22764	.31026	.16100	.16100
.28284	.32410	.22764	.31026	.16100	.16100
.37806	.41132	.22764	.31026	.16100	.16100
.44539	.47300	.22764	.31026	.16100	.16100
.26242	.30025	.31026	.37690	.16100	.16100
.32410	.35737	.31026	.37690	.16100	.16100
.41132	.43815	.31026	.37690	.16100	.16100
.47300	.49527	.31026	.37690	.16100	.16100
.45103	.45103	.16100	.16100	.16100	.22700
.57747	.57747	.16100	.16100	.16100	.22700

ORIGINAL PAGE IS
OF POOR QUALITY

.75630	.75630	.16100	.16100	.16100	.22700
.88274	.88274	.16100	.16100	.16100	.22700
.45103	.47201	.16100	.22764	.22700	.22700
.57747	.59390	.16100	.22764	.22700	.22700
.75630	.76627	.16100	.22764	.22700	.22700
.88274	.88816	.16100	.22764	.22700	.22700
.47201	.49802	.22764	.31026	.22700	.22700
.59390	.61426	.22764	.31026	.22700	.22700
.76627	.77864	.22764	.31026	.22700	.22700
.88816	.89488	.22764	.31026	.22700	.22700
.49802	.51901	.31026	.37690	.22700	.22700
.61426	.63068	.31026	.37690	.22700	.22700
.77864	.78862	.31026	.37690	.22700	.22700
.89488	.90029	.31026	.37690	.22700	.22700
.51901	.51901	.37690	.37690	.22700	.16100
.63068	.63068	.37690	.37690	.22700	.16100
.78862	.78862	.37690	.37690	.22700	.16100
.90029	.90029	.37690	.37690	.22700	.16100
.45103	.47201	.16100	.22764	.16100	.16100
.57747	.59390	.16100	.22764	.16100	.16100
.75630	.76627	.16100	.22764	.16100	.16100
.88274	.88816	.16100	.22764	.16100	.16100
.47201	.49802	.22764	.31026	.16100	.16100
.59390	.61426	.22764	.31026	.16100	.16100
.76627	.77864	.22764	.31026	.16100	.16100
.88816	.89488	.22764	.31026	.16100	.16100
.49802	.51901	.31026	.37690	.16100	.16100
.61426	.63068	.31026	.37690	.16100	.16100
.77864	.78862	.31026	.37690	.16100	.16100
.89488	.90029	.31026	.37690	.16100	.16100

33

CONTROL POINT COORDINATES=

XCP	YCP	ZCP	XCP	YCP	ZCP
-.05336	.04025	.16100	.04745	.04025	.16100
.09786	.04025	.16100	-.00688	.12075	.16100
.09393	.12075	.16100	.14433	.12075	.16100
.03461	.19262	.16100	.13542	.19262	.16100
.18582	.19262	.16100	.07868	.26895	.16100
.17949	.26895	.16100	.22989	.26895	.16100
.12275	.34528	.16100	.22356	.34528	.16100
.27397	.34528	.16100	.15762	.40613	.16100
.25792	.40613	.16100	.30807	.40613	.16100
.20547	.49029	.16100	.30429	.49029	.16100
.35370	.49029	.16100	.27879	.61922	.16100
.37534	.61922	.16100	.42362	.61922	.16100
.36872	.77739	.16100	.46250	.77739	.16100
.50939	.77739	.16100	.46442	.94571	.16100
.55525	.94571	.16100	.60066	.94571	.16100

ORIGINAL PAGE IS
OF POOR QUALITY

.55435	1.10387	.16100	.64240	1.10387	.16100
.68643	1.10387	.16100	.62766	1.23281	.16100
.71345	1.23281	.16100	.75635	1.23281	.16100
.67551	1.31697	.16100	.75982	1.31697	.16100
.80198	1.31697	.16100	.14124	.04025	.16100
.24596	.04025	.16100	.35068	.04025	.16100
.39406	.04025	.16100	.18473	.12075	.16100
.28226	.12075	.16100	.37978	.12075	.16100
.42018	.12075	.16100	.22356	.19262	.16100
.31466	.19262	.16100	.40576	.19262	.16100
.44350	.19262	.16100	.26480	.26895	.16100
.34908	.26895	.16100	.43336	.26895	.16100
.46827	.26895	.16100	.30605	.34528	.16100
.38350	.34528	.16100	.46096	.34528	.16100
.49304	.34528	.16100	.33805	.40613	.16100
.41043	.40613	.16100	.48280	.40613	.16100
.51278	.40613	.16100	.38100	.49029	.16100
.44690	.49029	.16100	.51280	.49029	.16100
.54009	.49029	.16100	.44681	.61922	.16100
.50278	.61922	.16100	.55875	.61922	.16100
.58193	.61922	.16100	.52753	.77739	.16100
.57132	.77739	.16100	.61512	.77739	.16100
.63326	.77739	.16100	.61343	.94571	.16100
.64427	.94571	.16100	.67510	.94571	.16100
.68787	.94571	.16100	.69416	1.10387	.16100
.71281	1.10387	.16100	.73147	1.10387	.16100
.73920	1.10387	.16100	.75996	1.23281	.16100
.76869	1.23281	.16100	.77742	1.23281	.16100
.78104	1.23281	.16100	.80291	1.31697	.16100
.80516	1.31697	.16100	.80741	1.31697	.16100
.80835	1.31697	.16100	.01635	.16100	.19400
.11716	.16100	.19400	.16757	.16100	.19400
.03461	.19262	.22700	.13542	.19262	.22700
.18582	.19262	.22700	.07868	.26895	.22700
.17949	.26895	.22700	.22989	.26895	.22700
.12275	.34528	.22700	.22356	.34528	.22700
.27397	.34528	.22700	.14100	.37690	.19400
.24181	.37690	.19400	.29222	.37690	.19400
.03461	.19262	.16100	.13542	.19262	.16100
.18582	.19262	.16100	.07868	.26895	.16100
.17949	.26895	.16100	.22989	.26895	.16100
.12275	.34528	.16100	.22356	.34528	.16100
.27397	.34528	.16100	.20648	.16100	.19400
.30040	.16100	.19400	.39433	.16100	.19400
.43324	.16100	.19400	.22356	.19262	.22700
.31466	.19262	.22700	.40576	.19262	.22700
.44350	.19262	.22700	.26480	.26895	.22700
.34908	.26895	.22700	.43336	.26895	.22700
.46827	.26895	.22700	.30605	.34528	.22700

.38350	.34528	.22700	.46096	.34528	.22700
.49304	.34528	.22700	.32313	.37690	.19400
.39776	.37690	.19400	.47239	.37690	.19400
.50330	.37690	.19400	.22356	.19262	.16100
.31466	.19262	.16100	.40576	.19262	.16100
.44350	.19262	.16100	.26480	.26895	.16100
.34908	.26895	.16100	.43336	.26895	.16100
.46827	.26895	.16100	.30605	.34528	.16100
.38350	.34528	.16100	.46096	.34528	.16100
.49304	.34528	.16100	.50167	.16100	.19400
.66688	.16100	.19400	.83210	.16100	.19400
.90053	.16100	.19400	.51076	.19262	.22700
.67315	.19262	.22700	.83553	.19262	.22700
.90280	.19262	.22700	.53271	.26895	.22700
.68827	.26895	.22700	.84383	.26895	.22700
.90826	.26895	.22700	.55465	.34528	.22700
.70339	.34528	.22700	.85213	.34528	.22700
.91373	.34528	.22700	.56374	.37690	.19400
.70965	.37690	.19400	.85556	.37690	.19400
.91600	.37690	.19400	.51076	.19262	.16100
.67315	.19262	.16100	.83553	.19262	.16100
.90280	.19262	.16100	.53271	.26895	.16100
.68827	.26895	.16100	.84383	.26895	.16100
.90826	.26895	.16100	.55465	.34528	.16100
.70339	.34528	.16100	.85213	.34528	.16100
.91373	.34528	.16100			

XX

ALPHA = 5.000 DEGREES

XX

VORTEX	XV	YV	CP	CPW
1	.02713	.02990	1.82867	1.71493
2	.20250	.02990	.72016	.65714
3	.37787	.02990	.49340	.43323
4	.42765	.02990	.43644	.37765
5	.58865	.02990	.40451	.32947
6	.81635	.02990	.27016	.19962
7	.97735	.02990	.09796	.06716
8	.02829	.08970	2.03928	1.90521
9	.21113	.08970	.72887	.66321
10	.39398	.08970	.48966	.42321
11	.44426	.08970	.42926	.35985
12	.60059	.08970	.40638	.31311
13	.82168	.08970	.27184	.18731
14	.97801	.08970	.10743	.06125
15	.02941	.14308	2.09304	1.99767

16	.21949	.14308	.72271	.67424
17	.40957	.14308	.34005	.42083
18	.46033	.14308	1.03031	.34900
19	.61214	.14308	1.14684	.30524
20	.82684	.14308	.74894	.18107
21	.97865	.14308	2.58549	.05894
22	.03070	.19978	2.15486	2.06422
23	.22912	.19978	.72365	.68234
24	.42754	.19978	.33955	.41747
25	.47885	.19978	1.20752	.33739
26	.62545	.19978	1.17653	.29922
27	.83278	.19978	.83687	.17691
28	.97938	.19978	2.84410	.05772
29	.03210	.25649	2.19760	2.10094
30	.23963	.25649	.73448	.68559
31	.44715	.25649	.34729	.41466
32	.49907	.25649	.82231	.32619
33	.63999	.25649	1.03385	.29501
34	.83927	.25649	.72370	.17474
35	.98018	.25649	2.69778	.05705
36	.03315	.30168	2.28225	2.12341
37	.24746	.30168	.75709	.68777
38	.46176	.30168	.49725	.41353
39	.51414	.30168	.39801	.31884
40	.65081	.30168	.41337	.29272
41	.84410	.30168	.31250	.17377
42	.98078	.30168	.13371	.05673
43	.03448	.36420	2.32885	2.15159
44	.25733	.36420	.77401	.69081
45	.48018	.36420	.48895	.41008
46	.53312	.36420	.37450	.30837
47	.66446	.36420	.37020	.29036
48	.85019	.36420	.23657	.17332
49	.98153	.36420	.08003	.05685
50	.03681	.45998	2.34367	2.16761
51	.27476	.45998	.75853	.68688
52	.51271	.45998	.45320	.40028
53	.56667	.45998	.32740	.28752
54	.68856	.45998	.32671	.28348
55	.86096	.45998	.20066	.17167
56	.98285	.45998	.06672	.05666
57	.04034	.57747	2.29861	2.15077
58	.30113	.57747	.72135	.66845
59	.56192	.57747	.41081	.37738
60	.61740	.57747	.27429	.25154
61	.72503	.57747	.29162	.26662
62	.87724	.57747	.18130	.16513
63	.98486	.57747	.06055	.05502
64	.04526	.70250	2.20105	2.08661

65	.33782	.70250	.66596	.62825
66	.63037	.70250	.35479	.33339
67	.68798	.70250	.20940	.19663
68	.77575	.70250	.24752	.23218
69	.89988	.70250	.15850	.14847
70	.98765	.70250	.05355	.05012
71	.05154	.81999	2.04510	1.95818
72	.38472	.81999	.58129	.55478
73	.71789	.81999	.27160	.25849
74	.77821	.81999	.12967	.12336
75	.84060	.81999	.17913	.17032
76	.92883	.81999	.12039	.11439
77	.99122	.81999	.04138	.03930
78	.05856	.91577	1.78441	1.71949
79	.43710	.91577	.43052	.41351
80	.81564	.91577	.15061	.14416
81	.87898	.91577	.04798	.04590
82	.91303	.91577	.08227	.07868
83	.96117	.91577	.06083	.05815
84	.99521	.91577	.02162	.02066
85	.06455	.97829	1.22583	1.18523
86	.48181	.97829	.17224	.16560
87	.89908	.97829	.04424	.04228
88	.96501	.97829	.00548	.00524
89	.97485	.97829	.01201	.01147
90	.98877	.97829	.01070	.01022
91	.99862	.97829	.00413	.00395

Y/SP	CL	CM	CT	CDI	CLW	CMW	CDW
.02990	.59220	-.07638	.04034	.04249	.52105	-.05282	.03686
.08970	.63088	-.14181	.05403	.03410	.54685	-.10411	.02852
.14308	1.13401	-.67387	.06193	.09684	.56844	-.15895	.02431
.19978	1.19648	-.82983	.06942	.09805	.59004	-.22333	.02073
.25649	1.11087	-.84433	.07576	.07962	.60982	-.29312	.01815
.30168	.73380	-.44346	.08049	.02185	.62471	-.35181	.01649
.36420	.73327	-.50984	.08716	.01504	.64387	-.43638	.01425
.45998	.73952	-.63551	.09462	.00839	.66970	-.57211	.01129
.57747	.74968	-.80354	.10039	.00398	.69569	-.74509	.00805
.70250	.75547	-.98261	.10408	.00107	.71338	-.92811	.00491
.81999	.73914	-1.11948	.10363	-.00077	.70601	-1.06974	.00243
.91577	.65436	-1.10122	.09265	-.00160	.62932	-1.05947	.00081
.97829	.41195	-.73218	.05928	-.00196	.39751	-.70674	-.00059

THE LIFT COEFFICIENT = .76694

TOTAL INDUCED DRAG COEFFICIENT = .02816

THE INDUCED DRAG PARAMETER = .04787

TOTAL PITCHING MOMENT COEFFICIENT = -.65297
THE COANDA LIFT COEFFICIENT, CLR = .46587
THE COANDA DRAG COEFFICIENT, CDR = -1.40297
THE COANDA MOMENT COEFFICIENT, CMR = -.39958
THE LIFT COEFFICIENT FOR THE WING ALONE = .60713
THE INDUCED DRAG COEFFICIENT FOR THE WING ALONE = .01435
THE PITCHING MOMENT COEFFICIENT FOR THE WING ALONE = -.49990
THE INDUCED DRAG PARAMETER FOR THE WING ALONE = .03892

LATERAL-DIRECTIONAL STABILITY CHARACTERISTICS WITH JET ON

**STABILITY DERIVATIVES EVALUATED AT ALPHA = 5.000 DEG.

AND AT MACH NO. = 0.000, BASED ON BODY AXES***

CYB = -.1602586 CLB = -.1686574 CNB = .0063876
CYP = .3305743 CLP = -.4357465 CNP = -.2673868
CYR = .0267657 CLR = .1535234 CNR = -.0067337

STABILITY DERIVATIVES BASED ON STABILITY AXES*

CYB = -.1602586 CLB = -.1681000 CNB = .0211058
CYP = .3329100 CLP = -.4456830 CNP = -.2299484
CYR = -.0020824 CLR = .1909618 CNR = .0032027

LATERAL-DIRECTIONAL STABILITY CHARACTERISTICS WITH JET OFF

**STABILITY DERIVATIVES EVALUATED AT ALPHA = 5.000 DEG.

AND AT MACH NO. = 0.000, BASED ON BODY AXES***

CYB = -.1346015 CLB = -.1653598 CNB = .0059699

CYP = .1397994 CLP = -.4371177 CNP = -.1398524
CYR = .0201641 CLR = .1430642 CNR = -.0058492

STABILITY DERIVATIVES BASED ON STABILITY AXES

CYB = -.1346015 CLB = -.1648388 CNB = .0204002
CYP = .1415590 CLP = -.4368374 CNP = -.1022171
CYR = .0079643 CLR = .1806995 CNR = -.0061295

Listing of Input Data Cards for Test Case 2

Card

1	#	NACA	TN	D-777A	#	HIGH	WING	DELTA	F=44	DEGREES		
2			1		0	1		1				
3	0.		0.		0.14142	1.		5.		-0.127		0.3175
4			2		1 44.	44.						
5	0.455		0.3663		0.	3.		0.07462		0.269		0.
6	0.		1.		1.	0.3050A		0.3050B		-0.0220B		-0.0220B _{1.}
7	3.132		44.		0.							
8			4		3	4		5		5		4
9			2		3							
10			3		2	2		0				
11	-0.127		0.07462		0.	-0.127		0.07462		0.161		0.161
12	-0.127		0.07462		0.161	-0.127		0.07462		0.3769		0.161
13	-0.127		0.07462		0.3769	-0.127		0.07462		0.7695		0.161
14	-0.127		0.07462		0.7695	-0.127		0.0406		1.3462		0.161
15	0.07462		0.29073		0.	0.07462		0.25669		0.161		0.161
16	0.07462		0.25669		0.161	0.07462		0.21104		0.3769		0.161
17	0.07462		0.21104		0.3769	0.07462		0.12802		0.7695		0.161
18	0.07462		0.12802		0.7695	0.0406		0.0406		1.3462		0.161
19	0.29073		0.381		0.	0.25669		0.34029		0.161		0.161
20	0.25669		0.34029		0.161	0.21104		0.2857		0.3769		0.161
21	0.21104		0.2857		0.3769	0.12802		0.18642		0.7695		0.161
22	0.12802		0.18642		0.7695	0.0406		0.0406		1.3462		0.161
23			4		7	3		2		2		4
24	-0.127		0.07462		0.161	0.161						
25	-0.127		0.07462		0.161	0.227						
26	-0.127		0.07462		0.3769	0.227						
27	-0.127		0.07462		0.3769	0.161						
28	0.07462		0.25669		0.161	0.161						
29	0.07462		0.25669		0.161	0.227						
30	0.07462		0.21104		0.3769	0.227						
31	0.07462		0.21104		0.3769	0.161						
32	0.25669		0.34029		0.161	0.161						
33	0.25669		0.34029		0.161	0.227						
34	0.21104		0.2857		0.3769	0.227						
35	0.21104		0.2857		0.3769	0.161						
36	0.34029		0.8075A		0.161	0.161						
37	0.34029		0.8075B		0.161	0.227						
38	0.2857		0.75299		0.3769	0.227						
39	0.2857		0.75299		0.3769	0.161						
40			1		1							
41	5.		1.3462									
42			1		2	7		12		1		12
43	-0.777		1.301		0.	0.		0.8		0.		

07

 * NASA TN D-7778 * HIGH WING DELTAF=44 DEGREES

 1 0 1 1

Output for Test Case 2

XXXXXXXXXXXXXXXXXXXXXXXXXX

CASE NUMBER = 1

XXXXXXXXXXXXXXXXXXXXXXXXXX

INPUT DATA

0.00000	0.00000	.14142	1.00000	5.00000	-.12700	.31750	
	2	1	44.00000	44.00000			
.45500	.36630	0.00000	3.00000	.07462	.26900	0.00000	1.00000
0.00000	1.00000	1.00000	.30508	.30508	-.02208	-.02208	
3.13200	44.00000	0.00000					
4	3	4	5	5	4		
2	3						
3	2	2	0	0			
-.12700	.07462	0.00000	-.12700	.07462	.16100	.16100	
-.12700	.07462	.16100	-.12700	.07462	.37690	.16100	
-.12700	.07462	.37690	-.12700	.07462	.76950	.16100	
-.12700	.07462	.76950	-.12700	.04060	1.34620	.16100	
.07462	.29073	0.00000	.07462	.25669	.16100	.16100	
.07462	.25669	.16100	.07462	.21104	.37690	.16100	
.07462	.21104	.37690	.07462	.12802	.76950	.16100	
.07462	.12802	.76950	.04060	.04060	1.34620	.16100	
.29073	.38100	0.00000	.25669	.34029	.16100	.16100	
.25669	.34029	.16100	.21104	.28570	.37690	.16100	
.21104	.28570	.37690	.12802	.18642	.76950	.16100	
.12802	.18642	.76950	.04060	.04060	1.34620	.16100	
4	7	3	2	2	4		
-.12700	.07462	.16100	.16100				
-.12700	.07462	.16100	.22700				
-.12700	.07462	.37690	.22700				
-.12700	.07462	.37690	.16100				
.07462	.25669	.16100	.16100				
.07462	.25669	.16100	.22700				
.07462	.21104	.37690	.22700				
.07462	.21104	.37690	.16100				
.25669	.34029	.16100	.16100				
.25669	.34029	.16100	.22700				
.21104	.28570	.37690	.22700				
.21104	.28570	.37690	.16100				
.34029	.80758	.16100	.16100				
.34029	.80758	.16100	.22700				
.28570	.75299	.37690	.22700				
.28570	.75299	.37690	.16100				
1	1						
5.00000	1.34620						
1	2	7	12	1	12		

T1

ORIGINAL PAGE IS
 OF POOR QUALITY

-.77700 1.30100 0.00000 0.00000 .80000 0.00000
 HALF SW= .45500E+00 CREF= .36630E+00

LPANEL,JPANEL,LWFJ=
 91 88 291

VORTEX ELEMENT ENDPOINT COORDINATES*

X1	X2	Y1	Y2	Z1	Z2
-.11349	-.11349	0.00000	.08050	.16100	.16100
-.02619	-.02619	0.00000	.08050	.16100	.16100
.06111	.06111	0.00000	.08050	.16100	.16100
-.11349	-.11349	.08050	.16100	.16100	.16100
-.02619	-.02619	.08050	.16100	.16100	.16100
.06111	.06111	.08050	.16100	.16100	.16100
-.11349	-.11349	.16100	.22764	.16100	.16100
-.02619	-.02619	.16100	.22764	.16100	.16100
.06111	.06111	.16100	.22764	.16100	.16100
-.11349	-.11349	.22764	.31026	.16100	.16100
-.02619	-.02619	.22764	.31026	.16100	.16100
.06111	.06111	.22764	.31026	.16100	.16100
-.11349	-.11349	.31026	.37690	.16100	.16100
-.02619	-.02619	.31026	.37690	.16100	.16100
.06111	.06111	.31026	.37690	.16100	.16100
-.11349	-.11349	.37690	.45782	.16100	.16100
-.02619	-.02619	.37690	.45782	.16100	.16100
.06111	.06111	.37690	.45782	.16100	.16100
-.11349	-.11349	.45782	.57320	.16100	.16100
-.02619	-.02619	.45782	.57320	.16100	.16100
.06111	.06111	.45782	.57320	.16100	.16100
-.11349	-.11349	.57320	.68858	.16100	.16100
-.02619	-.02619	.57320	.68858	.16100	.16100
.06111	.06111	.57320	.68858	.16100	.16100
-.11349	-.11349	.68858	.76950	.16100	.16100
-.02619	-.02619	.68858	.76950	.16100	.16100
.06111	.06111	.68858	.76950	.16100	.16100
-.11349	-.11396	.76950	.88836	.16100	.16100
-.02619	-.02970	.76950	.88836	.16100	.16100
.06111	.05457	.76950	.88836	.16100	.16100
-.11396	-.11463	.88836	1.05785	.16100	.16100
-.02970	-.03470	.88836	1.05785	.16100	.16100
.05457	.04524	.88836	1.05785	.16100	.16100
-.11463	-.11530	1.05785	1.22734	.16100	.16100
-.03470	-.03969	1.05785	1.22734	.16100	.16100
.04524	.03592	1.05785	1.22734	.16100	.16100
-.11530	-.11572	1.22734	1.33209	.16100	.16100
-.03969	-.04278	1.22734	1.33209	.16100	.16100
.03592	.03015	1.22734	1.33209	.16100	.16100
.10627	.10378	0.00000	.08050	.16100	.16100

42

.25908	.24455	0.00000	.08050	.16100	.16100
.10378	.10128	.08050	.16100	.16100	.16100
.24455	.23003	.08050	.16100	.16100	.16100
.10128	.09922	.16100	.22764	.16100	.16100
.23003	.21800	.16100	.22764	.16100	.16100
.09922	.09666	.22764	.31026	.16100	.16100
.21800	.20309	.22764	.31026	.16100	.16100
.09666	.09460	.31026	.37690	.16100	.16100
.20309	.19106	.31026	.37690	.16100	.16100
.09460	.09209	.37690	.45782	.16100	.16100
.19106	.17646	.37690	.45782	.16100	.16100
.09209	.08852	.45782	.57320	.16100	.16100
.17646	.15563	.45782	.57320	.16100	.16100
.08852	.08495	.57320	.68858	.16100	.16100
.15563	.13480	.57320	.68858	.16100	.16100
.08495	.08244	.68858	.76950	.16100	.16100
.13480	.12020	.68858	.76950	.16100	.16100
.08244	.07382	.76950	.88836	.16100	.16100
.12020	.10379	.76950	.88836	.16100	.16100
.07382	.06152	.88836	1.05785	.16100	.16100
.10379	.08040	.88836	1.05785	.16100	.16100
.06152	.04922	1.05785	1.22734	.16100	.16100
.08040	.05701	1.05785	1.22734	.16100	.16100
.04922	.04162	1.22734	1.33209	.16100	.16100
.05701	.04255	1.22734	1.33209	.16100	.16100
.30395	.28644	0.00000	.08050	.16100	.16100
.36778	.34791	0.00000	.08050	.16100	.16100
.28644	.26893	.08050	.16100	.16100	.16100
.34791	.32805	.08050	.16100	.16100	.16100
.26893	.25444	.16100	.22764	.16100	.16100
.32805	.31160	.16100	.22764	.16100	.16100
.25444	.23647	.22764	.31026	.16100	.16100
.31160	.29121	.22764	.31026	.16100	.16100
.23647	.22197	.31026	.37690	.16100	.16100
.29121	.27477	.31026	.37690	.16100	.16100
.22197	.20437	.37690	.45782	.16100	.16100
.27477	.25479	.37690	.45782	.16100	.16100
.20437	.17927	.45782	.57320	.16100	.16100
.25479	.22632	.45782	.57320	.16100	.16100
.17927	.15417	.57320	.68858	.16100	.16100
.22632	.19784	.57320	.68858	.16100	.16100
.15417	.13657	.68858	.76950	.16100	.16100
.19784	.17787	.68858	.76950	.16100	.16100
.13657	.11679	.76950	.88836	.16100	.16100
.17787	.14958	.76950	.88836	.16100	.16100
.11679	.08859	.88836	1.05785	.16100	.16100
.14958	.10923	.88836	1.05785	.16100	.16100
.08859	.06038	1.05785	1.22734	.16100	.16100
.10923	.06889	1.05785	1.22734	.16100	.16100

.06038	.04295	1.22734	1.33209	.16100	.16100
.06889	.04396	1.22734	1.33209	.16100	.16100
-.11349	-.11349	.16100	.16100	.16100	.22700
-.02619	-.02619	.16100	.16100	.16100	.22700
.06111	.06111	.16100	.16100	.16100	.22700
-.11349	-.11349	.16100	.22764	.22700	.22700
-.02619	-.02619	.16100	.22764	.22700	.22700
.06111	.06111	.16100	.22764	.22700	.22700
-.11349	-.11349	.22764	.31026	.22700	.22700
-.02619	-.02619	.22764	.31026	.22700	.22700
.06111	.06111	.22764	.31026	.22700	.22700
-.11349	-.11349	.31026	.37690	.22700	.22700
-.02619	-.02619	.31026	.37690	.22700	.22700
.06111	.06111	.31026	.37690	.22700	.22700
-.11349	-.11349	.37690	.37690	.22700	.16100
-.02619	-.02619	.37690	.37690	.22700	.16100
.06111	.06111	.37690	.37690	.22700	.16100
-.11349	-.11349	.16100	.22764	.16100	.16100
-.02619	-.02619	.16100	.22764	.16100	.16100
.06111	.06111	.16100	.22764	.16100	.16100
-.11349	-.11349	.22764	.31026	.16100	.16100
-.02619	-.02619	.22764	.31026	.16100	.16100
.06111	.06111	.22764	.31026	.16100	.16100
-.11349	-.11349	.31026	.37690	.16100	.16100
-.02619	-.02619	.31026	.37690	.16100	.16100
.06111	.06111	.31026	.37690	.16100	.16100
.10128	.10128	.16100	.16100	.16100	.22700
.23003	.23003	.16100	.16100	.16100	.22700
.10128	.09922	.16100	.22764	.22700	.22700
.23003	.21800	.16100	.22764	.22700	.22700
.09922	.09666	.22764	.31026	.22700	.22700
.21800	.20309	.22764	.31026	.22700	.22700
.09666	.09460	.31026	.37690	.22700	.22700
.20309	.19106	.31026	.37690	.22700	.22700
.09460	.09460	.37690	.37690	.22700	.16100
.19106	.19106	.37690	.37690	.22700	.16100
.10128	.09922	.16100	.22764	.16100	.16100
.23003	.21800	.16100	.22764	.16100	.16100
.09922	.09666	.22764	.31026	.16100	.16100
.21800	.20309	.22764	.31026	.16100	.16100
.09666	.09460	.31026	.37690	.16100	.16100
.20309	.19106	.31026	.37690	.16100	.16100
.26893	.26893	.16100	.16100	.16100	.22700
.32805	.32805	.16100	.16100	.16100	.22700
.26893	.25444	.16100	.22764	.22700	.22700
.32805	.31160	.16100	.22764	.22700	.22700
.25444	.23647	.22764	.31026	.22700	.22700
.31160	.29121	.22764	.31026	.22700	.22700
.23647	.22197	.31026	.37690	.22700	.22700

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ORIGINAL PAGE IS
OF POOR QUALITY

.29121	.27477	.31026	.37690	.22700	.22700
.22197	.22197	.37690	.37690	.22700	.16100
.27477	.27477	.37690	.37690	.22700	.16100
.26893	.25444	.16100	.22764	.16100	.16100
.32805	.31160	.16100	.22764	.16100	.16100
.25444	.23647	.22764	.31026	.16100	.16100
.31160	.29121	.22764	.31026	.16100	.16100
.23647	.22197	.31026	.27477	.16100	.16100
.29121	.27477	.31026	.37690	.16100	.16100
.35808	.35808	.16100	.16100	.16100	.22700
.48452	.48452	.16100	.16100	.16100	.22700
.66335	.66335	.16100	.16100	.16100	.22700
.78979	.78979	.16100	.16100	.16100	.22700
.35808	.34123	.16100	.22764	.22700	.22700
.48452	.46767	.16100	.22764	.22700	.22700
.66335	.64650	.16100	.22764	.22700	.22700
.78979	.77295	.16100	.22764	.22700	.22700
.34123	.32033	.22764	.31026	.22700	.22700
.46767	.44678	.22764	.31026	.22700	.22700
.64650	.62561	.22764	.31026	.22700	.22700
.77295	.75205	.22764	.31026	.22700	.22700
.32033	.30349	.31026	.37690	.22700	.22700
.44678	.42993	.31026	.37690	.22700	.22700
.62561	.60876	.31026	.37690	.22700	.22700
.75205	.73520	.31026	.37690	.22700	.22700
.30349	.30349	.37690	.37690	.22700	.16100
.42993	.42993	.37690	.37690	.22700	.16100
.60876	.60876	.37690	.37690	.22700	.16100
.73520	.73520	.37690	.37690	.22700	.16100
.35808	.34123	.16100	.22764	.16100	.16100
.48452	.46767	.16100	.22764	.16100	.16100
.66335	.64650	.16100	.22764	.16100	.16100
.78979	.77295	.16100	.22764	.16100	.16100
.34123	.32033	.22764	.31026	.16100	.16100
.46767	.44678	.22764	.31026	.16100	.16100
.64650	.62561	.22764	.31026	.16100	.16100
.77295	.75205	.22764	.31026	.16100	.16100
.32033	.30349	.31026	.37690	.16100	.16100
.44678	.42993	.31026	.37690	.16100	.16100
.62561	.60876	.31026	.37690	.16100	.16100
.75205	.73520	.31026	.37690	.16100	.16100

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CONTROL POINT COORDINATES*

XCP	YCP	ZCP	XCP	YCP	ZCP
-.07660	.04025	.16100	.02421	.04025	.16100
.07462	.04025	.16100	-.07660	.12075	.16100
.02421	.12075	.16100	.07462	.12075	.16100
-.07660	.19262	.16100	.02421	.19262	.16100

ORIGINAL PAGE IS
OF POOR QUALITY

.07462	.19262	.16100	-.07660	.26895	.16100
.02421	.26895	.16100	.07462	.26895	.16100
-.07660	.34528	.16100	.02421	.34528	.16100
.07462	.34528	.16100	-.07660	.41439	.16100
.02421	.41439	.16100	.07462	.41439	.16100
-.07660	.51254	.16100	.02421	.51254	.16100
.07462	.51254	.16100	-.07660	.63386	.16100
.02421	.63386	.16100	.07462	.63386	.16100
-.07660	.73201	.16100	.02421	.73201	.16100
.07462	.73201	.16100	-.07741	.82457	.16100
.02178	.82457	.16100	.07137	.82457	.16100
-.07953	.96874	.16100	.01540	.96874	.16100
.06287	.96874	.16100	-.08216	1.14696	.16100
.00752	1.14696	.16100	.05235	1.14696	.16100
-.08429	1.29113	.16100	.00114	1.29113	.16100
.04385	1.29113	.16100	.17842	.04025	.16100
.28222	.04025	.16100	.16991	.12075	.16100
.26520	.12075	.16100	.16231	.19262	.16100
.25000	.19262	.16100	.15424	.26895	.16100
.23387	.26895	.16100	.14617	.34528	.16100
.21773	.34528	.16100	.13887	.41439	.16100
.20311	.41439	.16100	.12849	.51254	.16100
.18236	.51254	.16100	.11566	.63386	.16100
.15670	.63386	.16100	.10528	.73201	.16100
.13595	.73201	.16100	.09552	.82457	.16100
.11967	.82457	.16100	.08034	.96874	.16100
.09782	.96874	.16100	.06158	1.14696	.16100
.07080	1.14696	.16100	.04640	1.29113	.16100
.04895	1.29113	.16100	.32652	.04025	.16100
.37082	.04025	.16100	.30783	.12075	.16100
.35047	.12075	.16100	.29115	.19262	.16100
.33230	.19262	.16100	.27343	.26895	.16100
.31300	.26895	.16100	.25571	.34528	.16100
.29369	.34528	.16100	.23967	.41439	.16100
.27622	.41439	.16100	.21688	.51254	.16100
.25140	.51254	.16100	.18871	.63386	.16100
.22072	.63386	.16100	.16592	.73201	.16100
.19590	.73201	.16100	.14608	.82457	.16100
.17250	.82457	.16100	.11693	.96874	.16100
.13604	.96874	.16100	.08089	1.14696	.16100
-.09098	1.14696	.16100	.05174	1.29113	.16100
.05452	1.29113	.16100	-.07660	.16100	.19400
.02421	.16100	.19400	.07462	.16100	.19400
-.07660	.19262	.22700	.02421	.19262	.22700
.07462	.19262	.22700	-.07660	.26895	.22700
.02421	.26895	.22700	.07462	.26895	.22700
-.07660	.34528	.22700	.02421	.34528	.22700
.07462	.34528	.22700	-.07660	.37690	.19400
.02421	.37690	.19400	.07462	.37690	.19400

L7

-.07660	.19262	.16100	.02421	.19262	.16100
.07462	.19262	.16100	-.07660	.26895	.16100
.02421	.26895	.16100	.07462	.26895	.16100
-.07660	.34528	.16100	.02421	.34528	.16100
.07462	.34528	.16100	.16565	.16100	.19400
.25669	.16100	.19400	.16231	.19262	.22700
.25000	.19262	.22700	.15424	.26895	.22700
.23387	.26895	.22700	.14617	.34528	.22700
.21773	.34528	.22700	.14283	.37690	.19400
.21104	.37690	.19400	.16231	.19262	.16100
.25000	.19262	.16100	.15424	.26895	.16100
.23387	.26895	.16100	.14617	.34528	.16100
.21773	.34528	.16100	.29849	.16100	.19400
.34029	.16100	.19400	.29115	.19262	.22700
.33230	.19262	.22700	.27343	.26895	.22700
.31300	.26895	.22700	.25571	.34528	.22700
.29369	.34528	.22700	.24837	.37690	.19400
.28570	.37690	.19400	.29115	.19262	.16100
.33230	.19262	.16100	.27343	.26895	.16100
.31300	.26895	.16100	.25571	.34528	.16100
.29369	.34528	.16100	.40872	.16100	.19400
.57393	.16100	.19400	.73915	.16100	.19400
.80758	.16100	.19400	.40073	.19262	.22700
.56594	.19262	.22700	.73115	.19262	.22700
.79959	.19262	.22700	.38143	.26895	.22700
.54664	.26895	.22700	.71185	.26895	.22700
.78029	.26895	.22700	.36213	.34528	.22700
.52734	.34528	.22700	.69255	.34528	.22700
.76098	.34528	.22700	.35413	.37690	.19400
.51934	.37690	.19400	.68456	.37690	.19400
.75299	.37690	.19400	.40073	.19262	.16100
.56594	.19262	.16100	.73115	.19262	.16100
.79959	.19262	.16100	.38143	.26895	.16100
.54664	.26895	.16100	.71185	.26895	.16100
.78029	.26895	.16100	.36213	.34528	.16100
.52734	.34528	.16100	.69255	.34528	.16100
.76098	.34528	.16100			

XX

ALPHA = 5.000 DEGREES

XX

VORTEX	XV	YV	CP	CPW
1	.02713	.02990	6.45517	5.26487
2	.20250	.02990	2.58683	2.03702
3	.37787	.02990	.21658	-.01165
4	.46607	.02990	-1.04294	-1.16843

5	.76095	.02990	-2.86361	-2.70494
6	.84808	.02990	-1.76723	-1.66788
7	.97394	.02990	-.69773	-.67130
8	.02829	.08970	5.11607	4.30027
9	.21113	.08970	2.26819	1.87297
10	.39398	.08970	.85439	.62040
11	.48072	.08970	.59620	.29744
12	.76296	.08970	-.40015	-.60151
13	.84757	.08970	-.39319	-.54201
14	.97385	.08970	-.17198	-.31581
15	.02941	.14308	4.54496	4.09463
16	.21949	.14308	2.02398	1.79930
17	.40957	.14308	.78674	.92512
18	.49490	.14308	8.80496	.95026
19	.76491	.14308	22.41063	1.41893
20	.84707	.14308	25.90014	1.22816
21	.97376	.14308	-3.17332	.17137
22	.03070	.19978	4.46712	4.11760
23	.22912	.19978	1.95459	1.79600
24	.42754	.19978	.92968	1.12441
25	.51124	.19978	7.46008	1.29494
26	.76715	.19978	31.59883	2.25879
27	.84649	.19978	30.23885	1.90504
28	.97366	.19978	2.71523	.49384
29	.03210	.25649	4.51368	4.18044
30	.23963	.25649	1.96195	1.81741
31	.44715	.25649	1.07803	1.24837
32	.52907	.25649	17.33984	1.44848
33	.76960	.25649	25.82381	2.55575
34	.84586	.25649	27.83594	2.17008
35	.97355	.25649	1.60166	.62556
36	.03350	.30782	4.69317	4.21241
37	.25001	.30782	2.01848	1.82692
38	.46653	.30782	1.45124	1.33375
39	.54669	.30782	1.68675	1.52888
40	.77202	.30782	3.13786	2.69362
41	.84524	.30782	2.69427	2.30851
42	.97345	.30782	.89984	.68278
43	.03569	.38073	4.65012	4.19547
44	.26641	.38073	1.99960	1.80659
45	.49713	.38073	1.57716	1.42301
46	.57452	.38073	1.74567	1.58101
47	.77585	.38073	2.96308	2.79088
48	.84426	.38073	2.57902	2.43865
49	.97328	.38073	.79890	.71982
50	.03884	.47085	4.42174	4.03568
51	.28992	.47085	1.84814	1.69152
52	.54099	.47085	1.56700	1.45320
53	.61440	.47085	1.63813	1.53371

54	.78132	.47085	2.88119	2.79312
55	.84286	.47085	2.60810	2.53644
56	.97304	.47085	.75662	.72061
57	.04183	.54376	4.10537	3.77962
58	.31220	.54376	1.61488	1.48926
59	.58258	.54376	1.37908	1.29320
60	.65222	.54376	1.35050	1.28005
61	.78652	.54376	2.59415	2.53494
62	.84152	.54376	2.47283	2.42160
63	.97281	.54376	.65539	.63140
64	.04437	.61252	3.81114	3.53254
65	.33118	.61252	1.37854	1.27556
66	.61798	.61252	.92115	.85488
67	.68597	.61252	.71192	.66205
68	.80001	.61252	.64592	.60285
69	.84946	.61252	.58585	.54746
70	.97417	.61252	.26522	.24804
71	.04835	.71961	3.34555	3.12974
72	.36091	.71961	1.08003	1.00476
73	.67346	.71961	.59600	.55151
74	.74127	.71961	.39475	.36493
75	.83523	.71961	.35244	.32541
76	.87597	.71961	.31146	.28741
77	.97872	.71961	.13549	.12486
78	.05512	.85199	2.70611	2.55803
79	.41140	.85199	.77597	.72855
80	.76768	.85199	.36141	.33716
81	.83520	.85199	.18410	.17155
82	.89504	.85199	.19106	.17787
83	.92099	.85199	.17182	.15990
84	.98644	.85199	.07619	.07083
85	.06305	.95909	1.78450	1.69932
86	.47059	.95909	.40301	.38045
87	.87814	.95909	.14467	.13550
88	.94530	.95909	.03553	.03324
89	.96516	.95909	.04930	.04611
90	.97378	.95909	.04728	.04422
91	.99550	.95909	.02319	.02168

Y/SP	CL	CM	CT	CDI	CLW	CMW	CDW
.02990	.06521	.97007	.30614	-.45001	-.16356	.89981	-.35711
.08970	1.10815	.25947	.20211	-.14922	.77873	.30056	-.11757
.14308	8.92702	-4.13543	.18140	2.74971	1.54133	-.14046	.11327
.19978	10.79594	-5.16229	.18311	3.77647	1.87790	-.26591	.22670
.25649	10.96797	-4.35972	.19303	3.55123	2.01911	-.26817	.26300
.30782	2.34984	-.28892	.20222	.30453	2.08796	-.24028	.27703
.38073	2.32245	-.18776	.20793	.27663	2.12583	-.18145	.28566
.47085	2.21843	-.08825	.19903	.26979	2.07045	-.09594	.28755
.54376	1.98969	.00128	.17938	.24127	1.86900	-.00997	.25816

.61252	1.46748	.15359	.15888	-.04501	1.36321	.14188	-.02652
.71961	1.21646	.19455	.12553	-.04210	1.13545	.18225	-.02886
.85199	1.00680	.20252	.08248	-.01632	.94933	.19141	-.00891
.95909	.66877	.15751	.02960	.01211	.63512	.14986	.01422

THE LIFT COEFFICIENT = 3.13778

TOTAL INDUCED DRAG COEFFICIENT = .70047

THE INDUCED DRAG PARAMETER = .07114

TOTAL PITCHING MOMENT COEFFICIENT = -.80898

THE COANDA LIFT COEFFICIENT, CLR = 2.36375

THE COANDA DRAG COEFFICIENT, CDR = -1.51185

THE COANDA MOMENT COEFFICIENT, CMR = -1.38906

THE LIFT COEFFICIENT FOR THE WING ALONE = 1.34306

THE INDUCED DRAG COEFFICIENT FOR THE WING ALONE = .08235

5 THE PITCHING MOMENT COEFFICIENT FOR THE WING ALONE = .05775

THE INDUCED DRAG PARAMETER FOR THE WING ALONE = .04565

FUSELAGE AERODYNAMIC CHARACTERISTICS ARE GIVEN BELOW

JET-ON CONFIGURATION

TOTAL PRESSURE LOADING AT EACH X-STATION, BASED ON LOCAL RADIUS

X/L	RADIUS	LOADING
-.36964	.02653	.21615
-.33586	.07697	.67853
-.27059	.11957	.50266
-.17830	.14928	.47310
-.06526	.16099	-1.49061
.06082	.16100	2.65183
.19135	.15954	-.61928
.31742	.13443	-.39553
.43046	.10702	-.51522
.52276	.07778	.32348
.58802	.04721	-5.22526
.62181	.01583	44.70392

THE FUSELAGE POTENTIAL LIFT COEFFICIENT = .04924

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THE FUSELAGE POTENTIAL MOMENT COEFFICIENT = .05072

JET-OFF CONFIGURATION

TOTAL PRESSURE LOADING AT EACH X-STATION, BASED ON LOCAL RADIUS

X/L	RADIUS	LOADING
-.36964	.02653	.20605
-.33586	.07697	.62975
-.27059	.11957	.45483
-.17830	.14928	.42110
-.06526	.16099	-1.27505
.06082	.16100	2.56220
.19135	.15954	-.58646
.31742	.13443	-.45178
.43046	.10702	-.57759
.52276	.07778	.15781
.58802	.04721	-4.78707
.62181	.01583	39.16723

THE FUSELAGE POTENTIAL LIFT COEFFICIENT = .04958

THE FUSELAGE POTENTIAL MOMENT COEFFICIENT = .06851

LATERAL-DIRECTIONAL STABILITY CHARACTERISTICS WITH JET ON

**STABILITY DERIVATIVES EVALUATED AT ALPHA = 5.000 DEG.

AND AT MACH NO. = 0.000, BASED ON BODY AXES***

CYB =	-.9966898	CLB =	-.1454903	CNB =	-.0910039
CYP =	-.0713625	CLP =	-.4520820	CNP =	-.2864078
CYR =	.2470868	CLR =	.2089370	CNR =	-.0132019

STABILITY DERIVATIVES, BASED ON STABILITY AXES*

CYB =	-.9966898	CLB =	-.1534323	CNB =	-.0783124
CYP =	-.0498001	CLP =	-.4588427	CNP =	-.2481083
CYR =	.2533144	CLR =	.2472365	CNR =	-.0064413

ORIGINAL PAGE IS
OF POOR QUALITY

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LATERAL-DIRECTIONAL STABILITY CHARACTERISTICS WITH JET OFF

**STABILITY DERIVATIVES EVALUATED AT ALPHA = 5.000 DEG.

AND AT MACH NO. = 0.000, BASED ON BODY AXES***

CYB = -.3479661 CLB = -.1597114 CNB = -.0846101

CYP = -.0824657 CLP = -.4609142 CNP = -.1630398

CYR = .0980542 CLR = .1661150 CNR = -.0044682

STABILITY DERIVATIVES BASED ON STABILITY AXES*

CYB = -.3479661 CLB = -.1670951 CNB = -.0706726

CYP = -.0739089 CLP = -.4606458 CNP = -.1232073

CYR = .1052507 CLR = .2059474 CNR = -.0047366

Listing of Input Data Cards for Test Case 3

Card

```

1      *** TEST CASE 3, OVER-WING BLOWING ***
2      1      0      1      1
3      0.4      1.003      0.43026      0.85914      2.      0.01386      3.08396
4      1      1      0.
5      12.9797      2.94      0.      0.      -1.299      2.032      0.381      0.254
6      3.6      0.      0.      0.      0.      0.      0.
7      3      5      3      7      3
8      2
9      4      0      0      0      0
10     -1.5247      2.472      0.741      -0.28884      2.96356      1.778      0.671
11     -0.28884      2.96356      1.778      0.31657      3.20436      2.286      0.671
12     0.31657      3.20436      2.286      2.855      4.214      4.416      0.671
13     3      5      3      4      5
14     -1.299      -0.28884      1.778      -1.299      0.31657      2.286
15     -0.28884      2.96356      1.778      0.31657      3.20436      2.286
16     2.96356      6.21506      1.778      3.20436      6.45676      2.286
17     1      0
18     0.      4.416
19     1      2      7      12      1      12
20     -7.      9.      1.      12.      1.      0.
21     -7.      -6.2      -5.4      -4.6      -3.      -1.4      0.2      1.8
22     3.4      5.      6.6      9.
23     0.      0.194      0.361      0.528      0.778      0.917      0.993      1.
24     0.944      0.847      0.708      0.444

```

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ORIGINAL PAGE IS
OF POOR QUALITY

 *** TEST CASE 3, OVER-WING BLOWING ***

 1 0 1 1

Output for Test Case 3

XXXXXXXXXXXXXXXXXXXXXXXXXXXX

CASE NUMBER = 1

XXXXXXXXXXXXXXXXXXXXXXXXXXXX

INPUT DATA

.40000	1.00300	.43026	.85914	2.00000	.01386	3.08396	
1	1	0.00000					
12.97970	2.94000	0.00000	0.00000	-1.29900	2.03200	.38100	.25400
3.60000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	

THE COMPUTED JET ENTRAINMENT ARE AS FOLLOWS

XJET	RJET	DM/DX
10.76626	2.37532	.03114
12.01626	2.37532	.03114
14.51626	2.37905	.03104
17.01626	2.41896	.03000
19.51626	2.50324	.02793
22.01626	2.61298	.02547
24.51626	2.73386	.02302
27.01626	2.85818	.02077
29.51626	2.98203	.01876
32.01626	3.10350	.01700
34.51626	3.22167	.01545
37.01626	3.33617	.01410
39.51626	3.44692	.01292
42.01626	3.55396	.01188
44.51626	3.65744	.01096
47.01626	3.75751	.01015
49.51626	3.85436	.00943
52.01626	3.94818	.00878
54.51626	4.03915	.00820
57.01626	4.12742	.00767
59.51626	4.21317	.00720
62.01626	4.29654	.00677
64.51626	4.37767	.00638
67.01626	4.45669	.00603
69.51626	4.53372	.00570
72.01626	4.60886	.00541
74.51626	4.68222	.00513
77.01626	4.75355	.00498
79.51626	4.82394	.00465
82.01626	4.89216	.00443
84.51626	4.95926	.00423

ORIGINAL PAGE IS
 OF POOR QUALITY

54

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      2
      4
-1.52470  2.47200  .74100  -.28884  2.96356  1.77800  .67100
-.28884  2.96356  1.77800  .31657  3.20436  2.28600  .67100
 .31657  3.20436  2.28600  2.85500  4.21400  4.41600  .67100
      3      5      3      4      5
-1.29900  -.28884  1.77800  -1.29900  .31657  2.28600
-.28884  2.96356  1.77800  .31657  3.20436  2.28600
 2.96356  6.21596  1.77800  3.20436  6.45676  2.28600
      1      0
 0.00000  4.41600
      1      2      7      12      1      12
-7.00000  9.00000  1.00000  12.00000  1.00000  0.00000
-7.00000  -6.20000  -5.40000  -4.60000  -3.00000  -1.40000  .20000  1.80000
 3.40000  5.00000  6.60000  9.00000
 0.00000  .19400  .36100  .52800  .77800  .91700  .99300  1.00000
 .94400  .84700  .70800  .44400
      HALF SW= .12980E+02      CREF= .29400E+01

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LPANEL,JPANEL,LWFJ*
 48      72      216

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XX

A RECTANGULAR JET WITH LATERAL EXTENT EQUAL TO THE EQUIVALENT JET DIAMETER IS USED FOR INTERACTION COMPUTATION

NOTE. CHECK WHETHER THE WING IS IMMersed IN THE JET

XX

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THE EQUIVALENT JET PROPERTIES ARE EVALUATED AT 1.54891
THE EQUIVALENT JET RADIUS IS .49329
THE VELOCITY RATIO OF THE EQUIVALENT JET,VO/VJ, IS .66254
VORTEX ELEMENT ENDPOINT COORDINATES*

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X1	X2	Y1	Y2	Z1	Z2
-1.37258	-1.18113	.74100	.90541	.67100	.67100
-.29109	-.13157	.74100	.90541	.67100	.67100
1.23839	1.35274	.74100	.90541	.67100	.67100
2.31988	2.40231	.74100	.90541	.67100	.67100
-1.18113	-.90814	.90541	1.13985	.67100	.67100
-.13157	.09589	.90541	1.13985	.67100	.67100
1.35274	1.51581	.90541	1.13985	.67100	.67100
2.40231	2.51984	.90541	1.13985	.67100	.67100

ORIGINAL PAGE IS OF POOR QUALITY

55

- .90814	- .63515	1.13985	1.37429	.67100	.67100
.09589	.32335	1.13985	1.37429	.67100	.67100
1.51581	1.67888	1.13985	1.37429	.67100	.67100
2.51984	2.63738	1.13985	1.37429	.67100	.67100
- .63515	- .44370	1.37429	1.53871	.67100	.67100
.32335	.48287	1.37429	1.53871	.67100	.67100
1.67888	1.79324	1.37429	1.53871	.67100	.67100
2.63738	2.71981	1.37429	1.53871	.67100	.67100
- .44370	.13071	1.53871	2.03200	.67100	.67100
.48287	.96147	1.53871	2.03200	.67100	.67100
1.79324	2.13635	1.53871	2.03200	.67100	.67100
2.71981	2.96711	1.53871	2.03200	.67100	.67100
.13071	.70512	2.03200	2.52529	.67100	.67100
.96147	1.44008	2.03200	2.52529	.67100	.67100
2.13635	2.47946	2.03200	2.52529	.67100	.67100
2.96711	3.21442	2.03200	2.52529	.67100	.67100
.70512	.94528	2.52529	2.73154	.67100	.67100
1.44008	1.64018	2.52529	2.73154	.67100	.67100
2.47946	2.62292	2.52529	2.73154	.67100	.67100
3.21442	3.31781	2.52529	2.73154	.67100	.67100
.94528	1.32830	2.73154	3.06047	.67100	.67100
1.64018	1.95932	2.73154	3.06047	.67100	.67100
2.62292	2.85170	2.73154	3.06047	.67100	.67100
3.31781	3.48272	2.73154	3.06047	.67100	.67100
1.32830	1.80592	3.06047	3.47065	.67100	.67100
1.95932	2.35727	3.06047	3.47065	.67100	.67100
2.85170	3.13700	3.06047	3.47065	.67100	.67100
3.48272	3.68835	3.06047	3.47065	.67100	.67100
1.80592	2.28354	3.47065	3.88082	.67100	.67100
2.35727	2.75523	3.47065	3.88082	.67100	.67100
3.13700	3.42229	3.47065	3.88082	.67100	.67100
3.68835	3.89398	3.47065	3.88082	.67100	.67100
2.28354	2.66656	3.88082	4.20975	.67100	.67100
2.75523	3.07436	3.88082	4.20975	.67100	.67100
3.42229	3.65108	3.88082	4.20975	.67100	.67100
3.89398	4.05888	3.88082	4.20975	.67100	.67100
2.66656	2.87912	4.20975	4.39230	.67100	.67100
3.07436	3.25147	4.20975	4.39230	.67100	.67100
3.65108	3.77805	4.20975	4.39230	.67100	.67100
4.05888	4.15039	4.20975	4.39230	.67100	.67100
-1.25044	-1.25044	1.53871	1.53871	.67100	1.44587
- .93651	- .93651	1.53871	1.53871	.67100	1.44587
- .62258	- .62258	1.53871	1.53871	.67100	1.44587
-1.25044	-1.21105	1.53871	2.03200	1.44587	1.44587
- .93651	- .64257	1.53871	2.03200	1.44587	1.44587
- .62258	- .07408	1.53871	2.03200	1.44587	1.44587
-1.21105	-1.17167	2.03200	2.52529	1.44587	1.44587
- .64257	- .34863	2.03200	2.52529	1.44587	1.44587
- .07408	.47442	2.52529	2.52529	1.44587	1.44587

-1.17167	-1.17167	2.52529	2.52529	1.44587	.67100
-.34863	-.34863	2.52529	2.52529	1.44587	.67100
.47442	.47442	2.52529	2.52529	1.44587	.67100
-1.25044	-1.21105	1.53871	2.03200	.67100	.67100
-.93651	-.64257	1.53871	2.03200	.67100	.67100
-.62258	-.07408	1.53871	2.03200	.67100	.67100
-1.21105	-1.17167	2.03200	2.52529	.67100	.67100
-.64257	-.34863	2.03200	2.52529	.67100	.67100
-.07408	.47442	2.03200	2.52529	.67100	.67100
-.44370	-.44370	1.53871	1.53871	.67100	1.44587
.48287	.48287	1.53871	1.53871	.67100	1.44587
1.79324	1.79324	1.53871	1.53871	.67100	1.44587
2.71981	2.71981	1.53871	1.53871	.67100	1.44587
-.44370	.13071	1.53871	2.03200	1.44587	1.44587
.48287	.96148	1.53871	2.03200	1.44587	1.44587
1.79324	2.13635	1.53871	2.03200	1.44587	1.44587
2.71981	2.96711	1.53871	2.03200	1.44587	1.44587
.13071	.70512	2.03200	2.52529	1.44587	1.44587
.96148	1.44008	2.03200	2.52529	1.44587	1.44587
2.13635	2.47946	2.03200	2.52529	1.44587	1.44587
2.96711	3.21442	2.03200	2.52529	1.44587	1.44587
.70512	.70512	2.52529	2.52529	1.44587	.67100
1.44008	1.44008	2.52529	2.52529	1.44587	.67100
2.47946	2.47946	2.52529	2.52529	1.44587	.67100
3.21442	3.21442	2.52529	2.52529	1.44587	.67100
-.44370	.13071	1.53871	2.03200	.67100	.67100
.48287	.96148	1.53871	2.03200	.67100	.67100
1.79324	2.13635	1.53871	2.03200	.67100	.67100
2.71981	2.96711	1.53871	2.03200	.67100	.67100
.13071	.70512	2.03200	2.52529	.67100	.67100
.96148	1.44008	2.03200	2.52529	.67100	.67100
2.13635	2.47946	2.03200	2.52529	.67100	.67100
2.96711	3.21442	2.03200	2.52529	.67100	.67100
2.92972	2.92972	1.53871	1.53871	.67100	1.44587
3.52047	3.52047	1.53871	1.53871	.67100	1.44587
4.47633	4.47633	1.53871	1.53871	.67100	1.44587
5.43219	5.43219	1.53871	1.53871	.67100	1.44587
6.02294	6.02294	1.53871	1.53871	.67100	1.44587
2.92972	3.16355	1.53871	2.03200	1.44587	1.44587
3.52047	3.75430	1.53871	2.03200	1.44587	1.44587
4.47633	4.71016	1.53871	2.03200	1.44587	1.44587
5.43219	5.66602	1.53871	2.03200	1.44587	1.44587
6.02294	6.25677	1.53871	2.03200	1.44587	1.44587
3.16355	3.39738	2.03200	2.52529	1.44587	1.44587
3.75430	3.98813	2.03200	2.52529	1.44587	1.44587
4.71016	4.94399	2.03200	2.52529	1.44587	1.44587
5.66602	5.89985	2.03200	2.52529	1.44587	1.44587
6.25677	6.49060	2.03200	2.52529	1.44587	1.44587
3.39738	3.39738	2.52529	2.52529	1.44587	.67100

3.98813	3.98813	2.52529	2.52529	1.44587	.67100
4.94399	4.94399	2.52529	2.52529	1.44587	.67100
5.89985	5.89985	2.52529	2.52529	1.44587	.67100
6.49060	6.49060	2.52529	2.52529	1.44587	.67100
2.92972	3.16355	1.53871	2.03200	.67100	.67100
3.52047	3.75430	1.53871	2.03200	.67100	.67100
4.47633	4.71016	1.53871	2.03200	.67100	.67100
5.43219	5.66602	1.53871	2.03200	.67100	.67100
6.02294	6.25677	1.53871	2.03200	.67100	.67100
3.16355	3.39738	2.03200	2.52529	.67100	.67100
3.75430	3.98813	2.03200	2.52529	.67100	.67100
4.71016	4.94399	2.03200	2.52529	.67100	.67100
5.66602	5.89985	2.03200	2.52529	.67100	.67100
6.25677	6.49060	2.03200	2.52529	.67100	.67100

CONTRDL POINT COORDINATES=

XCP	YCP	ZCP	XCP	YCP	ZCP
-.85662	.81717	.67100	.53709	.81717	.67100
1.93081	.81717	.67100	2.50811	.81717	.67100
-.63991	1.01660	.67100	.70320	1.01660	.67100
2.04631	1.01660	.67100	2.60264	1.01660	.67100
-.37205	1.26310	.67100	.90851	1.26310	.67100
2.18906	1.26310	.67100	2.71949	1.26310	.67100
-.15534	1.46253	.67100	1.07461	1.46253	.67100
2.30456	1.46253	.67100	2.81402	1.46253	.67100
.19545	1.78535	.67100	1.34348	1.78535	.67100
2.49151	1.78535	.67100	2.96704	1.78535	.67100
.73149	2.27865	.67100	1.75434	2.27865	.67100
2.77719	2.27865	.67100	3.20087	2.27865	.67100
1.10124	2.61891	.67100	2.03774	2.61891	.67100
2.97425	2.61891	.67100	3.36217	2.61891	.67100
1.38628	2.88123	.67100	2.25622	2.88123	.67100
3.12616	2.88123	.67100	3.48651	2.88123	.67100
1.79818	3.26029	.67100	2.57193	3.26029	.67100
3.34568	3.26029	.67100	3.66618	3.26029	.67100
2.25535	3.68101	.67100	2.92234	3.68101	.67100
3.58933	3.68101	.67100	3.86561	3.68101	.67100
2.66725	4.06007	.67100	3.23805	4.06007	.67100
3.80885	4.06007	.67100	4.04528	4.06007	.67100
2.95229	4.32238	.67100	3.45653	4.32238	.67100
3.96076	4.32238	.67100	4.16962	4.32238	.67100
-1.11775	1.53871	1.05843	-.75526	1.53871	1.05843
-.57402	1.53871	1.05843	-1.04427	1.78535	1.44587
-.53481	1.78535	1.44587	-.28008	1.78535	1.44587
-.89730	2.27865	1.44587	-.09389	2.27865	1.44587
.30781	2.27865	1.44587	-.82391	2.52529	1.05843
.12656	2.52529	1.05843	.60175	2.52529	1.05843
-1.04427	1.78535	.67100	-.53481	1.78535	.67100

SR

ORIGINAL PAGE IS
OF POOR QUALITY

-.28008	1.78535	.67100	-.89730	2.27865	.67100
-.09389	2.27865	.67100	.30781	2.27865	.67100
-.07256	1.53871	1.05843	1.13806	1.53871	1.05843
2.34868	1.53871	1.05843	2.85013	1.53871	1.05843
.19545	1.78535	1.44587	1.34348	1.78535	1.44587
2.49152	1.78535	1.44587	2.96705	1.78535	1.44587
.73149	2.27865	1.44587	1.75434	2.27865	1.44587
2.77719	2.27865	1.44587	3.20087	2.27865	1.44587
.99950	2.52529	1.05843	1.95977	2.52529	1.05843
2.92003	2.52529	1.05843	3.31779	2.52529	1.05843
.19545	1.78535	.67100	1.34348	1.78535	.67100
2.49152	1.78535	.67100	2.96705	1.78535	.67100
.73149	2.27865	.67100	1.75434	2.27865	.67100
2.77719	2.27865	.67100	3.20087	2.27865	.67100
3.16071	1.53871	1.05843	3.97381	1.53871	1.05843
4.97885	1.53871	1.05843	5.79195	1.53871	1.05843
6.10253	1.53871	1.05843	3.27762	1.78535	1.44587
4.09072	1.78535	1.44587	5.09577	1.78535	1.44587
5.90887	1.78535	1.44587	6.21945	1.78535	1.44587
3.51145	2.27865	1.44587	4.32455	2.27865	1.44587
5.32960	2.27865	1.44587	6.14270	2.27865	1.44587
6.45327	2.27865	1.44587	3.62837	2.52529	1.05843
4.44147	2.52529	1.05843	5.44651	2.52529	1.05843
6.25961	2.52529	1.05843	6.57019	2.52529	1.05843
3.27762	1.78535	.67100	4.09072	1.78535	.67100
5.09577	1.78535	.67100	5.90887	1.78535	.67100
6.21945	1.78535	.67100	3.51145	2.27865	.67100
4.32455	2.27865	.67100	5.32960	2.27865	.67100
6.14270	2.27865	.67100	6.45327	2.27865	.67100

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XX

ALPHA * 2.000 DEGREES

XX

VORTEX	XV	YV	CP	PW
1	.03806	.18505	.39232	.35731
2	.30866	.18505	.10702	.05549
3	.69134	.18505	.02094	.01441
4	.96194	.18505	-.00583	-.00917
5	.03806	.23021	.40380	.36237
6	.30866	.23021	.11075	.08971
7	.69134	.23021	.02449	.01786
8	.96194	.23021	.00044	-.00464
9	.03806	.28603	.43208	.37121
10	.30866	.28603	.11031	.09250
11	.69134	.28603	.02999	.02307
12	.96194	.28603	.01210	.00075

ORIGINAL PAGE IS
 OF POOR QUALITY

13	.03806	.33119	.45889	.37454
14	.30866	.33119	.10907	.09526
15	.69134	.33119	.03549	.02769
16	.96194	.33119	.03418	.00424
17	.03806	.40429	.58478	.38462
18	.30866	.40429	.13474	.10114
19	.69134	.40429	.05030	.03352
20	.96194	.40429	.12117	.00777
21	.03806	.51600	.54643	.39921
22	.30866	.51600	.14973	.11052
23	.69134	.51600	.06907	.04075
24	.96194	.51600	.13908	.01061
25	.03806	.59305	.50106	.41432
26	.30866	.59305	.14156	.11578
27	.69134	.59305	.07043	.04378
28	.96194	.59305	.05318	.01148
29	.03806	.65245	.49667	.42164
30	.30866	.65245	.14465	.11829
31	.69134	.65245	.06809	.04500
32	.96194	.65245	.02611	.01164
33	.03806	.73829	.50244	.43349
34	.30866	.73829	.14535	.12074
35	.69134	.73829	.06019	.04397
36	.96194	.73829	.01639	.01080
37	.03806	.83356	.50762	.44337
38	.30866	.83356	.13710	.11625
39	.69134	.83356	.04659	.03646
40	.96194	.83356	.01105	.00823
41	.03806	.91940	.49000	.43229
42	.30866	.91940	.10247	.08811
43	.69134	.91940	.02685	.02145
44	.96194	.91940	.00609	.00467
45	.03806	.97880	.36375	.32314
46	.30866	.97880	.03673	.03138
47	.69134	.97880	.01096	.00871
48	.96194	.97880	.00276	.00210

Y/SP	CL	CM	CT	CDI	CLW	CMW	CDW
.18505	.10449	.02596	.00148	.00217	.08856	.02453	.00176
.23021	.10988	.01764	.00383	.00001	.09285	.01716	-.00005
.28603	.11773	.00643	.00430	-.00019	.09788	.00739	.00004
.33119	.12668	-.00532	.00603	-.00161	.10158	-.00114	.00011
.40429	.17320	-.03712	.00243	.00362	.10788	-.01518	.00025
.51600	.18223	-.07530	.00249	.00387	.11653	-.03816	.00032
.59305	.16032	-.07853	.00613	-.00053	.12195	-.05474	.00020
.65245	.15585	-.09768	.00569	-.00025	.12443	-.06731	.00018
.73829	.15265	-.10386	.00580	-.00047	.12660	-.08482	.00004
.83356	.14471	-.11750	.00596	-.00091	.12319	-.09953	.00453
.91940	.12160	-.11239	.00573	-.00149	.10534	-.09720	.00403

.97880 .07248 -.07203 .00411 -.00158 .06338 -.06295 .00221

THE LIFT COEFFICIENT = .10438

TOTAL INDUCED DRAG COEFFICIENT = .00060

THE INDUCED DRAG PARAMETER = .05465

TOTAL PITCHING MOMENT COEFFICIENT = -.03792

THE LIFT COEFFICIENT WITH JET ENTRAINMENT ALONE = .09615

THE INDUCED DRAG COEFFICIENT WITH JET ENTRAINMENT ALONE = -.00006

THE PITCHING MOMENT COEFFICIENT WITH JET ENTRAINMENT ALONE = -.02854

THE LIFT COEFFICIENT FOR THE WING ALONE = .07892

THE INDUCED DRAG COEFFICIENT FOR THE WING ALONE = .00065

THE PITCHING MOMENT COEFFICIENT FOR THE WING ALONE = -.02624

THE INDUCED DRAG PARAMETER FOR THE WING ALONE = .10407

61 ***FUSELAGE AERODYNAMIC CHARACTERISTICS ARE GIVEN BELOW***

JET-ON CONFIGURATION

TOTAL PRESSURE LOADING AT EACH X-STATION, BASED ON LOCAL RADIUS

X/L	RADIUS	LOADING
-.43322	.01871	.05259
-.39944	.15172	.08151
-.33418	.37217	.08391
-.24188	.65812	.04907
-.12884	.86934	.01089
-.00276	.98553	.01521
.12776	.99496	.03406
.25384	.90868	.00020
.36688	.77627	-.01669
.45918	.63125	.01137
.52444	.51508	-.02437
.55822	.45209	-.09939

THE FUSELAGE POTENTIAL LIFT COEFFICIENT = .00800

THE FUSELAGE POTENTIAL MOMENT COEFFICIENT = .00829

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JET-OFF CONFIGURATION

TOTAL PRESSURE LOADING AT EACH X-STATION, BASED ON LOCAL RADIUS

X/L	RADIUS	LOADING
-.43322	.01871	.06775
-.39944	.15172	.08411
-.33418	.37217	.08451
-.24188	.65812	.06302
-.12884	.86934	.01474
-.00276	.98553	.01145
.12776	.99496	.02494
.25384	.90868	-.00118
.36688	.77627	-.01815
.45918	.63125	-.02539
.52444	.51508	-.02813
.55822	.45208	-.04919

THE FUSELAGE POTENTIAL LIFT COEFFICIENT = .00699

THE FUSELAGE POTENTIAL MOMENT COEFFICIENT = .01236

LATERAL-DIRECTIONAL STABILITY CHARACTERISTICS WITH JET ON

29 **STABILITY DERIVATIVES EVALUATED AT ALPHA = 2.000 DEG.

AND AT MACH NO. = .400, BASED ON BODY AXES***

CYB = -.1352017	CLB = -.0793607	CNB = -.1744832
CYP = .1402299	CLP = -.2498866	CNP = -.0601710
CYR = .1662392	CLR = .0556727	CNR = -.0501926

STABILITY DERIVATIVES BASED ON STABILITY AXES*

CYB = -.1352017	CLB = -.0844513	CNB = -.1717479
CYP = .1460327	CLP = -.2500436	CNP = -.0532004
CYR = .1613442	CLR = .0626434	CNR = -.0500356

LATERAL-DIRECTIONAL STABILITY CHARACTERISTICS WITH JET OFF

**STABILITY DERIVATIVES EVALUATED AT ALPHA = 2.000 DEG.

AND AT MACH NO. = .400, BASED ON BODY AXES***

CYB = -.1348120 CLB = -.0769513 CNB = -.1746655

CYP = .0862469 CLP = -.2410532 CNP = -.0355239

CYR = .1676378 CLR = .0575684 CNR = -.0514798

STABILITY DERIVATIVES BASED ON STABILITY AXES*

CYB = -.1348120 CLB = -.0830483 CNB = -.1719794

CYP = .0970986 CLP = -.2404582 CNP = -.0289065

CYR = .1646272 CLR = .0591857 CNR = -.0520748

References

1. Lan, C. Edward, Fillman, Greg L. and Fox, Charles H., Jr.: Computer Program for Calculating Aerodynamic Characteristics of Upper-Surface-Blowing and Over-Wing-Blowing Configurations. NASA TM X-73987, February 1977.
2. Hopkins, E. J.: A Semiempirical Method for Calculating the Pitching Moment of Bodies of Revolution at Low Mach Numbers. NACA RMA51C14, 1951.
3. Lan, C. Edward: Theoretical Aerodynamics of Over-Wing-Blowing Configurations. NASA CR-144969, 1976.
4. Roskam, Jan: Flight Dynamics of Rigid and Elastic Airplanes. Part 1, Chapter 4. Published by Roskam Aviation and Engineering Corp., 519 Boulder, Lawrence, KS, 1972.
5. Phelps, A. E.: Wind-Tunnel Investigation of a Twin-Engine Straight-Wing Upper-Surface Blown Jet-Flap Configuration. NASA TN D-7778, 1975.

Computer Program Listing

The following is a listing of the 5,427 separate cards which constitute the computer program.

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OVERLAY (WNGJET,0,0)                                LDS 10
PROGRAM WNGJET(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=CUTPUT,TAPE1,TAPE2,TLDS 20
1APE3,TAPE4,TAPE7,TAPE8,TAPE9)                    LDS 30
C      AERODYNAMICS OF WING-JET INTERACTION        LDS 40
C      BY C. EDWARD LAN OF THE UNIVERSITY OF KANSAS  LDS 50
C                                                    LDS 60
C THIS PROGRAM IS APPLICABLE TO BOTH UPPER-SURFACE-BLOWING AND OVER- LDS 70
C WING BLOWING CONFIGURATIONS.                    LDS 80
C                                                    LDS 90
C NOTF. ROOT AND TIP CAMBER FUNCTIONS MAY BE DEFINED AS FUNCTION LDS 100
C SURPROGRAMS ZCR(X) AND ZCT(X), RESPECTIVELY.    LDS 110
C THE ARRAY DIMENSIONS OF THIS PROGRAM RESTRICT THE NUMBER OF WING LDS 120
C VORTICES TO BE 100 MAXIMUM AND THE TOTAL WING AND JET VORTICES TO BFLDS 130
C 200 MAXIMUM. ALSO, CHECK THE ARRAY SIZE OF GAMMA IN SUBRCUTINE LDS 140
C "SOLUTN" BEFORE USING THE PROGRAM.              LDS 150
C                                                    LDS 160
C      DIMENSION TITLE(13)                          LDS 170
C      COMMON /SKODE/ KCODEF                          LDS 180
C      COMMON /SCHEME/ C(2),X(10,41),Y(10,41),SLOPE(15),XL(2,15),XTT(41),LDS 190
1XLL(41)                                            LDS 200
C      COMMON /GEOM/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTLDS 210
1E(50),PSI(20),CH(95),XV(200),YV(100),SN(8,8),XN(200,2),YN(200,2),ZLDS 220
2N(200,2),WIDTH(8),YCON(25),SWEEP(50),HALFB.SJ(21,8),EX(95,2),TX(95LDS 230
3,2),SC(160,5),SI(160,5),LC(3)                    LDS 240
C      COMMON /AERO/ AM1,AM2,B1,P2,CL(30),CT(30),CD(30),GAM(2,130)    LDS 250
C      COMMON /SOME/ AC,AWING,LAT,NAL,LWF,LWFJ,CHORDT(3),SNG(5),YC(5),YCNLDS 260
1(6),WKN,RDX,PDG,NDG                                LDS 270
C      COMMON /CONST/ NCS,NCW,M1(8),NSJ,ACJ(5),LAST,MJW1(3,5),MJW2(3,5),JLDS 280
1PANEL,MJJ(5),NW(3),NNJ,NJP                          LDS 290
C      COMMON /PARAM/ ALPT,ALPC,ALPS,CDF,SCF,TH,TDF    LDS 300
C      COMMON /JET/ PK1,XC,XJT(31),A(31),P(31)        LDS 310
C      COMMON /ADD/ CP(130),CM(30),BRFAK(P),SWP(P,15),GAL(30),ISYM,VMU,VULDS 320
1,TEMP,FCR,CAMLER,CAMLET,CAMTER,CAMTET,XJ,YJ,ZJ,RJ,ALP,CREF,TWISTF LDS 330
C      COMMON /COST/ LTOTAL,LPAN1,NJW(5),LPANEL,IFENTN,LPAN2,EXI1,PTIAL,TWLDS 340
1IST,DF(5),NFP                                        LDS 350
C      COMMON /CAMB/ ICAM,IM,XT(2,11),ZC(2,11),AAM(2,10),BBM(2,10),CCM(2,LDS 360
110),DDM(2,10)                                       LDS 370
C      IARY - USED IN SYSTEMC                          LDS 380
C      DIMENSION IARY(6)                               LDS 390
C      DATA IARY/4*(-0),(0),(-0)/                    LDS 400
C      SYSTEMC SUPPRESSES THE PRINTING OF NON-FATAL ERROR MESSAGES IN LDS 410
C THE EVALUATION OF (EXP(A)), WHEN (A) IS LESS THAN (-675.84) ON LDS 420
C CYBER-175. THIS CALL MIGHT NOT BE NEEDED FOR OTHER COMPUTING LDS 430
C SYSTEMS.                                            LDS 440
C      CALL SYSTEMC (115,IARY)                          LDS 450
C      PI=3.14159265                                    LDS 460
C      READ (5,70) (TITLE(I),I=1,13)                  LDS 470
C      WRITE (6,80)                                     LDS 480
C      WRITE (6,70) (TITLE(I),I=1,13)                  LDS 490

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WRITE (6,80)                                LDS 500
NCCN=1                                       LDS 510
C                                             LDS 520
C ***NUMBER OF CASES TO BE RUN, GEOMETRY CODE (=1 IF GEOMETRY VARIES. LDS 530
C   IN THIS CASE, ALPHA MAY ALSO BE DIFFERENT. =0 FOR THE SAME GEOME- LDS 540
C   TRY BUT DIFFERENT ALPHAS) , AND SYMMETRY CODE (=0 FOR A CENTERED LDS 550
C   JET, AND=1 OTHERWISE) ***              LDS 560
C ***LATERAL MODE SELECTOR (=0 FOR SYMMETRICAL MODE OF MOTION, AND =1 LDS 570
C   IF LATERAL-DIRECTIONAL DERIVATIVES ARE TO BE COMPUTED) ***      LDS 580
C                                             LDS 590
READ (5,60) ICASE,NG,ISYM,LAT               LDS 600
WRITE (6,60) ICASE,NG,ISYM,LAT             LDS 610
10 CONTINUE                                 LDS 620
WRITE (6,90)                                LDS 630
WRITE (6,100) NCCN                          LDS 640
WRITE (6,90)                                LDS 650
CALL OVERLAY (6*W*NGJET,1,0)                LDS 660
J1=LWF+1                                    LDS 670
CALL OVERLAY (6*W*NGJET,2,0)                LDS 680
CALL OVERLAY (6*W*NGJET,3,0)                LDS 690
20 CONTINUE                                 LDS 700
CALL OVERLAY (6*W*NGJET,4,0)                LDS 710
CALL OVERLAY (6*W*NGJET,5,0)                LDS 720
NCCN=NCCN+1                                  LDS 730
IF (NCCN.GT.ICASE) GO TO 40                 LDS 740
IF (NG.EQ.1) GO TO 10                       LDS 750
C                                             LDS 760
C ***ADDITIONAL ANGLES OF ATTACK IN DEGS. TO BE COMPUTED, TO BE READ IN LDS 770
C   REMIND THE GEOMETRY DATA DEFINED IN SUBROUTINE "GEOMTY" ***     LDS 780
C                                             LDS 790
READ (5,50) ALP                              LDS 800
ALP=ALP*PI/180.                              LDS 810
ALPS=SIN(ALP)                                LDS 820
ALPC=COS(ALP)                                LDS 830
ALPT=ALPS/ALPC                               LDS 840
DO 30 I=1,NC5                                LDS 850
XLL(I)=ALP+(TWISTR+TWIST*YIE(I)/HALFR)*PI/180. LDS 860
T=XLL(I)                                     LDS 870
30 XTT(I)=SIN(T)/CCS(T)                       LDS 880
WRITE (6,90)                                  LDS 890
WRITE (6,100) NCCN                            LDS 900
WRITE (6,90)                                  LDS 910
GO TO 20                                       LDS 920
40 CONTINUE                                 LDS 930
STOP                                          LDS 940
C                                             LDS 950
50 FORMAT (8F10.5)                             LDS 960
60 FORMAT (7(6X,I4))                           LDS 970
70 FORMAT (13A6)                               LDS 980

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80  FORMAT (40H*****  

90  FORMAT (1H0,20X,25HXXXXXXXXXXXXXXXXXXXXXXXXXXXX)
100  FORMAT (1H0,25X.13+CASE NUMBER =,I2)
      END
      FUNCTION ZCR (X)
      COMMON /CAMB/ ICAM,IM,XT(2,11),ZC(2,11),AAM(2,10),BBM(2,10),CCM(2,10),DDM(2,10)
      IF (ICAM.EQ.1) GO TO 10
C
C  *** CAMBER FUNCTION FOR THE ROOT SECTION ***
C
      IF (X.LT.0.2025) ZCR=2.6995*(3.*X*X-1.215*X+0.114715)
      IF (X.GE.0.2025) ZCR=-0.0220P
      GO TO 20
10  ZCR=ZCAM(1,X)
20  RETURN
      END
      FUNCTION ZCT (X)
      COMMON /CAMB/ ICAM,IM,XT(2,11),ZC(2,11),AAM(2,10),BBM(2,10),CCM(2,10),DDM(2,10)
      IF (ICAM.EQ.1) GO TO 10
C
C  *** CAMBER FUNCTION FOR THE TIP SECTION ***
C
      ZCT=ZCR(X)
      GO TO 20
10  ZCT=ZCAM(2,X)
20  RETURN
      END
      FUNCTION ZCAM (I,X)
      COMMON /CAMB/ ICAM,IM,XT(2,11),ZC(2,11),AAM(2,10),BBM(2,10),CCM(2,10),DDM(2,10)
      K=1
10  IF (X.GE.XT(I,K).AND.X.LT.XT(I,K+1)) GO TO 20
      K=K+1
      IF (K.GE.IM) GO TO 30
      GO TO 10
20  SM=X-XT(I,K)
      ZCAM=3.*AAM(I,K)*SM**2+2.*BBM(I,K)*SM+CCM(I,K)
      GO TO 50
30  IF (X.LT.XT(I,1)) GO TO 40
      K=IM-1
      GO TO 20
40  K=1
      GO TO 20
50  RETURN
      END
      FUNCTION FUR (X)
      COMMON /FUSRAD/ IFR,IFN,IFF(21),RFF(21),AAF(20),BBF(20),CCF(20),DDFUR

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LDS 990
LDS1000
LDS1010
LDS1020-
ZCR 10
ZCR 20
ZCR 30
ZCR 40
ZCR 50
ZCR 60
ZCR 70
ZCR 80
ZCR 90
ZCR 100
ZCR 110
ZCR 120
ZCR 130-
ZCT 10
ZCT 20
ZCT 30
ZCT 40
ZCT 50
ZCT 60
ZCT 70
ZCT 80
ZCT 90
ZCT 100
ZCT 110
ZCT 120-
ZCM 10
ZCM 20
ZCM 30
ZCM 40
ZCM 50
ZCM 60
ZCM 70
ZCM 80
ZCM 90
ZCM 100
ZCM 110
ZCM 120
ZCM 130
ZCM 140
ZCM 150
ZCM 160
ZCM 170
ZCM 180-
FUR 10
FUR 20

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	IF(20)	FUR 30
	IF (IFR.NE.0) GO TO 30	FUR 40
C		FUR 50
C	* DEFINE THE FUSELAGE RADIUS AS A FUNCTION OF X *	FUR 60
C		FUR 70
	IF (X.LT.(-0.127)) GO TO 10	FUR 80
	IF (X.GT.0.381) GO TO 20	FUR 90
	FUR=0.161	FUR 100
	GO TO 80	FUR 110
10	FUR=0.161*SQRT(1.-(1.-(X+0.777)/0.65)**2)	FUR 120
	GO TO 80	FUR 130
20	FUR=0.161*SQRT(1.-1.0869565*(X-0.381))	FUR 140
	GO TO 80	FUR 150
30	CONTINUE	FUR 160
	K=1	FUR 170
40	IF (X.GE.XFF(K).AND.X.LT.XFF(K+1)) GO TO 50	FUR 180
	K=K+1	FUR 190
	IF (K.GE.IFN) GO TO 60	FUR 200
	GO TO 40	FUR 210
50	CM=X-XFF(K)	FUR 220
	FUR=AAF(K)*SM**3+BBF(K)*CM**2+CCF(K)*SM+DDF(K)	FUR 230
	GO TO 80	FUR 240
60	IF (X.LT.XFF(1)) GO TO 70	FUR 250
	K=IFN-1	FUR 260
	GO TO 50	FUR 270
70	K=1	FUR 280
	GO TO 50	FUR 290
80	RETURN	FUR 300
	END	FUR 310-
	FUNCTION SLOP (X)	SLP 10
	COMMON /FUSRAD/ IFR,IFN,XFF(21),BBF(21),AAF(20),BBF(20),CLF(20),DDSL	SLP 20
	IF(20)	SLP 30
	IF (IFR.NE.0) GO TO 30	SLP 40
C		SLP 50
C	* DEFINE THE DERIVATIVE OF FUSFLAGE RADIUS WITH DIMENSIONAL X	SLP 60
C	MULTIPLIFD BY RADIUS. OR, =R(DR/CX) . *	SLP 70
C		SLP 80
	IF (X.LT.(-0.127)) GO TO 10	SLP 90
	IF (X.GT.0.381) GO TO 20	SLP 100
	SLCP=0.	SLP 110
	GO TO 80	SLP 120
10	SLCP=0.0399*(1.-(X+0.777)/0.65)	SLP 130
	IF (ARS(X+0.777).LE.0.001) SLCP=0.	SLP 140
	GO TO 80	SLP 150
20	SLCP=-0.0140#7	SLP 160
	GO TO 80	SLP 170
30	CONTINUE	SLP 180
	K=1	SLP 190
40	IF (X.GE.XFF(K).AND.X.LT.XFF(K+1)) GO TO 50	SLP 200

	K=K+1	SLP 210
	IF (K.GE.IFN) GO TO 60	SLP 220
	GO TO 40	SLP 230
50	SM=X-XFF(K)	SLP 240
	SLOP=3.*AAF(K)*SM**2+2.*BRF(K)*SM+CCF(K)	SLP 250
	SLCP=SLOP*FUR(X)	SLP 260
	GO TO 80	SLP 270
60	IF (X.LT.XFF(1)) GO TO 70	SLP 280
	K=IFN-1	SLP 290
	GO TO 50	SLP 300
70	K=1	SLP 310
	GO TO 50	SLP 320
80	RETLRN	SLP 330
	END	SLP 340-
	SUBROUTINE VMSEQN (NC1,K,AA,A,CA)	VSN 10
C	TO SOLVE THE SIMULTANEOUS EQUATIONS BY PURCELL'S VECTOR METHOD	VSN 20
	DIMENSION AA(1), CA(1), A(1)	VSN 30
	NC=K*NC1	VSN 40
	SUM1=0.	VSN 50
	K1=K-1	VSN 60
	JJ=1	VSN 70
	DO 10 J=1,K1	VSN 80
	SUM1=SUM1+AA(J)*A(JJ)	VSN 90
10	JJ=JJ+NC1+1	VSN 100
	SUM1=SUM1+AA(K)	VSN 110
	DO 30 I=1,NC1	VSN 120
	SUM2=0.	VSN 130
	JJ=I+1	VSN 140
	DO 20 J=1,K1	VSN 150
	SUM2=SUM2+AA(J)*A(JJ)	VSN 160
20	JJ=JJ+NC1+1	VSN 170
	KK=K+I	VSN 180
	SUM2=SUM2+AA(KK)	VSN 190
30	CA(I)=-SUM2/SUM1	VSN 200
	M=1	VSN 210
	L=0	VSN 220
	KNC=(K-1)*NC1	VSN 230
	DO 60 I=1,NC	VSN 240
	IF (I.GT.KNC) GO TO 50	VSN 250
	MM=(M-1)*NC1+1	VSN 260
	IF (I.EQ.MM) GO TO 70	VSN 270
40	KK=KK+1	VSN 280
	IL=I+L	VSN 290
	A(I)=CA(KK)*BASE+A(IL)	VSN 300
	GO TO 60	VSN 310
50	II=I-KNC	VSN 320
	A(I)=CA(II)	VSN 330
60	CONTINUE	VSN 340
	GO TO 80	VSN 350

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70	II=MM+N-1	VSN 360
	BASE=A(II)	VSN 370
	KK=0	VSN 380
	L=L+1	VSN 390
	M=M+1	VSN 400
	GO TO 40	VSN 410
80	CONTINUE	VSN 420
	RETURN	VSN 430
	END	VSN 440-
	SUBROUTINE INTEG (F,NN,LJ,I7,IJ,P,IR)	INT 10
C	TO MAKE REFINED INTEGRATION FOR INDUCED TANGENTIAL VELOCITIES	INT 20
	COMMON /GEOM/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTINT	30
	1E(50),PSI(20),CH(95),XV(200),YV(100),SN(8,8),XN(200,2),YN(200,2),ZINT	40
	2N(200,2),WIDTH(P),YCON(25),SWEEP(50),HALFB,SJ(21,8),EX(95,2),TX(95	INT 50
	3,2),SC(160,5),SI(160,5),LC(3)	INT 60
	PI=3.14159265	INT 70
	J=LJ+1	INT 80
	JJ=NN*16	INT 90
	IF (NN.GT.6) JJ=NN*8	INT 100
	FJ=JJ	INT 110
	C1=TX(IZ,1)-EX(I7,1)	INT 120
	C2=TX(IZ,2)-EX(I7,2)	INT 130
	SUM=0.	INT 140
	DO 10 K=1,JJ	INT 150
	XX1=EX(IZ,1)+C1*SC(K,IR)	INT 160
	XX2=EX(IZ,2)+C2*SC(K,IR)	INT 170
	X1=XX1-XCP(IJ)	INT 180
	X2=XX2-XCP(IJ)	INT 190
	Y1=YN(J,1)-YCP(IJ)	INT 200
	Y2=YN(J,2)-YCP(IJ)	INT 210
	Z1=ZN(J,1)-ZCP(IJ)	INT 220
	Z2=ZN(J,2)-ZCP(IJ)	INT 230
	X12=XX2-XX1	INT 240
	Y12=YN(J,2)-YN(J,1)	INT 250
	Z12=ZN(J,2)-ZN(J,1)	INT 260
	Y7I=Y1*Z12-Z1*Y12	INT 270
	XYK=X1*Y12-Y1*X12	INT 280
	XZJ=X1*Z12-Z1*X12	INT 290
	ALB=XYK*XYK+XZJ*XZJ+B*Y7I*Y7I	INT 300
	R1=SQRT(X1*X1+P*Y1*Y1+B*Z1*Z1)	INT 310
	R2=SQRT(X2*X2+B*Y2*Y2+B*Z2*Z2)	INT 320
	UU=(X2*X12+P*Y2*Y12+B*Z2*Z12)/P2-(X1*X12+B*Y1*Y12+B*Z1*Z12)/R1	INT 330
10	SUM=SUM+UU*Y7I/ALB*SI(K,IR)	INT 340
	F=SUM*CH(IZ)/(P.*FJ)	INT 350
	RETURN	INT 360
	END	INT 370-
	SUBROUTINE FUSELA (NF,AW,N,I,S,XTEF,XF,XCF,RF,BB,SNP,NKF,KZ)	FSA 10
	DIMENSION AW(1),XF(1),RF(1),XCF(1),SNP(5,20),S(1),NKF(1)	FSA 20
	PI=3.14159265	FSA 30

	IK=0	FSA 40
	N1=NKF(1)	FSA 50
	N2=1	FSA 60
	HL=(S(2)+S(1))/2.	FSA 70
	FNT=NKF(1)	FSA 80
	A1=XCF(I)-XTEF	FSA 90
	A2=SQRT(A1*A1+PP*RF(I)*RF(I))	FSA 100
	DO 40 JJ=1,NF	FSA 110
	M=JL-IK	FSA 120
	XS=XCF(I)-XF(JJ)	FSA 130
	XSR=SQRT(XS*XS+PP*RF(I)*RF(I))	FSA 140
	IF (N.FG,0) GO TO 20	FSA 150
	RFL=1.	FSA 160
	IF (N.GE,2) GO TO 10	FSA 170
	IF (I.FG,NF) RFL=0.	FSA 180
	IF (I.NF,NF) RFL=(A1+A2)**N*A1/A2	FSA 190
10	CONTINUE	FSA 200
	RFR=(XS+XSR)**N*XS/XSR	FSA 210
	GO TO 30	FSA 220
20	IF (I.NF,NF) RFL=A1/A2	FSA 230
	IF (I.EG,NF) RFL=0.	FSA 240
	RFR=XS/XSR	FSA 250
30	AW(JJ)=-HL*(RFL-RFR)*SNP(N2,M)/(4.*FNT)	FSA 260
	IF (JJ.NE,N1) GO TO 40	FSA 270
	N2=N2+1	FSA 280
	IK=N1	FSA 290
	N1=N1+NKF(N2)	FSA 300
	HL=(S(N2+1)-S(N2))/2.	FSA 310
	FNT=NKF(N2)	FSA 320
40	CONTINUE	FSA 330
	RETLRN	FSA 340
	END	FSA 350-
	SUBROUTINE UNWF (R,XX,YY,7,AW,PW,JPFI,KL,WK2,IC)	UNF 10
	DIMENSION AW(1),PW(1)	UNF 20
	COMMON /SCHEME/ C(2),X(10,41),Y(10,41),SLOPE(15),XL(2,15),XTT(41),	UNF 30
	IXLL(41)	UNF 40
	COMMON /FUS/ XF(20),XCF(20),RF(20),SNP(5,20),XLFF,XTEF,WARP(20),NCUNF	UNF 50
	IUM,NF,NT,CSF(5,10),XAS(6),NKF(5),F0,F10,KF,NTL	UNF 60
	PI=3.14159265	UNF 70
	P=SQRT(YY*YY+7*7)	UNF 80
	IF (7) 10,20,30	UNF 90
10	THETA=PI-ATAN(YY/ARS(7))	UNF 100
	GO TO 40	UNF 110
20	THETA=PI/2.	UNF 120
	GO TO 40	UNF 130
30	THETA=ATAN(YY/ARS(7))	UNF 140
40	A1=XX-XTEF	UNF 150
	A2=SQRT(A1*A1+P*P*P)	UNF 160
	ST=SIN(THETA)	UNF 170

	CT=COS(THETA)	UNF 180
	DO 100 N=1,NT	UNF 190
	FNF=NKF(1)	UNF 200
	IK=0	UNF 210
	N1=NKF(1)	UNF 220
	N2=1	UNF 230
	S=XAS(2)-XAS(1)	UNF 240
	FN=N	UNF 250
	FLT=0.	UNF 260
	FLR=0.	UNF 270
	IF (N.GF.2) GO TO 50	UNF 280
	A3=((A1+A2)/R)**N	UNF 290
	FLT=-A3/FN	UNF 300
	FLR=A1/R*A3/A2	UNF 310
50	CONTINUE	UNF 320
	DO 90 JJ=1,NF	UNF 330
	M=JJ-IK	UNF 340
	K=JJ+(N-1)*NF	UNF 350
	XS=XX-XF(JJ)	UNF 360
	XSR=SQRT(XS*XS+P*P*R)	UNF 370
	XR=((XS+XSR)/R)**N	UNF 380
	FTX=-XP/FN	UNF 390
	FRX=XS/R*XR/XSR	UNF 400
	P1=S*(FPX-FLR)*SNP(N2,M)/(R.*FNF)	UNF 410
	P2=S*(FTX-FLT)*SNP(N2,M)/(R.*FNF)	UNF 420
	Q1=COS(FN*THETA)	UNF 430
	Q2=SIN(FN*THETA)	UNF 440
	UR=G1*P1	UNF 450
	IJT=-FN*Q2*P2	UNF 460
	VR=G2*P1	UNF 470
	VT=FN*Q1*P2	UNF 480
	VT=VT/P	UNF 490
	UT=UT/P	UNF 500
	IF (JJ.NF.N1) GO TO 60	UNF 510
	N2=N2+1	UNF 520
	IK=N1	UNF 530
	N1=N1+NKF(N2)	UNF 540
	S=XAS(N2+1)-XAS(N2)	UNF 550
	FNF=NKF(N2)	UNF 560
60	IF (KL.FQ.1) GO TO 80	UNF 570
	IF (ID.FQ.2) GO TO 70	UNF 580
	RW(K)=VR*CT-VT*ST	UNF 590
	AW(K)=LR*CT-UT*ST	UNF 600
	GO TO 90	UNF 610
70	RW(K)=VR*ST+VT*CT	UNF 620
	GO TO 90	UNF 630
80	RW(K)=(VR*ST+VT*CT)*Y(4,IPHI)+(VR*CT-VT*ST)*Y(3,IPHI)	UNF 640
	AW(K)=(LR*ST+UT*CT)*Y(4,IPHI)+(LR*CT-UT*ST)*Y(3,IPHI)	UNF 650
90	CONTINUE	UNF 660

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100	CONTINUE	UNF 670
	IF (KL.NE.1) GO TO 110	UNF 680
	RFL=A1/R*(A1+A2)/P/A2	UNF 690
	XP=XX-XLEF	UNF 700
	A6=SQRT(XP*XP+P*R*R)	UNF 710
	RF0=XP/R*(XP+A6)/R/A6	UNF 720
	UR=-CT*(RFL-RF0)/(4.*PI)	UNF 730
	TL=-(A1+A2)/R	UNF 740
	T0=-(XP+A6)/R	UNF 750
	UT=ST*(TL-T0)/(4.*PI)	UNF 760
	UT=LT/R	UNF 770
	WK2=(UR*ST+UT*CT)*Y(4,IPHI)+(UR*CT-UT*ST)*Y(3,IPHI)	UNF 780
110	CONTINUE	UNF 790
	RETURN	UNF 800
	END	UNF 810-
	SUBROUTINE FUSVOL (R,X,Y,Z,WN,WK,GR,L,M7)	FSL 10
	COMMON /FUS/ XF(20),XCF(20),RF(20),SNP(5,20),XLEF,XTEF,WARC(20),ACFSL	20
	IUM,NF,NT,CSF(5,10),XAS(6),AKF(5),F0,F10,KF,NTL	FSL 30
	R=SQRT(Y*Y+7*7)	FSL 40
	PI=3.14159265	FSL 50
	IF (7) 10,20,30	FSL 60
10	THETA=PI-ATAN(Y/APS(Z))	FSL 70
	GO TO 40	FSL 80
20	THETA=PI/2.	FSL 90
	GO TO 40	FSL 100
30	THETA=ATAN(Y/APS(7))	FSL 110
40	A1=X-XTEF	FSL 120
	A2=SQRT(A1*A1+P*R*R)	FSL 130
	RFL=A1/A2/R	FSL 140
	XFF=X-XLEF	FSL 150
	R2=SQRT(XEF*XEF+P*R*R)	FSL 160
	RF0=XFF/R/P2	FSL 170
	FT=-(A1+A2)/R+(XFF+R2)/P	FSL 180
	FR=(1.+A1/A2)/R*A1/R-(1.+XFF/R2)/R*XFF/R	FSL 190
	CS=COS(THETA)	FSL 200
	SN=SIN(THETA)	FSL 210
	WN=0.	FSL 220
	IF (M7.NE.0) GO TO 60	FSL 230
	IF (L.FC.0) GO TO 90	FSL 240
	JK=0	FSL 250
	N1=AKF(1)	FSL 260
	N2=1	FSL 270
	FNF=NKF(1)	FSL 280
	S=XAS(2)-XAS(1)	FSL 290
	WN=0.	FSL 300
	DO F0 J=1,NF	FSL 310
	M=J-TK	FSL 320
	XS=X-XF(J)	FSL 330
	XSP=SQRT(XS*XS+P*P*R)	FSL 340

	RFX=XS/XSR/R	FSL 350
	WN=KN+(PFL-RFX)*WARD(J)*SNP(N2,M)*S/FNF	FSL 360
	IF (J.NE.N1.OR.J.EQ.NF) GO TO 50	FSL 370
	N2=N2+1	FSL 380
	IK=N1	FSL 390
	N1=N1+NKF(N2)	FSL 400
	S=XAS(N2+1)-XAS(N2)	FSL 410
	FNF=NKF(N2)	FSL 420
50	CONTINUE	FSL 430
	WN=WN*PI/2.	FSL 440
	WN=- (WN+(RFL-RF0)*F0)/(4.*PI)	FSL 450
	WN=KN*CS	FSL 460
	FP=F10	FSL 470
	S1=SN	FSL 480
	S2=CS	FSL 490
	GO TO 80	FSL 500
60	FP=FR0	FSL 510
	IF (WK.GT.0.9) GO TO 70	FSL 520
	S1=-CS	FSL 530
	S2=SN	FSL 540
	GO TO 80	FSL 550
70	S1=SN	FSL 560
	S2=CS	FSL 570
80	CONTINUE	FSL 580
	WN=WN-S1*S1*FT*FP/R/(4.*PI)-CS*S2*FR*FP/(4.*PI)	FSL 590
90	CONTINUE	FSL 600
	WK=(-S1*SN*FT/P-CS*CS*FR)/(4.*PI)	FSL 610
	RETURN	FSL 620
	END	FSL 630-
	SUBROUTINE FSPEFF (R,X,Y,Z,GAM,WK1,WK2)	FSD 10
	DIMENSION GAM(2,1)	FSD 20
	COMMON /FUS/ XF(20),XCF(20),RF(20),SNP(5,20),XLFF,XTEF,WARD(20),NCFSD 30	
	IUM,NF,NT,CSF(5,10),XAS(6),AKF(5),F0,F10,KF,NTL	FSD 40
	PI=3.14159265	FSD 50
	R=SQRT(Y*Y+Z*Z)	FSD 60
	IF (Z) 10,20,30	FSD 70
10	THETA=PI-ATAN(Y/ABS(Z))	FSD 80
	GO TO 40	FSD 90
20	THETA=PI/2.	FSD 100
	GO TO 40	FSD 110
30	THETA=ATAN(Y/ABS(Z))	FSD 120
40	A1=X-XTEF	FSD 130
	A2=SQRT(A1*A1+P*P*R)	FSD 140
	RFL=- (A1+A2)/R/A2	FSD 150
	DO 60 I=1,NT	FSD 160
	FI=I	FSD 170
	CS=COS(FI*THETA)	FSD 180
	SS=SIN(FI*THETA)	FSD 190
	IK=0	FSD 200

	N1=NKF(1)	FSD 210
	N2=1	FSD 220
	HL=0.5*(XAS(2)-XAS(1))	FSD 230
	FNT=NKF(1)	FSD 240
	DO 50 JJ=1,NF	FSD 250
	J=JJ+(I-1)*NF	FSD 260
	M=JJ-IK	FSD 270
	XS=X-XF(JJ)	FSD 280
	XSP=SQRT(XS*XS+P*P*R)	FSD 290
	RL=RFL	FSD 300
	IF (I.GE.2) RL=0.	FSD 310
	RX=-((XS+XSR)/R)**I/XSP	FSD 320
	GAM(2,J)=HL*CS*(RX-RL)*SNP(N2,M)/(4.*FNT)	FSD 330
	GAM(1,J)=HL*SS*(RX-RL)*SNP(N2,M)/(4.*FNT)	FSD 340
	IF (JJ.NE.N1) GO TO 50	FSD 350
	N2=N2+1	FSD 360
	IK=I+1	FSD 370
	N1=N1+NKF(N2)	FSD 380
	HL=0.5*(XAS(N2+1)-XAS(N2))	FSD 390
	FNT=NKF(N2)	FSD 400
50	CONTINUE	FSD 410
60	CONTINUE	FSD 420
	XP=X-XLEF	FSD 430
	A6=SQRT(XP*XP+P*P*R)	FSD 440
	RF0=- (XP+A6)/R/A6	FSD 450
	WK2=-CCS(THETA)*(RFL-RF0)/(4.*PI)	FSD 460
	WK1=-SIN(THETA)*(PFL-RF0)/(4.*PI)	FSD 470
	RETURN	FSD 480
	END	FSD 490-
	SUBROUTINE VELFICS (LWF,LPANEL,AW,CW,AM,LPAN1,LPAN2,IL,ISYM)	VFS 10
	DIMENSION AW(1),FW(20),CW(1),SSF(5,10),DW(20)	VFS 20
	COMMON /GFOM/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLF(50),XTVFS	30
	1E(50),PSI(20),CH(95),XV(200),YV(100),SN(P,P),XA(200,2),YA(200,2),ZVFS	40
	2N(200,2),WIDTH(P),YCON(25),SWEEP(50),HALFR,CJ(21,8),EX(95,2),TX(95,VFS	50
	3,2),SC(160,5),SI(160,5),LC(3)	VFS 60
	COMMON /CONST/ NCS,NCW,M(P),NSJ,NCJ(5),LAST,MJW1(3,5),MJW2(3,5),JVFS	70
	IPANEL,MJJ(5),NW(3),NNJ,NJP	VFS 80
	COMMON /FUS/ XF(20),XCF(20),PF(20),SNP(5,20),XLFF,XTEF,WARD(20),NCVFS	90
	1UM,TF,TT,CSF(5,10),XAS(6),NKF(5),F0,F10,KF,NTI	VFS 100
	R=1.-AM*AM	VFS 110
	PI=3.14159265	VFS 120
	TH1=SNP(5,20)	VFS 130
	NH1=SNP(5,19)	VFS 140
	NJH=(NSJ+1)/2+1	VFS 150
	IF (ISYM.EQ.0) NJH=NSJ/2	VFS 160
	IF (ISYM.EQ.0) NP=NSJ-	VFS 170
	IF (ISYM.NE.0) NP=NSJ+1	VFS 180
	KY=0	VFS 190
	IF (IL.EQ.2) KY=1	VFS 200

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	NG=NF	VFS 210
	LPL=LPADEL	VFS 220
	LPW=LWF	VFS 230
	IF (IL.FQ.2) LPL=LAST	VFS 240
	IF (IL.FQ.2) LPW=LAST+NTL	VFS 250
	DO 30 I=1,NT	VFS 260
	FI=I	VFS 270
	DO 30 K=1,NCLM	VFS 280
	IF (NH1.NE.0.AND.K.LE.NH1) GO TO 10	VFS 290
	FK=K-NH1	VFS 300
	FCLM=NCUM-NH1	VFS 310
	PP=PI-TH1	VFS 320
	TP=TH1	VFS 330
	GO TO 20	VFS 340
10	FK=K	VFS 350
	FCLM=NH1	VFS 360
	PP=TH1	VFS 370
	TP=0.	VFS 380
20	CONTINUE	VFS 390
	TA=(2.*FK-1.)*PP/(2.*FCUM)+TP	VFS 400
30	SSF(I,K)=SIN(FI*TA)	VFS 410
	IPFI=1	VFS 420
	MJ=LPAFL+NCJ(1)	VFS 430
	INN=1	VFS 440
	JNN=1	VFS 450
	DO 70 J=1,LPL	VFS 460
	II=I	VFS 470
	IF (IL.FQ.2) II=J+LPAFL	VFS 480
	IF (IL.FQ.2.AND.I.GT.JPAFL) II=I-JPAFL	VFS 490
	KL=1	VFS 500
	IF (II.LE.LPAFL) KL=0	VFS 510
	X=XCP(II)	VFS 520
	Y=YCP(II)	VFS 530
	Z=ZCP(II)	VFS 540
	CALL UNWF (P,X,Y,Z,AW,CW,IPFI,KL,WK2,KY)	VFS 550
	WRITE (01) (CW(K),K=1,NTL)	VFS 560
	WRITE (07) (AW(K),K=1,NTL)	VFS 570
	IF (IL.NF.2) GO TO 70	VFS 580
	IF (IL.FQ.2.AND.I.GT.JPAFL) GO TO 70	VFS 590
	IF (II.LT.MJ.OP.II.FQ.LAST) GO TO 40	VFS 600
	IPFI=IPFI+1	VFS 610
	MJ=MJ+NCJ(INN)	VFS 620
40	IF (II.EQ.(MJJ(INN)-1)) GO TO 50	VFS 630
	GO TO 60	VFS 640
50	JNN=INN	VFS 650
	INN=INN+1	VFS 660
60	IF (II.FQ.MJJ(JNN)) IPFI=1	VFS 670
70	CONTINUE	VFS 680
	CALL UNFW (LAST,LPAFL,P,LPA1,LPA2,NW,AW,PW,MJJ,IL,NCJ,NCF,NP)	VFS 690

	DO 150 I=1,NT	VFS 700
	REWIND 08	VFS 710
	N=I	VFS 720
	DO 140 J=1,NF	VFS 730
	JJ=J	VFS 740
	DO 110 K=1,LPL	VFS 750
	KI=K	VFS 760
	IF (IL.EQ.2.AND.K.LE.LPANFL) KI=K+JPANFL	VFS 770
	IF (IL.FG.2.AND.K.GT.LPANFL) KI=K-LPANFL	VFS 780
	READ (08) (Bw(KK),KK=1,NCUM)	VFS 790
	READ (08) (Dw(KK),KK=1,NCUM)	VFS 800
	AN=0.	VFS 810
	RN=0.	VFS 820
	DO 100 KK=1,NCUM	VFS 830
	IF (NH1.NE.0.AND.K.LE.NH1) GO TO 80	VFS 840
	FCLM=NCLM-NH1	VFS 850
	PP=PI-TH1	VFS 860
	GO TO 90	VFS 870
80	FCUM=NH1	VFS 880
	PP=TH1	VFS 890
90	CONTINUE	VFS 900
	PN=PN+Dw(KK)*CSF(I,KK)*PP/FCUM	VFS 910
100	AN=AN+Bw(KK)*CSF(I,KK)*PP/FCLM	VFS 920
	AN=AN*2./PI	VFS 930
	RN=RN*2./PI	VFS 940
	CW(KI)=PN*RF(J)**(I+1)	VFS 950
110	AW(KI)=AN*RF(J)**(I+1)	VFS 960
	CALL FUSELA (NG,Rw,N,JJ,XAS,XTEF,XF,XCF,RF,P,SNP,NKF,KY)	VFS 970
	DO 130 KK=1,NTL	VFS 980
	N1=(I-1)*NF+1	VFS 990
	N2=I*NF	VFS1000
	NP=KK+LPL	VFS1010
	IF (KK.GE.N1.AND.KK.LE.N2) GO TO 120	VFS1020
	AW(NP)=0.	VFS1030
	CW(NP)=0.	VFS1040
	GO TO 130	VFS1050
120	NK=KK-N1+1	VFS1060
	AW(NP)=Bw(NK)	VFS1070
	CW(NP)=FW(NK)	VFS1080
130	CONTINUE	VFS1090
	WPJTE (01) (Cw(K),K=1,LPW)	VFS1100
140	WRITE (07) (Aw(K),K=1,LPW)	VFS1110
150	CONTINUE	VFS1120
	RETURN	VFS1130
	END	VFS1140-
	SUPROUTINE WING (AW,Rw,LPANFL,I,PP,LPAN1,LPAN2,KF)	WNG 10
	DIMENSION AW(1),Rw(1)	WNG 20
	DIMENSION W(4)	WNG 30
	COMMON /GEOM/ HALFSW,XCP(200),YCP(200),ZCP(200),XLF(50),YLE(50),XTWNG	40

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1E(50),PSI(20),CH(95),XV(200),YV(100),SN(P,8),XN(200,2),YN(200,2),ZWNG 50
2A(200,2),WIDTH(R),YCON(25),SWFEP(50),HALFB,SJ(21,8),EX(95,2),TX(95WNG 60
3,2),SC(160,5),SI(160,5),LC(3) WNG 70
COMMON /AFRO/ AM1,AM2,B1,P2,CL(30),CT(30),CP(30),GAM(2,130) WNG 80
COMMON /CONST/ NCS,NCW,M1(R),NSJ,NCJ(5),LAST,MJW1(3,5),MJW2(3,5),JWNG 90
1PANEL,MJJ(5),NW(3),NNJ,NJP WNG 100
IP=1 WNG 110
IZ=1 WNG 120
IFF=1 WNG 130
ISN=1 WNG 140
NL=NW(1) WNG 150
NN=NW(1) WNG 160
DO 60 J=1,LPANFL WNG 170
MI=J-IFF+1 WNG 180
FN=NL WNG 190
IF (J.EQ.(LPAN1+1).OR.J.EQ.(LPAN2+1)) IP=1 WNG 200
IF (J.GT.LPAN1.AND..J.LE.LPAN2) ISN=2 WNG 210
IF (J.GT.LPAN2.AND..J.LE.LPANEL) ISN=3 WNG 220
IF (J.GE.LPAN1.AND..J.LT.LPANFL) GO TO 10 WNG 230
GO TO 20 WNG 240
10 NL=NW(2) WNG 250
IF (J.GE.LPAN2.AND..J.LT.LPANEL) NL=NW(3) WNG 260
20 CONTINUE WNG 270
X1=XN(J,1)-XCP(I) WNG 280
X2=XN(J,2)-XCP(I) WNG 290
X12=XN(J,2)-XN(J,1) WNG 300
Y12=YN(J,2)-YN(J,1) WNG 310
Z12=ZN(J,2)-ZN(J,1) WNG 320
Z1=ZN(J,1)-ZCP(I) WNG 330
Z2=ZN(J,2)-ZCP(I) WNG 340
X7J=X1*Z12-Z1*X12 WNG 350
DO 50 II=1,2 WNG 360
IF (II.EQ.1) GO TO 30 WNG 370
N=1 WNG 380
GO TO 40 WNG 390
30 N=2 WNG 400
40 CONTINUE WNG 410
YC=(-1.)*N*YCP(I) WNG 420
Y1=YN(J,1)-YC WNG 430
Y2=YN(J,2)-YC WNG 440
XYK=X1*Y12-Y1*X12 WNG 450
Y7I=Y1*Z12-Z1*Y12 WNG 460
ALR1=XYK*XYK+X7J*XZJ+RF*Y7I*Y7I WNG 470
R1F1=SQRT(X1*X1+RF*Y1*Y1+RF*Z1*Z1) WNG 480
R2F1=SQRT(X2*X2+RF*Y2*Y2+RF*Z2*Z2) WNG 490
UUE1=(X2*X12+RF*Y2*Y12+RF*Z2*Z12)/R2F1-(X1*X12+RF*Y1*Y12+RF*Z1*Z12) WNG 500
1)/R1F1 WNG 510
G1F1=(1.-X1/R1F1)/(Y1*Y1+Z1*Z1) WNG 520
G2F1=(1.-X2/R2F1)/(Y2*Y2+Z2*Z2) WNG 530

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F1=UR1*XYK/ALB1 WNG 540
F2=-Y2*G2B1+Y1*G1B1 WNG 550
W(II+2)=(F1+F2)*CF(I7)*SN(MI,ISN)/(R.*FN) WNG 560
IF (IP.EQ.1.AND.KF.NE.0) F2=-Y2*G2B1 WNG 570
50 W(II)=(F1+F2)*CF(I7)*SN(MI,ISN)/(R.*FN) WNG 580
AW(J)=W(1)+W(2) WNG 590
RW(J)=W(3)-W(4) WNG 600
IF (J.LT.NN.OR.J.FO.LPANEL) GO TO 60 WNG 610
IP=IP+1 WNG 620
IZ=I7+1 WNG 630
YFF=NN+1 WNG 640
NN=NN+NL WNG 650
60 CONTINUE WNG 660
RETURN WNG 670
END WNG 680-
SUBROUTINE UNFW (LAST,LPANEL,R1,LPAN1,LPAN2,NW,AK,BW,MJJ,IL,NCJ,NJUNW 10
1H,NP) UNW 20
DIMENSION SF(10),CF(10),AW(1),W(4),NW(1),RW(1),MJJ(1),NCJ(1)UNW 30
1) UNW 40
COMMON /FUS/ XF(20),XCF(20),RF(20),SNP(5,20),XLEF,XTEF,WARD(20),NCUNW 50
1UM,NF,NT,CSF(5,10),XAS(6),NKF(5),FO,F10,KF,NTL UNW 60
COMMON /GFOM/ HALFSW,XCP(200),YCP(200),ZCP(200),XLF(50),YLE(50),XTUNW 70
1F(50),PSI(20),CH(95),XV(200),YV(100),SN(8,P),XN(200,2),YN(200,2),ZUNW 80
2N(200,2),WIDTH(8),YCON(25),SWEEP(50),HALFR,SJ(21,P),EX(95,2),TX(95)UNW 90
3,2),SC(160,5),ST(160,5),LC(3) UNW 100
PI=3.14159265 UNW 110
REWIND 02 UNW 120
TH1=SNP(5,20) UNW 130
NH1=SNP(5,19) UNW 140
JCOT=XTE(50) UNW 150
ICON=LPANEL UNW 160
IF (IL.EQ.2) ICON=LAST UNW 170
DO 30 I=1,NCLM UNW 180
IF (NH1.NE.0.AND.I.LE.NH1) GO TO 10 UNW 190
FI=I-NH1 UNW 200
FCUM=NCUM-NH1 UNW 210
PP=PI-TH1 UNW 220
TP=TH1 UNW 230
GO TO 20 UNW 240
10 FI=I UNW 250
FCUM=NH1 UNW 260
PP=TH1 UNW 270
TP=0. UNW 280
20 CONTINUE UNW 290
T=(2.*FI-1.)*PP/(2.*FCUM)+TP UNW 300
CF(I)=COS(T) UNW 310
30 SF(I)=SIN(T) UNW 320
KCON=NF+1 UNW 330
KC=NCUM UNW 340

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	DO 200 I=1,KCON	UNW 350
	IF (I.FQ.KCON) KC=1	UNW 360
	IP=1	UNW 370
	I7=1	UNW 380
	IFF=1	UNW 390
	IND=1	UNW 400
	JKT=1	UNW 410
	L1=LPANEL+1	UNW 420
	LAST1=LAST-1	UNW 430
	ISA=1	UNW 440
	MM=AW(1)	UNW 450
	NN=AW(1)	UNW 460
	DO 190 J=1,ICON	UNW 470
	MI=J-IFF+1	UNW 480
	FN=AN	UNW 490
	IF (J.GT.LPANEL) GO TO 50	UNW 500
	IF (J.EG.(LPAN1+1).OR.J.FG.(LPAN2+1)) IP=1	UNW 510
	IF (J.GT.LPAN1.AND.J.LE.LPAN2) ISA=2	UNW 520
	IF (J.GT.LPAN2.AND.J.LE.LPANEL) ISA=3	UNW 530
	IF (J.GE.LPAN1.AND.J.LT.LPANEL) GO TO 40	UNW 540
	GO TO 50	UNW 550
40	NN=AW(2)	UNW 560
	IF (J.GF.LPAN2.AND.J.LT.LPANEL) NN=AW(3)	UNW 570
50	CONTINUE	UNW 580
	IF (JCOT.EQ.1.AND.J.GT.LPANEL) GO TO 60	UNW 590
	GO TO 70	UNW 600
60	IF (JKT.EQ.1.OR.JKT.EQ.(NJP+1)) IP=1	UNW 610
70	CONTINUE	UNW 620
	IF (J.GF.LPANEL.AND.J.LT.MJJ(IND)) NN=NCJ(IND)	UNW 630
	CHORD=CH(IZ)	UNW 640
	IF (IL.EQ.1) GO TO 100	UNW 650
	IF (J.EQ.L1) GO TO 80	UNW 660
	GO TO 90	UNW 670
80	ISA=ISA+1	UNW 680
	L1=MJJ(IND)+1	UNW 690
90	NL=MJJ(IND)-1	UNW 700
	IF (NL.EQ.LAST1) GO TO 100	UNW 710
	IF (J.EQ.NL) IND=IND+1	UNW 720
100	CONTINUE	UNW 730
	DO 160 K=1,KC	UNW 740
	IF (I.FQ.KCON) GO TO 110	UNW 750
	X=XCF(I)	UNW 760
	Y=RF(I)*SF(K)	UNW 770
	Z=RF(I)*CF(K)	UNW 780
	GO TO 120	UNW 790
110	X=XLFF	UNW 800
	Y=0.	UNW 810
	Z=0.	UNW 820
120	CONTINUE	UNW 830

	X1=XN(J,1)-X	UNW 840
	X2=XN(J,2)-X	UNW 850
	X12=XN(J,2)-XN(J,1)	UNW 860
	Y12=YN(J,2)-YN(J,1)	UNW 870
	Z12=ZN(J,2)-ZN(J,1)	UNW 880
	Z1=ZN(J,1)-Z	UNW 890
	Z2=ZN(J,2)-Z	UNW 900
	X7J=X1*Z12-Z1*X12	UNW 910
	DO 150 II=1,2	UNW 920
	FCP=1.	UNW 930
	IF (II.EQ.2) FCP=-1.	UNW 940
	YC=Y*FCP	UNW 950
	Y1=YN(J,1)-YC	UNW 960
	Y2=YN(J,2)-YC	UNW 970
	XYK=X1*Y12-Y1*X12	UNW 980
	YZI=Y1*Z12-Z1*Y12	UNW 990
	ALP1=XYK*XYK+XZJ*XZJ+B1*YZI*YZI	UNW1000
	R1P1=SQRT(X1*X1+P1*Y1*Y1+P1*Z1*Z1)	UNW1010
	R2P1=SQRT(X2*X2+P1*Y2*Y2+P1*Z2*Z2)	UNW1020
	UUB1=(X2*X12+B1*Y2*Y12+P1*Z2*Z12)/R2P1-(X1*X12+P1*Y1*Y12+P1*Z1*Z12	UNW1030
	1)/R1P1	UNW1040
	G1P1=(1.-X1/P1P1)/(Y1*Y1+Z1*Z1)	UNW1050
	G2P1=(1.-X2/R2P1)/(Y2*Y2+Z2*Z2)	UNW1060
	F12=UUB1*XYK/ALP1	UNW1070
	G12=-Y2*G2P1+Y1*G1P1	UNW1080
	IF (I.FQ.KCON) GO TO 130	UNW1090
	F13=UUB1*X7J/ALP1	UNW1100
	G13=Z2*G2P1-Z1*G1P1	UNW1110
	F1=-F13*SF(K)*FCP+F12*CF(K)	UNW1120
	F2=G13*SF(K)*FCP+G12*CF(K)	UNW1130
	IF (J.LE.LPANEL) GO TO 140	UNW1140
	F1=2.*F1	UNW1150
	F2=2.*F2	UNW1160
	GO TO 140	UNW1170
130	F1=F12	UNW1180
	F2=G12	UNW1190
	IF (J.LE.LPANEL) GO TO 140	UNW1200
	F1=2.*F1	UNW1210
	F2=2.*F2	UNW1220
140	W(II+2)=(F1+F2)*CFORD*SN(MI,ISN)/(P.*FN)	UNW1230
	IF (IP.NE.1) GO TO 150	UNW1240
	G12=-Y2*G2P1	UNW1250
	G13=Z2*G2P1	UNW1260
	F2=G13*SF(K)*FCP+G12*CF(K)	UNW1270
	IF (I.EQ.KCON) F2=G12	UNW1280
	IF (J.LE.LPANEL) GO TO 150	UNW1290
	F2=2.*F2	UNW1300
150	W(II)=(F1+F2)*CFORD*SN(MI,ISN)/(P.*FN)	UNW1310
	IF (I.EQ.KCON) GO TO 160	UNW1320

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	AW(K)=W(1)+W(2)	UNW1330
	BW(K)=W(3)-W(4)	UNW1340
160	CONTINUE	UNW1350
	IF (I.EG.KCON) GO TO 170	UNW1360
	WRITE (08) (AW(KK),KK=1,NCUM)	UNW1370
	WRITE (08) (BW(KK),KK=1,NCUM)	UNW1380
	GO TO 180	UNW1390
170	AW(J)=W(1)+W(2)	UNW1400
180	CONTINUE	UNW1410
	IF (J.LT.MM) GO TO 190	UNW1420
	IP=IP+1	UNW1430
	I7=I7+1	UNW1440
	IFF=MM+1	UNW1450
	MM=MM+NN	UNW1460
	IF (J.GT.LPANEL) JKT=JKT+1	UNW1470
	IF (JKT.EQ.(NF+1)) JKT=1	UNW1480
190	CONTINUE	UNW1490
	IF (I.NF.KCON) GO TO 200	UNW1500
	WRITE (08) (AW(KK),KK=1,I'CON)	UNW1510
200	CONTINUE	UNW1520
	RETURN	UNW1530
C		UNW1540
	FNC	UNW1550-
	OVERLAY (WAGJET,1.0)	GEO 10
	PROGRAM GEOMTY	GEO 20
C	TO SET UP THE GEOMETRY OF THE VORTEX ELEMENTS AND CONTROL POINTS	GEO 30
	DIMENSION XXL(5),YL(5),XXT(5),ZL(5),CPCWL(31),CPSWL(31)	GEO 40
	COMMON /SCHEME/ C(2),X(10,41),Y(10,41),SLOPE(15),XL(2,15),XTT(41),	GEO 50
	1XLL(41)	GEO 60
	COMMON /GEOM/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTGEO	GEO 70
	1F(50),PSI(20),CH(95),XV(200),YV(100),SN(8,8),XN(200,2),YN(200,2),ZGEO	GEO 80
	2N(200,2),WIDTH(8),YCON(25),SWFFP(50),HALFR,SJ(21,8),EX(95,2),TX(95	GEO 90
	3,2),SC(160,5),SI(160,5),LC(3)	GEO 100
	COMMON /SKODE/ KCCDE	GEO 110
	COMMON /AFRO/ AM1,AM2,P1,P2,CL(30),CT(30),CD(30),GAM(2,130)	GEO 120
	COMMON /SOME/ NC,NWING,LAT,NAL,LWF,LWFJ,CHCRDT(3),SNG(5),YE(5),YCN	GEO 130
	1(6),WKN,PDX,MCG,NDG	GEO 140
	COMMON /FUSRAD/ IFR,IFN,XFF(21),RFF(21),AAF(20),RRF(20),CCF(20),DDGEO	GEO 150
	1F(20)	GEO 160
	COMMON /FUS/ XF(20),XCF(20),RF(20),SNP(5,20),XLEF,XTEF,WARD(20),NCGEO	GEO 170
	1UM,NF,NT,CSF(5,10),XAS(6),AKF(5),F0,F10,KF,NTL	GEO 180
	COMMON /CONST/ NCS,NCW,M1(8),NSJ,NCJ(5),LAST,MJW1(3,5),MJW2(3,5),JGEO	GEO 190
	1PANEL,MJJ(5),NW(3),NAJ,NJP	GEO 200
	COMMON /PARAM/ ALPT,ALPC,ALPS,CDF,SDF,TH,TRF	GEO 210
	COMMON /ADD/ CP(130),CM(20),PPFAK(8),SWP(8,15),GAL(30),ISYM,VMU,VUGEO	GEO 220
	1,TEMP,FCR,CAMLER,CAMLET,CAMTFR,CAMTFT,XJ,YJ,ZJ,RJ,ALP,CREF,TWISTR	GEO 230
	COMMON /COST/ LCTAL,LPAN1,MJW(5),LPANFL,IENTA,LPAN2,EXIT,PTIAL,TW	GEO 240
	1IST,DF(5),NFP	GEO 250
	COMMON /CAMB/ ICAM,IM,XT(2,11),ZC(2,11),AAM(2,10),BPM(2,10),CCM(2,GEO	GEO 260

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110).DDM(2,10) GEO 270
WRITE (6,620) GEO 280
PI=3.14159265 GEO 290
NCS=0 GEO 300
KL=0 GEO 310
IPANFL=1 GEO 320
PT=0. GEO 330
DO 10 I=1,5 GEO 340
YCN(I)=0. GEO 350
10 DF(I)=0. GEO 360
C GEO 370
C ***MACH NUMBERS OF FREESTREAM AND JET FLOW, FREESTREAM/JET VELOCITY GEO 380
C RATIO, JET/FREESTREAM TEMPERATURE RATIO, ANGLE OF ATTACK IN DEGREE., GEO 390
C WING L.E. AND T.F. X-COORDINATES AT THE JET AXIS LOCATION*** GEO 400
C GEO 410
C READ (5,570) AM1,AM2,VML,TFMP,ALP,XEL,XET GEO 420
C WRITE (6,570) AM1,AM2,VML,TEMP,ALP,XEL,XET GEO 430
C GEO 440
C ***NUMBER OF FLAP SECTIONS (INCLUDING THE JET SPAN), THE NUMERICAL GEO 450
C ORDER OF JET SPAN AND THE CORRESPONDING FLAP DEFLECTION ANGLES IN GEO 460
C DEGREES *** GEO 470
C GEO 480
C READ (5,610) NFP,NJP,(DF(I),I=1,NFP) GEO 490
C WRITE (6,610) NFP,NJP,(DF(I),I=1,NFP) GEO 500
C GEO 510
C ***REFERENCE HALF WING AREA, REFERENCE CHORD, TWIST IN DEG., INCIDENT- GEO 520
C CE OF ROOT CHORD IN DEG., X-, Y- AND Z- COORDINATES OF JET CENTER GEO 530
C AT EXIT, AND JET RADIUS *** GEO 540
C * NOTE. FOR USB APPLICATIONS, YJ,7J AND RJ MAY BE ANY NON-ZERO VALUES GEO 550
C ,UNLESS THE RECTANGULAR JET IS NOT ON THE SURFACE AND THE ENTRAIN- GEO 560
C MENT EFFECT IS TO BE ACCOUNTED FOR. GEO 570
C GEO 580
C READ (5,570) HALFSW,CREF,TWIST,TWISTR,XJ,YJ,7J,RJ GEO 590
C WRITE (6,570) HALFSW,CREF,TWIST,TWISTR,XJ,YJ,7J,RJ GEO 600
C GEO 610
C ***TRAILING-EDGE ANGLE IN DEG., PARTIAL-SPAN FLAP INDICATOR (=0. FOR GEO 620
C NO CP FULL-SPAN FLAP, AND =1. OTHERWISE), CONFIGURATION INDICATOR GEO 630
C (=1. FOR USB, AND =0. FOR OWB), L.E. CAMBER AT THE ROOT AND TIP, GEO 640
C AND T.F. CAMBER AT THE ROOT AND TIP *** GEO 650
C * NOTE. FOR USB APPLICATIONS, TEANGL MAY BE ANY VALUE * GEO 660
C GEO 670
C * IF CAMBER ORDINATES ARE TO BE READ IN, THE L.E. AND T.E. CAMBER GEO 680
C SLOPES TO BE READ IN BFLOW MAY BE ARBITRARY NUMBERS * GEO 690
C GEO 700
C READ (5,570) TEANGL,PTIAL,USB,CAMLER,CAMLET,CAMTER,CAMTET GEO 710
C WRITE (6,570) TEANGL,PTIAL,USB,CAMLER,CAMLET,CAMTER,CAMTET GEO 720
C IF (RJ.LE.0.0001) RJ=1. GEO 730
C IUSR=USB GEO 740
C DFJ=0. GEO 750

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	CMU=0.	GEO 760
C		GEO 770
C	* THE FOLLOWING DATA ARE NOT NEEDED FOR OWR APPLICATIONS *	GEO 780
	IF (IUSE.EQ.1) GO TO 20	GEO 790
C		GEO 800
C	*** THRUST COEFFICIENT, JET DEFLECTION ANGLE IN DEG, AND ENTRAINMENT	GEO 810
C	CODE IF THE RECTANGULAR JET IS NOT ON THE WING SURFACE (=1. IF THE	GEO 820
C	ENTRAINMENT DUE TO AN EQUIVALENT ROUND JET IS TO BE INCLUDED, =0.	GEO 830
C	OTHERWISE)	GEO 840
C		GEO 850
	READ (5,570) CMU,DFJ,TNJ	GEO 860
	WRITE (6,570) CMU,DFJ,TNJ	GEO 870
20	CONTINUE	GEO 880
	DFJ=DFJ*PI/180.	GEO 890
	CDF=DFJ	GEO 900
	DO 30 I=1,5	GEO 910
30	DF(I)=DF(I)*PI/180.	GEO 920
	TDF=DF(NJP)	GEO 930
	ALP=ALP*PI/180.	GEO 940
	ALPS=SIN(ALP)	GEO 950
	ALPC=COS(ALP)	GEO 960
	ALPT=ALPS	GEO 970
	DE=TEANGL*PI/180.+TDF	GEO 980
	IF (IUSR.EQ.1) CDF=DFJ	GEO 990
	EXIT=0.	GEO 1000
	IF (XJ.GT.XEL) EXIT=1.	GEO 1010
	XEL=(XFL-XJ)/RJ	GEO 1020
	XET=(XFT-XJ)/RJ	GEO 1030
	Z=ZJ/RJ	GEO 1040
	TH=0.	GEO 1050
	M1(4)=0	GEO 1060
	ITN=TNJ	GEO 1070
	YCCA(23)=TNJ	GEO 1080
	IF (IUSE.EQ.1.AND.ITN.EQ.0) GO TO 40	GEO 1090
	CALL ENTRN (VMU,AM2,TEMP,XM,CU,RT,XEL,XET,7,KCCODE,XJC)	GEO 1100
	XFGUI=XM*RJ+XJ	GEO 1110
	REGUI=RT*RJ	GEO 1120
	RT=REGUI	GEO 1130
	IF (IUSR.EQ.1) GO TO 40	GEO 1140
	IF (XFL.LT.0..AND.ZJ.GE.(2.*RJ)) KCODE=0	GEO 1150
	IF (ZJ.GE.(3.*RJ)) KCODE=0	GEO 1160
	F1=-29.5428*CU*CU+33.7371*CU-P.9148	GEO 1170
	IF (CU.GT.0.6339) F1=0.6+0.4*(F1-0.6339)/0.3661	GEO 1180
	IF (F1.LT.0..AND.ZJ.GE.(1.9*RJ)) KCODE=0	GEO 1190
	IF (KCODE.EQ.0) GO TO 40	GEO 1200
	ZP=PI*RT/2.	GEO 1210
	TH=ZR	GEO 1220
40	CONTINUE	GEO 1230
	IF (IUSR.EQ.1) KCODE=1	GEO 1240

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      READ (5,570) (7C(I,J),J=1,IM)
      DO 80 J=1,IM
      XFF(J)=XT(I,J)
      RFF(J)=ZC(I,J)
      CALL SPLINE (IM,XFF,RFF,AAF,RBF,CCF,DDF)
      DO 90 J=1,IM1
      AAM(I,J)=AAF(J)
      RBM(I,J)=RBF(J)
      CCM(I,J)=CCF(J)
      DDM(I,J)=DDF(J)
      CONTINUE
      CONTINUE
      CONTINUE
      LL=1
      FN=NCW
      DO 130 I=1,NCW
      FI=I
      CPCWL(I)=0.5*(1.-COS((2.*FI-1.)*PI/(2.*FN)))
      SN(I,L)=2.*SGRT(CPCWL(I)*(1.-CPCWL(I)))
      CPCWL(I)=CPCWL(I)*100.
      DO 250 KK=1,NC
      C
      C *** COORDINATES OF BREAK CHORDS BOUNDING SPANWISE SECTIONS ***
      C
      READ (5,570) ((XXL(I),XXT(I),YL(I),I=1,2),7S)
      WRITE (6,570) ((XXL(I),XXT(I),YL(I),I=1,2),7S)
      IF (IUSR.EQ.1) GO TO 210
      IF (ISYM.EQ.0.AND.KK.EQ.1) GO TO 140
      IF (KK.EQ.(NJV(NJV)+1)) GO TO 150
      IF (ISYM.NE.0.AND.KK.EQ.(NJV(NJV)-1)) GO TO 160
      IF (ISYM.NE.0.AND.KK.EQ.NJV(NJV)) GO TO 140
      GO TO 210
      140 XXL(2)=XXL(1)+(XXL(2)-XXL(1))*(YL(2)-YL(1)+RT-RJ)/(YL(2)-YL(1))
      XXT(2)=XXT(1)+(XXT(2)-XXT(1))*(YL(2)-YL(1)+RT-RJ)/(YL(2)-YL(1))
      IF (ISYM.EQ.0) GO TO 170
      150 XXL(1)=XL2
      XXT(1)=XT2
      GO TO 170
      160 XXL(2)=XXL(1)+(XXL(2)-XXL(1))*(YL(2)-YL(1)-RT+RJ)/(YL(2)-YL(1))
      XXT(2)=XXT(1)+(XXT(2)-XXT(1))*(YL(2)-YL(1)-RT+RJ)/(YL(2)-YL(1))
      170 XL2=XXL(2)
      XT2=XXT(2)
      IF (ISYM.EQ.0.AND.KK.EQ.1) GO TO 180
      IF (ISYM.NE.0.AND.KK.EQ.(NJV(NJV)-1)) GO TO 180
      YL(1)=YL2
      180 IF (ISYM.EQ.0) GO TO 190
      IF (KK.EQ.(NJV(NJV)+1)) GO TO 210
      IF (KK.EQ.NJV(NJV)) YL(2)=YL(2)+RT-RJ
      IF (KK.EQ.(NJV(NJV)-1)) YL(2)=YL(2)-RT+RJ
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	GO TO 200	GE02230
190	IF (KK.EQ.1) YL(2)=YL(2)+RT-RJ	GE02240
200	YL2=YL(2)	GE02250
210	CONTINUE	GE02260
	FM=M1(KK)	GE02270
	NSW=M1(KK)	GE02280
	DO 220 J=1,NSW	GE02290
	FJ=J	GE02300
	CPSWL(J)=0.5*(1.-COS((2.*FJ-1.)*PI/(2.*FM)))*100.	GE02310
	YCCN(J)=0.5*(1.-COS(FJ*PI/FM))	GE02320
	SJ(J,KK)=SIN(FJ*PI/FM)	GE02330
220	CONTINUE	GE02340
	IF (KK.FQ.NC) GO TO 230	GE02350
	CPSWL(1)=0.	GE02360
	CPSWL(NSW)=100.	GE02370
	GO TO 240	GE02380
230	CPSWL(1)=0.	GE02390
240	IF (KK.EQ.NJW(LL)) MJW1(L,LL)=IPANEL	GE02400
	IF (KK.EQ.NJW(NJP)) LC(L)=KL+1	GE02410
	LR=(L-1)*NC+KK	GE02420
	CALL PANEL (XXL,YL,XYT,CPCWL,CPSWL,NSW,IPANFL,LPANEL,KL,LR,SWP,7S)	GE02430
	IPANEL=LPANEL+1	GE02440
	NCS=NCS+NSW-1	GE02450
	WIDTH(KK)=YL(2)-YL(1)	GE02460
	BREAK(KK)=YL(1)	GE02470
	IF (KK.EQ.NJW(LL)) MJW2(L,LL)=LPANFL	GE02480
	IF (KK.NE.NC) GO TO 250	GE02490
	CHCRDT(L)=XYT(2)-XXL(2)	GE02500
	YCN(L)=XXL(2)	GE02510
	HALFR=YL(2)	GE02520
250	IF (KK.EQ.NJW(LL)) LL=LL+1	GE02530
	IF (L.EQ.3) GO TO 300	GE02540
	IF (L.EQ.1) LPAN1=LPANEL	GE02550
	IF (L.EQ.2) LPAN2=LPANEL	GE02560
	IF (NW(2).EQ.0) GO TO 260	GE02570
	L=L+1	GE02580
	NCW=NW(L)	GE02590
	IF (L.EQ.3.AND.NW(3).EQ.0) GO TO 280	GE02600
	GO TO 120	GE02610
260	DO 270 I=2,3	GE02620
	DO 270 J=1,NFP	GE02630
	MJW1(I,J)=0	GE02640
270	MJW2(I,J)=0	GE02650
	LPAN2=LPANEL	GE02660
	NCS=NCS*3	GE02670
	GO TO 300	GE02680
280	DO 290 I=1,NFP	GE02690
	MJW1(3,I)=0	GE02700
290	MJW2(3,I)=0	GE02710

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L=L-1
NCS=NCS+NCS/2
300 CONTINUE
NCS=NCS/3
NCW=NW(1)+NW(2)+NW(3)
VU=VMU
IF (IUSP.FG.1) CU=VMU
VMU=CUJ
RTJ=RJ
ZJT=ZJ+ZS
IF (RT.GT.ARS(7J).AND.KCDF.FG.0) ZJT=RT*7J/ABS(7J)+ZS
IF (IUSP.EG.1) GO TO 310
AM2=AM1/(VMU*SQRT(TEMP))
IF (AM2.GT.0.9) WRITE (6,660) AM2
IF (AM2.GT.0.9) AM2=0.9
310 CONTINUE
LAST=LPLANFL
C
C *** TOTAL NUMBER OF STREAMWISE JET SECTIONS, NUMBER OF JET CIRCUM-
C FERENTIAL STRIPS MINUS ONE FOR A NON-CENTERED JET (USE ODD NUMBERS
C ) AND PLUS ONE FOR A CENTERED JET (USE EVEN NUMBERS), AND NUMBERS
C OF JET VORTEX ELEMENTS ON EACH JET SECTION ***
C
READ (5,580) NNJ,NSJ,(NCJ(I),I=1,NNJ)
WRITE (6,580) NNJ,NSJ,(NCJ(I),I=1,NNJ)
IF (KCODE.EQ.0) CALL CIRCJ (ISYM,NSJ,Y)
IF (ISYM.FG.0) NSJJ=NSJ/2
IF (ISYM.NE.0) NSJJ=(NSJ+1)/2
NSYJ=1-ISYM
NSJ1=NSJJ-1
FNJ=NSJJ
CPSWL(1)=0.
CPSWL(NSJJ)=1.
YCON(1)=0.5*(1.-COS(PI/FNJ))
DO 320 I=2,NSJ1
FI=I
CPSWL(I)=0.5*(1.-COS((2.*FI-1.)*PI/(2.*FNJ)))
320 YCON(I)=0.5*(1.-COS(FI*PI/FNJ))
IFNTN=NC
JC=NCS*L
NJ1=NNJ-1
DO 420 JJ=1,NNJ
IF (IUSB.FG.1) GO TO 370
C
C *** COORDINATES OF BOUNDING LINES OF JET SECTIONS PROJECTED ON X-Y
C PLANE ***
C
READ (5,570) (XXL(I),XXT(I),YL(I),I=1,2)
WRITE (6,570) (XXL(I),XXT(I),YL(I),I=1,2)
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GE02720
GE02730
GE02740
GE02750
GE02760
GE02770
GE02780
GE02790
GE02800
GE02810
GE02820
GE02830
GE02840
GE02850
GE02860
GE02870
GE02880
GF02890
GE02900
GE02910
GE02920
GE02930
GE02940
GE02950
GE02960
GE02970
GE02980
GE02990
GE03000
GE03010
GE03020
GE03030
GE03040
GE03050
GE03060
GE03070
GE03080
GE03090
GE03100
GE03110
GE03120
GE03130
GE03140
GE03150
GE03160
GE03170
GE03180
GF03190
GE03200

	IF (ISYM.EQ.0) GO TO 330	GE03210
	XL1=XXL(1)-(XXL(2)-XXL(1))*(RT-RTJ)/(YL(2)-YL(1))	GE03220
	XT1=XXT(1)-(XXT(2)-XXT(1))*(RT-RTJ)/(YL(2)-YL(1))	GE03230
330	XL2=XXL(1)+(XXL(2)-XXL(1))*(RT+RTJ)/(YL(2)-YL(1))	GE03240
	XT2=XXT(1)+(XXT(2)-XXT(1))*(RT+RTJ)/(YL(2)-YL(1))	GE03250
	IF (ISYM.EQ.0) GO TO 340	GE03260
	XXL(1)=XL1	GE03270
	XXT(1)=XT1	GE03280
340	XXL(2)=XL2	GE03290
	XXT(2)=XT2	GE03300
	IF (ISYM.EQ.0) GO TO 350	GE03310
	YL(1)=YL(1)-RT+RTJ	GE03320
350	YL(2)=YL(2)+RT-RTJ	GE03330
	IF (KCODE.EQ.0) GO TO 360	GE03340
	XXL(4)=XXL(2)	GE03350
	XXT(4)=XXT(2)	GE03360
	YL(4)=YL(2)	GE03370
	XXL(2)=XXL(1)	GE03380
	XXT(2)=XXT(1)	GE03390
	YL(2)=YL(1)	GE03400
	XXL(3)=XXL(4)	GE03410
	XXT(3)=XXT(4)	GE03420
	YL(3)=YL(4)	GE03430
	ZL(1)=ZS	GE03440
	ZL(2)=ZR+ZS	GE03450
	ZL(3)=ZR+7S	GE03460
	ZL(4)=ZS	GE03470
360	CONTINUE	GE03480
.	GO TO 390	GE03490
C		GE03500
C	***COORDINATES OF BREAK POINTS DEFINING RECTANGULAR JET SECTIONS FOR	GF03510
C	USE CONFIGURATIONS***	GE03520
C		GE03530
370	DO 380 I=1,4	GE03540
	READ (5,570) XXL(I),XXT(I),YL(I),ZL(I)	GE03550
380	WRITE (6,570) XXL(I),XXT(I),YL(I),ZL(I)	GE03560
390	CONTINUE	GE03570
	II=JJ	GE03580
	JJ]=JJ+L	GE03590
	FNCJ=NCJ(JJ)	GE03600
	NJ=NCJ(JJ)	GE03610
	NMJ=NJ*16	GE03620
	IF (NJ.GT.6) NMJ=NJ*8	GE03630
	FNJ=NMJ	GE03640
	DO 400 J=1,NMJ	GE03650
	FJ=J	GE03660
	SC(J,JJ)=0.5*(1.-COS((2.*FJ-1.)*PI/(2.*FNJ)))	GE03670
400	SI(J,JJ)=SIN((2.*FJ-1.)*PI/(2.*FNJ))	GE03680
	DO 410 J=1,NJ	GE03690

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FJ=J
CPCWL(J)=0.5*(1.-COS((2.*FJ-1.)*PI/(2.*FNCJ)))
410 SN(J, JJ1)=2.*SQRT(CPCWL(J)*(1.-CPCWL(J)))
IF (KCCDE.EQ.0) CALL JSHAPE (XXL, XXT, YL, YJ, ZJT, FT, CPCWL, IPANEL, NJ,
1JC, ISYM)
IF (KCCDE.EQ.1) CALL RESHAP (XXL, XXT, YL, ZL, CPCWL, CPSWL, IPANEL, NJ, J
1C, II, NSYM)
MJJ(JJ)=LAST
420 JPANEL=LAST+1
SDF=XXT(1)-XXL(1)
IF (IUSP.EQ.1) TH=ZL(3)-ZL(4)
YCON(25)=7L(4)-7CP(1)
YCCN(24)=USB
C(I)=CMU
IF (KCODE.EQ.0) YCCN(25)=1.
IF (KCODE.EQ.1) CALL RECTJ (ISYM, NSJ, Y)
JPANEL=LAST-LPANEL
LTCTAL=LAST+JPANEL
C
C ***NUMBER OF SECTIONS IN WHICH THE DIHEDRAL IS TO BE DEFINED .
C DIHEDRAL IN DEG., AND THE OUTBOARD Y COORDINATE OF THE SECTION .
C * MDG=1 IF THERE IS DIHEDRAL, =0, OTHERWISE *
C
READ (5,580) MDG, MDG
WRITE (6,580) MDG, MDG
READ (5,570) (SNG(I), YG(I), I=1, NDC)
WRITE (6,570) (SNG(I), YG(I), I=1, NDC)
DO 430 I=1, NDC
430 SNG(I)=SIN(SNG(I)*PI/180.)
LWF=LPANEL
LWFJ=LTCTAL
NTL=0
KW=0
WKN=0.
RDX=0.
C
C *** KF=1 IF THE FUSELAGE IS PRESENT, =0 OTHERWISE. NT=NUMBER OF
C FOURIER TERMS EXCLUDING THE ZERO-ORDER TERM. NCUM=NUMBER OF CIR-
C CUMFERENTIAL LOCATIONS AT WHICH PRESSURE LOADING IS TO BE COMPUTED
C . NF=NUMBER OF CONTROL STATIONS ALONG THE FUSELAGE AXIS ***
C * KW=NUMBER OF SEGMENTS INTO WHICH THE FUSELAGE AXIS IS DIVIDED.
C NKF=NUMBER OF SINGULARITY ELEMENTS IN EACH SEGMENT *
C * FOR MIDWING CONFIGURATIONS, USE EVEN NUMBERS FOR NCUM *
C
DO 440 I=1, 5
NKF(I)=0.
440 XAS(I)=0.
XAS(6)=0.
READ (5,580) KF, NT, NCUM, NF, KW, (NKF(I), I=1, KW)

```

GE03700
 GE03710
 GE03720
 GE03730
 GE03740
 GE03750
 GE03760
 GE03770
 GE03780
 GE03790
 GE03800
 GE03810
 GE03820
 GE03830
 GE03840
 GE03850
 GE03860
 GE03870
 GE03880
 GE03890
 GE03900
 GE03910
 GE03920
 GE03930
 GE03940
 GE03950
 GE03960
 GE03970
 GE03980
 GE03990
 GE04000
 GE04010
 GE04020
 GE04030
 GE04040
 GE04050
 GE04060
 GE04070
 GE04080
 GE04090
 GE04100
 GE04110
 GE04120
 GE04130
 GE04140
 GE04150
 GE04160
 GE04170
 GE04180

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WRITE (6,580) KF,NT,NCUM,NF,KW,(AKF(I),I=1,KW)
IF (KF.EQ.0) GO TO 500
NTL=NT*NF
KW1=KW+1
C
C *** X-COORDINATES DEFINING THE FUSELAGE SEGMENTS, INCLUDING THE NOSE
C AND THE TAIL, FUSIND=0. IF THE FUSELAGE GEOMETRY IS TO BE DEFINED
C ANALYTICALLY IN FUNCTIONS FUR(X) AND SLOP(X), =1. OTHERWISE,
C FUSNO=NUMBER OF FUSELAGE STATIONS TO BE INPUT TO DEFINE THE
C SHAPE IF FUSIND=1. , =0. OTHERWISE ***
C * X1=BODY STATION IN FRACTION OF BODY LENGTH AT WHICH THE RATE OF
C CHANGE OF CROSS-SECTIONAL AREA WITH BODY LENGTH FIRST REACHES
C MAXIMUM NEGATIVE VALUE. SEE DATCCM *
C * XJF=1. IF THE LOWER INBOARD EDGE OF THE USEJET IS ON THE FUSELAGE
C , =0. OTHERWISE *
C
READ (5,570) (XAS(I),I=1,KW1),FUSIND,FUSNO,X1,XJF
WRITE (6,570) (XAS(I),I=1,KW1),FUSIND,FUSNO,X1,XJF
IF (X1.LT.0.01) X1=1.
IFR=FUSIND
IFN=FUSNO
C ***IF FUSIND=1., READ IN THE FUSELAGE X-STATIONS AND THE RADII.
C OTHERWISE, SKIP ***
IF (IFR.EQ.0) GO TO 450
READ (5,570) (XFF(I),I=1,IFN)
READ (5,570) (RFF(I),I=1,IFN)
WRITE (6,570) (XFF(I),I=1,IFN)
WRITE (6,570) (RFF(I),I=1,IFN)
CALL SPLINE (IFN,XFF,RFF,AAF,RRF,CCF,DDF)
450 CONTINUE
XLEF=XAS(1)
XTEF=XAS(KW1)
IF (YN(2,1).LE.0.01) GO TO 480
IF (ZCP(2).GE.0.) TH1=PI/2.-ATAN(7CP(2)/YN(2,1))
IF (ZCP(2).LT.0.) TH1=PI/2.+ATAN(ABS(ZCP(2))/YN(2,1))
IF (ZCP(2).LT.0.) GO TO 460
IF (ARS(ZCP(2)).LE.0.001) GO TO 470
F1=TH1/PI*FLCAT(NCUM)
NH1=F1
IF (NH1.LT.2) NH1=2
GO TO 490
460 TH2=PI-TH1
F2=TH2/PI*FLCAT(NCUM)
NH2=F2
IF (NH2.LT.2) NH2=2
NH1=NCUM-NH2
GO TO 490
470 NH1=NCUM/2
GO TO 490

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GEO4190
GEO4200
GEO4210
GEO4220
GEO4230
GEO4240
GEO4250
GEO4260
GEO4270
GEO4280
GEO4290
GEO4300
GEO4310
GEO4320
GEO4330
GEO4340
GEO4350
GEO4360
GEO4370
GEO4380
GEO4390
GEO4400
GEO4410
GEO4420
GEO4430
GEO4440
GEO4450
GEO4460
GEO4470
GEO4480
GEO4490
GEO4500
GEO4510
GEO4520
GEO4530
GEO4540
GEO4550
GEO4560
GEO4570
GEO4580
GEO4590
GEO4600
GEO4610
GEO4620
GEO4630
GEO4640
GEO4650
GEO4660
GEO4670

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480	NH1=0	ORIGINAL PAGE IS	GE04680
	TH1=0.	OF POOR QUALITY	GE04690
490	CONTINUE		GE04700
	SMP(5,20)=TH1		GE04710
	SNP(5,19)=NH1		GE04720
	XTE(50)=XJF		GE04730
	CALL GFOFUS (RDX)		GE04740
	LWF=L PANEL+NTL		GE04750
	LWFJ=LTOTAL+NTL		GE04760
	WKN=-R.*PI*RDX		GE04770
500	CONTINUE		GE04780
	WRITE (6,590) HALF SW,CREF		GE04790
	WRITE (6,630)		GE04800
	WRITE (6,580) L PANEL,JPANFL,LWFJ		GE04810
	IF (IUSP.EQ.1) GO TO 510		GE04820
	WRITE (6,750)		GE04830
	IF (KCCODE.EQ.0) WRITE (6,770)		GE04840
	IF (KCCODE.EQ.1) WRITE (6,780)		GE04850
	IF (KCCODE.EQ.1) WRITE (6,790)		GE04860
	WRITE (6,750)		GE04870
	WRITE (6,730) XFQUI		GE04880
	WRITE (6,740) RFCLI		GE04890
	WRITE (6,760) VM		GE04900
510	CONTINUE		GE04910
	IF (ICAM.NE.1) GO TO 520		GE04920
	WRITE (6,670)		GE04930
	WRITE (6,690) (XT(1,I),I=1,IM)		GE04940
	WRITE (6,700) (ZC(1,I),I=1,IM)		GE04950
	WRITE (6,680)		GE04960
	WRITE (6,690) (XT(2,I),I=1,IM)		GE04970
	WRITE (6,700) (ZC(2,I),I=1,IM)		GE04980
	CAMLEP=ZCR(0.)		GE04990
	CAMTFR=ZCR(1.)		GE05000
	CAMLET=ZCT(0.)		GE05010
	CAMTET=ZCT(1.)		GE05020
520	CONTINUE		GE05030
	WRITE (6,640)		GE05040
	WRITE (6,710)		GE05050
	WRITE (6,600) (XN(I,1),XN(I,2),YN(I,1),YN(I,2),ZN(I,1),ZN(I,2),I=1		GE05060
	1, LAST)		GE05070
	WRITE (6,650)		GE05080
	WRITE (6,720)		GE05090
	WRITE (6,600) (XCP(I),YCP(I),ZCP(I),I=1, LAST)		GE05100
	IF (KCCODE.EQ.1) GO TO 540		GE05110
	IF (ISYM.EQ.0) GO TO 530		GE05120
	FN2=(NSJ-1)/2+1		GE05130
	NJP=(NSJ-1)/2+2		GE05140
	ANG=PI/(2.*FN2)		GE05150
	FAC=(SIN(3.*ANG)-SIN(ANG)/COS(ANG))/(1.-COS(3.*ANG))		GE05160

	PHT=PI/2.-ATAN(FAC)	GE05170
	NJH1=NJH-1	GE05180
	NJH2=NJH+1	GE05190
	Y(3,2)=SIN(PHI)	GE05200
	Y(4,2)=-COS(PHI)	GE05210
	Y(3,NJH1)=Y(3,2)	GE05220
	Y(4,NJH1)=-Y(4,2)	GE05230
	Y(3,NJH2)=-Y(3,2)	GE05240
	Y(4,NJH2)=Y(4,2)	GE05250
	Y(3,NSJ1)=-Y(3,2)	GE05260
	Y(4,NSJ1)=-Y(4,2)	GE05270
	GO TO 540	GE05280
530	FN2=NSJ/2	GE05290
	NJH=NSJ/2	GE05300
	ANG1=1.-0.5*(1.-COS(PI/(2.*FN2)))	GE05310
	ANG3=1.-0.5*(1.-COS(3.*PI/(2.*FN2)))	GE05320
	ANG1=ATAN(SQRT(1.-ANG1*ANG1)/ANG1)	GE05330
	ANG3=ATAN(SQRT(1.-ANG3*ANG3)/ANG3)	GE05340
	FAC=(SIN(ANG3)-SIN(ANG1)/COS(ANG1))/(1.-COS(ANG3))	GE05350
	PHI=PI/2.-ATAN(FAC)	GE05360
	NJH1=NJH-1	GE05370
	NJH2=NSJ1	GE05380
	Y(3,NJH1)=SIN(PHI)	GE05390
	Y(4,NJH1)=COS(PHI)	GE05400
	Y(3,NJH2)=-Y(3,NJH1)	GE05410
	Y(4,NJH2)=Y(4,NJH1)	GE05420
540	CONTINUE	GE05430
	FNJ=NCJ(MNJ)	GE05440
	NPJ=NCJ(MNJ)	GE05450
	DO 550 J=1,NPJ	GE05460
	FJ=J	GE05470
550	PSI(J)=SIN(FJ*PI/FNJ)	GE05480
	PETA1=SQRT(1.-AM1*AM1)	GE05490
	PETA2=SQRT(1.-AM2*AM2)	GE05500
	R1=PETA1*PETA1	GE05510
	R2=PETA2*PETA2	GE05520
	DO 560 KK=1,NC	GE05530
	XLL(KK)=ALP+(TWISTR+TWIST*YLE(KK)/HALFR)*PI/180.	GE05540
	T=XLL(KK)	GE05550
560	XTT(KK)=SIN(T)/COS(T)	GE05560
	YCN(6)=X1	GE05570
	ZJ=ZJ+7S	GE05580
	RETURN	GE05590
C		GE05600
570	FORMAT (8(F10.5))	GE05610
580	FORMAT (8(6X,I4))	GE05620
590	FORMAT (10X,8H+HALF SW=,E12.5,10X,5HCREF=,F12.5)	GE05630
600	FORMAT (6(F10.5))	GE05640
610	FORMAT (2(6X,I4),7F10.5)	GE05650

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620   FORMAT (1H0,10HINPUT DATA)                         GE05660
630   FORMAT (1H0,15HLPANEL,JPANEL,LWFJ=)                GE05670
640   FORMAT (1H0,36HVORTEX ELEMENT ENDPOINT COORDINATES=) GE05680
650   FORMAT (1H0,26HCCNTROL POINT COORDINATES=)         GE05690
660   FORMAT (1H0,42HWARNING, THE EQUIVALENT JET MACH NUMBER IS,F10.5,41)GE05700
1HIT HAS BEEN SET TO 0.9 IN THE COMPUTATION)
670   FORMAT (/45H*** CAMBER ORDINATES FOR THE ROCT SECTION ***) GF05720
680   FORMAT (/44H*** CAMBER ORDINATES FOR THE TIP SECTION ***) GE05730
690   FORMAT (/7X,3HX/C,11F10.5)                         GE05740
700   FORMAT (/7X,3H7/C,11F10.5)                         GE05750
710   FORMAT (/4X,2HX1,8X,2HX2,8X,2HY1,8X,2HY2,8X,2HZ1,6X,2HZ2) GE05760
720   FORMAT (/4X,3HXCP,7X,3HYCP,7X,3HZCP,7X,3HXCPC,7X,3HYCPC,7X,3HZCPC) GE05770
730   FORMAT (1H0,46HTHE EQUIVALENT JET PROPERTIFS ARE EVALUATED AT,F10.GE05780
15)
740   FOPMATE (1H0,28HTHE EQUIVALENT JET RADIUS IS,F10.5) GE05800
750   FOPMATE (/20X,50HXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXGE05810
1)
760   FOPMATE (1H0,49HTHE VELOCITY RATIO OF THE EQUIVALENT JET,V0/VJ,IS,FG05830
110.5)
770   FOPMATE (/20X,39HAN EQUIVALENT CIRCULAR JET IS USED FOR/20X,23HINTEGE05850
1RACTION COMPUTATION)
780   FOPMATE (/20X,43HA RECTANGULAR JET WITH LATERAL EXTENT EQUAL/20X,42GE05870
1HTC THE EQUIVALENT JET DIAFTER IS USED FOR/20X,23HINTERACTION COMGE05880
2PUTATION)
790   FOPMATE (/20X,51HNOTE, CHECK WHETHER THE WING IS IMPERSED IN THE JFGE05900
1T)
    FNC
    SUPROUTINE GECFUS (ROX)
    COMMON /FUS/ XF(20),XCF(20),RF(20),SNP(5,20),XLEF,XTEF,WARD(20),NCGEF  10
    UM,NF,NT,CSF(5,10),XAS(6),NKF(5),F0,F10,KF,NTL
    PI=3.14159265
    S=XTEF-XLEF
    TH1=SNP(5,20)
    NH1=SNP(5,19)
    ROX=SLOP(XLEF)
    NF1=NF+1
    FNT=NT
    DO 30 I=1,NT
    FI=I
    DO 30 K=1,NCLM
    IF (NH1.NE.0.AND.K.LE.NH1) GO TO 10
    FK=K-NH1
    FCUM=NCUM-NH1
    PP=PI-TH1
    TP=TH1
    GO TO 20
    FK=K
    FCUM=NH1
    PP=TH1

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	TP=0.	GEF 230
20	CONTINUE	GEF 240
	TA=(2.*FK-1.)*PP/(2.*FCUM)+TP	GEF 250
30	CSF(I,K)=COS(FI*TA)	GEF 260
	IK=0	GEF 270
	FNF=NKF(1)	GEF 280
	X0=XAS(1)	GEF 290
	N2=1	GEF 300
	N1=NKF(1)	GEF 310
	SL=XAS(2)-XAS(1)	GEF 320
	DO 40 I=1,NF	GEF 330
	M=I-1K	GEF 340
	FI=M	GEF 350
	XF(I)=X0+0.5*SL*(1.-COS((2.*FI-1.)*PI/(2.*FNF)))	GEF 360
	XCF(I)=X0+0.5*SL*(1.-COS(FI*PI/FNF))	GEF 370
	SNP(N2,M)=SIN((2.*FI-1.)*PI/(2.*FNF))	GEF 380
	XC=XCF(I)	GEF 390
	RF(I)=FLR(XC)	GEF 400
	IF (I.EQ.N1) GO TO 40	GEF 410
	N2=N2+1	GEF 420
	IK=N1	GEF 430
	N1=N1+NKF(N2)	GEF 440
	SL=XAS(N2+1)-XAS(N2)	GEF 450
	FNF=NKF(N2)	GEF 460
	X0=XAS(N2)	GEF 470
40	CONTINUE	GEF 480
	RETURN	GEF 490
	ENC	GEF 500-
	SUPROUTINE SPLINE (N,X,Y,A,B,C,D)	SPL 10
	DIMENSION S(111), F(21), CA(21)	SPL 20
	DIMENSION A(1), P(1), C(1), D(1), X(1), Y(1)	SPL 30
	NI=N+1	SPL 40
	N1=N-1	SPL 50
	H(NI)=0.	SPL 60
	H(1)=X(3)-X(2)	SPL 70
	H(2)=-X(3)+X(1)	SPL 80
	H(3)=X(2)-X(1)	SPL 90
	DO 10 K=4,N	SPL 100
10	H(K)=0.	SPL 110
	DO 20 K=1,N	SPL 120
20	S(K)=-H(K+1)/H(1)	SPL 130
	NJ=N-1	SPL 140
	DO 70 I=2,N	SPL 150
	IF (I.EQ.N) GO TO 30	SPL 160
	H(NI)=-6.*((Y(I+1)-Y(I))/(X(I+1)-X(I))-(Y(I)-Y(I-1))/(X(I)-X(I-1)))	SPL 170
	1)	SPL 180
	GO TO 40	SPL 190
30	H(NI)=0.	SPL 200
40	DO 60 J=1,N	SPL 210

	H(J)=0.	SPL 220
	IF (I.EQ.N) GO TO 50	SPL 230
	IF (J.LT.(I-1).OR.J.GT.(I+1)) GO TO 60	SPL 240
	H(I-1)=X(I)-X(I-1)	SPL 250
	H(I)=2.*(X(I+1)-X(I-1))	SPL 260
	H(I+1)=X(I+1)-X(I)	SPL 270
	GO TO 60	SPL 280
50	H(N-2)=X(N)-X(N-1)	SPL 290
	H(N-1)=-X(N)+X(N-2)	SPL 300
	H(N)=X(N-1)-X(N-2)	SPL 310
60	CONTINUE	SPL 320
	II=I	SPL 330
	CALL VMSEGN (NJ,II,H,S,CA)	SPL 340
	NJ=NJ-1	SPL 350
70	CONTINUE	SPL 360
	DO 80 I=1,N1	SPL 370
	A(I)=(S(I+1)-S(I))/(6.*(X(I+1)-X(I)))	SPL 380
	B(I)=S(I)/2.	SPL 390
	C(I)=(Y(I+1)-Y(I))/(X(I+1)-X(I))- (X(I+1)-X(I))*(2.*S(I)+S(I+1))/6.	SPL 400
80	D(I)=Y(I)	SPL 410
	RETURN	SPL 420
	END	SPL 430-
	SUBROUTINE RESHAP (XXL,XXT,YL,7L,CPCWL,CPSWL,IPANEL,NJ,JC,JJ,NSYM)RSP	10
C	TO DEFINE THE LOCATIONS OF VORTEX AND CONTROL POINTS ON RECT. JETSRSP	20
	DIMENSION XXL(1), YL(1), XXT(1), 7L(1), CPCWL(1), CPSWL(1)	RSP 30
	COMMON /SCHEME/ C(2),X(10,41),Y(10,41),SLOPF(15),XL(2,15),XTT(41),RSP	40
	1XXL(41)	RSP 50
	COMMON /GEOM/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTRSP	60
	LE(50),PSI(20),CH(95),XV(200),YV(100),SN(8,8),XN(200,2),YN(200,2),ZRSP	70
	2N(200,2),WIDTH(8),YCON(25),SWEEP(50),HALFR,SJ(21,8),EX(95,2),TX(95RSP	80
	3,2),SC(160,5),SI(160,5),LC(3)	RSP 90
	COMMON /CONST/ NCS,NCW,M1(8),NSJ,NCJ(5),LAST,MJW1(3,5),MJW2(3,5),JRSP	100
	IPANEL,MJJ(5),NW(3),NNJ,NJP	RSP 110
	PI=3.14159265	RSP 120
	IF (NSYM.EQ.0) NSJJ=(NSJ+1)/2	RSP 130
	IF (NSYM.NE.0) NSJJ=NSJ/2	RSP 140
	NSJ1=NSJJ-1	RSP 150
	DO 10 J=1,NJ	RSP 160
	FJ=J	RSP 170
	FNJ=NJ	RSP 180
10	PSI(J)=0.5*(1.-COS(FJ*PI/FNJ))	RSP 190
	DO 170 IS=1,4	RSP 200
	IF (NSYM.EQ.1.AND.IS.EQ.1) GO TO 170	RSP 210
	IF (IS.EQ.4) GO TO 20	RSP 220
	K1=IS	RSP 230
	K2=IS+1	RSP 240
	GO TO 30	RSP 250
20	K1=1	RSP 260
	K2=4	RSP 270

30	CONTINUE	RSP 280
	SPAN=YL(K2)-YL(K1)	RSP 290
	XDIF=XXL(K2)-XXL(K1)	RSP 300
	DO 40 I=1,2	RSP 310
	II=I+K1-1	RSP 320
	IF (IS.EQ.4.AND.I.EQ.2) II=4	RSP 330
	C(I)=XXT(II)-XXL(II)	RSP 340
	DO 40 J=1,NJ	RSP 350
40	XL(I,J)=XXL(II)+CPCWL(J)*C(I)	RSP 360
	IF (ABS(SPAN).LE.0.001) GO TO 70	RSP 370
	DO 50 J=1,NJ	RSP 380
50	SLOPE(J)=(XL(2,J)-XL(1,J))/SPAN	RSP 390
	DO 60 K=1,NSJJ	RSP 400
	YK=CPSWL(K)*SPAN	RSP 410
	DO 60 J=1,NJ	RSP 420
	Y(J,K)=YK+YL(K1)	RSP 430
	X(J,K)=XL(1,J)+SLOPE(J)*(Y(J,K)-YL(K1))	RSP 440
60	CONTINUE	RSP 450
	NS=NSJJ	RSP 460
70	IF (ABS(SPAN).LE.0.001) NS=1	RSP 470
	DO 160 K=1,NS	RSP 480
	YC=YCON(K)	RSP 490
	IF (ABS(SPAN).LE.0.001) YC=0.5	RSP 500
	KK=JC+K	RSP 510
	CH(KK)=C(1)-(C(1)-C(2))*YC	RSP 520
	IF (ABS(SPAN).LE.0.001) GO TO 80	RSP 530
	YC1=CPSWL(K)	RSP 540
	YC2=CPSWL(K+1)	RSP 550
	GO TO 90	RSP 560
80	YC1=0.	RSP 570
	YC2=1.	RSP 580
90	CONTINUE	RSP 590
	FX(KK,1)=XXL(K1)+XDIF*YC1	RSP 600
	EX(KK,2)=XXL(K1)+XDIF*YC2	RSP 610
	TX(KK,1)=XXT(K1)+(XXT(K2)-XXT(K1))*YC1	RSP 620
	TX(KK,2)=XXT(K1)+(XXT(K2)-XXT(K1))*YC2	RSP 630
	DO 160 J=1,NJ	RSP 640
	NPANEL=(K-1)*NJ+J-1+IPANFL	RSP 650
	NPAN1=NPANEL-1	RSP 660
	DO 130 I=1,2	RSP 670
	KI1=K+I-1	RSP 680
	IF (ABS(SPAN).LE.0.001) GO TO 100	RSP 690
	X1=X(J,KI1)	RSP 700
	Y1=Y(J,KI1)	RSP 710
	IF (J.NE.1) GO TO 110	RSP 720
	ZZ=ZL(K1)+(ZL(K2)-ZL(K1))*(Y1-YL(K1))/SPAN	RSP 730
	XX=XDIF*(Y1-YL(K1))/SPAN+XXL(K1)	RSP 740
	GO TO 120	RSP 750
100	IZN=K1	RSP 760

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IF (I.EQ.2) I7A=K2
X1=XL(I,J)
Y1=YL(K1)
IF (J.NE.1) GO TO 110
ZZ=ZL(IZN)
XX=XXL(IZN)
GO TO 120
110 ZZ=ZN(NPANEL,I)
XX=XN(NPANEL,I)
120 XN(NPANEL,I)=X1
YN(NPANEL,I)=Y1
ZN(NPANEL,I)=Z7
130 CONTINUE
XD=XDIF*YC+XXL(K1)
XCP(NPANEL)=XD+CH(KK)*PSI(J)
YCP(NPANEL)=YC*SPAN+YL(K1)
IF (ABS(SPAN).LE.0.001) GO TO 140
ZC=ZN(NPANEL,1)+(ZN(NPANFL,1)-ZN(NPANEL,2))*(YCP(NPANEL)-YN(NPANEL
1,1))/(YN(NPANEL,1)-YN(NPANEL,2))
XC=XN(NPANEL,1)+SLOPE(J)*(YCP(NPANFL)-YN(NPANEL,1))
GO TO 150
140 ZC=0.5*(ZN(NPANFL,1)+ZN(NPANFL,2))
XC=0.5*(XN(NPANFL,1)+XN(NPANEL,2))
150 ZCP(NPANEL)=ZC
XV(NPANEL)=XC
160 CONTINUE
IPANEL=NPANEL+1
LAST=NPANEL
JC=KK
170 CONTINUE
RETURN
END
SUBROUTINE PANEL (XXL,YL,XXT,CPCWL,CPSWL,NSW,IPANEL,LPANEL,KK,LR,SPNL
1WP,ZS)
C TO DEFINE THE LOCATIONS OF VORTEX AND CONTROL POINTS ON THE WING
DIMENSION XXL(1),YL(1),XXT(1),CPCWL(1),CPSWL(1)
DIMENSION SWP(8,15)
COMMON /SCHEME/ C(2),X(10,41),Y(10,41),SLOPE(15),XL(2,15),XTT(41),PNL
1XLL(41)
COMMON /GEOM/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTPNL
1E(50),PSI(20),CH(95),XV(200),YV(100),SN(8,P),XN(200,2),YN(200,2),ZPNL
2N(200,2),WIDTH(8),YCON(25),SWEEP(50),HALFB,SJ(21,8),EX(95,2),TX(95PNL
3,2),SC(160,5),SI(160,5),LC(3)
COMMON /CONST/ ACS,NCW,M1(8),NSJ,NCJ(5),LAST,MJW1(3,5),MJW2(3,5),JPNL
1PANEL,MJJ(5),NW(3),NNJ,NJP
PI=3.14159265
NSW1=NSW-1
DO 10 I=1,2
C(I)=XXT(I)-XXL(I)

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RSP 770
RSP 780
RSP 790
RSP 800
RSP 810
RSP 820
RSP 830
RSP 840
RSP 850
RSP 860
RSP 870
RSP 880
RSP 890
RSP 900
RSP 910
RSP 920
RSP 930
RSP 940
RSP 950
RSP 960
RSP 970
RSP 980
RSP 990
RSP1000
RSP1010
RSP1020
RSP1030
RSP1040
RSP1050
RSP1060
RSP1070
RSP1080-
PNL 10
PNL 20
PNL 30
PNL 40
PNL 50
PNL 60
PNL 70
PNL 80
PNL 90
PNL 100
PNL 110
PNL 120
PNL 130
PNL 140
PNL 150
PNL 160
PNL 170

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DO 10 J=1,NCW
XL(I,J)=XXL(I)+CPCWL(J)*C(I)/100.
SPAN=YL(2)-YL(1)
DO 20 J=1,NCW
PSI(J)=0.5*(1.-COS(FLOAT(J)*PI/FLOAT(NCW)))
SLOPE(J)=(XL(2,J)-XL(1,J))/SPAN
SWP(J,LR)=ATAN(SLOPE(J))
DO 30 K=1,NSW
YK=CPSWL(K)*SPAN/100.
DO 30 J=1,NCW
Y(J,K)=YK+YL(1)
X(J,K)=XL(1,J)+SLOPE(J)*(Y(J,K)-YL(1))
CONTINUE
XLL(1)=XXL(1)
XTT(1)=XXT(1)
DO 40 I=2,NSW
XLL(I)=XLL(I-1)+(XXL(2)-XXL(1))*(Y(1,I)-Y(1,I-1))/SPAN
XTT(I)=XTT(I-1)+(XXT(2)-XXT(1))*(Y(1,I)-Y(1,I-1))/SPAN
DO 60 K=1,NSW1
KK=NCS+K
YLE(KK)=YCON(K)*SPAN+YL(1)
XLE(KK)=XLL(K)+(XLL(K+1)-XLL(K))*(YLE(KK)-Y(1,K))/(Y(1,K+1)-Y(1,K))
1)
XTE(KK)=XTT(K)+(XTT(K+1)-XTT(K))*(YLE(KK)-Y(1,K))/(Y(1,K+1)-Y(1,K))
1)
CH(KK)=XTE(KK)-XLE(KK)
FX(KK,1)=XXL(1)+(XXL(2)-XXL(1))*CPSWL(K)/100.
EX(KK,2)=XXL(1)+(XXL(2)-XXL(1))*CPSWL(K+1)/100.
TX(KK,1)=XXT(1)+(XXT(2)-XXT(1))*CPSWL(K)/100.
TX(KK,2)=XXT(1)+(XXT(2)-XXT(1))*CPSWL(K+1)/100.
TANG=(XXL(2)-XXL(1))/SPAN
SWEEP(KK)=ATAN(TANG)
DO 60 J=1,NCW
NPANEL=(K-1)*NCW+J-1+IPANEL
DO 50 I=1,2
KII=K+I-1
XN(NPANEL,I)=X(J,KII)
YN(NPANEL,I)=Y(J,KII)
ZN(NPANEL,I)=ZS
CONTINUE
XCP(NPANEL)=XLE(KK)+PSI(J)*CH(KK)
YCP(NPANEL)=YLE(KK)
ZCP(NPANEL)=ZS
XV(NPANEL)=XLE(KK)+CPCWL(J)*CH(KK)/100.
YV(NPANEL)=YLE(KK)
CONTINUE
LPANEL=NPANEL
RETURN
END

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PNL 180
PNL 190
PNL 200
PNL 210
PNL 220
PNL 230
PNL 240
PNL 250
PNL 260
PNL 270
PNL 280
PNL 290
PNL 300
PNL 310
PNL 320
PNL 330
PNL 340
PNL 350
PNL 360
PNL 370
PNL 380
PNL 390
PNL 400
PNL 410
PNL 420
PNL 430
PNL 440
PNL 450
PNL 460
PNL 470
PNL 480
PNL 490
PNL 500
PNL 510
PNL 520
PNL 530
PNL 540
PNL 550
PNL 560
PNL 570
PNL 580
PNL 590
PNL 600
PNL 610
PNL 620
PNL 630
PNL 640
PNL 650
PNL 660-

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	SUBROUTINE ENTRN (U,AMJ,T,XM,CMU,RT,XEL,XET,Z,KCODE,XJC)	ENT 10
C	TO COMPUTE THE JET ENTRAINMENT FUNCTION	ENT 20
	DIMENSION CSJ(70), SSJ(70)	ENT 30
	DIMENSION PU1(31), PU2(31), FU1(31), FU2(31), FU3(31), FR2(31)	ENT 40
	COMMON /JET/ PK1,XC,X(31),A(31),B(31)	ENT 50
	WRITE (6,260)	ENT 60
	WRITE (6,270)	ENT 70
	PI=3.14159265	ENT 80
	IK=1	ENT 90
	RFJ=T	ENT 100
	PK1=0.0185+0.011*U	ENT 110
	KCCDF=0	ENT 120
	XMID=0.5*(XEL+XET)	ENT 130
	XM=XMID	ENT 140
	X0=0.	ENT 150
	R0=1.	ENT 160
	F=2.*PK1*SQRT((1.-U)*REJ)	ENT 170
	XC=0.35/F	ENT 180
	XJC=XC	ENT 190
	P1=1.-U	ENT 200
	UA=(1.+2.*U/(1.-U))/(1.+U/(1.-U))	ENT 210
	X(1)=XC	ENT 220
	DXX=(3.*XET-XEL)/30.	ENT 230
	IDX=DXX	ENT 240
	DXX=IDX	ENT 250
	IF (DXX.GT.3.) GO TO 10	ENT 260
	IF (DXX.GE.1..AND.DXX.LE.3.) DXX=2.5	ENT 270
	IF (DXX.LT.1.) DXX=1.5	ENT 280
10	CONTINUE	ENT 290
	X(2)=X(1)+DXX/2.	ENT 300
	DO 20 I=2,30	ENT 310
20	X(I+1)=X(I)+DXX	ENT 320
	DO 30 I=1,70	ENT 330
	FI=I	ENT 340
	CSJ(I)=COS((2.*FI-1.)*PI/140.)	ENT 350
30	SSJ(I)=SIN((2.*FI-1.)*PI/140.)	ENT 360
	DO 160 I=1,31	ENT 370
	IF (U.LE.0.01) GO TO 80	ENT 380
	IF (I.EQ.1.AND.ABS(T-1.).LE.0.01) GO TO 100	ENT 390
	IF (I.EQ.1) S=(2.*PK1*SQRT(REJ*(1.-U))*XC/0.72-0.35)*SQRT((1.-U)/U	ENT 400
	ENT 410	ENT 410
	1*ALOG(UA))	ENT 420
	IF (I.EQ.2) S=DSX*(X(2)-XC)	ENT 430
	IF (I.GT.2) S=SH+DSX*DXX	ENT 440
	M=1	ENT 450
	IF (I.EQ.1) M=2	ENT 460
40	CONTINUE	ENT 470
	SUM=0.	ENT 480
	DO 50 J=1,70	ENT 490
	SR=0.5*S*(1.-CSJ(J))	ENT 490

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AP1=(1.-U)*(1.-EXP(-1./(2.*SB))) ENT 500
AG=ALOG((1.+2.*U/AP1)/(1.+U/AP1)) ENT 510
50 SUM=SUM+(1./SQRT(AP1*AG)-SQRT(2.*SR/((1.-U)*0.69314718)))*SSJ(J) ENT 520
RES=SUM*PI/70.*0.5*S*SQRT(U)+SQRT(2.*U/(1.-U))*S**1.5/1.0397208 ENT 530
X1=RES+0.35 ENT 540
IF (M.NE.1) GO TO 70 ENT 550
XT=X1/(2.*PK1*SQRT((1.-U)*REJ)) ENT 560
P1=(1.-U)*(1.-EXP(-1./(2.*S))) ENT 570
G1=ALOG((1.+2.*U/P1)/(1.+U/P1)) ENT 580
DSX=2.*PK1*SQRT(REJ*(1.-U)*P1*G1/U) ENT 590
SH=S ENT 600
IF (ABS(X(I)-XT).LE.0.01) GO TO 60 ENT 610
DX=X(I)-XT ENT 620
S=S+DX*DSX ENT 630
SH=S ENT 640
GO TO 40 ENT 650
60 P1=(1.-U)*(1.-EXP(-1./(2.*SH))) ENT 660
70 IF (ABS(T-1.).LE.0.01) GO TO 100 ENT 670
XH=X1*0.72/(2.*PK1*SQRT((1.-U)*REJ)) ENT 680
IF (ABS(X(I)-XH).LE.0.01) GO TO 90 ENT 690
AK2=(1.-U)*(1.-EXP(-1./(2.*S))) ENT 700
AG2=ALOG((1.+2.*U/AK2)/(1.+U/AK2)) ENT 710
DSX1=2.*PK1/0.72*SQRT(REJ*(1.-U)*AK2*AG2/U) ENT 720
DX=X(I)-XH ENT 730
S=S+DX*DSX1 ENT 740
M=M+1 ENT 750
GO TO 40 ENT 760
P0 IF (I.NE.1) SH=2.*PK1*SQRT(REJ)*X(I)-0.35 ENT 770
IF (I.NE.1) P1=(1.-U)*(1.-EXP(-1./(2.*SH))) ENT 780
DSX=2.*PK1*SQRT(REJ) ENT 790
IF (ABS(T-1.).LE.0.01) GO TO 100 ENT 800
S=2.*PK1/0.72*SQRT(REJ)*X(I)-0.35 ENT 810
90 IF (I.FQ.1.AND.U.GT.0.01) DSX=2.*PK1*SQRT(REJ*ALOG(UA)/U)*(1.-U) ENT 820
H0=1.-EXP(-1./(2.*S)) ENT 830
HOP=-2.*H0**2/0.72 ENT 840
P1P=-2.*P1*P1/(1.-U) ENT 850
P2=(T-1.+0.2*(1.-U*U)*AMJ*AMJ*T)*H0-0.2*P1*AMJ*AMJ*T*(P1+2.*U) ENT 860
P2P=(T-1.+0.2*(1.-U*U)*AMJ*AMJ*T)*HOP-0.2*P1P*AMJ*AMJ*T*(P1+2.*U)-ENT 870
10.2*P1*AMJ*AMJ*T*P1P ENT 880
F1P=-P2P*0.8907*(0.08901-0.04005*P2+0.01792*P2**2-0.00646*P2**3)/(ENT 890
11.+1.05001*P2) ENT 900
F2P=-P2P*0.79335*(0.0527-0.02886*P2+0.01478*P2**2-0.00589*P2**3)/(ENT 910
11.+1.08869*P2) ENT 920
F3P=-P2P*(0.12857-0.04653*P2+0.01820*P2**2-0.00599*P2**3)/(1.+1.02ENT 930
1272*P2) ENT 940
GO TO 110 ENT 950
100 P2=0. ENT 960
P2P=0. ENT 970
F1P=0. ENT 980

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F2P=0. ENT 990
F3P=0. ENT1000
IF (I.EQ.1.AND.U.GT.0.01) DSX=2.*PK1*SQRT(REJ*ALOG(UA)/U)*(1.-U) ENT1010
110 PIP=-2.*P1*P1/(1.-U) ENT1020
F1=0.8907*(0.12857+0.01617*P2-0.00607*P2**2+0.00192*P2**3)/(1.+0.8 ENT1030
11817*P2) ENT1040
F2=0.79335*(0.06676+0.00453*P2-0.00204*P2**2+0.00075*P2**3)/(1.+0. ENT1050
185716*P2) ENT1060
F3=(0.21429+0.04061*P2-0.01249*P2**2+0.00351*P2**3)/(1.+0.78948*P2 ENT1070
1) ENT1080
FU=U*P1*F1+P1*P1*F2 ENT1090
DMC1=(P1P*F1+P1*F1P-U*P2P*F3-U*P2*F3P)/FU ENT1100
DMC2=(P1*F1-U*P2*F3)*(U*P1P*F1+U*P1*F1P+2.*P1*P1P*F2+P1*P1*F2P)/(F ENT1110
1U*FU) ENT1120
DMX=2.*(1.-U)*(DMC1-DMC2)*DSX/SQRT(REJ) ENT1130
RJ2=0.5*(1.-U)/FU ENT1140
RJ1=SQRT(RJ2) ENT1150
WRITE (6,250) X(I),RJ1,DMX ENT1160
IF (Z.LT.0) GO TO 140 ENT1170
IF (IK.GT.1) GO TO 140 ENT1180
IF (X(I).GE.XEL) GO TO 120 ENT1190
GO TO 140 ENT1200
120 IF (RJ1.LT.Z) GO TO 140 ENT1210
XMJ=X0+(Z-R0)*(X(I)-X0)/(RJ1-R0) ENT1220
IF (XEL.LT.0) GO TO 130 ENT1230
IF (XMJ.LT.XET) KCODE=1 ENT1240
IK=IK+1 ENT1250
GO TO 140 ENT1260
130 XM=0.5*XET ENT1270
IF (XMJ.LE.XM) KCODE=1 ENT1280
IK=IK+1 ENT1290
140 CONTINUE ENT1300
R0=RJ1 ENT1310
X0=X(I) ENT1320
PU1(I)=P1 ENT1330
PU2(I)=P2 ENT1340
FU1(I)=F1 ENT1350
FU2(I)=F2 ENT1360
FU3(I)=F3 ENT1370
RR2(I)=RJ2 ENT1380
IF (I.EQ.1) GO TO 150 ENT1390
B(I)=(DMX-DMXC)/(X(I+1)-X(I)) ENT1400
A(I)=DMXC-B(I)*X(I) ENT1410
GO TO 160 ENT1420
150 A(I)=0.145*DMX/0.32 ENT1430
B(I)=(DMX-A(I))/XC ENT1440
160 DMXC=DMX ENT1450
K=1 ENT1460
170 IF (K.GT.30) GO TO 240 ENT1470

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	IF (XM.GE.0..AND.XM.LT.XC) GO TO 180	ENT1480
	IF (XM.GE.X(K).AND.XM.LT.X(K+1)) GO TO 180	ENT1490
	K=K+1	ENT1500
	GO TO 170	ENT1510
180	F11=RR2(K)*(PU1(K)*U*FU1(K)+PU1(K)**2*FU2(K))/(U*U)	ENT1520
	F12=RR2(K+1)*(PU1(K+1)*U*FU1(K+1)+PU1(K+1)**2*FU2(K+1))/(U*U)	ENT1530
	F21=RR2(K)*(PU1(K)*FU1(K)-U*PU2(K)*FU3(K))/U	ENT1540
	F22=RR2(K+1)*(PU1(K+1)*FU1(K+1)-U*PU2(K+1)*FU3(K+1))/U	ENT1550
	IF (ABS(T-1.).LE.0.001) GO TO 190	ENT1560
	F31=RR2(K)*(9.*PU1(K)/70.-PU1(K)*FU1(K)+U*PU2(K)*FU3(K))/U	ENT1570
	F32=RR2(K+1)*(9.*PU1(K+1)/70.-PU1(K+1)*FU1(K+1)+U*PU2(K+1)*FU3(K+1))/U	ENT1580
	X11=F11/(F21+F31)	ENT1600
	X12=F12/(F22+F32)	ENT1610
	GO TO 200	ENT1620
190	F31=0.	ENT1630
	F32=0.	ENT1640
200	CONTINUE	ENT1650
	X1=X(K)	ENT1660
	X2=X(K+1)	ENT1670
	X21=F11/(F21+F31)+F31*(F11/(F21+F31)-1.)/F21	ENT1680
	X22=F12/(F22+F32)+F32*(F12/(F22+F32)-1.)/F22	ENT1690
	X31=2.*F21*(F21+F31)/(F11-F21-F31)	ENT1700
	X31=SQRT(X31)	ENT1710
	X32=2.*F22*(F22+F32)/(F12-F22-F32)	ENT1720
	X32=SQRT(X32)	ENT1730
	IF (XM.GE.0..AND.XM.LT.XC) GO TO 210	ENT1740
	GO TO 220	ENT1750
210	X1=0.	ENT1760
	X2=X	ENT1770
	X22=X21	ENT1780
	X32=X31	ENT1790
	X21=1./U	ENT1800
	X31=1.	ENT1810
	IF (ABS(T-1.).LE.0.001) GO TO 220	ENT1820
	X12=X11	ENT1830
	X11=1./(T*U)	ENT1840
220	CMU=X21+(XM-X1)*(X22-X21)/(X2-X1)	ENT1850
	RT=X31+(XM-X1)*(X32-X31)/(X2-X1)	ENT1860
	CMU=1./CMU	ENT1870
	IF (ABS(T-1.).LE.0.001) GO TO 230	ENT1880
	RU=X11+(XM-X1)*(X12-X11)/(X2-X1)	ENT1890
	T=1./(CMU*RU)	ENT1900
230	CONTINUE	ENT1910
240	CONTINUE	ENT1920
	RETURN	ENT1930
C		ENT1940
250	FORMAT (8F10.5)	ENT1950
260	FORMAT (/5X,43HTHE COMPUTED JET ENTRAINMENT ARE AS FOLLOWS)	ENT1960

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270	FORMAT (/5X,4PXJFT,PX,4PRJET,5X,5PDM/DX)		ENT1970
	END		ENT1980-
	SUBROUTINE RECTJ (ISYM,NSJ,Y)		RCT 10
C	TO DEFINE THE UNIT NORMAL VECTORS TO THE SURFACE OF RECTANGULAR		RCT 20
C	JETS		RCT 30
	DIMENSION Y(10,41)		RCT 40
	IF (ISYM.EQ.0) GO TO 10		RCT 50
	NSJ1=NSJ+1		RCT 60
	NJH=(NSJ-1)/2+2		RCT 70
	GO TO 20		RCT 80
10	NSJ1=NSJ-1		RCT 90
	NJH=NSJ/2		RCT 100
20	DO 50 I=1,NSJ1		RCT 110
	IF (I.EQ.1.AND.ISYM.NE.0) GO TO 30		RCT 120
	IF (I.EQ.NJH) GO TO 40		RCT 130
	Y(3,I)=1.		RCT 140
	Y(4,I)=0.		RCT 150
	GO TO 50		RCT 160
30	Y(3,I)=0.		RCT 170
	Y(4,I)=-1.		RCT 180
	GO TO 50		RCT 190
40	Y(3,I)=0.		RCT 200
	Y(4,I)=1.		RCT 210
50	CONTINUE		RCT 220
	RETURN		RCT 230
	END		RCT 240-
	SUBROUTINE CIRCJ (ISYM,NSJ,Y)		CRJ 10
C	TO DEFINE THE UNIT NORMAL VECTORS TO THE SURFACE OF CIRCULAR JETS		CRJ 20
	DIMENSION Y(10,41)		CRJ 30
	PI=3.14159265		CRJ 40
	IF (ISYM.EQ.0) GO TO 10		CRJ 50
	NSJ1=NSJ+1		CRJ 60
	NN=(NSJ-1)/2+1		CRJ 70
	FN2=NN		CRJ 80
	NJH=NN+1		CRJ 90
	Y(1,1)=-SIN(PI/(2.*FN2))		CRJ 100
	Y(2,1)=-COS(PI/(2.*FN2))		CRJ 110
	GO TO 20		CRJ 120
10	Y(1,1)=1.		CRJ 130
	Y(2,1)=0.		CRJ 140
	NSJ1=NSJ-1		CRJ 150
	FN2=NSJ/2		CRJ 160
	NJH=NSJ/2		CRJ 170
20	CONTINUE		CRJ 180
	DO 50 I=1,NSJ1		CRJ 190
	K=I		CRJ 200
	KI=I		CRJ 210
	IF (I.GT.NJH.AND.ISYM.NE.0) K=I-NJH+1		CRJ 220
	IF (I.GT.NJH.AND.ISYM.EQ.0) K=I-NJH		CRJ 230

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FI=K
IF (ISYM.NE.0) ANG2=(FI-1.)*PI/FN2
IF (ISYM.EQ.0) ANG2=FI*PI/FN2
YP=0.5*(1.-COS(ANG2))
IF (ISYM.EQ.0) ANG2=PI-ATAN(SQRT(1.-YP*YP)/YP)
II=I+1
KK=I
KII=II
IF (I.GT.NJH) KK=II-NJH
FII=KK
IF (I.LE.NJH.AND.ISYM.EQ.0) FII=KK+1
ANG1=(2.*FII-1.)*PI/(2.*FN2)
YP=0.5*(1.-COS(ANG1))
IF (ANG1.GT.PI) YP=-YP
IF (ISYM.EQ.0) ANG1=PI-ATAN(SQRT(1.-YP*YP)/YP)
IF (I.GT.NJH) GO TO 30
GO TO 40
30  ANG1=-ANG1
    ANG2=-ANG2
40  CONTINUE
    Y(1,KII)=SIN(ANG1)
    Y(2,KII)=-COS(ANG1)
    Y(3,KI)=SIN(ANG2)
    Y(4,KI)=-COS(ANG2)
50  CONTINUE
    RETURN
    END
SUPROUTINE JSHAPE (XXL,XXT,YL,YJ,ZJ,RJ,CPCWL,IPANEL,NJ,JC,ISYM)  JSP 10
C   TO DEFINE THE LOCATIONS OF VORTEX AND CONTROL POINTS ON CIRCULAR  JSP 20
C   JETS  JSP 30
DIMENSION CPCWL(1), XXL(1), XXT(1), YL(1)  JSP 40
COMMON /SCHEME/ C(2),X(10,41),Y(10,41),SLOPE(15),XL(2,15),XTT(41),JSP 50
1XLL(41)  JSP 60
COMMON /GEOM/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTJSP 70
1E(50),PSI(20),CH(95),XV(200),YV(100),SN(8,8),XA(200,2),YA(200,2),ZJSP 80
2N(200,2),WIDTH(8),YCON(25),SWEEP(50),HALFR,NSJ(21,8),EX(95,2),TX(95)JSP 90
3,2),SC(160,5),SI(160,5),LC(3)  JSP 100
COMMON /CONST/ NCS,NCW,M1(8),NSJ,NCJ(5),LAST,MJW1(3,5),MJW2(3,5),JJSP 110
1PANEL,MJJ(5),NW(3),NNJ,NJP  JSP 120
PI=3.14159265  JSP 130
N1=NSJ+1  JSP 140
IF (ISYM.EQ.0) N1=NSJ-1  JSP 150
N2=N1+1  JSP 160
IF (ISYM.EQ.0) N2=NSJ  JSP 170
N12=N1/2+2  JSP 180
IF (ISYM.EQ.0) N12=NSJ/2+1  JSP 190
DO 10 I=1,2  JSP 200
C(I)=XXT(I)-XXL(I)  JSP 210
DO 10 J=1,NJ  JSP 220

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10	XL(I,J)=XXL(I)+CPCWL(J)*C(I)	JSP 230
	DO 20 J=1,NJ	JSP 240
	FJ=J	JSP 250
	FNCJ=NJ	JSP 260
	PSI(J)=0.5*(1.-COS(FJ*PI/FNCJ))	JSP 270
20	SLOPE(J)=(XL(2,J)-XL(1,J))/(2.*RJ)	JSP 280
	DO 30 K=1,N2	JSP 290
	YY=Y(2,K)	JSP 300
	IF (ISYM.NE.0.AND.K.EQ.1) YY=-1.	JSP 310
	IF (ISYM.NE.0.AND.K.EQ.2) YY=-1.	JSP 320
	IF (K.EQ.(N12-1).OR.K.EQ.N12) YY=1.	JSP 330
	IF (K.EQ.N2) YY=1.	JSP 340
	XTT(K)=YJ+RJ*YY	JSP 350
30	X(J,K)=XL(1,J)+SLOPE(J)*(XTT(K)-YL(1))	JSP 360
	DO 120 K=1,N1	JSP 370
	KK=JC+K	JSP 380
	L=K	JSP 390
	IF (K.EQ.N12) L=1	JSP 400
	EX(KK,1)=XXL(1)+(XXL(2)-XXL(1))*(XTT(L)-YL(1))/(2.*RJ)	JSP 410
	EX(KK,2)=XXL(1)+(XXL(2)-XXL(1))*(XTT(K+1)-YL(1))/(2.*RJ)	JSP 420
	TX(KK,1)=XXT(1)+(XXT(2)-XXT(1))*(XTT(L)-YL(1))/(2.*RJ)	JSP 430
	TX(KK,2)=XXT(1)+(XXT(2)-XXT(1))*(XTT(K+1)-YL(1))/(2.*RJ)	JSP 440
	CH(KK)=C(1)-(C(1)-C(2))*0.5*(1.+Y(4,K))	JSP 450
	DO 120 J=1,NJ	JSP 460
	NPANFL=(K-1)*NJ+J-1+IPANEL	JSP 470
	DO 90 I=1,2	JSP 480
	KI1=K+I-1	JSP 490
	SIGN=1.	JSP 500
	IF (K.EQ.N12.AND.I.EQ.1) KI1=1	JSP 510
	IF (ISYM.EQ.0) GO TO 40	JSP 520
	IF (KI1.EQ.1.OR.KI1.EQ.2) GO TO 60	JSP 530
	GO TO 50	JSP 540
40	IF (K.EQ.N12.AND.KI1.EQ.1) SIGN=-1.	JSP 550
50	CONTINUE	JSP 560
	IF (KI1.EQ.(N12-1).OR.KI1.EQ.N12) GO TO 70	JSP 570
	IF (KI1.EQ.N2) GO TO 70	JSP 580
	YY=Y(2,KI1)	JSP 590
	ZZ=Y(1,KI1)*SIGN	JSP 600
	GO TO 80	JSP 610
60	YY=-1.	JSP 620
	ZZ=-Y(1,KI1)/Y(2,KI1)	JSP 630
	GO TO 80	JSP 640
70	YY=1.	JSP 650
	ZZ=Y(1,KI1)/Y(2,KI1)	JSP 660
80	CONTINUE	JSP 670
	XN(NPANFL,I)=X(J,KI1)	JSP 680
	YN(NPANFL,I)=YJ+RJ*YY	JSP 690
90	ZN(NPANFL,I)=ZJ+RJ*ZZ	JSP 700
	YK=0.5*(1.+Y(4,K))	JSP 710

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IF (ISYM.EQ.0) YK=2,*YK-1. JSP 720
XCP(NPANEL)=XXL(1)+(XXL(2)-XXL(1))*YK+PSI(J)*CH(KK) JSP 730
IF (ABS(YN(NPANEL,2)-YN(NPANEL,1)).LE.0.0001) GO TO 100 JSP 740
YCP(NPANEL)=YL(1)+YK*(YL(2)-YL(1)) JSP 750
ZCP(NPANEL)=ZN(NPANEL,1)+(ZN(NPANEL,2)-ZN(NPANEL,1))*(YCP(NPANEL)- JSP 760
1YN(NPANEL,1))/(YN(NPANEL,2)-YN(NPANEL,1)) JSP 770
GO TO 110 JSP 780
100 ZCP(NPANEL)=ZJ JSP 790
YCP(NPANEL)=YN(NPANEL,1) JSP 800
110 CONTINUE JSP 810
XV(NPANEL)=XXL(1)+(XXL(2)-XXL(1))*YK+CPCWL(J)*CH(KK) JSP 820
120 CONTINUE JSP 830
JC=JC+N1 JSP 840
LAST=NPANEL JSP 850
RETURN JSP 860
END JSP 870-
OVERLAY (WNGJET,2,0) JOF 10
PROGRAM JETOFF JOF 20
C TC SET UP THE JETOFF INFLUENCE COEFFICIENT MATRIX AND COMPUTE THE JOF 30
C CAMPER TERMS JOF 40
DIMENSION AW(131), BW(131) JOF 50
COMMON /GEOM/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTJOF 60
1E(50),PSI(20),CH(95),XV(200),YV(100),SN(8,8),XN(200,2),YN(200,2),ZJOF 70
2N(200,2),WIDTH(8),YCON(25),SWEFP(50),HALFR,SJ(21,8),EX(95,2),TX(95JOF 80
3,2),SC(160,5),SI(160,5),LC(3) JOF 90
COMMON /AERO/ AM1,AM2,B1,B2,CL(30),CT(30),CD(30),GAM(2,130) JOF 100
COMMON /CONST/ NCS,NCW,M1(8),NSJ,NCJ(5),LAST,MJW1(3,5),MJW2(3,5),JJOF 110
1PANEL,MJJ(5),NW(3),NNJ,NJP JOF 120
COMMON /ADD/ CP(130),CM(30),BREAK(8),SWP(8,15),GAL(30),ISYM,VMU,VUJOF 130
1,TEMP,FCR,CAMLER,CAMLET,CAMTER,CAMTET,XJ,YJ,ZJ,RJ,ALP,CREF,TWISTR JOF 140
COMMON /PARAM/ ALPT,ALPC,ALPS,CDF,SDF,TH,TDF JOF 150
COMMON /COST/ LTOTAL,LPAN1,NJW(5),LPANEL,IENTN,LPAN2,EXIT,PTIAL,TWJOF 160
1IST,DF(5),NFP JOF 170
COMMON /SOME/ NC,NWING,LAT,NAL,LWF,LWFJ,CHORDT(3),SNG(5),YG(5),YCNJOF 180
1(6),WKN,RDX,MDE,NDG JOF 190
COMMON /FUS/ XF(20),XCF(20),RF(20),SNP(5,20),XLEF,XTEF,WARD(20),NCJOF 200
1UM,NF,NT,CSF(5,10),XAS(6),NKF(5),F0,F10,KF,NTL JOF 210
PI=3.14159265 JOF 220
J1=LPANEL+1 JOF 230
B=R1 JOF 240
AM=AM1 JOF 250
IC=1 JOF 260
MG=NW(1) JOF 270
NG=NW(1) JOF 280
NC=IENTN JOF 290
IG=1 JOF 300
F0=0. JOF 310
F10=0. JOF 320
GR0=0. JOF 330

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	REWIND 03	JOF 340
	REWIND 04	JOF 350
	J1=LWF+1	JOF 360
10	CONTINUE	JOF 370
	IF (KF.EQ.0) GO TO 20	JOF 380
	REWIND 1	JOF 390
	REWIND 7	JOF 400
C		JOF 410
C	* COMPUTE THE INFLUENCE COEFFICIENTS DUE TO THE PRESENCE OF THE	JOF 420
C	FUSELAGE, AND STORE ON FILE (07) *	JOF 430
C		JOF 440
	CALL VELFUS (LWF,LPANEL,AW,BW,AM,LPAN1,LPAN2,1,ISYM)	JOF 450
	REWIND 1	JOF 460
	REWIND 7	JOF 470
	READ (08) (CP(I),I=1,LPANEL)	JOF 480
20	CONTINUE	JOF 490
	LL=1	JOF 500
	IF (NW(2).EQ.0) GO TO 40	JOF 510
	II=1+NCS	JOF 520
	IF (NW(3).NE.0) GO TO 30	JOF 530
	CHCPD=CH(1)+CH(II)	JOF 540
	GO TO 50	JOF 550
30	III=II+NCS	JOF 560
	CHORD=CH(1)+CH(II)+CH(III)	JOF 570
	GO TO 50	JOF 580
40	CHORD=CH(1)	JOF 590
50	CONTINUE	JOF 600
	CALL WING (AW,RW,LPANEL,1,B,LPAN1,LPAN2,KF)	JOF 610
	XC=(XCP(1)-XLE(IG))/CHORD	JOF 620
	CAM=ZCR(XC)-(ZCR(XC)-ZCT(XC))*YCP(1)/HALFB	JOF 630
	AW(J1)=-CAM	JOF 640
	BW(J1)=0.	JOF 650
	IF (KF.EQ.0) GO TO 80	JOF 660
	READ (07) (GAM(2,LK),LK=1,NTL)	JOF 670
	READ (01) (GAM(1,LK),LK=1,NTL)	JOF 680
	DO 60 LK=1,NTL	JOF 690
	KK=LPANEL+LK	JOF 700
	BW(KK)=GAM(1,LK)	JOF 710
60	AW(KK)=GAM(2,LK)	JOF 720
	XQ=XCP(1)	JOF 730
	YQ=YCP(1)	JOF 740
	ZQ=ZCP(1)	JOF 750
	WK=0.	JOF 760
	CALL FUSVCL (P,XQ,YQ,ZQ,WN,WK,GP0,0,0)	JOF 770
	DO 70 KK=1,LPANEL	JOF 780
70	AW(KK)=AW(KK)+WK*WKN*CP(KK)	JOF 790
80	CONTINUE	JOF 800
	WRITE (03) (AW(JJ),JJ=1,J1)	JOF 810
	WRITE (04) (BW(JJ),JJ=1,J1)	JOF 820

	IJ=2	JOF 830
	NJ=L PANEL-1	JOF 840
90	CALL WING (AW,BW,L PANEL,IJ,P,LPAN1,LPAN2,KF)	JOF 850
	IF (NW(2).EQ.0) GO TO 110	JOF 860
	II=IG+NCS	JOF 870
	IF (NW(3).NE.0) GO TO 100	JOF 880
	CHORD=CH(IG)+CH(II)	JOF 890
	CHFL=CH(IG)	JOF 900
	GO TO 120	JOF 910
100	III=II+NCS	JOF 920
	CHCRD=CH(IG)+CH(II)+CH(III)	JOF 930
	CHFL=CH(IG)+CH(II)	JOF 940
	GO TO 120	JOF 950
110	CHCRD=CH(IG)	JOF 960
	CHFL=CH(IG)	JOF 970
120	CONTINUE	JOF 980
	FCR=CHFL/CHORD	JOF 990
	XC=(XCP(IJ)-XLE(IG))/CHORD	JOF1000
	COM=ABS(XC-FCR)	JOF1010
	FCR1=FCR-0.01	JOF1020
	FCR2=FCR+0.01	JOF1030
	CZ=0.	JOF1040
	IF (ABS(1.-XC).LE.0.01) GO TO 130	JOF1050
	ZC1=ZCR(XC)	JOF1060
	ZC2=ZCT(XC)	JOF1070
	CZ=ZC1-(ZC1-ZC2)*YCP(IJ)/HALFB	JOF1080
130	CONTINUE	JOF1090
	IF (XC.LT.FCR1) CAM=CZ	JOF1100
	IF (COM.LT.0.001) CAM=CZ-0.5*DF(LL)	JOF1110
	IF (XC.GT.FCR2.AND.ABS(1.-XC).GT.0.01) CAM=-DF(LL)+CZ	JOF1120
	IF (ABS(1.-XC).LE.0.01) CAM=-DF(LL)+CAMTER-(CAMTER-CAMTET)*YCP(IJ)	JOF1130
	1/HALFB	JOF1140
	IF (PTIAL.LE.0.01.AND.XC.GT.FCR2) GO TO 180	JOF1150
	IF (PTIAL.GT.0.01) GO TO 150	JOF1160
	IF (DF(LL).GT.0.01.AND.XC.GT.FCR1) GO TO 180	JOF1170
140	IF (IJ.NE.MG) GO TO 180	JOF1180
	IF (ABS(XC-1.).LE.0.01) GO TO 160	JOF1190
	JK=1	JOF1200
	IF (NW(3).NE.0.AND.IJ.GT.LPAN1) JK=2	JOF1210
	NCM=IJ+(NCS-IG)*NW(JK)+(IG-1)*NW(JK+1)+1	JOF1220
	XC1=(XCP(NCM)-XLE(IG))/CHORD	JOF1230
	CAM1=ZCR(XC1)-(ZCR(XC1)-ZCT(XC1))*YCP(IJ)/HALFB	JOF1240
	CAM=(CAM+CAM1)/2.	JOF1250
	GO TO 180	JOF1260
150	IF (IJ.GE.MJW1(1,LL).AND.IJ.LE.MJW2(1,LL)) GO TO 170	JOF1270
	IF (IJ.GE.MJW1(2,LL).AND.IJ.LE.MJW2(2,LL)) GO TO 180	JOF1280
	IF (IJ.GE.MJW1(3,LL).AND.IJ.LE.MJW2(3,LL)) GO TO 180	JOF1290
	CAM=CZ	JOF1300
	GO TO 140	JOF1310

160	CAM=CAMTER-(CAMTER-CAMTET)*YCP(IJ)/HALFR	JOF1320
	GO TO 180	JOF1330
170	IF (XC.GT.FCR1) GO TO 180	JOF1340
	GO TO 140	JOF1350
180	CONTINUE	JOF1360
	AW(J1)=-CAM	JOF1370
	BW(J1)=0.	JOF1380
	IF (KF.EQ.0) GO TO 210	JOF1390
	READ (07) (GAM(2,LK),LK=1,NTL)	JOF1400
	READ (01) (GAM(1,LK),LK=1,NTL)	JOF1410
	DO 190 LK=1,NTL	JOF1420
	KK=L PANEL+LK	JOF1430
	RW(KK)=GAM(1,LK)	JOF1440
190	AW(KK)=GAM(2,LK)	JOF1450
	XQ=XCP(IJ)	JOF1460
	YQ=YCP(IJ)	JOF1470
	ZQ=ZCP(IJ)	JOF1480
	WK=0.	JOF1490
	CALL FUSVOL (B,XQ,YQ,ZQ,WN,WK,GP0,0,0)	JOF1500
	DO 200 KK=1,L PANEL	JOF1510
200	AW(KK)=AW(KK)+WK*WKN*CP(KK)	JOF1520
210	CONTINUE	JOF1530
	WRITE (03) (AW(JJ),JJ=1,J1)	JOF1540
	WRITE (04) (BW(JJ),JJ=1,J1)	JOF1550
	IF (IJ.GE.LPAN1.AND.IJ.LT.LPAN2) NG=NW(2)	JOF1560
	IF (IJ.GE.LPAN2.AND.IJ.LT.LPAN1) NG=NW(3)	JOF1570
	IF (IJ.EQ.MJW2(1,LL).OR.IJ.EQ.MJW2(2,LL)) LL=LL+1	JOF1580
	IF (IJ.EQ.MJW2(3,LL)) LL=LL+1	JOF1590
	IF (LL.GT.NFP) LL=1	JOF1600
	IF (IJ.LT.MG) GO TO 220	JOF1610
	IG=IG+1	JOF1620
	MG=MG+NG	JOF1630
220	IF (IJ.EQ.LPAN1.OR.IJ.EQ.LPAN2) IG=1	JOF1640
	IF (IJ.EQ.LPAN1.OR.IJ.EQ.LPAN2) LL=1	JOF1650
	IJ=IJ+1	JOF1660
	NJ=NJ-1	JOF1670
	IF (IJ.LE.LPAN1) GO TO 50	JOF1680
	IF (KF.EQ.0) GO TO 260	JOF1690
	DO 250 KJ=1,NTL	JOF1700
	READ (07) (AW(KK),KK=1,LWF)	JOF1710
	READ (01) (BW(KK),KK=1,LWF)	JOF1720
	AW(J1)=0.	JOF1730
	BW(J1)=0.	JOF1740
	IF (KJ.GT.NF) GO TO 240	JOF1750
	KI=KJ	JOF1760
	XS=XCF(KI)-XTEF	JOF1770
	XB=XCF(KI)-XLEF	JOF1780
	IF (KJ.EQ.NF) RFL=0.	JOF1790
	IF (KJ.NE.NF) RFL=XS/SQRT(XS*XS+R*RF(KI)*RF(KI))	JOF1800

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	RF1=XS*(1.+RFL)	JOF1810
	RF0=XB*(1.+XB/SGRT(XB*XB+R*RF(KI)*RF(KI)))	JOF1820
	WK=- (RF1-RF0)*WKN/(4.*PI)	JOF1830
	DO 230 KK=1,LPANEL	JOF1840
230	AW(KK)=AW(KK)+WK*CP(KK)	JOF1850
240	CONTINUE	JOF1860
	WRITE (03) (AW(JJ),JJ=1,J1)	JOF1870
	WRITE (04) (BW(JJ),JJ=1,J1)	JOF1880
250	IJ=IJ+1	JOF1890
260	CONTINUE	JOF1900
	IC=IC+1	JOF1910
	R=R2	JOF1920
	AM=AM2	JOF1930
	IG=1	JOF1940
	NG=AW(1)	JOF1950
	MG=AW(1)	JOF1960
	IF (ABS(R1-R2).LE.0.001) GO TO 270	JOF1970
	IF (IC.LE.2) GO TO 10	JOF1980
270	CONTINUE	JOF1990
	RETURN	JOF2000
C		JOF2010
	END	JOF2020-
	OVERLAY (WNGJET,3,0)	JON 10
	PROGRAM JETON	JON 20
C	TO SET UP THE JETON INFLUENCE COEFFICIENT MATRICES	JON 30
	DIMENSION AW(331), BW(331), CG(250)	JON 40
	COMMON /GEOM/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTJON	JON 50
	1E(50),PSI(20),CH(95),XV(200),YV(100),SN(8,8),XN(200,2),YN(200,2),ZJON	JON 60
	2N(200,2),WIDTH(8),YCON(25),SWEEP(50),HALFB,SJ(21,8),EX(95,2),TX(95JON	JON 70
	3,2),SC(160,5),SI(160,5),LC(3)	JON 80
	COMMON /SKODE/ KCODE	JON 90
	COMMON /AERO/ AM1,AM2,B1,B2,CL(30),CT(30),CD(30),GAM(2,130)	JON 100
	COMMON /CONST/ NCS,NCW,M1(8),NSJ,NCJ(5),LAST,MJW1(3,5),MJW2(3,5),JJON	JON 110
	1PANEL,MJJ(5),NW(3),NNJ,NJP	JON 120
	COMMON /PARAM/ ALPT,ALPC,ALPS,CDF,SDF,TH,TF	JON 130
	COMMON /ADD/ CP(130),CM(30),BREAK(8),SWP(8,15),GAL(30),ISYM,VMU,VUJON	JON 140
	1,TEMP,FCR,CAMLER,CAMLFT,CAMTER,CAPTFT,XJ,YJ,ZJ,PJ,ALP,CREF,TWISTR	JON 150
	COMMON /COST/ LTOTAL,LPAN1,NJW(5),LPANEL,IFNTN,LPAN2,EXIT,PTIAL,TWJON	JON 160
	LIST,DF(5),NFP	JON 170
	COMMON /SOME/ NC,NWING,LAT,NAL,LWF,LWFJ,CHORDT(3),SNG(5),YG(5),YCNJON	JON 180
	1(6),WKN,RDX,MCG,NDG	JON 190
	COMMON /FUS/ XF(20),XCF(20),RF(20),SNP(5,20),XLEF,XTEF,WARD(20),NCJON	JON 200
	1UM,NF,NT,CSF(5,10),XAS(6),NKF(5),F0,F10,KF,NTL	JON 210
	REWIND 02	JON 220
	PI=3.14159265	JON 230
	AM=AM1	JON 240
	F0=0.	JON 250
	F10=0.	JON 260
	GB0=0.	JON 270

	IF (KF.EQ.0) GO TO 10	JON 280
	REWIND 1	JON 290
	REWIND 7	JON 300
	CALL VELFUS (LWF,LPANEL,AW,BW,AM,LPAN1,LPAN2,2,ISYM)	JON 310
	REWIND 1	JON 320
	REWIND 7	JON 330
10	READ (08) (CG(I),I=1,LAST)	JON 340
	CONTINUE	JON 350
	REWIND 09	JON 360
	J1=LWFJ	JON 370
	LP1=LTOTAL+1	JON 380
	MJ=LPANEL+NCJ(1)	JON 390
	MCON=LAST+NCJ(1)	JON 400
	IPHI=1	JON 410
	JL=LAST+1	JON 420
	INA=1	JON 430
	LN=1	JON 440
	LN1=1	JON 450
	JNA=1	JON 460
	VMUC=VMU*ALPC	JON 470
	MK=1	JON 480
	I=LAST+1	JON 490
	I1=I-JPANEL	JON 500
	CALL MATRIX (AW,BW,LTOTAL,LPANEL,VMUC,I,MCON,MJ,IPHI,INA,LN,LN1,TE	JON 510
	IMP,LPAN1,ISYM,KCODE,EXIT,LPAN2,KF)	JON 520
	IF (KF.EQ.0) GO TO 50	JON 530
	VK=VMUC	JON 540
	TM=TEMP	JON 550
	IF (EXIT.LE.0.001) GO TO 20	JON 560
	IF (NNJ.EQ.1) GO TO 20	JON 570
	VK=1.	JON 580
	TM=1.	JON 590
20	XQ=XCP(I1)	JON 600
	YQ=YCP(I1)	JON 610
	ZQ=ZCP(I1)	JON 620
	CALL FSPEED (B1,XQ,YQ,ZQ,GAM,WK1,WK2)	JON 630
	DO 30 KK=1,LAST	JON 640
	IF (KK.LE.LPANEL) KG=KK+2*JPANEL	JON 650
	IF (KK.GT.LPANEL) KG=KK-LPANEL+JPANEL	JON 660
30	AW(KG)=AW(KG)-WK2*WKN*CG(KK)*TM*VK*VK	JON 670
	DO 40 LK=1,NTL	JON 680
	KK=LTOTAL+LK	JON 690
	BW(KK)=-GAM(1,LK)*TM*VK*VK	JON 700
40	AW(KK)=-GAM(2,LK)*TM*VK*VK	JON 710
50	CONTINUE	JON 720
	WRITE (03) (AW(JJ),JJ=1,J1)	JON 730
	WRITE (09) (BW(JJ),JJ=1,J1)	JON 740
	KI=2	JON 750
	NI=LTOTAL-1	JON 760

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	LI=LAST+2	JON 770
	VMP=VMUC	JON 780
60	KJ=LI	JON 790
	IF (LI.GT.LAST) KJ=LI-JPANEL	JON 800
	CALL MATRIX (AW,BW,LTOTAL,LPANEL,VMP,LI,MCCN,MJ,IPHI,IAN,LN,LN1,TE	JON 810
	IMP,LPAN1,ISYM,KCODE,EXIT,LPAN2,KF)	JON 820
	IF (KF.EQ.0) GO TO 130	JON 830
	XQ=XCP(KJ)	JON 840
	YQ=YCP(KJ)	JON 850
	ZQ=ZCP(KJ)	JON 860
	IF (LI.GT.LAST) GO TO 90	JON 870
	READ (07) (GAM(2,LK),LK=1,NTL)	JON 880
	READ (01) (GAM(1,LK),LK=1,NTL)	JON 890
	DO 70 LK=1,NTL	JON 900
	KK=LTOTAL+LK	JON 910
	BW(KK)=GAM(1,LK)	JON 920
70	AW(KK)=GAM(2,LK)	JON 930
	CALL FUSVOL (B1,XQ,YQ,ZQ,WN,WK,GF0,0,0)	JON 940
	DO 80 KK=1,LAST	JON 950
	IF (KK.LE.LPANEL) KG=KK+2*JPANEL	JON 960
	IF (KK.GT.LPANEL) KG=KK-LPANEL+JPANEL	JON 970
80	AW(KG)=AW(KG)+WK*WKN*CG(KK)	JON 980
	GO TO 130	JON 990
90	VK=VMUC	JON1000
	TM=TEMP	JON1010
	IF (EXIT.LE.0.001) GO TO 100	JON1020
	IF (NNJ.EQ.1) GO TO 100	JON1030
	IF (KJ.GT.LPANEL.AND.KJ.LE.MJJ(1)) VK=1.	JON1040
	IF (KJ.GT.LPANEL.AND.KJ.LE.MJJ(1)) TM=1.	JON1050
100	CALL FSPEED (B1,XQ,YQ,ZQ,GAM,WK1,WK2)	JON1060
	DO 110 KK=1,LAST	JON1070
	IF (KK.LE.LPANEL) KG=KK+2*JPANEL	JON1080
	IF (KK.GT.LPANEL) KG=KK-LPANEL+JPANEL	JON1090
110	AW(KG)=AW(KG)-WK2*WKN*CG(KK)*TM*VK*VK	JON1100
	DO 120 LK=1,NTL	JON1110
	KK=LTOTAL+LK	JON1120
	BW(KK)=-GAM(1,LK)*TM*VK*VK	JON1130
120	AW(KK)=-GAM(2,LK)*TM*VK*VK	JON1140
130	CONTINUE	JON1150
	WRITE (03) (AW(JJ),JJ=1,J1)	JON1160
	WRITE (09) (BW(JJ),JJ=1,J1)	JON1170
	IF (KJ.LT.MJ.OR.KJ.EQ.LAST) GO TO 140	JON1180
	IPHI=IPHI+1	JON1190
	MJ=MJ+NCJ(INN)	JON1200
140	CONTINUE	JON1210
	MJI=MJJ(INN)-1	JON1220
	IF (KJ.EQ.MJI) GO TO 150	JON1230
	GO TO 160	JON1240
150	JNA=INN	JON1250

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	INN=INN+1	JON1260
160	IF (KJ.EQ.MJJ(JNN)) IPHI=1	JON1270
	IF (LI.EQ.LTOTAL) GO TO 170	JON1280
	GO TO 180	JON1290
170	CONTINUE	JON1300
	IPHI=1	JON1310
	MJ=L PANEL+NCJ(1)	JON1320
	JNN=1	JON1330
	INN=1	JON1340
180	CONTINUE	JON1350
	KI=KI+1	JON1360
	NI=NI-1	JON1370
	IF (LI.EQ.LTOTAL) GO TO 190	JON1380
	IF (LI.EQ.LAST) GO TO 200	JON1390
	LI=LI+1	JON1400
	GO TO 210	JON1410
190	LI=L PANEL+1	JON1420
	GO TO 210	JON1430
200	LI=1	JON1440
210	CONTINUE	JON1450
	JP=LI-LAST+L PANEL	JON1460
	JP1=JP-1	JON1470
	IF (JP.EQ.MJJ(LN1)) LN1=LN1+1	JON1480
	IF (JP1.EQ.MJJ(LN)) LN=LN+1	JON1490
	IF (KI.LE.LTOTAL) GO TO 60	JON1500
	IF (KF.EQ.0) GO TO 240	JON1510
	JQ1=J PANEL+1	JON1520
	DO 220 KJ=1,J PANEL	JON1530
	AW(KJ)=0.	JON1540
220	BW(KJ)=0.	JON1550
	DO 230 KJ=1,NTL	JON1560
	READ (07) (AW(KK),KK=JQ1,LWFJ)	JON1570
	READ (01) (BW(KK),KK=JQ1,LWFJ)	JON1580
	WRITE (03) (AW(JJ),JJ=1,J1)	JON1590
	WRITE (09) (BW(JJ),JJ=1,J1)	JON1600
230	IJ=IJ+1	JON1610
240	CONTINUE	JON1620
	RETURN	JON1630
C		JON1640
	END	JON1650-
	SUBROUTINE MATRIX (AW,BW,LTOTAL,L PANEL,VMU,I,MCCN,MJ,IPHI,INN,LN,LMAT	10
	1N1,TEMP,L PAN1,ISYM,KCODE,EXIT,L PAN2,KF)	MAT 20
C	TO COMPUTE THE JETON INFLUENCE COEFFICIENT MATRICES	MAT 30
	DIMENSION AW(1), PW(1)	MAT 40
	DIMENSION W(4), V(4)	MAT 50
	DIMENSION SV(300), SW(300)	MAT 60
	COMMON /GEOM/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTMAT	70
	1E(50),PSI(20),CH(95),XV(200),YV(100),SN(8,8),XN(200,2),YN(200,2),ZMAT	80
	2N(200,2),WIDTH(8),YCON(25),SWFEP(50),HALFB,SJ(21,8),EX(95,2),TX(95MAT	90

	3,2),SC(160,5),SI(160,5),LC(3)	MAT 100
	COMMON /SCHEME/ C(2),X(10,41),Y(10,41),SLOPE(15),XL(2,15),XTT(41),	MAT 110
	1XLL(41)	MAT 120
	COMMON /AERO/ AM1,AM2,B1,B2,CL(30),CT(30),CD(30),GAM(2,130)	MAT 130
	COMMON /CONST/ NCS,NCW,M1(8),NSJ,NCJ(5),LAST,MJW1(3,5),MJW2(3,5),	JMAT 140
	1PANEL,MJJ(5),NW(3),NNJ,NJP	MAT 150
	COMMON /PARAM/ ALPT,ALPC,ALPS,CDF,SDF,TH,TDF	MAT 160
	EQUIVALENCE (X(1,1),SV(1))	MAT 170
	PI=3.14159265	MAT 180
	ZJET=YCON(25)	MAT 190
	IUSB=YCON(24)	MAT 200
	JCOT=XTE(50)	MAT 210
	DFJ=CDF	MAT 220
	VUT=VMU	MAT 230
	TEM=TEMP	MAT 240
	NN2=NNJ-1	MAT 250
	N1=NNJ-1	MAT 260
	N2=NNJ-2	MAT 270
	N3=NNJ-3	MAT 280
	NJH=(NSJ+1)/2+1	MAT 290
	IF (ISYM.EQ.0) NJH=NSJ/2	MAT 300
	IF (ISYM.EQ.0) NP=NSJ-1	MAT 310
	IF (ISYM.NE.0) NP=NSJ+1	MAT 320
	NJT=NJH-1	MAT 330
	IZ=1	MAT 340
	IP=1	MAT 350
	IFF=1	MAT 360
	MM=NW(1)	MAT 370
	NN=NW(1)	MAT 380
	IND=1	MAT 390
	ISN=1	MAT 400
	JKT=1	MAT 410
	L1=LPANEL+1	MAT 420
	LAST1=LAST-1	MAT 430
	IF (I.GT.LAST) GO TO 10	MAT 440
	IJ=I	MAT 450
	GO TO 20	MAT 460
10	IJ=I-JPANEL	MAT 470
20	CONTINUE	MAT 480
	DO 260 J=1,LAST	MAT 490
	MI=J-IFF+1	MAT 500
	FN=NN	MAT 510
	IF (J.EQ.(LPAN1+1).OR.J.F0.(LPAN2+1)) IP=1	MAT 520
	IF (JCOT.EQ.1.AND.J.GT.LPANEL) GO TO 30	MAT 530
	GO TO 40	MAT 540
30	IF (JKT.EQ.1.OR.JKT.EQ.(NJH+1)) IP=1	MAT 550
40	CONTINUE	MAT 560
	IF (J.GT.LPAN1.AND.J.LE.LPAN2) ISN=2	MAT 570
	IF (J.GT.LPAN2.AND.J.LE.LPANEL) ISN=3	MAT 580

	IF (J.GE.LPANI.AND.J.LT.LPANEL) GO TO 50	MAT 590
	GO TO 60	MAT 600
50	NN=NW(2)	MAT 610
	IF (J.GE.LPAN2.AND.J.LT.LPANEL) NN=NW(3)	MAT 620
60	CONTINUE	MAT 630
	IF (J.GE.LPANEL.AND.J.LT.MJJ(IND)) NN=NCJ(IND)	MAT 640
	CHCRD=CH(IZ)	MAT 650
	IF (J.EQ.L1) GO TO 70	MAT 660
	GO TO 80	MAT 670
70	ISN=ISN+1	MAT 680
	L1=MJJ(IND)+1	MAT 690
80	NL=MJJ(IND)-1	MAT 700
	IF (NL.EQ.LAST1) GO TO 90	MAT 710
	IF (J.EQ.NL) INC=INC+1	MAT 720
90	CONTINUE	MAT 730
	X1=XN(J,1)-XCP(IJ)	MAT 740
	X2=XN(J,2)-XCP(IJ)	MAT 750
	X12=XN(J,2)-XN(J,1)	MAT 760
	Y12=YN(J,2)-YN(J,1)	MAT 770
	Z12=ZN(J,2)-ZN(J,1)	MAT 780
	Z1=ZN(J,1)-ZCP(IJ)	MAT 790
	Z2=ZN(J,2)-ZCP(IJ)	MAT 800
	XZJ=X1*Z12-Z1*X12	MAT 810
	DO 240 II=1,2	MAT 820
	IF (II.EQ.1) GO TO 100	MAT 830
	N=1	MAT 840
	GO TO 110	MAT 850
100	N=2	MAT 860
110	CONTINUE	MAT 870
	YC=(-1.)*N*YCP(IJ)	MAT 880
	Y1=YN(J,1)-YC	MAT 890
	Y2=YN(J,2)-YC	MAT 900
	XYK=X1*Y12-Y1*X12	MAT 910
	YZI=Y1*Z12-Z1*Y12	MAT 920
	ALB1=XYK*XYK+XZJ*XZJ+B1*YZI*YZI	MAT 930
	R1B1=SQRT(X1*X1+B1*Y1*Y1+B1*Z1*Z1)	MAT 940
	R2B1=SQRT(X2*X2+B1*Y2*Y2+B1*Z2*Z2)	MAT 950
	UUB1=(X2*X12+B1*Y2*Y12+B1*Z2*Z12)/R2B1-(X1*X12+B1*Y1*Y12+B1*Z1*Z12	MAT 960
	1)/R1B1	MAT 970
	G1B1=(1.-X1/R1B1)/(Y1*Y1+Z1*Z1)	MAT 980
	G2B1=(1.-X2/R2B1)/(Y2*Y2+Z2*Z2)	MAT 990
	IF (I.GT.LPANEL) GO TO 130	MAT1000
	F1=UUB1*XYK/ALB1	MAT1010
	F2=-Y2*G2B1+Y1*G1B1	MAT1020
	IF (J.GT.LPANEL) GO TO 120	MAT1030
	H2=F2	MAT1040
	IF (IP.EQ.1.AND.KF.NE.0) H2=-Y2*G2B1	MAT1050
	GO TO 220	MAT1060
120	F3=0.	MAT1070

	F4=0.	MAT1080
	F1=2.*F1	MAT1090
	F2=2.*F2	MAT1100
	H2=F2	MAT1110
	IF (IP.EQ.1.AND.KF.NE.0) H2=-2.*Y2*G2R1	MAT1120
	GO TO 220	MAT1130
130	CONTINUE	MAT1140
	IF (J.LE.LPANEL) GO TO 150	MAT1150
	IF (ABS(B1-B2).LE.0.001) GO TO 140	MAT1160
	ALP2=XYK*XYK+XZJ*XZJ+B2*YZI*YZI	MAT1170
	R1B2=SQRT(X1*X1+B2*Y1*Y1+B2*Z1*Z1)	MAT1180
	R2B2=SQRT(X2*X2+B2*Y2*Y2+B2*Z2*Z2)	MAT1190
	UUB2=(X2*X12+B2*Y2*Y12+B2*Z2*Z12)/R2B2-(X1*X12+B2*Y1*Y12+B2*Z1*Z12	MAT1200
	1)/R1B2	MAT1210
	G1B2=(1.-X1/R1B2)/(Y1*Y1+Z1*Z1)	MAT1220
	G2B2=(1.-X2/R2B2)/(Y2*Y2+Z2*Z2)	MAT1230
	GO TO 150	MAT1240
140	ALB2=ALP1	MAT1250
	UUP2=UUB1	MAT1260
	G2B2=G2B1	MAT1270
	G1B2=G1B1	MAT1280
150	CONTINUE	MAT1290
	IF (I.GT.LAST) GO TO 180	MAT1300
	F13=UUP1*XZJ/ALP1	MAT1310
	F12=UUB1*XYK/ALB1	MAT1320
	G13=Z2*G2B1-Z1*G1B1	MAT1330
	G12=-Y2*G2B1+Y1*G1B1	MAT1340
	H13=G13	MAT1350
	H12=G12	MAT1360
	IF (IP.EQ.1.AND.KF.NE.0) H13=Z2*G2R1	MAT1370
	IF (IP.EQ.1.AND.KF.NE.0) H12=-Y2*G2R1	MAT1380
	IF (J.LE.LPANEL) GO TO 160	MAT1390
	F23=UUB2*XZJ/ALB2	MAT1400
	F22=UUB2*XYK/ALB2	MAT1410
	G23=Z2*G2R2-Z1*G1B2	MAT1420
	G22=-Y2*G2R2+Y1*G1B2	MAT1430
	GO TO 170	MAT1440
160	F22=0.	MAT1450
	G22=0.	MAT1460
	F23=0.	MAT1470
	G23=0.	MAT1480
170	F1=-F13*Y(4,IPHI)*(-1.)**N+F12*Y(3,IPHI)	MAT1490
	F2=G13*Y(4,IPHI)*(-1.)**N+G12*Y(3,IPHI)	MAT1500
	F3=-F23*Y(4,IPHI)*(-1.)**N+F22*Y(3,IPHI)	MAT1510
	F4=G23*Y(4,IPHI)*(-1.)**N+G22*Y(3,IPHI)	MAT1520
	H2=H13*Y(4,IPHI)*(-1.)**N+H12*Y(3,IPHI)	MAT1530
	IF (J.LE.LPANEL) GO TO 210	MAT1540
	F1=F1*2.	MAT1550
	F2=2.*F2	MAT1560

	F3=2.*F3	MAT1570
	F4=2.*F4	MAT1580
	H2=2.*H2	MAT1590
	GO TO 210	MAT1600
180	F1=UUB1*YZI/ALB1	MAT1610
	IF (FXIT.LE.0.001) GO TO 190	MAT1620
	IF (NNJ.EQ.1) GO TO 190	MAT1630
	IF (IJ.GT.LPANEL.AND.IJ.LE.MJJ(1)) VMU=1.	MAT1640
	IF (IJ.GT.LPANEL.AND.IJ.LE.MJJ(1)) TEMP=1.	MAT1650
190	CONTINUE	MAT1660
	F2=0.	MAT1670
	H2=0.	MAT1680
	IF (J.LE.LPANEL) GO TO 200	MAT1690
	F3=UUB2*YZI/ALB2	MAT1700
	F4=0.	MAT1710
	F1=-F1*VMU*VMU*2.*TEMP	MAT1720
	F3=-F3*2.	MAT1730
	GO TO 210	MAT1740
200	F1=-F1*VMU*VMU*TEMP	MAT1750
210	CONTINUE	MAT1760
220	W(II)=(F1+F2)*CHORD*SN(MI,ISN)/(P.*FN)	MAT1770
	V(II)=(F1+H2)*CHORD*SN(MI,ISN)/(P.*FN)	MAT1780
	IF (J.LE.LPANEL) GO TO 230	MAT1790
	IF (II.EQ.2) GO TO 230	MAT1800
	K2=II+2	MAT1810
	W(K2)=(F3+F4)*CHORD*SN(MI,ISN)/(P.*FN)	MAT1820
230	CONTINUE	MAT1830
240	CONTINUE	MAT1840
	IF (J.LT.MM) GO TO 250	MAT1850
	IZ=IZ+1	MAT1860
	IP=IP+1	MAT1870
	IFF=MM+1	MAT1880
	MM=MM+NN	MAT1890
	IF (J.GT.LPANEL) JKT=JKT+1	MAT1900
	IF (JKT.EQ.(NP+1)) JKT=1	MAT1910
250	CONTINUE	MAT1920
	IF (J.LE.LPANEL) JA=J+2*JPANEL	MAT1930
	IF (J.GT.LPANEL) JA=J-LPANEL+JPANEL	MAT1940
	AW(JA)=V(1)+V(2)	MAT1950
	BW(JA)=W(1)-W(2)	MAT1960
	SV(JA)=V(1)	MAT1970
	SW(JA)=W(1)	MAT1980
	IF (J.LE.LPANEL) GO TO 260	MAT1990
	J1=J-LPANEL	MAT2000
	AW(J1)=W(3)	MAT2010
	BW(J1)=W(3)	MAT2020
	VMU=VUT	MAT2030
	TEMP=TEM	MAT2040
260	CONTINUE	MAT2050

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	IF (KCODE.EQ.0) GO TO 380	MAT2060
	IF (IUSB.EQ.1.AND.ZJET.GT.0.01) GO TO 360	MAT2070
	IF (DFJ.LE.0.0001) GO TO 360	MAT2080
	IF (NNJ.EQ.1.AND.I.LE.LPANEL) GO TO 360	MAT2090
	IF (NNJ.EQ.1.AND.I.GT.LPANEL) GO TO 270	MAT2100
	IF (I.LE.MJJ(N1).OR.I.GT.LAST) GO TO 360	MAT2110
270	CONTINUE	MAT2120
	IF (I.GT.LAST) GO TO 360	MAT2130
	IF (IPHI.EQ.NJH) GO TO 360	MAT2140
	IF (ISYM.NE.0.AND.IPHI.EQ.1) GO TO 360	MAT2150
	IF (IPHI.LT.NJH) IL=IPHI-ISYM	MAT2160
	IF (IPHI.GT.NJH) IL=IPHI-NJH	MAT2170
	REWIND 2	MAT2180
	IF (NNJ.EQ.1) MJN1=LPANEL	MAT2190
	IF (NNJ.NE.1) MJN1=MJJ(N1)	MAT2200
	MF=IJ-MJN1-(IPHI-1)*NCJ(NNJ)	MAT2210
	FNNJ=NCJ(NNJ)	MAT2220
	DISTJ=SDF	MAT2230
	DLX=DISTJ*0.5*PI/FNNJ	MAT2240
	SZX=-(1.-VMU)	MAT2250
	IQ=(IL-1)*NCJ(NNJ)	MAT2260
	CALL SKIP (IQ,JPANEL)	MAT2270
	DO 310 JJ=1,MF	MAT2280
	READ (02) (SV(K),K=1,JPANEL)	MAT2290
	IF (JJ.EQ.MF) GO TO 280	MAT2300
	DXTH=DLX*PSI(JJ)/TH	MAT2310
	GO TO 290	MAT2320
280	DXTH=DLX*PSI(JJ)*0.5/TH	MAT2330
290	CONTINUE	MAT2340
	PROD=SZX*DXTH	MAT2350
	DO 300 K1=1,JPANEL	MAT2360
	KK=K1+JPANEL	MAT2370
300	AW(KK)=AW(KK)+PROD*SV(K1)	MAT2380
310	CONTINUE	MAT2390
	IQ=NCJ(NNJ)-MF+((NP-1-ISYM)/2-1)*NCJ(NNJ)	MAT2400
	CALL SKIP (IQ,JPANEL)	MAT2410
	DO 350 JJ=1,MF	MAT2420
	READ (02) (SV(K),K=1,JPANEL)	MAT2430
	IF (JJ.EQ.MF) GO TO 320	MAT2440
	DXTH=DLX*PSI(JJ)/TH	MAT2450
	GO TO 330	MAT2460
320	DXTH=DLX*PSI(JJ)*0.5/TH	MAT2470
330	PROD=SZX*DXTH	MAT2480
	DO 340 K1=1,JPANEL	MAT2490
	KK=K1+JPANEL	MAT2500
340	AW(KK)=AW(KK)-PROD*SV(K1)	MAT2510
350	CONTINUE	MAT2520
360	CONTINUE	MAT2530
	IF (EXIT.LE.0.001) GO TO 370	MAT2540

	IF (NNJ.EQ.1) GO TO 370	MAT2550
	IF (IJ.GT.LPANEL.AND.IJ.LF.MJJ(1)) VMU=1.	MAT2560
	IF (IJ.GT.LPANEL.AND.IJ.LF.MJJ(1)) TEMP=1.	MAT2570
370	CONTINUE	MAT2580
380	IF (I.LE.LAST) GO TO 730	MAT2590
	IF (IPHI.EQ.NJH) GO TO 590	MAT2600
	IF (ISYM.NE.0.AND.IPHI.EQ.1) GO TO 590	MAT2610
	IF (NNJ.EQ.1) GO TO 450	MAT2620
	IF (IJ.GT.MJJ(N1)) GO TO 450	MAT2630
	IF (IPHI.GT.NJH.AND.ZJET.LE.0.01) GO TO 450	MAT2640
	IF (IPHI.GT.NJH) L1=NJH	MAT2650
	IF (ISYM.EQ.0.AND.IPHI.GT.NJH) L1=NJH+1	MAT2660
	IF (IPHI.LE.NJH) L1=1	MAT2670
	NZ=1	MAT2680
	IF (NW(2).NE.0.AND.NW(3).EQ.0) NZ=2	MAT2690
	IF (NW(3).NE.0) NZ=3	MAT2700
	IF (NNJ.LE.3.AND.NW(2).NE.0) IR=N2	MAT2710
	IF (NNJ.LE.3.AND.NW(2).EQ.0) IR=N1	MAT2720
	IF (NNJ.GE.4.AND.NW(3).NE.0) IR=N3	MAT2730
	IF (NNJ.EQ.4.AND.NW(3).EQ.0) IR=N2	MAT2740
	DO 440 NR=1,NZ	MAT2750
	K1=MJW1(NR,NJP)+(IPHI-L1-ISYM)*NW(NR)-1	MAT2760
	K2=LC(NR)+IPHI-L1-ISYM	MAT2770
	KNW=NW(NR)	MAT2780
	K1=K1-KNW	MAT2790
	K2=K2-1	MAT2800
	MR=3	MAT2810
	IF (K1.GE.0) GO TO 390	MAT2820
	K1=K1+KNW	MAT2830
	K2=K2+1	MAT2840
	MR=2	MAT2850
390	DO 430 NQ=1,MR	MAT2860
	SUM=0.	MAT2870
	SUMB=0.	MAT2880
	DO 400 KK=1,KNW	MAT2890
	KL=K1+KK	MAT2900
	JA=KL+2*JPANEL	MAT2910
	SUMB=SUMB+SW(JA)	MAT2920
400	SUM=SUM+SV(JA)	MAT2930
	CALL INTEG (RFS,KNW,K1,K2,IJ,P1,IR)	MAT2940
	DO 420 KK=1,KNW	MAT2950
	KL=K1+KK	MAT2960
	JA=KL+2*JPANEL	MAT2970
	AA=1.	MAT2980
	DO 410 L=1,KNW	MAT2990
	LL=K1+L	MAT3000
	IF (L.EQ.KK) GO TO 410	MAT3010
	AA=AA*(XCP(IJ)-XV(LL))/(XV(KL)-XV(LL))	MAT3020
410	CONTINUE	MAT3030

	AW(JA)=AW(JA)-SUN*AA-RES*AA*VMU*VMU*TEMP	MAT3040
	BW(JA)=PW(JA)-SUMB*AA-RES*AA*VMU*VMU*TEMP	MAT3050
420	CONTINUE	MAT3060
	K1=K1+KNW	MAT3070
	K2=K2+1	MAT3080
430	CONTINUE	MAT3090
	IP=IP+1	MAT3100
440	CONTINUE	MAT3110
450	CONTINUE	MAT3120
	IF (KCODE.EQ.0) GO TO 590	MAT3130
	IF (NW(?).EQ.0) NSTRIP=NCS	MAT3140
	IF (NW(2).NE.0.AND.NW(3).EQ.0) NSTRIP=NCS*2	MAT3150
	IF (NW(3).NE.0) NSTRIP=NCS*3	MAT3160
	IF (IPHI.LT.NJH) IP=NJH+1	MAT3170
	IF (IPHI.GT.NJH) IP=ISYM+1	MAT3180
	IF (NNJ.EQ.1) GO TO 500	MAT3190
	IF (IJ.GT.MJJ(N1)) GO TO 500	MAT3200
	IF (NNJ.EQ.2) GO TO 510	MAT3210
	IF (IJ.GT.MJJ(N2)) GO TO 510	MAT3220
	IF (NNJ.EQ.3) GO TO 490	MAT3230
	IF (IJ.GT.MJJ(N3)) GO TO 490	MAT3240
	IF (NNJ.EQ.4) GO TO 470	MAT3250
	IF (NNJ.EQ.5.AND.IJ.GT.MJJ(NNJ-4)) GO TO 460	MAT3260
	L1=NNJ-4	MAT3270
	I7=NSTRIP	MAT3280
	GO TO 520	MAT3290
460	L1=N3	MAT3300
	IZ=NSTRIP+NP	MAT3310
	GO TO 520	MAT3320
470	L1=N3	MAT3330
	I7=NSTRIP	MAT3340
	GO TO 520	MAT3350
480	L1=N2	MAT3360
	IZ=NSTRIP+(NNJ-3)*NP	MAT3370
	GO TO 520	MAT3380
490	CONTINUE	MAT3390
	L1=N2	MAT3400
	I7=NSTRIP	MAT3410
	GO TO 520	MAT3420
500	L1=NNJ	MAT3430
	IZ=NSTRIP+(NNJ-1)*NP	MAT3440
	GO TO 520	MAT3450
510	L1=N1	MAT3460
	IZ=NSTRIP+(NNJ-2)*NP	MAT3470
520	CONTINUE	MAT3480
	I7=IZ+IP	MAT3490
	NT=NIJ	MAT3500
	IF (ISYM.NE.0) NT=NIJ-1	MAT3510
	KNW=NCJ(L1)	MAT3520

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	DO 580 KP=1,NT	MAT3530
	SUM1=0.	MAT3540
	SUM2=0.	MAT3550
	SUM3=0.	MAT3560
	SUM4=0.	MAT3570
	K1=VJJ(L1)-NP*NCJ(L1)+(KP-1)*NCJ(L1)+(IP-1)*NCJ(L1)	MAT3580
	DO 530 KK=1,KNW	MAT3590
	KL=K1+KK	MAT3600
	KJ=KL+JPANEL	MAT3610
	IA=KL-LPANEL+JPANFL	MAT3620
	IB=KJ-LAST	MAT3630
	SUM3=SUM3+SW(IA)	MAT3640
	SUM4=SUM4+BW(IB)	MAT3650
	SUM1=SUM1+SV(IA)	MAT3660
530	SUM2=SUM2+AW(IB)	MAT3670
	CALL INTFG (RES,KNW,K1,I7,IJ,B1,L1)	MAT3680
	IF (ABS(B1-P2).LE.0.001) GO TO 540	MAT3690
	CALL INTEG (REF,KNW,K1,I7,IJ,B2,L1)	MAT3700
	GO TO 550	MAT3710
540	REF=RES	MAT3720
550	DO 570 KK=1,KNW	MAT3730
	KL=K1+KK	MAT3740
	KJ=KL+JPANEL	MAT3750
	IA=KL-LPANEL+JPANEL	MAT3760
	IR=KJ-LAST	MAT3770
	AA=1.	MAT3780
	DO 560 L=1,KNW	MAT3790
	LL=K1+L	MAT3800
	IF (L.EG.KK) GO TO 560	MAT3810
	AA=AA*(XCP(IJ)-XV(LL))/(XV(KL)-XV(LL))	MAT3820
560	CONTINUE	MAT3830
	AW(IA)=AW(IA)-SUM1*AA-RES*AA*VMU*VMU*TFMP*2.	MAT3840
	AW(IB)=AW(IR)-SUM2*AA-REF*AA*2.	MAT3850
	BW(IA)=BW(IA)-SUM3*AA-RES*AA*VMU*VMU*TFMP*2.	MAT3860
	BW(IB)=BW(IR)-SUM4*AA-REF*AA*2.	MAT3870
570	CONTINUE	MAT3880
	IZ=IZ+1	MAT3890
580	CONTINUE	MAT3900
590	CONTINUE	MAT3910
	SK=1.	MAT3920
	IF (IPHI.GT.NJH) SK=-1.	MAT3930
	J1=I-LAST+LPANEL	MAT3940
	K=VCON-LAST-NCJ(LN)+LPANEL	MAT3950
	JNJ=NCJ(LN)	MAT3960
	DO 610 KK=1,JNJ	MAT3970
	KL=K+KK	MAT3980
	KJ=KL+JPANEL	MAT3990
	IA=KL-LPANEL+JPANEL	MAT4000
	IR=KJ-LAST	MAT4010

	AA=1.	MAT4020
	DO 600 L=1,JNJ	MAT4030
	LL=K+L	MAT4040
	IF (L.EQ.KK) GO TO 600	MAT4050
	AA=AA*(XCP(JI)-XV(LL))/(XV(KL)-XV(LL))	MAT4060
600	CONTINUE	MAT4070
	BW(IA)=BW(IA)-AA*VML*VMU*TEMP*SK	MAT4080
	BW(IB)=BW(IB)+AA*SK	MAT4090
	AW(IB)=AW(IB)+AA*SK	MAT4100
610	AW(IA)=AW(IA)-AA*VMU*VMU*TEMP*SK	MAT4110
	IF (I.EG.MCON.AND.I.LT.LTOTAL) MCON=MCON+NCJ(LN1)	MAT4120
	IF (KCODE.EQ.0) GO TO 700	MAT4130
	IF (IUSB.EQ.1.AND.7JET.GT.0.01) GO TO 700	MAT4140
	IF (NNJ.EQ.1) GO TO 700	MAT4150
	IF (IJ.GT.MJJ(N1)) GO TO 700	MAT4160
	IF (IPHI.LE.NJH) GO TO 700	MAT4170
	L1=NJH	MAT4180
	IF (ISYM.EQ.0) L1=NJH+1	MAT4190
	IF (NW(2).EQ.0) GO TO 630	MAT4200
	IF (NW(3).EQ.0) GO TO 620	MAT4210
	IF (IJ.GT.MJJ(N2)) GO TO 660	MAT4220
	IF (IJ.GT.MJJ(N3)) GO TO 650	MAT4230
	IF (NNJ.EQ.4) GO TO 640	MAT4240
	IF (NNJ.EQ.5.AND.IJ.GT.MJJ(NNJ-4)) GO TO 640	MAT4250
	GO TO 700	MAT4260
620	IF (IJ.GT.MJJ(N2)) GO TO 650	MAT4270
	IF (NNJ.EQ.3) GO TO 640	MAT4280
	IF (NNJ.EQ.4.AND.IJ.GT.MJJ(N3)) GO TO 640	MAT4290
	GO TO 700	MAT4300
630	IF (NNJ.EQ.2) GO TO 640	MAT4310
	IF (NNJ.EQ.3.AND.IJ.GT.MJJ(N2)) GO TO 640	MAT4320
	GO TO 700	MAT4330
640	K1=MJWI(1,NJP)+(IPHI-L1-ISYM)*NW(1)-1	MAT4340
	KNW=NW(1)	MAT4350
	GO TO 670	MAT4360
650	K1=MJWI(2,NJP)+(IPHI-L1-ISYM)*NW(2)-1	MAT4370
	KNW=NW(2)	MAT4380
	GO TO 670	MAT4390
660	K1=MJWI(3,NJP)+(IPHI-L1-ISYM)*NW(3)-1	MAT4400
	KNW=NW(3)	MAT4410
670	DO 690 KK=1,KNW	MAT4420
	KL=K1+KK	MAT4430
	JA=KL+2*JPANEL	MAT4440
	AA=1.	MAT4450
	DO 680 L=1,KNW	MAT4460
	LL=K1+L	MAT4470
	IF (L.EQ.KK) GO TO 680	MAT4480
	AA=AA*(XCP(IJ)-XV(LL))/(XV(KL)-XV(LL))	MAT4490
680	CONTINUE	MAT4500

	RW(JA)=PW(JA)-AA*VMU*VMU*TFMP*0.5	MAT4510
690	AW(JA)=AW(JA)-AA*VMU*VMU*TEMP*0.5	MAT4520
700	CONTINUE	MAT4530
	IF (KCODE.EQ.0) GO TO 730	MAT4540
	IF (ZJET.GT.0.01) GO TO 730	MAT4550
	IF (DFJ.LE.0.0001) GO TO 730	MAT4560
	IF (NNJ.EQ.1) GO TO 710	MAT4570
	IF (IJ.LE.MJJ(N1)) GO TO 730	MAT4580
710	CONTINUE	MAT4590
	IF (IPHI.EQ.NJH) GO TO 730	MAT4600
	IF (ISYM.NE.0.AND.IPHI.EQ.1) GO TO 730	MAT4610
	DO 720 J=1,JPANFL	MAT4620
	JJ=J+JPANEL	MAT4630
720	SV(J)=-AW(JJ)	MAT4640
	WRITE (02) (SV(J),J=1,JPANFL)	MAT4650
730	CONTINUE	MAT4660
	VMU=VUT	MAT4670
	TEMP=TFM	MAT4680
	RETURN	MAT4690
C		MAT4700
	END	MAT4710-
	SUBROUTINE SKIP (I,JPANEL)	SKP 10
	DIMENSION DUMMY(200)	SKP 20
	IF (I.EQ.0) GO TO 20	SKP 30
	DO 10 J=1,I	SKP 40
	READ (02) (DUMMY(K),K=1,JPANEL)	SKP 50
10	CONTINUE	SKP 60
20	RETURN	SKP 70
	END	SKP 80-
	OVERLAY (WNGJET,4,0)	SOL 10
	PROGRAM SOLUTN	SOL 20
C	TO SOLVE THE JET ON AND JET OFF EQUATIONS	SOL 30
C		SOL 40
C	*** GAMMA MUST BE DIMENSIONED TO HAVE AT LEAST (N+1)**2/4 ELEMENTS,	SOL 50
C	WHERE N IS THE SIZE OF THE MATRIX ***	SOL 60
C		SOL 70
	DIMENSION AW(330), CA(330), GAMMA(25000)	SOL 80
	DIMENSION GAMVR(330), GAMW(130)	SOL 90
	COMMON /SKODE/ KCODE	SOL 100
	COMMON /SCHEME/ C(2),X(10,41),Y(10,41),SLOPE(15),XL(2,15),XTT(41),	SOL 110
	IXLL(41)	SOL 120
	COMMON /GEOM/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTS	SOL 130
	LE(50),PSI(20),CF(95),XV(200),YV(100),SN(8,8),XN(200,2),YN(200,2),ZS	SOL 140
	2N(200,2),WIDTH(8),YCON(25),SWEEP(50),HALFB,SJ(21,8),EX(95,2),TX(95	SOL 150
	3,2),SC(160,5),SI(160,5),LC(3)	SOL 160
	COMMON /PARAM/ ALPT,ALPC,ALPS,CDF,SDF,TH,TDF	SOL 170
	COMMON /AERO/ AM1,AM2,R1,R2,CL(30),CT(30),CD(30),GAM(2,130)	SOL 180
	COMMON /ADD/ CP(130),CM(30),BREAK(R),SWP(8,15),GAL(30),ISYM,VMU,VUS	SOL 190
	1,TEMP,FCR,CANLEP,CANLEI,CAMTER,CAMTFT,XJ,YJ,ZJ,RJ,ALP,CREF,TWISTR	SOL 200

	COMMON /CONST/ NCS,NCW,M1(R),MSJ,MCJ(5),LAST,MJK1(3,5),MJW2(3,5),JSOL	210
	IPANEL,MJJ(5),NW(3),NNJ,NJP	SOL 220
	COMMON /COST/ LTOTAL,LPANI,NJW(5),LPANFL,IENTN,LPAN2,EXIT,PTIAL,TWSOL	230
	IIST,DF(5),NFP	SOL 240
	COMMON /SOME/ NC,NWING,LAT,NAL,LWF,LWFJ,CHORDT(3),SNG(5),YC(5),YCN	SOL 250
	I(6),WKN,RDX,MDG,NDG	SOL 260
	COMMON /FUS/ XF(20),XCF(20),RF(20),SNP(5,20),XLEF,XTEF,WARD(20),NCS	SOL 270
	IUM,NF,NT,CSF(5,10),XAS(6),NKF(5),F0,F10,KF,NTL	SOL 280
	REWIND 03	SOL 290
	REWIND 08	SOL 300
	IUSR=YCON(24)	SOL 310
	NC=IENTN	SOL 320
	ZZ=YCON(25)	SOL 330
	ITN=YCON(23)	SOL 340
	IC=1	SOL 350
	J1=LWF+1	SOL 360
	LP1=LWFJ+1	SOL 370
	RR=P1	SOL 380
	R=PR	SOL 390
	DFJ=CDF	SOL 400
	PI=3.14159265	SOL 410
	GB0=0.	SOL 420
	SS=SIN(ALP)	SOL 430
	CS=COS(ALP)	SOL 440
	IF (KF.EQ.0) GO TO 10	SOL 450
	S=XTEF-XLEF	SOL 460
	F0=4.*PI*CS*PDX	SOL 470
	F10=-R.*PI*SS*PDX	SOL 480
	G10=0.	SOL 490
	GB0=0.	SOL 500
	GR0=0.	SOL 510
	CALL FALONE (B,CS,AW,CA,GAMMA)	SOL 520
10	CONTINUE	SOL 530
20	CONTINUE	SOL 540
	IG=1	SOL 550
	MG=NW(1)	SOL 560
	NG=NW(1)	SOL 570
	READ (03) (AW(I),I=1,J1)	SOL 580
	XR=XCP(1)	SOL 590
	YP=YCP(1)	SOL 600
	ZR=ZCP(1)	SOL 610
	PHRV=0.	SOL 620
	WN=0.	SOL 630
	IF (IUSR.EQ.1.AND.ITN.EQ.0) GO TO 30	SOL 640
	CALL INDVEL (XR,YP,ZB,XJ,YJ,ZJ,RJ,PP,PHRV,PHX,TEMP,VU,PHY,ISYM)	SOL 650
30	CONTINUE	SOL 660
	IF (KF.EQ.0) GO TO 40	SOL 670
	CALL FUSVOL (R,XR,YB,ZB,WN,WK,GB0,1,0)	SOL 680
40	CONTINUE	SOL 690

	AW(J1)=AW(J1)+XTT(IG)+PHRV/(ALPC*VU)+WN	SOL 700
	DO 50 I=1,LWF	SOL 710
50	GAMMA(I)=-AW(I+1)/AW(I)	SOL 720
	NJ=LWF-1	SOL 730
	DO 110 IJ=2,LWF	SOL 740
	READ (03) (AW(K),K=1,J1)	SOL 750
	WN=0.	SOL 760
	XB=XCP(IJ)	SOL 770
	YB=YCP(IJ)	SOL 780
	ZB=ZCP(IJ)	SOL 790
	IF (IUSB.EQ.1.AND.ITN.EQ.0) GO TO 60	SOL 800
60	CALL INDEL (XB,YB,ZB,XJ,YJ,ZJ,RJ,BB,PHRV,PHX,TEMP,VU,PHY,ISYM)	SOL 810
	CONTINUE	SOL 820
	IF (IJ.LE.LPANEL) ALPT=XTT(IG)	SOL 830
	IF (IJ.GT.LPANEL) GO TO 70	SOL 840
	GO TO 80	SOL 850
70	ALPT=0.	SOL 860
	I=IJ-LPANEL	SOL 870
	IF (I.GT.NF) GO TO 90	SOL 880
	KI=I	SOL 890
	XS=XCF(KI)-XTEF	SOL 900
	XB=XCF(KI)-XLFF	SOL 910
	IF (KI.EQ.NF) PFL=0.	SOL 920
	IF (KI.NE.NF) PFL=XS/SQRT(XS*XS+P*RF(KI)*RF(KI))	SOL 930
	RF1=XS*(1.+RFL)	SOL 940
	RF0=XB*(1.+XB/SQRT(XB*XB+P*RF(KI)*RF(KI)))	SOL 950
	ALPT=SS*RF(KI)*RF(KI)-(RF1-RF0)*F10/(4.*PI)	SOL 960
	GO TO 90	SOL 970
80	IF (KF.EQ.0) GO TO 90	SOL 980
	CALL FLSVOL (B,XP,YP,ZB,WN,WK,GP0,1,0)	SOL 990
90	CONTINUE	SOL1000
	AW(J1)=AW(J1)+PHRV/(ALPC*VU)+WN+ALPT	SOL1010
	IK=IJ	SOL1020
	CALL VMSEQN (NJ,IK,AW,GAMMA,CA)	SOL1030
	NJ=NJ-1	SOL1040
	IF (IJ.GE.LPAN1.AND.IJ.LT.LPAN2) NG=NW(2)	SOL1050
	IF (IJ.GE.LPAN2.AND.IJ.LT.LPANFL) NG=NW(3)	SOL1060
	IF (IJ.LT.MG) GO TO 100	SOL1070
	IG=IG+1	SOL1080
	MG=MG+NG	SOL1090
100	IF (IJ.EQ.LPAN1.CR.IJ.EQ.LPAN2) IG=1	SOL1100
110	CONTINUE	SOL1110
	DO 120 I=1,LWF	SOL1120
120	GAM(IG,I)=GAMMA(I)	SOL1130
	IF (ABS(B1-R2).LE.0.001) GO TO 130	SOL1140
	IC=IC+1	SOL1150
	BR=R2	SOL1160
	R=BR	SOL1170
	IF (IC.GT.2) GO TO 130	SOL1180

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130 GO TO 20' SOL1190
CONTINUE SOL1200
VMUC=VMU*ALPC SOL1210
CALL SOLUJ (VMUC,VMU,TFMP,LPANEL,LPAN1,LPAN2,LWFJ,LTOTAL,LAST,ISYMSOL1220
1,KCCDE,EXIT,NW,KCJ,MJWI,MJJ,NA,NJP,7Z,CAMTER,CAMTET,YCP,HALFB,DFJ,SOL1230
2TDF,GAMW,GAMMA,AW,CA,JPANEL,MJW2,0.,0.,0.,0.F10,NTL,KF) SOL1240
J7=JPANEL+1 SOL1250
IA=2*JPANEL SOL1260
JPAN1=IA+1 SOL1270
DO 140 I=1,LWFJ SOL1280
140 GAMVR(I)=GAMMA(I) SOL1290
IF (IUSP.EQ.1.AND.ITN.EQ.0) GO TO 230 SOL1300
IG=1 SOL1310
MG=NW(1) SOL1320
NG=NW(1) SOL1330
R=P1 SOL1340
REWIND 03 SOL1350
READ (03) (AW(I),I=1,J1) SOL1360
WN=0. SOL1370
IF (KF.EQ.0) GO TO 150 SOL1380
XQ=XCP(1) SOL1390
YQ=YCP(1) SOL1400
ZQ=ZCP(1) SOL1410
CALL FUSVOL (P,XC,YQ,ZQ,WN,WK,GP0,1,0) SOL1420
150 CONTINUE SOL1430
AW(J1)=AW(J1)+XTT(IG)+WN SOL1440
DO 160 I=1,LWF SOL1450
160 GAMMA(I)=-AW(I+1)/AW(I) SOL1460
NJ=LWF-1 SOL1470
DO 210 IJ=2,LWF SOL1480
RFAC (03) (AW(K),K=1,J1) SOL1490
WN=0. SOL1500
IF (IJ.LE.LPANEL) ALPT=XTT(IG) SOL1510
IF (IJ.GT.LPANEL) GO TO 170 SOL1520
GO TO 180 SOL1530
170 ALPT=0. SOL1540
I=IJ-LPANEL SOL1550
IF (I.GT.NF) GO TO 190 SOL1560
KI=I SOL1570
XS=XCF(KI)-XTFF SOL1580
XR=XCF(KI)-XLEF SOL1590
IF (KI.EQ.NF) RFL=0. SOL1600
IF (KI.NE.NF) RFL=XS/SQRT(XS*XS+R*RF(KI)*RF(KI)) SOL1610
RF1=XS*(1.+RFL) SOL1620
RF0=XR*(1.+R/SQRT(XB*XR+R*RF(KI)*RF(KI))) SOL1630
ALPT=SS*RF(KI)*RF(KI)-(RF1-RF0)*F10/(4.*PI) SOL1640
GO TO 190 SOL1650
180 IF (KF.EQ.0) GO TO 190 SOL1660
XQ=XCP(IJ) SOL1670
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	YQ=YCP(IJ)	SOL1680
	ZQ=ZCP(IJ)	SOL1690
	CALL FUSVOL (P,XQ,YG,ZQ,WX,WK,GR0,1.0)	SOL1700
190	CONTINUE	SOL1710
	AW(JI)=AW(JI)+WX+ALPT	SOL1720
	IK=IJ	SOL1730
	CALL VMSEQN (NJ,IK,AW,GAMMA,CA)	SOL1740
	NJ=NJ-1	SOL1750
	IF (IJ.GE.LPAN1.AND.IJ.LT.LPAN2) NG=NW(2)	SOL1760
	IF (IJ.GE.LPAN2.AND.IJ.LT.LPAN1) NG=NW(3)	SOL1770
	IF (IJ.LT.MG) GO TO 200	SOL1780
	IG=IG+1	SOL1790
	MG=MG+NG	SOL1800
200	IF (IJ.EQ.LPAN1.OR.IJ.EQ.LPAN2) IG=1	SOL1810
210	CONTINUE	SOL1820
	DO 220 I=1,LWF	SOL1830
220	GAM(2,I)=GAMMA(I)	SOL1840
CD 3116		SOL1850
	GO TO 250	SOL1860
230	DO 240 I=1,LWF	SOL1870
240	GAM(2,I)=GAM(1,I)	SOL1880
250	CONTINUE	SOL1890
	CAM=CAMLER	SOL1900
	CAMT=CAMLET	SOL1910
	CALL THRUST (LTCTAL,LPANEL,GAMVR,GAMW,CAM,LPAN1,VU,XJ,YJ,ZJ,RJ,TFM	SOL1920
	IP,GAL,ISYM,LPAN2,CAMT,SNQ,YG,LWF,LWFJ,AW,CA,CM,0.,0.,0.,1)	SOL1930
	DO 260 I=1,LWF	SOL1940
	IR=I+IA	SOL1950
	IC=1	SOL1960
260	CP(I)=GAMVR(IR)+GAM(IC,I)	SOL1970
	IF (LAT.NE.1) GO TO 270	SOL1980
	REWIND 02	SOL1990
	REWIND 07	SOL2000
	WRITE (07) (CD(I),I=1,NC)	SOL2010
	WRITE (07) (CM(I),I=1,NC)	SOL2020
	CALL LATDIR (KF,AW,CA,GAMMA,CP,GAMW,VMUC,NA,ZZ,YCP,HALFB,DFJ,TDF,KS	SOL2030
	ICODE,F10,NTL)	SOL2040
270	CONTINUE	SOL2050
	DO 280 I=1,LWF	SOL2060
	PC=ALPC	SOL2070
	IF (I.GT.LPANEL) PC=1.	SOL2080
	IP=I+JA	SOL2090
	CP(I)=CP(I)*ALPC	SOL2100
280	GAMVR(IP)=(GAMVR(IP)+GAM(1,I))*PC	SOL2110
	WRITE (08) (GAMVR(I),I=1,LWFJ)	SOL2120
	RETURN	SOL2130
C		SOL2140
	END	SOL2150-
	SUBROUTINE SOLUJ (VMUC,VMU,TEMP,LPANEL,LPAN1,LPAN2,LWFJ,LTCTAL,LA<SLJ 10	

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1T,ISYM,KCODE,EXIT,NW,NCJ,MJW1,MJU,NA,NJP,ZZ,CAMTER,CAMTET,YCP,HALFSLJ 20
2B,DFJ,TDF,GAMW,GAMMA,AW,CA,JPANEL,MJW2,P,PET,RL,LZ,F10,NTL,KF) SLJ 30
DIMENSION NW(1), NCJ(1), MJW1(3,1), MJU(1), YCP(1), GAMMA(1), AW(1SLJ 40
1), CA(1), GAMW(1), MJW2(3,1) SLJ 50
REWIND 09 SLJ 60
IPHI=1 SLJ 70
MJ=L*PANEL+NCJ(1) SLJ 80
LP1=LWFJ+1 SLJ 90
NA=3 SLJ 100
IF (NW(2).EQ.0) NA=1 SLJ 110
IF (NW(2).NE.0.AND.NW(3).EQ.0) NA=2 SLJ 120
INN=1 SLJ 130
JNN=1 SLJ 140
I=LAST+1 SLJ 150
IF (LZ.EQ.0) RFAC (03) (AW(K),K=1,LWFJ) SLJ 160
IF (LZ.NE.0) RFAC (09) (AW(K),K=1,LWFJ) SLJ 170
CALL STREAM (ALPHA,VMUC,I,IPHI,LPANEL,TEMP,LPAN1,LPAN2,ISYM,KCODE, SLJ 180
1,EXIT,MJ,GAMW,P,PET,RL,LZ,KF,NTL,F10) SLJ 190
AW(LP1)=ALPHA SLJ 200
DO 10 I=1,LWFJ SLJ 210
10 GAMMA(I)=-AW(I+1)/AW(I) SLJ 220
KI=2 SLJ 230
NI=LWFJ-1 SLJ 240
LI=LAST+2 SLJ 250
IH=NW(NA)+MJW1(NA,NJP)-1 SLJ 260
20 KJ=LI SLJ 270
IF (LI.GT.LAST) KJ=LI-JPANEL SLJ 280
IF (LZ.EQ.0) RFAC (03) (AW(K),K=1,LWFJ) SLJ 290
IF (LZ.NE.0) RFAC (09) (AW(K),K=1,LWFJ) SLJ 300
ALPHA=0. SLJ 310
IF (KI.GT.LTOTAL) GO TO 40 SLJ 320
CALL STREAM (ALPHA,VMUC,LI,IPHI,LPANEL,TEMP,LPAN1,LPAN2,ISYM,KCODE)SLJ 330
1,EXIT,MJ,GAMW,P,PET,RL,LZ,KF,NTL,F10) SLJ 340
IF (LZ.NE.0) GO TO 40 SLJ 350
IF (KCODE.EQ.0) GO TO 40 SLJ 360
IF (ZZ.GE.0.01) GO TO 40 SLJ 370
C SLJ 380
C ADDITIONAL EXTERNAL FLOW DEFLECTION IS ALLOWED IF THE JET ANGLE IS SLJ 390
C GREATER THAN THE FLAP ANGLE BECAUSE OF THE EFFECT OF FINITE TRAI- SLJ 400
C LING-EDGE ANGLES. FOR THIN AIRFOILS, THIS CAN BE ELIMINATED BY SLJ 410
C INSERTING THE STATEMENT, IF (KCODE.EQ.1) GO TO 63 SLJ 420
C SLJ 430
IF (LI.GE.MJW1(NA,NJP).AND.LI.LE.MJW2(NA,NJP)) GO TO 30 SLJ 440
GO TO 40 SLJ 450
30 IF (LI.NE.IH) GO TO 40 SLJ 460
IF ((DFJ-TDF).LT.0.) GO TO 40 SLJ 470
CZT=CAMTER-(CAMTER-CAMTET)*YCP(LI)/HALFB SLJ 480
APA=0.5*(DFJ-TDF+CZT) SLJ 490
IF (VMU.GT.0.85) APA=APA*(1.-VMU)/0.15 SLJ 500

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	IF (APA.LT.0.) APA=0.	SLJ 510
	ALPHA=ALPHA+APA	SLJ 520
	IH=IH+NW(NA)	SLJ 530
40	CONTINUE	SLJ 540
	AW(LP1)=ALPHA	SLJ 550
	CALL VMSEGN (NI,KI,AW,GAMMA,CA)	SLJ 560
	IF (KJ.LT.MJ.OR.KJ.EQ.LAST) GO TO 50	SLJ 570
	IPHI=IPHI+1	SLJ 580
	MJ=MJ+NCJ(INN)	SLJ 590
50	CONTINUE	SLJ 600
	MJI=MJJ(INN)-1	SLJ 610
	IF (KJ.EQ.MJI) GO TO 60	SLJ 620
	GO TO 70	SLJ 630
60	JNN=INN	SLJ 640
	INN=INN+1	SLJ 650
70	IF (KJ.EQ.MJJ(JNN)) IPHI=1	SLJ 660
	IF (LI.EQ.LTCTAL) GO TO 80	SLJ 670
	GO TO 90	SLJ 680
80	CONTINUE	SLJ 690
	IPHI=1	SLJ 700
	MJ=LPPANEL+NCJ(1)	SLJ 710
	JNN=1	SLJ 720
	INN=1	SLJ 730
90	CONTINUE	SLJ 740
	KI=KI+1	SLJ 750
	NI=NI-1	SLJ 760
	IF (LI.EQ.LTCTAL) GO TO 100	SLJ 770
	IF (LI.EQ.LAST) GO TO 110	SLJ 780
	LI=LI+1	SLJ 790
	GO TO 120	SLJ 800
100	LI=LPPANFL+1	SLJ 810
	GO TO 120	SLJ 820
110	LI=1	SLJ 830
120	CONTINUE	SLJ 840
	IF (KI.LE.LWFJ) GO TO 20	SLJ 850
	RETURN	SLJ 860
C		SLJ 870
	FND	SLJ 880-
	SUBROUTINE LATDIR (KF,AW,CA,GAMMA,GAMVR,GAMW,VMLC,NA,ZZ,YCP,HALFP,LAT	LAT 10
	IDFJ,TDF,KCODE,F10,NTL)	LAT 20
	DIMENSION AW(1), CA(1), GAMMA(1), GAMVR(1), GAMW(1), YCP(1)	LAT 30
	COMMON /AERO/ AM1,AM2,R1,R2,CL(30),CT(30),CD(30),GAM(2,130)	LAT 40
	COMMON /SCME/ NC,NWING,LAT.NAL,LWF,LWFJ,CHORDT(3),SNG(5),Y(5),YCN	LAT 50
	LAT(6),WKN,RDX,MDF,NDG	LAT 60
	COMMON /CONST/ NCS,NCW,M1(8),NSJ,NCJ(5),LAST,MJW1(3,5),MJW2(3,5),JLAT	LAT 70
	LPANEL,MJJ(5),NW(3),NNJ,NJP	LAT 80
	COMMON /ADD/ CP(130),CM(30),BREAK(8),SWP(8,15),GAL(30),ISYM,VMU,VJLAT	LAT 90
	1,TEMP,FCR,CAMLEP,CAMLET,CAMTER,CAMTET,XJ,YJ,7J,RJ,ALP,CREF,TWISTR	LAT 100
	COMMON /COST/ LTOTAL,LPAN1,NJW(5),LPANEL,IENTN,LPAN2,EXIT,PTIAL,TWLAT	LAT 110

	LIST,DF(5),NFP	LAT 120
	REWIND 1	LAT 130
	IA=2*JPANEL	LAT 140
	CAM=CAMLER	LAT 150
	CAMT=CAMLET	LAT 160
	DO 10 I=1,LPANEL	LAT 170
10	GAMMA(I)=CAM(2,I)	LAT 180
	CALL GAMAX (AW,CA,LPAN1,LPANEL,GAMMA,NC,BREAK,SWP,CHORDT,LPAN2,NWILAT 190	
	ING,1)	LAT 200
	WRITE (02) (CA(I),I=1,LPANEL)	LAT 210
	CALL GAMAX (AW,CA,LPAN1,LPANFL,GAMVR,NC,BREAK,SWP,CHORDT,LPAN2,NWILAT 220	
	ING,0)	LAT 230
	WRITE (07) (CA(I),I=1,LPANFL)	LAT 240
	P=1.	LAT 250
	RET=0.	LAT 260
	RL=0.	LAT 270
	L=1	LAT 280
	B=F1	LAT 290
	DO 100 J=1.3	LAT 300
	IF (KF,NE,0) GO TO 20	LAT 310
	IF (RET,GT,0..AND,MDG,EG,0) GO TO 30	LAT 320
	IF (RL,GT,0..AND,MDG,EG,0) GO TO 30	LAT 330
20	CONTINUE	LAT 340
	CALL LATERL (GAMMA,AW,CA,LPANFL,LPAN1,LPAN2,LWF,DF,NAL,SNG,YG,B,P,LAT 350	
	IBFT,RL)	LAT 360
	WRITE (01) (GAMMA(I),I=1,LWF)	LAT 370
	GO TO 50	LAT 380
30	DO 40 KK=1,LWF	LAT 390
40	GAMMA(KK)=0.	LAT 400
	WRITE (01) (GAMMA(I),I=1,LWF)	LAT 410
50	CONTINUE	LAT 420
	DO 60 I=1,LWF	LAT 430
60	GAMW(I)=GAMMA(I)	LAT 440
	CALL SOLUJ (VMUC,VMU,TEMP,LPANEL,LPAN1,LPAN2,LWFJ,LTOTAL,LAST,ISYMLAT 450	
	1,KCCDE,EXIT,NW,NCJ,MJW1,MJJ,NA,NJP,Z7,CAMTER,CAMTET,YCP,FALFB,DFJ,LAT 460	
	ZTDF,GAMW,GAMMA,AW,CA,JPANEL,MJW2,P,BET,RL,1,F10,NTL,KF)	LAT 470
	DO 70 I=1,LWF	LAT 480
	IR=IA+I	LAT 490
70	GAMMA(IR)=GAMMA(IR)+GAMW(I)	LAT 500
	WRITE (08) (GAMMA(I),I=1,LWFJ)	LAT 510
	CALL THRUST (LTOTAL,LPANEL,GAMMA,GAMW,CAM,LPAN1,VU,XJ,YJ,ZJ,RJ,TEMLAT 520	
	1P,GAL,ISYM,LPAN2,CAMT,SNG,YG,LWF,LWFJ,AW,CA,CM,P,BET,RL,0)	LAT 530
	WRITE (07) (CD(I),I=1,NCS)	LAT 540
	WRITE (02) (CM(I),I=1,NCS)	LAT 550
	CALL GAMAX (AW,CA,LPAN1,LPANEL,GAMW,NC,BREAK,SWP,CHORDT,LPAN2,NWILAT 560	
	IG,1)	LAT 570
	DO 80 K=1,LPANEL	LAT 580
	IB=K+JA	LAT 590
80	GAMMA(K)=GAMMA(IB)	LAT 600

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CALL GAMAX (AW,CA,LPAN1,LPANFL,GAMMA,NC,BRFK,SWP,CFORDT,LPAN2,NWILAT 610
ING,0) LAT 620
IF (J.EQ.2) GO TO 90 LAT 630
IF (J.EQ.3) GO TO 100 LAT 640
RET=1. LAT 650
P=0. LAT 660
GO TO 100 LAT 670
90 RL=1. LAT 680
RET=0. LAT 690
100 CONTINUE LAT 700
RETURN LAT 710
C LAT 720
END LAT 730
SUBROUTINE STREAM (ALPHA,VMU,I,IPHI,LPANEL,TEMP,LPAN1,LPAN2,ISYM,KSTR 10
ICODE,EXIT,MJ,GAMW,F,RET,RL,LZ,KF,NTL,F10) STR 20
C TO COMPUTE THE RIGHT HAND SIDE OF THE SIMULTANECUS EQUATIONS STR 30
DIMENSION PHIN(300), GAMW(1) STR 40
DIMENSION FJS(30), FJA(30), CQP(2,30) STR 50
COMMON /SCHEME/ C(2),X(10,41),Y(10,41),SLOPE(15),XL(2,15),XTT(41),STR 60
IXLL(4) STR 70
COMMON /GEOM/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSTR 80
IF(50),PSI(20),CH(95),XV(200),YV(100),SN(8,8),XN(200,2),YN(200,2),ZSTR 90
2N(200,2),WIDTH(8),YCON(25),SWFFP(50),HALFR,SJ(21,8),EX(95,2),TX(95STR 100
3,2),SC(160,5),SI(160,5),LC(3) STR 110
COMMON /AERO/ AM1,AM2,P1,R2,CL(30),CT(30),CD(30),GAM(2,130) STR 120
COMMON /CONST/ ACS,NCW,M1(8),NSJ,ACJ(5),LAST,MJH1(3,5),MJH2(3,5),JSTR 130
IPANEL,MJJ(5),NW(3),NNJ,NJP STR 140
COMMON /PARAM/ ALPT,ALPC,ALPS,CDF,SDF,TH,TDF STR 150
EQUIVALENCE (X(1,1),PHIN(1)) STR 160
PI=3.14159265 STR 170
IUSE=YCON(24) STR 180
ZJFT=YCON(25) STR 190
BK=C.*PI/180. STR 200
N1=NNJ-1 STR 210
N2=NNJ-2 STR 220
N3=NNJ-3 STR 230
IF (NNJ.EQ.1) N1=1 STR 240
NJF=(NSJ+1)/2+1 STR 250
IF (ISYM.EQ.0) NJF=NSJ/2 STR 260
NP=NJF-1 STR 270
IF (ISYM.EQ.0) NP=NJF STR 280
ALPHA=0. STR 290
IF (I.GT.LPANEL) GO TO 10 STR 300
GO TO 310 STR 310
10 IF (I.GT.LAST) GO TO 110 STR 320
IF (EXIT.LE.0.001) GO TO 20 STR 330
IF (NNJ.EQ.1) GO TO 20 STR 340
IF (I.LE.MJJ(1).AND.I.NE.MJ) GO TO 310 STR 350
20 CONTINUE STR 360
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	IF (L7.NE.0) GO TO 30	STR 370
	ALPHA=ALPS/ALPC*Y(3,IPHI)*(1.-VVL)	STR 380
	IF (KCODE.EQ.0) ALPHA=0.	STR 390
	IF (TH.LE.0.001) GO TO 40	STR 400
	IF (IPHI.EQ.NJH) GO TO 40	STR 410
	IF (ISYM.NE.0.AND.IPHI.EQ.1) GO TO 40	STR 420
	IF (NNJ.EQ.1.AND.I.GT.LPANEL) ALPHA=ALPHA+CDF*(1.-VMU)	STR 430
	IF (NNJ.NE.1.AND.I.GT.MJJ(N1)) ALPHA=ALPHA+CDF*(1.-VMU)	STR 440
	GO TO 40	STR 450
30	ALPHA=(-8ET*BK*Y(4,IPHI)+P*YCP(I)/HALFR*Y(3,IPHI)+RL*XCP(I)/HALFB*Y(4,IPHI))*(1.-VMU)	STR 460
40	CONTINUE	STR 470
	IF (ARS(B1-B2).LE.0.001) GO TO 50	STR 480
	IF (L7.NE.0) GO TO 50	STR 490
	CALL NCRSPD (I,ALPH,LPANEL,IPHI,LPAN1,LPAN2,KF,NTL,F10)	STR 500
	ALPHA=ALPHA+ALPH	STR 510
50	IF (KCODE.EQ.0) GO TO 310	STR 520
	IF (EXIT.LE.0.001) GO TO 60	STR 530
	IF (NNJ.EQ.1) GO TO 60	STR 540
	IF (I.LE.MJJ(1).AND.I.EQ.MJ) ALPHA=ALPHA/2.	STR 550
60	IF (IPHI.EQ.NJH) GO TO 310	STR 560
	IF (LZ.NE.0) GO TO 310	STR 570
	IF (ISYM.NE.0.AND.IPHI.EQ.1) GO TO 310	STR 580
	IF (IUSR.EQ.1.AND.ZJET.GT.0.01) GO TO 310	STR 590
	IF (CDF.LT.0.0001) GO TO 310	STR 600
	IF (NNJ.EQ.1) GO TO 70	STR 610
	IF (I.LE.MJJ(N1)) GO TO 310	STR 620
70	IF (IPHI.LT.NJH) IL=IPHI+ISYM	STR 630
	IF (IPHI.GT.NJH) IL=IPHI-NJH+ISYM	STR 640
	IF (NNJ.EQ.1) MJN1=LPANFL	STR 650
	IF (NNJ.NE.1) MJN1=MJJ(N1)	STR 660
	MF=I-MJN1-(IPHI-1)*NCJ(NNJ)	STR 670
	FNNJ=NCJ(NNJ)	STR 680
	DISTJ=SCF	STR 690
	DLX=DISTJ*0.5*PI/FNNJ	STR 700
	SZX=-(1.-VMU)	STR 710
	IQ=(IL-1)*NCJ(NNJ)	STR 720
	IF (NNJ.EQ.1) IP=LPANEL+IQ+1	STR 730
	IF (NNJ.NE.1) IP=MJJ(N1)+IQ+1	STR 740
	DO 100 JJ=1,MF	STR 750
	IF (JJ.EQ.MF) GO TO 80	STR 760
	DXTF=DLX*PSI(JJ)*TFMP*VVL*VMU/TH	STR 770
	GO TO 90	STR 780
80	DXTF=DLX*PSI(JJ)*TFMP*0.5*VMU*VMU/TH	STR 790
90	JK1=IP+JJ	STR 800
	JK2=JK1-1	STR 810
	PRCD=SZX*DXTF	STR 820
	JK3=JK2+NP*NCJ(NNJ)	STR 830
	ALPHA=ALPHA+PRCD*(PHIN(JK2)-PHIN(JK3))	STR 840
		STR 850

100	CONTINUE	STR 860
	GO TO 310	STR 870
110	CONTINUE	STR 880
	IJ=I-JPANEL	STR 890
	JZ=1	STR 900
	K3=0	STR 910
	KQ=0	STR 920
	FAC=1.	STR 930
	IF (KCODE.EQ.0) GO TO 290	STR 940
	IF (FXIT.LE.0.01) GO TO 120	STR 950
	IF (NNJ.EQ.1) GO TO 120	STR 960
	IF (IJ.GT.LPANEL.AND.IJ.LE.MJJ(1)) GO TO 310	STR 970
120	CONTINUE	STR 980
	ADDT=0.	STR 990
	IF (KF.FQ.0) GO TO 170	STR1000
	CALL FSPEED (B1,YCP(IJ),YCP(IJ),ZCP(IJ),CGP,WK1,WK2)	STR1010
	AL1=0.	STR1020
	IF (LZ.EQ.0) AL1=F10*WK2	STR1030
	DO 130 LK=1,NTL	STR1040
	IF (L7.EQ.0) FFF=CGP(2,LK)	STR1050
	IF (L7.NE.0) FFF=CGP(1,LK)	STR1060
	KK=LPANEL+LK	STR1070
	IF (LZ.EQ.0) GA=GAM(1,KK)	STR1080
	IF (LZ.NE.0) GA=GAMW(KK)	STR1090
130	AL1=AL1+FFF*GA	STR1100
	IF (ABS(B1-B2).LF.0.001) GO TO 150	STR1110
	IF (LZ.NE.0) GO TO 150	STR1120
	CALL FSPEED (B2,XCP(IJ),YCP(IJ),ZCP(IJ),CGP,WK1,WK2)	STR1130
	AL2=0.	STR1140
	IF (LZ.EQ.0) AL2=F10*WK2	STR1150
	DO 140 LK=1,NTL	STR1160
	IF (L7.FQ.0) FFF=CGP(2,LK)	STR1170
	IF (LZ.NE.0) FFF=CGP(1,LK)	STR1180
	KK=LPANFL+LK	STR1190
	IF (LZ.EQ.0) GA=GAM(2,KK)	STR1200
140	AL2=AL2+FFF*GA	STR1210
	GO TO 160	STR1220
150	AL2=AL1	STR1230
160	ADDT=AL2-TEMP*VMU*VMU*AL1	STR1240
170	CONTINUE	STR1250
	IF (IUSR.FQ.1.AND.ZJFT.GT.0.01) GO TO 290	STR1260
	IF (NNJ.EQ.1) GO TO 290	STR1270
	IF (IJ.GT.MJJ(N1)) GO TO 290	STR1280
	IF (IPHI.LE.NJH) GO TO 290	STR1290
	L1=NJH	STR1300
	IF (ISYM.EQ.0) L1=NJH+1	STR1310
	IF (NW(2).EQ.0) GO TO 190	STR1320
	IF (NW(3).EQ.0) GO TO 190	STR1330
	IF (IJ.GT.MJJ(N2)) GO TO 240	STR1340

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	IF (IJ.GT.MJJ(N3)) GO TO 220	STR1350
	IF (NNJ.EQ.4) GO TO 200	STR1360
	IF (NNJ.EQ.5.AND.IJ.GT.MJJ(NNJ-4)) GO TO 200	STR1370
	GO TO 290	STR1380
180	IF (IJ.GT.MJJ(N2)) GO TO 220	STR1390
	IF (NNJ.EQ.3) GO TO 200	STR1400
	IF (NNJ.EQ.4.AND.IJ.GT.MJJ(N3)) GO TO 200	STR1410
	GO TO 290	STR1420
190	IF (NNJ.EQ.2) GO TO 200	STR1430
	IF (NNJ.EQ.3.AND.IJ.GT.MJJ(N2)) GO TO 200	STR1440
	GO TO 290	STR1450
200	K1=MJW1(1,NJP)+(IPHI-L1-ISYM)*NW(1)-1	STR1460
	K2=LC(1)+IPHI-L1-ISYM	STR1470
	KNW=NW(1)	STR1480
	IF (IJ.NE.MJ) GO TO 250	STR1490
	IF (EXIT.LE.0.01.AND.NW(2).NE.0) GO TO 210	STR1500
	GO TO 250	STR1510
210	JZ=2	STR1520
	K3=LPAN1+(K2-1)*NW(2)	STR1530
	KQ=NW(2)	STR1540
	FAC=0.5	STR1550
	GO TO 250	STR1560
220	K1=MJW1(2,NJP)+(IPHI-L1-ISYM)*NW(2)-1	STR1570
	K2=LC(2)+IPHI-L1-ISYM	STR1580
	KNW=NW(2)	STR1590
	IF (IJ.NE.MJ) GO TO 250	STR1600
	IF (ARS(EXIT-1.).LE.0.001.AND.NW(3).NE.0) GO TO 230	STR1610
	GO TO 250	STR1620
230	J7=2	STR1630
	K3=LPAN2+(K2-1-NCS)*NW(3)	STR1640
	KQ=NW(3)	STR1650
	FAC=0.5	STR1660
	GO TO 250	STR1670
240	K1=MJW1(3,NJP)+(IPHI-L1-ISYM)*NW(3)-1	STR1680
	K2=LC(3)+IPHI-L1-ISYM	STR1690
	KNW=NW(3)	STR1700
250	CONTINUE	STR1710
	ALPHA1=0.	STR1720
	ALPHA2=0.	STR1730
	DO 280 JL=1,JZ	STR1740
	DO 270 KK=1,KNW	STR1750
	KL=K1+KK	STR1760
	AA=1.	STR1770
	DO 260 L=1,KNW	STR1780
	LL=K1+L	STR1790
	IF (L.EQ.KK) GO TO 260	STR1800
	AA=AA*(XCP(IJ)-XV(LL))/(XV(KL)-XV(LL))	STR1810
260	CONTINUE	STR1820
	IF (LZ.EQ.0) GA=GAM(1,KL)	STR1830

	IF (LZ.NE.0) GA=GAMW(KL)	STR1840
	ALPHA1=ALPHA1+AA*GA	STR1850
	IF (ABS(R1-B2).LE.0.001) GO TO 270	STR1860
	IF (LZ.EQ.0) GA=GAM(2,KL)	STR1870
	IF (LZ.NE.0) GA=GAMW(KL)	STR1880
	ALPHA2=ALPHA2+AA*GA	STR1890
270	CONTINUE	STR1900
	KNK=KQ	STR1910
280	K1=K3	STR1920
	ALPHA1=ALPHA1*FAC	STR1930
	ALPHA2=ALPHA2*FAC	STR1940
	IF (ABS(R1-B2).LE.0.001) ALPHA2=ALPHA1	STR1950
	ALPHA=(ALPHA2-TEMP*VMU*VMU*ALPHA1)*0.5+ADDT	STR1960
	GO TO 310	STR1970
290	CONTINUE	STR1980
	CALL SPFED (VMU,I,ALPHA,LPANEL,TEMP,LPAN1,LPAN2,PHIS,IPHI,ISYM,GAM	STR1990
	1W,LZ)	STR2000
	ALPHA=ALPHA*FAC+ADDT*FAC	STR2010
	IF (KCODE.EQ.0) GO TO 310	STR2020
	IF (CDF.LT.0.0001) GO TO 310	STR2030
	IF (NNJ.EQ.1) GO TO 300	STR2040
	IF (IJ.LE.MJU(N1)) GO TO 310	STR2050
300	PHIN(IJ)=PHIS	STR2060
310	CONTINUE	STR2070
	RETURN	STR2080
C		STR2090
	END	STR2100-
	SUPROUTINE GAMAX (AW,CA,LPAN1,LPANEL,GAMMA,KC,BREAK,SWP,CHORDT,LPAGAM	10
	IN2,NWING,KZ)	GAM 20
	DIMENSION AW(1), CA(1), GAMMA(1), BREAK(1)	GAM 30
	DIMENSION SWP(8,15)	GAM 40
	DIMENSION G(10), CHORDT(1)	GAM 50
	DIMENSION A(15), F(15), THETA(15)	GAM 60
	COMMON /AERO/ AM1,AM2,B1,B2,CL(30),CT(30),CD(30),GAM(2,130)	GAM 70
	COMMON /GEOM/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTGAM	80
	1E(50),PSI(20),CH(95),XV(200),YV(100),SN(8,8),XN(200,2),YN(200,2),ZGAM	90
	2N(200,2),WIDTH(8),YCON(25),SWEEP(50),HALFR,SJ(21,8),EX(95,2),TX(95	GAM 100
	3,2),SC(160,5),SI(160,5),LC(3)	GAM 110
	COMMON /CONST/ NCS,NCW,M1(8),NSJ,NCJ(5),LAST,MJW1(3,5),MJW2(3,5),JGAM	120
	1PANEL,MJJ(5),AW(3),NNJ,NJP	GAM 130
	PI=3.14159265	GAM 140
	DO 80 I=1,NCS	GAM 150
	NA=1	GAM 160
	NK=(I-1)*NW(1)	GAM 170
	SUMI=0.	GAM 180
	NW=NW(1)	GAM 190
	ISN=1	GAM 200
	FN=NW(1)	GAM 210
10	N1=NWW+1	GAM 220

	DO 20 J=1,NWW	GAM 230
	KK=NK+J	GAM 240
	FJ=J	GAM 250
	THETA(J)=(2.*FJ-1.)*PI/(2.*FN)	GAM 260
	F(J)=GAMMA(KK)*SN(J,ISN)	GAM 270
20	CONTINUE	GAM 280
	THETA(N1)=PI	GAM 290
	DO 40 J=1,N1	GAM 300
	A(J)=0.	GAM 310
	FJ=J	GAM 320
	DO 30 K=1,NWW	GAM 330
30	A(J)=A(J)+F(K)*COS((FJ-1.)*THETA(K))	GAM 340
	IF (J.EQ.1) A(J)=A(J)/FN	GAM 350
	IF (J.NE.1) A(J)=A(J)*2./FN	GAM 360
40	CONTINUE	GAM 370
	DO 60 K=1,N1	GAM 380
	KK=NK+K	GAM 390
	SUM=A(1)*THETA(K)	GAM 400
	DO 50 J=1,NWW	GAM 410
	FJ=J	GAM 420
50	SUM=SUM+A(J+1)*SIN(FJ*THETA(K))/FJ	GAM 430
	IZ=I	GAM 440
	IF (NA.EQ.2) IZ=I+ACS	GAM 450
	IF (NA.EQ.3) IZ=I+2*NCS	GAM 460
	SUM=-0.5*CH(IZ)*SUM+SUMI	GAM 470
	IF (K.EQ.N1) GO TO 60	GAM 480
	AW(KK)=SUM	GAM 490
60	CONTINUE	GAM 500
	IF (NA.EQ.3) GO TO 70	GAM 510
	IF ((NA+1).LE.3.AND.NW(NA+1).EQ.0) GO TO 70	GAM 520
	NA=NA+1	GAM 530
	NWW=NW(NA)	GAM 540
	IF (NA.EQ.2) NK=LPA1+(I-1)*NW(2)	GAM 550
	IF (NA.EQ.3) NK=LPA2+(I-1)*NW(3)	GAM 560
	ISA=ISN+1	GAM 570
	FN=NWW	GAM 580
	SUMI=SUM	GAM 590
	GO TO I0	GAM 600
70	CONTINUE	GAM 610
80	CONTINUE	GAM 620
	NK1=0	GAM 630
	NK2=LPA1	GAM 640
	NK3=LPA2	GAM 650
	DO 250 I=1,NC	GAM 660
	HAR=HALFB	GAM 670
	M=N1(I)	GAM 680
	FM=M	GAM 690
	MM=M-1	GAM 700
	DO 90 J=1,MM	GAM 710

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	FJ=J	GAM 720
	YCCN(J)=COS(FJ*PI/FM)	GAM 730
	Y=0.5*WIDTH(I)*(1.-YCON(J))+BREAK(I)	GAM 740
90	PSI(J)=SQRT(1.-(Y/HAB)**2)	GAM 750
	DO 230 J=1,NCW	GAM 760
	G(J)=0.	GAM 770
	IF (J.GT.NW(1)) GO TO 100	GAM 780
	NK=NK1	GAM 790
	LK=0	GAM 800
	IR1=I	GAM 810
	JJ=J	GAM 820
	MK=NW(1)	GAM 830
	GO TO 120	GAM 840
100	IF (J.GT.(NW(1)+NW(2))) GO TO 110	GAM 850
	NK=NK2	GAM 860
	MK=NW(2)	GAM 870
	LK=NW(1)	GAM 880
	IR1=I+NC	GAM 890
	JJ=J-NW(1)	GAM 900
	GO TO 120	GAM 910
110	NK=NK3	GAM 920
	MK=NW(3)	GAM 930
	LK=NW(1)+NW(2)	GAM 940
	IR1=I+2*NC	GAM 950
	JJ=J-NW(1)-NW(2)	GAM 960
120	L1=NK+J-LK	GAM 970
	L2=L1+MK	GAM 980
	L3=L2+MK	GAM 990
	SP=SWP(JJ,IR1)	GAM1000
	CS=COS(SP)	GAM1010
	TAN=SIN(SP)/CS	GAM1020
	SM=0.	GAM1030
	DO 140 LQ=1,MM	GAM1040
	LP=L1+(LQ-1)*MK	GAM1050
	AA=1.	GAM1060
	DO 130 LS=1,MM	GAM1070
	LN=L1+(LS-1)*MK	GAM1080
	IF (LS.EQ.LQ) GO TO 130	GAM1090
	AA=AA*(BREAK(I)-YCP(LN))/(YCP(LP)-YCP(LN))	GAM1100
130	CONTINUE	GAM1110
140	SM=SM+AA*AW(LP)*PSI(LQ)	GAM1120
	GAMA0=SM	GAM1130
	IF (I.EQ.NC) GO TO 170	GAM1140
	SM=0.	GAM1150
	DO 160 LQ=1,MM	GAM1160
	LP=L1+(LQ-1)*MK	GAM1170
	AA=1.	GAM1180
	DO 150 LS=1,MM	GAM1190
	LN=L1+(LS-1)*MK	GAM1200

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IF (LS.EQ.LQ) GO TO 150
AA=AA*(BREAK(I+1)-YCP(LN))/(YCP(LP)-YCP(LN))
150 CONTINUE
160 SM=SM+AA*AW(LP)*PSI(LQ)
GAMAN=SM
GO TO 180
170 GAMAN=0.
180 DO 210 K=1,MM
LL=NK+(K-1)*MK+J-LK
CA(LL)=0.
DO 200 KK=1,MM
LI=NK+(KK-1)*MK+J-LK
IF (KK.EQ.K) GO TO 190
CA(LL)=CA(LL)+2.*(-1.)**(K+KK)*AW(LI)*PSI(KK)/(WIDTH(I)*(YCON(KK)-
1YCON(K)))
GO TO 200
190 CA(LL)=CA(LL)+AW(LL)*PSI(K)*YCON(K)/(WIDTH(I)*SJ(K,I)*SJ(K,I))
200 CONTINUE
CA(LL)=CA(LL)+GAMAC*(-1.)**K/(1.-YCON(K))/WIDTH(I)-GAMAN*(-1.)**(M
1+K)/(1.+YCON(K))/WIDTH(I)+AW(LL)*YCP(LI)/(HAB*FAB*PSI(K))
CA(LL)=CA(LL)/PSI(K)
IF (I.NE.NC) GO TO 210
G(J)=G(J)+AW(LL)*PSI(K)*(-1.)**(K+M)/(1.+YCON(K))
210 CA(LL)=TAN*GAMMA(LL)+CA(LL)
IF (J.EQ.NW(1)) NK1=LL
IF (J.EQ.(NW(1)+NW(2))) NK2=LL
IF (I.EQ.NC) GO TO 220
GO TO 230
220 CONTINUE
G(J)=2./WIDTH(I)*G(J)+0.5*(-1.)**M*GAMA0/WIDTH(I)
G(J)=G(J)*SQRT(HAB)/2.828427124
CL(J)=G(J)
230 CONTINUE
NK3=LL
IF (I.EQ.NC) GO TO 240
GO TO 250
240 CONTINUE
IF (KZ.FQ.0) WRITE (07) (CL(JJ),JJ=1,NCW)
IF (KZ.NE.0) WRITE (02) (CL(JJ),JJ=1,NCW)
250 CONTINUE
RETURN
C
END
SUPROUTINE LATFRL (GAMMA,AW,CA,LPANEL,LPAN1,LPAN2,LWF,DF,NAL,SNG,YLRL 10
1G,P,P,BET,RL) LRL 20
DIMENSION GAMMA(1), AW(1), CA(1), DF(1), SNG(1), YG(1) LRL 30
COMMON /GEOM/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTLRL 40
1E(50),PSI(20),CH(95),XV(200),YV(100),SN(8,8),XN(200,2),YN(200,2),ZLRL 50
2N(200,2),WIDTH(8),YCON(25),SWFEP(50),HALFR,SJ(21,8),EX(95,2),TX(95)LRL 60

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	3,2),SC(160,5),SI(160,5).LC(3)	LRL 70
	COMMON /CONST/ NCS,NCW,M1(8),NSJ,NCJ(5),LAST,MJW1(3,5),MJW2(3,5),JLRL	80
	LPANEL,MJJ(5),NW(3),NNJ,NJP	LRL 90
	COMMON /FUS/ XF(20),XCF(20),PF(20),SNP(5,20),XLEF,XTEF,WARD(20),NCLRL	100
	IUM,NF,NT,CSF(5,10),XAS(6),NKF(5),F0,F10,KF,NTL	LRL 110
	L1=LWF+1	LRL 120
	REWIND 04	LRL 130
	PI=3.14159265	LRL 140
	SK=SNG(1)	LRL 150
	BK=5.*PI/180.	LRL 160
	READ (04) (AW(I),I=1,L1)	LRL 170
	AW(L1)=P*YCP(1)/HALFB+BK*SK*BET-RL*XCP(1)/HALFF*SK	LRL 180
	WN=0.	LRL 190
	IF (KF.EQ.0) GO TO 10	LRL 200
	X=XCP(1)	LRL 210
	Y=YCP(1)	LRL 220
	Z=ZCP(1)	LRL 230
	WK=0.	LRL 240
	G=0.	LRL 250
	CALL FUSVOL (B,X,Y,Z,WN,WK,G,1,1)	LRL 260
10	AW(L1)=AW(L1)+WN	LRL 270
	DO 20 I=1,LWF	LRL 280
20	GAMMA(I)=-AW(I+1)/AW(I)	LRL 290
	NJ=LWF-1	LRL 300
	MM=AW(1)	LRL 310
	NN=AW(1)	LRL 320
	KW=1	LRL 330
	I7=1	LRL 340
	DO 50 IJ=2,LWF	LRL 350
	READ (04) (AW(K),K=1,L1)	LRL 360
	IF (IJ.LE.LPANEL) GO TO 30	LRL 370
	I=IJ-LPANEL	LRL 380
	AW(L1)=0.	LRL 390
	IF (I.GT.NF) GO TO 70	LRL 400
	AW(L1)=(-BK*BET+RL*XCF(I)/HALFB)*RF(I)*RF(I)	LRL 410
	GO TO 70	LRL 420
30	IF (YCP(IJ).GT.YG(KW)) GO TO 40	LRL 430
	GO TO 50	LRL 440
40	KW=KW+1	LRL 450
	SK=SNG(KW)	LRL 460
50	AW(L1)=P*YCP(IJ)/HALFR+BET*BK*SK-RL*XCP(IJ)/HALFB*SK	LRL 470
	WN=0.	LRL 480
	IF (KF.EQ.0) GO TO 60	LRL 490
	X=XCP(IJ)	LRL 500
	Y=YCP(IJ)	LRL 510
	Z=ZCP(IJ)	LRL 520
	CALL FUSVOL (B,X,Y,Z,WN,WK,G,1,1)	LRL 530
60	AW(L1)=AW(L1)+WN	LRL 540
70	IK=IJ	LRL 550

	CALL VMSEGN (NJ,IK,AW,GAMMA,CA)	LRL 560
	NJ=NJ-1	LRL 570
	IF (IJ.GE.LPAN1.AND.IJ.LT.LPAN2) NN=NW(2)	LRL 580
	IF (IJ.GE.LPAN2.AND.IJ.LT.LPANFL) NN=NW(3)	LRL 590
	IF (IJ.LT.MM) GO TO 80	LRL 600
	MM=MM+NN	LRL 610
	I7=I7+1	LRL 620
80	IF (IJ.EQ.LPAN1.OR.IJ.EQ.LPAN2) IZ=1	LRL 630
	IF (IJ.EQ.LPAN1.OR.IJ.EQ.LPAN2) KW=1	LRL 640
90	CONTINUE	LRL 650
	RETLRN	LRL 660
C	END	LRL 670
	SUBROUTINE INDVEL (XD,Y,ZD,XJ,YJ,ZJ,RJ,R2,PHRV,PHX,T,U,PHY,ISYM)	LRL 680-
C	TO COMPUTE THE INDUCED VELOCITIES DUE TO JET ENTRAINMENT	IND 10
	DIMENSION VZ(2), VX(2), VY(2)	IND 20
	COMMON /JET/ PK1,XC,X(31),A(31),P(31)	IND 30
	RFJ=T	IND 40
	V7(2)=0.	IND 50
	VX(2)=0.	IND 60
	VY(2)=0.	IND 70
	SPJ=SQRT(REJ)	IND 80
	XR=(XD-XJ)/RJ	IND 90
	NCCT=ISYM+1	IND 100
	DO 40 K=1,NCCT	IND 110
	IF (K.EQ.1) FC=1.	IND 120
	IF (K.EQ.2) FC=-1.	IND 130
	RR=SQRT((ZD-ZJ)**2+(Y*FC-YJ)**2)/RJ	IND 140
	F1=SQRT((XR-XC)**2+B2*RR*RR)	IND 150
	F2=SQRT(XR**2+P2*RR*RR)	IND 160
	G10=(XR-XC)/F1-XP/F2	IND 170
	G20=1./F1-1./F2	IND 180
	SUMR=-(A(1)+B(1)*XB)*G10/RR-P2*RR*P(1)*G20	IND 190
	SUMX=(A(1)+B(1)*XB)*G20-P(1)*G10+B(1)*ALOG((XR-XC+F1)/(XB-F2))	IND 200
	IF (U.LE.0.01) GO TO 20	IND 210
	J=2	IND 220
10	SUM1=SUMR	IND 230
	SUM2=SUMX	IND 240
	F1=SQRT((XR-X(J))**2+B2*RR*RR)	IND 250
	F2=SQRT((XR-X(J-1))**2+P2*RR*RR)	IND 260
	G1=(XB-X(J))/F1-(XB-X(J-1))/F2	IND 270
	G2=1./F1-1./F2	IND 280
	SUMR=SUMR-(A(J)+B(J)*XB)*G1/RR-P2*RR*P(J)*G2	IND 290
	SUMX=SUMX+(A(J)+B(J)*XB)*G2-P(J)*G1+B(J)*ALOG((XR-X(J)+F1)/(XB-X(J-1)+F2))	IND 300
	IF (J.GE.31) GO TO 30	IND 310
	J=J+1	IND 320
	GO TO 10	IND 330
20	SUMR=SUMR+0.32*(1.+(XP-XC)/F1)/RR	IND 340
		IND 350
		IND 360

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	SUMX=SUMX-0.32/F1	IND 370
30	PHRV=SRJ*0.25*SUMR*(ZJ-ZD)/(RR*RJ)	IND 380
	PHY=-SRJ*0.25*SUMP*(Y-YJ*FC)/(RR*RJ)	IND 390
	PHX=-SRJ*0.25*SUMX	IND 400
	VX(K)=PHX/2.	IND 410
	VY(K)=PHY/2.	IND 420
40	VZ(K)=PHRV/2.	IND 430
	PHRV=VZ(1)+VZ(2)	IND 440
	PHX=VX(1)+VX(2)	IND 450
	PHY=VY(1)+VY(2)	IND 460
	RETURN	IND 470
C		IND 480
	END	IND 490-
	SUBROUTINE SPEFC (VMU,I,ALPHA,LPANEL,TEMP,LPAN1,LPAN2,PHIS,IPHI,ISSPD	10
	1YM,GAMW,LZ)	SPD 20
C	TO COMPUTE THE INDUCED TANGENTIAL VELOCITIES DUE TO WING ALONE	SPD 30
C	VORTICES	SPD 40
	DIMENSION SU(100), GAMW(1)	SPD 50
	COMMON /SCHEME/ C(2),X(10,41),Y(10,41),SLOPF(15),XL(2,15),XTT(41),	SPD 60
	1XLL(41)	SPD 70
	COMMON /GEOM/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YL(50),XTSPD	80
	1E(50),PSI(20),CH(95),XV(200),YV(100),SN(8,8),YN(200,2),YN(200,2),ZSPD	90
	2N(200,2),WIDTH(8),YCON(25),SWEEP(50),HALFR,SJ(21,8),EX(95,2),TX(95	SPD 100
	3,2),SC(160,5),SI(160,5),LC(3)	SPD 110
	COMMON /AERO/ AM1,AM2,P1,P2,CL(30),CT(30),CD(30),GAM(2,130)	SPD 120
	COMMON /CONST/ NCS,NCW,M1(8),NSJ,NCJ(5),LAST,MJW1(3,5),MJW2(3,5),J	SPD 130
	1PANEL,MJJ(5),NW(3),NNJ,NJP	SPD 140
	N1=NNJ-1	SPD 150
	N2=NNJ-2	SPD 160
	N3=NNJ-3	SPD 170
	7JET=YCON(25)	SPD 180
	II=I-JPANEL	SPD 190
	RR=B1	SPD 200
	IC=1	SPD 210
10	CONTINUE	SPD 220
	IZ=1	SPD 230
	MM=0	SPD 240
	ISN=1	SPD 250
	NL=NW(1)	SPD 260
	NM=NW(1)	SPD 270
	B=0.	SPD 280
	DO 70 J=1,LPANEL	SPD 290
	JJ=C-MM	SPD 300
	FN=NL	SPD 310
	IF (J.GT.LPAN1.AND.J.LE.LPAN2) ISN=2	SPD 320
	IF (J.GT.LPAN2.AND.J.LE.LPANEL) ISN=3	SPD 330
	IF (J.GE.LPAN1.AND.J.LT.LPANEL) GO TO 20	SPD 340
	GO TO 30	SPD 350
20	NL=NW(2)	SPD 360

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	IF (J.GE.LPAN2.AND.J.LT.LPANEL) NL=NW(3)	SPD 370
30	CONTINUE	SPD 380
	X1=XN(J,1)-XCP(II)	SPD 390
	X2=XN(J,2)-XCP(II)	SPD 400
	X12=XN(J,2)-XN(J,1)	SPD 410
	Y12=YN(J,2)-YN(J,1)	SPD 420
	Z1=ZN(J,1)-ZCP(II)	SPD 430
	Z2=ZN(J,2)-ZCP(II)	SPD 440
	Z12=ZN(J,2)-ZN(J,1)	SPD 450
	XZJ=X1*Z12-Z1*X12	SPD 460
	DO 60 K=1,2	SPD 470
	IF (K.EQ.1) GO TO 40	SPD 480
	N=1	SPD 490
	GO TO 50	SPD 500
40	N=2	SPD 510
50	CONTINUE	SPD 520
	YC=(-1.)*N*YCP(II)	SPD 530
	Y1=YN(J,1)-YC	SPD 540
	Y2=YN(J,2)-YC	SPD 550
	XYK=X1*Y12-Y1*X12	SPD 560
	Y7I=Y1*Z12-Z1*Y12	SPD 570
	ALP1=XYK*XYK+XZJ*XZJ+PB*Y7I*Y7I	SPD 580
	R1P1=SQRT(X1*X1+PB*Y1*Y1+PB*Z1*Z1)	SPD 590
	R2P1=SQRT(X2*X2+PB*Y2*Y2+PB*Z2*Z2)	SPD 600
	UUP1=(X2*X12+PB*Y2*Y12+PB*Z2*Z12)/R2P1-(X1*X12+PB*Y1*Y12+PB*Z1*Z12)/R1P1	SPD 610
	F1=UUP1*Y7I/ALP1	SPD 620
	IF (LZ.EQ.0) GA=GAM(IC,J)	SPD 640
	IF (LZ.NE.0) GA=GAMW(J)	SPD 650
	SUM=F1*CH(IZ)*SN(JJ,ISN)*GA/FN	SPD 660
60	IF (K.EQ.1) SU(J)=F1*CH(IZ)*SN(JJ,ISN)/FN	SPD 670
	B=P+SUM	SPD 680
	IF (J.LT.NM) GO TO 70	SPD 690
	IZ=IZ+1	SPD 700
	NM=NM	SPD 710
	NM=NM+NL	SPD 720
70	CONTINUE	SPD 730
	NJH=(NSJ+1)/2+1	SPD 740
	IF (ISYM.EQ.0) NJH=NSJ/2	SPD 750
	IF (IPHI.EQ.NJH) GO TO 140	SPD 760
	IF (ISYM.NE.0.AND.IPHI.EQ.1) GO TO 140	SPD 770
	IF (NNJ.EQ.1) GO TO 140	SPD 780
	IF (II.GT.MJJ(N1)) GO TO 140	SPD 790
	IF (IPHI.GT.NJH.AND.ZJET.LE.0.01) GO TO 140	SPD 800
	IF (IPHI.GT.NJH) L1=NJH	SPD 810
	IF (ISYM.EQ.0.AND.IPHI.GT.NJH) L1=NJH+1	SPD 820
	IF (IPHI.LE.NJH) L1=1	SPD 830
	NZ=1	SPD 840
	IF (NW(2).NE.0.AND.NW(3).EQ.0) NZ=2	SPD 850

	IF (NW(3).NE.0) N7=3	SPD 860
	IF (NNJ.LE.3.AND.NW(2).NE.0) IR=N2	SPD 870
	IF (NNJ.LE.3.AND.NW(2).EQ.0) IR=N1	SPD 880
	IF (NNJ.GE.4.AND.NW(3).NE.0) IR=N3	SPD 890
	IF (NNJ.EQ.4.AND.NW(3).EQ.0) IR=N2	SPD 900
	DO 130 MP=1,NZ	SPD 910
	K1=MJW1(MP,NJP)+(IPHI-L1-ISYM)*NW(MP)-1	SPD 920
	K2=LC(MP)+IPHI-L1-ISYM	SPD 930
	KNW=NW(MP)	SPD 940
	K1=K1-KNW	SPD 950
	K2=K2-1	SPD 960
	MR=3	SPD 970
	IF (K1.GE.0) GO TO 80	SPD 980
	K1=K1+KNW	SPD 990
	K2=K2+1	SPD1000
	MR=2	SPD1010
80	DO 120 MR=1,MR	SPD1020
	SUM=0.	SPD1030
	DO 90 KK=1,KNW	SPD1040
	KL=K1+KK	SPD1050
90	SUM=SUM+SU(KL)	SPD1060
	CALL INTEG (RES,KNW,K1,K2,II,BP,IR)	SPD1070
	CORN=0.	SPD1080
	DO 110 KK=1,KNW	SPD1090
	KL=K1+KK	SPD1100
	AA=1.	SPD1110
	DO 100 L=1,KNW	SPD1120
	LL=K1+L	SPD1130
	IF (L.EQ.KK) GO TO 100	SPD1140
	AA=AA*(XCP(II)-XV(LL))/(XV(KL)-XV(LL))	SPD1150
100	CONTINUE	SPD1160
	IF (L7.EQ.0) GA=GAM(IC,KL)	SPD1170
	IF (L7.NE.0) GA=GAMW(KL)	SPD1180
110	CORN=CORN+AA*GA	SPD1190
	B=B-CORN*SUM+CORN*RES*B.	SPD1200
	K1=K1+KNW	SPD1210
	K2=K2+1	SPD1220
120	CONTINUE	SPD1230
	IR=IR+1	SPD1240
130	CONTINUE	SPD1250
140	CONTINUE	SPD1260
	IF (IC.EQ.2) GO TO 150	SPD1270
	ALPHA1=P/B.	SPD1280
	IC=IC+1	SPD1290
	RB=B2	SPD1300
	IF (ABS(B1-P2).LF,0.001) GO TO 160	SPD1310
	GO TO 10	SPD1320
150	ALPHA2=P/P.	SPD1330
	GO TO 170	SPD1340

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160 ALPHA2=ALPHA1 SPD1350
170 ALPHA=ALPHA2-TEMP*VMU*VMU*ALPHA1 SPD1360
PHIS=ALPHA2 SPD1370
RETURN SPD1380
C SPD1390
END SPD1400-
SUBROUTINE NORSPD (I,ALPH,LPANEL,IPHI,LPAN1,LPAN2,KF,NTL,F10) NRD 10
C TO COMPUTE THE INDUCED NORMAL VELOCITIES DUE TO WING ALONE NRD 20
C VORTICES NRD 30
DIMENSION AW(30), BW(30) NRD 40
COMMON /SCHEME/ C(2),X(10,41),Y(10,41),SLOPE(15),XL(2,15),XTT(41),NRD 50
1XLL(41) NRD 60
COMMON /GEOM/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTNRD 70
1E(50),PSI(20),CH(95),XV(200),YV(100),SN(8,8),XN(200,2),YN(200,2),ZNRD 80
2N(200,2),WIDTH(8),YCON(25),SWEEP(50),HALFR,SJ(21,8),EX(95,2),TX(95NRD 90
3,2),SC(160,5),SI(160,5),LC(3) NRD 100
COMMON /AERO/ AM1,AM2,B1,R2,CL(30),CT(30),CD(30),GAM(2,130) NRD 110
COMMON /CONST/ NCS,NCW,M1(8),NSJ,NCJ(5),LAST,MJW1(3,5),MJW2(3,5),JNRD 120
1PANEL,MJJ(5),NW(3),NNJ,NJP NRD 130
NJF=(NSJ-1)/2 NRD 140
I7=1 NRD 150
IP=1 NRD 160
MM=0 NRD 170
NM=NW(1) NRD 180
ISN=1 NRD 190
NL=NW(1) NRD 200
A1=0. NRD 210
A2=0. NRD 220
DO 10 J=1,LPANEL NRD 230
JJ=J-MM NRD 240
FN=NL NRD 250
IF (J.EQ.(LPAN1+1).OR.J.EQ.(LPAN2+1)) IP=1 NRD 260
IF (J.GT.LPAN1.AND.J.LE.LPAN2) ISN=2 NRD 270
IF (J.GT.LPAN2.AND.J.LE.LPANEL) ISN=3 NRD 280
IF (J.GE.LPAN1.AND.J.LT.LPANEL) GO TO 10 NRD 290
GO TO 20 NRD 300
10 NL=NW(2) NRD 310
IF (J.GE.LPAN2.AND.J.LT.LPANEL) NL=NW(3) NRD 320
20 CONTINUE NRD 330
X1=XN(J,1)-XCP(I) NRD 340
X2=XN(J,2)-XCP(I) NRD 350
X12=XN(J,2)-XN(J,1) NRD 360
Y12=YN(J,2)-YN(J,1) NRD 370
Z12=ZN(J,2)-ZN(J,1) NRD 380
Z1=ZN(J,1)-ZCP(I) NRD 390
Z2=ZN(J,2)-ZCP(I) NRD 400
XZJ=X1*Z12-Z1*X12 NRD 410
DO 70 K=1,2 NRD 420
IF (K.EQ.1) GO TO 30 NRD 430

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N=1 NRD 440
GO TO 40 NRD 450
30 N=2 NRD 460
40 CONTINUE NRD 470
YC=(-1.)**N*YCP(I) NRD 480
Y1=YN(J,1)-YC NRD 490
Y2=YN(J,2)-YC NRD 500
XYK=X1*Y12-Y1*X12 NRD 510
Y7I=Y1*Z12-Z1*Y12 NRD 520
ALP1=XYK*XYK+X7J*XZJ+B1*Y7I*YZI NRD 530
R1P1=SQRT(X1*X1+B1*Y1*Y1+B1*Z1*Z1) NRD 540
R2P1=SQRT(X2*X2+B1*Y2*Y2+B1*Z2*Z2) NRD 550
UUB1=(X2*X12+B1*Y2*Y12+B1*Z2*Z12)/R2B1-(X1*X12+B1*Y1*Y12+B1*Z1*Z12NRD 560
1)/R1P1 NRD 570
G1=(1.-X1/R1P1)/(Y1*Y1+Z1*Z1) NRD 580
G2=(1.-X2/R2B1)/(Y2*Y2+Z2*Z2) NRD 590
ALP2=XYK*XYK+X2J*XZJ+B2*Y7I*YZI NRD 600
R1P2=SQRT(X1*X1+B2*Y1*Y1+B2*Z1*Z1) NRD 610
R2P2=SQRT(X2*X2+B2*Y2*Y2+B2*Z2*Z2) NRD 620
UUB2=(X2*X12+B2*Y2*Y12+B2*Z2*Z12)/R2B2-(X1*X12+B2*Y1*Y12+B2*Z1*Z12NRD 630
1)/R1P2 NRD 640
G3=(1.-X1/R1P2)/(Y1*Y1+Z1*Z1) NRD 650
G4=(1.-X2/R2B2)/(Y2*Y2+Z2*Z2) NRD 660
F13=UUB1*XZJ/ALP1 NRD 670
F12=UUB1*XYK/ALP1 NRD 680
G13=Z2*G2-Z1*G1 NRD 690
G12=-Y2*G2+Y1*G1 NRD 700
F23=UUB2*XZJ/ALP2 NRD 710
F22=UUB2*XYK/ALP2 NRD 720
G23=Z2*G4-Z1*G3 NRD 730
G22=-Y2*G4+Y1*G3 NRD 740
IF (IP.EQ.1.AND.KF.NE.0) GO TO 50 NRD 750
GO TO 60 NRD 760
50 G13=Z2*G2 NRD 770
G12=-Y2*G2 NRD 780
G23=Z2*G4 NRD 790
G22=-Y2*G4 NRD 800
60 CONTINUE NRD 810
F1=-F13*Y(4,IPHI)*(-1.)**N+F12*Y(3,IPHI) NRD 820
F2=G13*Y(4,IPHI)*(-1.)**N+G12*Y(3,IPHI) NRD 830
F3=-F23*Y(4,IPHI)*(-1.)**N+F22*Y(3,IPHI) NRD 840
F4=G23*Y(4,IPHI)*(-1.)**N+G22*Y(3,IPHI) NRD 850
A1=A1+(F1+F2)*CH(I2)*SN(JJ,ISN)*GAM(1,J)/FN NRD 860
A2=A2+(F3+F4)*CH(I7)*SN(JJ,ISN)*GAM(2,J)/FN NRD 870
70 IF (J.LT.NM.GR.J.FQ.LPANEL) GO TO 80 NRD 880
IZ=IZ+1 NRD 890
IP=IP+1 NRD 900
MM=MM NRD 910
NM=NM+NL NRD 920

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80	CONTINUE	NRD 930
	IF (KF.EQ.0) GO TO 110	NRD 940
	CALL UNWF (B1,XCP(I),YCP(I),ZCP(I),AW,RW,IPHI,1,AL1,0)	NRD 950
	A1=A1+AL1*F10*P.	NRD 960
	DO 90 K=1,NTL	NRD 970
	KK=K+LPANEL	NRD 980
90	A1=A1+AW(K)*GAM(1,KK)*8.	NRD 990
	CALL UNWF (B2,XCP(I),YCP(I),ZCP(I),AW,RW,IPHI,1,AL2,0)	NRD1000
	A2=A2+AL2*F10*P.	NRD1010
	DO 100 K=1,NTL	NRD1020
	KK=K+LPANEL	NRD1030
100	A2=A2+AW(K)*GAM(2,KK)*8.	NRD1040
110	CONTINUE	NRD1050
	ALPH=(A1-A2)/P.	NRD1060
	RETURN	NRD1070
	END	NRD1080-
	SUBROUTINE FALONE (P,CS,AW,CA,GAMMA)	FLN 10
	DIMENSION AW(1), CA(1), GAMMA(1)	FLN 20
	COMMON /FUS/ XF(20),XCF(20),RF(20),SNP(5,20),XLEF,XTEF,WARD(20),ACFLN	FLN 30
	IUM,NF,NT,CSF(5,10),XAS(6),NKF(5),F0,F10,KF,NTL	FLN 40
	N=0	FLN 50
	PI=3.14159265	FLN 60
	NI=NF	FLN 70
	NF1=NF+1	FLN 80
	S=XTEF-XLEF	FLN 90
	DO 30 I=1,NF	FLN 100
	IJ=I	FLN 110
	XS=XCF(IJ)-XTEF	FLN 120
	IF (I.EQ.NF) RFL=0.	FLN 130
	IF (I.NE.NF) RFL=XS/SGRT(XS*XS+R*RF(IJ)*RF(IJ))	FLN 140
	CALL FUSELA (NI,AW,N,IJ,XAS,XTEF,XF,XCF,RF,P,SNP,NKF)	FLN 150
	XD=XCF(IJ)	FLN 160
	XEF=XCF(IJ)-XLEF	FLN 170
	AW(NF1)=-SLOP(XD)*CS-(RFL-XEF/SGRT(XEF*XEF+R*RF(IJ)*RF(IJ)))*F0/(4	FLN 180
	PI)	FLN 190
	IF (I.NE.1) GO TO 20	FLN 200
	DC 10 K=1,NF	FLN 210
10	GAMMA(K)=-AW(K+1)/AW(1)	FLN 220
	NJ=NF-1	FLN 230
	GO TO 30	FLN 240
20	CALL VMSEGN (NJ,IJ,AW,GAMMA,CA)	FLN 250
	NJ=NJ-1	FLN 260
30	CONTINUE	FLN 270
	DO 40 I=1,NF	FLN 280
40	WARD(I)=GAMMA(I)	FLN 290
	RETURN	FLN 300
C	END	FLN 310
	SUBROUTINE THRUST (LTOTAL,LPANFL,GAMMA,GAMW,CAM,LPAN1,VMU,XJ,YJ,ZJTHR	FLN 320-
		10

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	1,RJ,T,GAL,ISYM,LPAN2,CAMLFT,SNG,YG,LWF,LWFJ,AW,BW,CM,P,BET,RL,KZ)	THR	20
C	TO EVALUATE THE LEADING EDGE THRUST	THR	30
	DIMENSION GAMMA(1), GAL(1), GAMW(1), SNG(1), YG(1)	THR	40
	DIMENSION AW(1), BW(1), CM(1)	THR	50
	COMMON /SCHEME/ C(2),X(10,41),Y(10,41),SLOPE(15),XL(2,15),XTT(41),THR	THR	60
	1XLL(41)	THR	70
	COMMON /GEOM/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTTHR	THR	80
	1E(50),PSI(20),CH(95),XV(200),YV(100),SN(8,8),XA(200,2),YN(200,2),ZTHR	THR	90
	2N(200,2),WIDTH(8),YCON(25),SWFFP(50),HALFB,SJ(21,8),EX(95,2),TX(95THR	THR	100
	3,2),SC(160,5),SI(160,5),LC(3)	THR	110
	COMMON /AERO/ AM1,AM2,B1,B2,CL(30),CT(30),CD(30),GAM(2,130)	THR	120
	COMMON /CONST/ NCS,NCW,M1(8),NSJ,NCJ(5),LAST,MJW1(3,5),MJW2(3,5),JTHR	THR	130
	1PANEL,MJJ(5),NW(3),NNJ,NJP	THR	140
	COMMON /PARAM/ ALPT,ALPC,ALPS,PDF,SDF,TH,TDF	THR	150
	COMMON /FUS/ XF(20),XCF(20),RF(20),SNP(5,20),XLEF,XTEF,WARD(20),ACTHR	THR	160
	1UP,AF,NT,CSF(5,10),XAS(6),AKF(5),F0,F10,KF,ATL	THR	170
	PI=3.14159265	THR	180
	CAMLER=CAM	THR	190
	CN=NW(1)	THR	200
	KW=1	THR	210
	SK=SNG(1)	THR	220
	BK=5.*PI/180.	THR	230
	IUSP=YCON(24)	THR	240
	.ITN=YCON(23)	THR	250
	DO 300 I=1,NCS	THR	260
	FCCS=CCS(SWEEP(I))	THR	270
	FTAN=TAN(SWEEP(I))	THR	280
	NK=I*NW(1)	THR	290
	IF (NW(2).EQ.0) GO TO 20	THR	300
	II=I+NCS	THR	310
	IF (NW(3).NE.0) GO TO 10	THR	320
	CHL=CH(I)+CH(II)	THR	330
	GO TO 30	THR	340
10	III=II+NCS	THR	350
	CHL=CH(I)+CH(II)+CH(III)	THR	360
	GO TO 30	THR	370
20	CHL=CH(I)	THR	380
30	CONTINUE	THR	390
	SRT=SQRT(CH(I)/CHL)	THR	400
	BP=P1	THR	410
	IC=1	THR	420
	I7=1	THR	430
	IS=1	THR	440
	MM=0	THR	450
	ISN=1	THR	460
	NM=NW(1)	THR	470
	NL=NW(1)	THR	480
	BC=0.	THR	490
	A=0.	THR	500

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	WN=0.	THR 510
	KP=1+(I-1)*NW(1)	THR 520
	IF (KF.EQ.0) GO TO 60	THR 530
	XQ=XLE(I)	THR 540
	YQ=YLE(I)	THR 550
	ZQ=ZCP(KP)	THR 560
	IPHI=1	THR 570
	CALL UNWF (B1,XQ,YQ,ZQ,AW,BW,IPHI,0,WK2,0)	THR 580
	DO 50 IP=1,NTL	THR 590
	IQ=IP+LPANEL	THR 600
	IF (KZ.EQ.0) GO TO 40	THR 610
	A=A+AW(IP)*GAM(1,IQ)*R.	THR 620
	PC=PC+AW(IP)*GAM(2,IQ)*R.	THR 630
	GO TO 50	THR 640
40	PC=PC+RW(IP)*GAMW(IQ)*R.	THR 650
50	CONTINUE	THR 660
60	CONTINUE	THR 670
	DC 150 NN=1,LPANEL	THR 680
	L=NN	THR 690
	IF (KZ.EQ.0) GAM=GAMW(NN)	THR 700
	IF (KZ.NE.0) GAM=GAM(2,NN)	THR 710
	J=NN-MM	THR 720
	FN=NL	THR 730
	IF (NN.EQ.(LPAN1+1).OR.NN.EQ.(LPAN2+1)) IS=1	THR 740
	IF (NN.GE.LPAN1.AND.NN.LT.LPANFL) GO TO 70	THR 750
	GO TO 80	THR 760
70	NL=NW(2)	THR 770
	IF (NN.GE.LPAN2.AND.NN.LT.LPANFL) NL=NW(3)	THR 780
	IF (NN.GT.LPAN1.AND.NN.LE.LPAN2) ISN=2	THR 790
	IF (NN.GT.LPAN2.AND.NN.LE.LPANFL) ISN=3	THR 800
P0	CONTINUE	THR 810
	X1=XN(NN,1)-XLF(I)	THR 820
	X2=XN(NN,2)-XLF(I)	THR 830
	X12=XN(NN,2)-XN(NN,1)	THR 840
	Y12=YN(NN,2)-YN(NN,1)	THR 850
	Z12=ZN(L,2)-ZN(L,1)	THR 860
	Z1=ZN(L,1)-ZCP(KP)	THR 870
	Z2=ZN(L,2)-ZCP(KP)	THR 880
	X7J=X1*Z12-Z1*X12	THR 890
	FCP=1.	THR 900
	DO 140 K=1,2	THR 910
	IF (KZ.EQ.0.AND.K.EQ.2) FCP=-1.	THR 920
	IF (K.EQ.1) GO TO 90	THR 930
	N1=1	THR 940
	GO TO 100	THR 950
90	N1=2	THR 960
100	CONTINUE	THR 970
	YC=YLE(I)*(-1.)**N1	THR 980
	Y1=YN(NN,1)-YC	THR 990

	Y2=YN(NM,2)-YC	THR1000
	XYK=X1*Y1Z-Y1*X1Z	THR1010
	Y7I=Y1*Z1Z-Z1*Y1Z	THR1020
	ALB1=XYK*XYK+XZJ*XZJ+B1*Y7I*Y7I	THR1030
	R1B1=SQRT(X1*X1+R1*Y1*Y1+B1*Z1*Z1)	THR1040
	R2B1=SQRT(X2*X2+R1*Y2*Y2+B1*Z2*Z2)	THR1050
	UUP1=(X2*X1Z+B1*Y2*Y1Z+B1*Z2*Z1Z)/R2B1-(X1*X1Z+R1*Y1*Y1Z+B1*Z1*Z1Z	THR1060
	1)/R1B1	THR1070
	IF (IS.EQ.1.AND.KF.NE.0) GO TO 120	THR1080
110	CONTINUE	THR1090
	G1P1=(1.-X1/R1B1)/(Y1*Y1+Z1*Z1)	THR1100
	GO TO 130	THR1110
120	IF (KZ.EQ.0) GO TO 110	THR1120
	G1P1=0.	THR1130
130	CONTINUE	THR1140
	G2P1=(1.-X2/R2B1)/(Y2*Y2+Z2*Z2)	THR1150
	F1=UUP1*XYK/ALB1	THR1160
	F2=-Y2*G2B1+Y1*G1P1	THR1170
	PC=PC+(F1+F2)*SN(J,ISN)*CAW*CH(I7)/FN*FCP	THR1180
	IF (KZ.EQ.0) GO TO 140	THR1190
	A=A+(F1+F2)*SN(J,ISN)*GAW(IC,NM)*CH(I7)/FN	THR1200
140	CONTINUE	THR1210
	IF (NM.LT.NM.OR.NM.EQ.1.PANEL) GO TO 150	THR1220
	IS=IS+1	THR1230
	IZ=IZ+1	THR1240
	NM=NM	THR1250
	NM=NM+NL	THR1260
150	CONTINUE	THR1270
	IF (KZ.EQ.0) GO TO 160	THR1280
	CAMLE=CAMLER-(CAMLER-CAMLET)*YLE(I)/HALFB	THR1290
	ALPT=XTT(I)	THR1300
160	CONTINUE	THR1310
	IF (KF.EQ.0) GO TO 170	THR1320
	WK=0.	THR1330
	G=0.	THR1340
	MP=0	THR1350
	IF (KZ.EQ.0) MP=1	THR1360
	CALL FUSVOL (B1,XG,YG,ZG,WN,WK,G,1,MP)	THR1370
170	CONTINUE	THR1380
	IF (KZ.FQ.1) GO TO 200	THR1390
	CAMLE=0.	THR1400
	IF (YLF(I).GT.YG(KW)) GO TO 180	THR1410
	GO TO 190	THR1420
180	KW=KW+1	THR1430
	SK=SNK(KW)	THR1440
190	ALPT=P*YLE(I)/HALFR+BET*PK*SK-PL*XLE(I)/HALFB*SK	THR1450
	GO TO 220	THR1460
200	CONTINUE	THR1470
	A=A/A.+ALPT-CAMLE+WN	THR1480

	XB=XLE(I)	THR1490
	YB=YLF(I)	THR1500
	ZB=ZCP(KP)	THR1510
	PHRV=0.	THR1520
	IF (IUSB.EQ.1.AND.ITN.EQ.0) GO TO 210	THR1530
	CALL INVEL (XB,YB,ZB,XJ,YJ,ZJ,RJ,PI,PHRV,PHX,T,VMU,PHY,ISYM)	THR1540
210	CONTINUE	THR1550
	A=A+PHRV/(ALPC*VML)	THR1560
	A=A*SRT	THR1570
	THRT1=A/(CN*SQRT(FTAN*FTAN+BB))	THR1580
	IF (K7.EQ.0) GO TO 220	THR1590
	XTE(I)=(PI/2.)*SQRT(1.-AM1*AM1*FCOS*FCOS)*THRT1*THRT1/FCOS	THR1600
220	CONTINUE	THR1610
	BC=EC/8.+ALPT-CAMLE+WN	THR1620
	BC=BC*SRT	THR1630
	THR=BC/(CN*SQRT(FTAN*FTAN+BP))	THR1640
	CM(I)=THR	THR1650
	IF (K7.EQ.0) GO TO 230	THR1660
	X(S,I)=(PI/2.)*SQRT(1.-AM1*AM1*FCOS*FCOS)*THR*THR/FCOS	THR1670
230	CONTINUE	THR1680
	IF (KZ.EQ.0) THRT1=THR	THR1690
	NM=NW(1)	THR1700
	INC=1	THR1710
	ISN=1	THR1720
	L1=L PANEL+1	THR1730
	I7=1	THR1740
	MM=0	THR1750
	II=NW(1)	THR1760
	A=0.	THR1770
	FACTOR=1.	THR1780
	AM=AM1	THR1790
	PR=P1	THR1800
	CONV=ALPC	THR1810
	DO 320 NN=1, LAST	THR1820
	IF (NN.GT.LPANEL) NA=NN-LPANEL+JPANEL	THR1830
	IF (NN.LE.LPANFL) NA=NN+2*JPANFL	THR1840
	FN=IT	THR1850
	IF (NN.GT.LPAN1.AND.NN.LE.LPAN2) ISN=2	THR1860
	IF (NN.GT.LPAN2.AND.NN.LE.LPANFL) ISN=3	THR1870
	IF (NN.GE.LPAN1.AND.NN.LT.LPANFL) GO TO 240	THR1880
	GO TO 250	THR1890
240	II=NW(2)	THR1900
	IF (NN.GE.LPAN2.AND.NN.LT.LPANFL) II=NW(3)	THR1910
250	CONTINUE	THR1920
	IF (NN.GE.LPANFL.AND.NN.LT.MJJ(IND)) II=NCJ(IND)	THR1930
	J=NN-MM	THR1940
	CHORD=CH(IZ)	THR1950
	IF (NN.FG.L1) GO TO 260	THR1960
	GO TO 270	THR1970

260	ISN=ISN+1	THR1980
	L1=MJJ(IND)+1	THR1990
270	NL=MJJ(IND)-1	THR2000
	IF (NN.EQ,NL) IND=IND+1	THR2010
	IF (NN.GT,LPANFL) FACTOR=0.5	THR2020
	X1=XN(NN,1)-X.F(I)	THR2030
	X2=XN(NN,2)-X.F(I)	THR2040
	X12=XN(NN,2)-X(NN,1)	THR2050
	Y12=YN(NN,2)-Y(NN,1)	THR2060
	Z12=ZN(NN,2)-Z(NN,1)	THR2070
	Z1=ZN(NN,1)-ZCP(KP)	THR2080
	Z2=ZN(NN,2)-ZCP(KP)	THR2090
	X7J=X1*Z12-Z1*X12	THR2100
	FCC=1.	THR2110
	DO 300 K=1,2	THR2120
	IF (K7.EQ.0.AND,K.FQ.2) FCC=-1.	THR2130
	IF (K.EG.1) GO TO 280	THR2140
	N1=1	THR2150
	GO TO 290	THR2160
280	N1=2	THR2170
290	CONTINUE	THR2180
	YC=YLF(I)*(-1.)**N1	THR2190
	Y1=YN(NN,1)-YC	THR2200
	Y2=YN(NN,2)-YC	THR2210
	X*YK=X1*Y12-Y1*X12	THR2220
	Y71=Y1*Z12-Z1*Y12	THR2230
	ALPRIM=XYK*XYK+X7J*X2J+PP*Y71*Y71	THR2240
	RXYZ1=SQRT(X1*X1+PP*Y1*Y1+PP*Z1*Z1)	THR2250
	RXYZ2=SQRT(X2*X2+PP*Y2*Y2+PP*Z2*Z2)	THR2260
	UU=(Y2*X12+PP*Y2*Y12+PP*Z2*Z12)/RXYZ2-(X1*X12+PP*Y1*Y12+PP*Z1*Z12)	THR2270
	1/RXYZ1	THR2280
	GN1=(1.-X1/RXYZ1)/(Y1*Y1+Z1*Z1)	THR2290
	GN2=(1.-X2/RXYZ2)/(Y2*Y2+Z2*Z2)	THR2300
	F1=UU*XYK/ALPRIM	THR2310
	F2=GN1*Y1-GN2*Y2	THR2320
300	A=A+(F1+F2)*SN(J,ISN)*CHCDF*GAMMA(MA)/(R.*FA*FACTOR)*FCC	THR2330
	IF (NN.LT,MM) GO TO 310	THR2340
	I7=I7+1	THR2350
	MM=MM	THR2360
	MM=MM+1	THR2370
310	CONTINUE	THR2380
320	CONTINUE	THR2390
	A=A*SQRT	THR2400
	THRT2=A/(CN*SQRT(FTAN*FTAN+PP))	THR2410
	THRT=(THRT1+THRT2)*CCNV	THR2420
	GAL(I)=2.*THRT/(SPT*CCNV)	THR2430
	CD(I)=THRT	THR2440
	IF (K7.FQ.0) GO TO 330	THR2450
	CT(I)=(PI/2.)*SQRT(1.-AM*AM*FCCS*FCOS)*THRT*THRT/FCOS	THR2460

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330 CONTINUE                                THR2470
RETURN                                      THR2480
END                                          THR2490=
OVERLAY (WNGJET,5,0)                       LOD 10
PROGRAM LOAD                                LOD 20
C TO EVALUATE THE AERODYNAMIC CHARACTERISTICS LOD 30
DIMENSION GAMP(330), GAMP(330), GAMR(330), GAMX(150), CPWW(130), SLOD 40
LECT(30), CPF(10,30), GAMXW(150)          LOD 50
DIMENSION CQ(330)                           LOD 60
DIMENSION SDWASH(100), AW(5), BW(40)        LOD 70
COMMON /GEOM/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTLOD 80
LE(50),PSI(20),CF(95),XV(200),YV(100),SN(8,8),XA(200,2),YA(200,2),ZLOD 90
2N(200,2),WIDTH(8),YCON(25),SWEEP(50),HALFB,SJ(21,8),EX(95,2),TX(95LOD 100
3,2),SC(160,5),SJ(160,5),LC(3)            LOD 110
COMMON /AERO/ AM1,AM2,R1,R2,CL(30),CT(30),CD(30),GAM(2,130) LOD 120
COMMON /SOME/ NC,NWING,LAT,NAL,LWF,LWFJ,CHORDT(3),SNG(5),YG(5),YCNLOD 130
1(6),WKN,RDX,MDG,NDG                       LOD 140
COMMON /CONST/ NCS,NCW,M1(8),NSJ,NCJ(5),LAST,MJK1(3,5),MJK2(3,5),JLOD 150
1PANEL,MJJ(5),AW(3),NNJ,NJP                 LOD 160
COMMON /PARAM/ ALPT,ALPC,ALPS,CDF,SDF,TH,TDF LOD 170
COMMON /SCHEME/ C(2),X(10,41),Y(10,41),SLOPE(15),XL(2,15),XTT(41),LOD 180
1XLL(41)                                     LOD 190
COMMON /ADD/ CP(130),CM(30),BREAK(8),SWP(8,15),GAL(30),ISYM,VMU,VULOLOD 200
1,TEMP,FCR,CAMLER,CAMLET,CAMTER,CAMTET,XJ,YJ,ZJ,RJ,ALP,CREF,TWISTR LOD 210
COMMON /COST/ LTOTAL,LPAN1,NJW(5),LPANEL,IENTA,LPAN2,EXIT,PTIAL,TWLOD 220
1IST,DF(5),NFP                               LOD 230
COMMON /FUS/ XF(20),XCF(20),RF(20),SNP(5,20),XLEF,XTEF,WAFD(20),ACLLOD 240
1UM,AF,NT,CSF(F,10),XAS(6),NKF(5),F0,F10,KF,NTL LOD 250
PI=3.14159265                                LOD 260
IA=2*JPANEL                                  LOD 270
RK=5.*PI/180.                                LOD 280
NW2=NW(1)+NW(2)                              LOD 290
NW3=NW(2)+NW(3)                              LOD 300
NJF=(NSJ+1)/2+1                             LOD 310
IF (ISYM.EQ.0) NJF=NSJ/2                    LOD 320
IF (ISYM.EQ.0) NP=NSJ-1                     LOD 330
IF (ISYM.NE.0) NP=NSJ+1                     LOD 340
AM=AM1                                        LOD 350
ALPH=ALP*180./PI                             LOD 360
WRITE (6,460)                                LOD 370
WRITE (6,450) ALPH                           LOD 380
WRITE (6,460)                                LOD 390
ZJET=YCON(25)                                LOD 400
IUSB=YCON(24)                                LOD 410
ITN=YCON(23)                                LOD 420
NC=IENTA                                     LOD 430
DFJ=CDF                                       LOD 440
CMU=C(1)                                      LOD 450
REWIND 01                                    LOD 460

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	REWIND 02	LOD 470
	REWIND 07	LOD 480
	REWIND 08	LOD 490
	ITAPE=2	LOD 500
	ITAPG=1	LOD 510
	DO 210 I=1,3	LOD 520
	II=I	LOD 530
	IF (I.EQ.2) GO TO 30	LOD 540
	IF (I.EQ.3) GO TO 60	LOD 550
	IF (IUSB.EQ.1.AND.ITN.EQ.0) GO TO 210	LOD 560
	DO 10 J=1,LPANEL	LOD 570
10	CPW(J)=GAM(1,J)*ALPC	LOD 580
	DO 20 J=1,NCS	LOD 590
20	SFCT(J)=XTE(J)	LOD 600
	GO TO 170	LOD 610
30	DO 40 J=1,LPANFL	LOD 620
40	CPW(J)=GAM(2,J)*ALPC	LOD 630
	DO 50 J=1,NCS	LOD 640
50	SECT(J)=X(5,J)	LOD 650
	GO TO 90	LOD 660
60	DO 70 J=1,LPANEL	LOD 670
70	CPW(J)=CP(J)	LOD 680
	DO 80 J=1,NCS	LOD 690
80	SECT(J)=CT(J)	LOD 700
90	IF (LAT.NE.1) GO TO 170	LOD 710
C		LOD 720
C	EDGE SINGULARITY PARAMETERS FOR, (1) CPF1(L.F.), CPF2(TIP) FOR	LOD 730
C	SYMMETRICAL LOADING, (2) CPF3(L.F.), CPF4(TIP) FOR P MOTION,	LOD 740
C	(3) CPF5(L.F.), CPF6(TIP) FOR P MOTION, (4) CPF7(L.F.), CPF8(TIP)	LOD 750
C	FOR P MOTION	LOD 760
	READ (ITAPE) (CPF(1,K),K=1,NCS)	LOD 770
	READ (ITAPE) (CPF(2,K),K=1,NCW)	LOD 780
	READ (ITAPF) (GAMX(K),K=1,LPANFL)	LOD 790
	IF (I.NE.2) GO TO 110	LOD 800
	DO 100 K=1,LPANEL	LOD 810
100	GAMXW(K)=GAMX(K)	LOD 820
110	CONTINUE	LOD 830
	K1=1	LOD 840
	DO 120 KK=1,3	LOD 850
	READ (ITAPE) (CPF(K1+2,K),K=1,NCS)	LOD 860
	READ (ITAPF) (CPF(K1+3,K),K=1,NCW)	LOD 870
	K1=K1+2	LOD 880
120	CONTINUE	LOD 890
	I1=1	LOD 900
	I2=LPANEL	LOD 910
	IF (I.EQ.3) I1=2*JPANFL+1	LOD 920
	IF (I.EQ.3) I2=LTCTAL	LOD 930
	IPARM=LWF	LOD 940
	IF (I.EQ.3) IPARM=LWFJ	LOD 950

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	RFAD (ITAPG) (GAMP(K),K=1,IPARM)	LOD 960
	READ (ITAPG) (GAMP(K),K=1,IPARM)	LOD 970
	READ (ITAPG) (GAMP(K),K=1,IPARM)	LOD 980
	DO 160 KP=I1,I2	LOD 990
	K=KP-IA	LOD1000
	IF (I.EQ.2) K=KP	LOD1010
	SIDFF=0.	LOD1020
	SIDEJ=0.	LOD1030
	IF (KF.EQ.0) GO TO 140	LOD1040
	CALL UNWF (B1,XV(K),YV(K),ZCP(K),AW,BW,1,0,WK2,2)	LOD1050
	DO 130 J=1,NTL	LOD1060
	KK=J+I2	LOD1070
130	SIDFF=SIDFF+BW(J)*GAMB(KK)	LOD1080
140	IF (I.EQ.2) GO TO 150	LOD1090
	CALL SDWJ (SIDEJ,XV(K),YV(K),ZCP(K),GAMB,LPADEL,ISYM)	LOD1100
150	CONTINUE	LOD1110
	IF (I.EQ.2) SDWASH(K)=SIDFF	LOD1120
	GAMB(KP)=GAMB(KP)-YV(K)/HALFR*CPWW(K)/ALPC-XV(K)/HALFB*GAMX(K)	LOD1130
160	GAMB(KP)=GAMB(KP)-(SIDFF+SIDEJ-PK)*GAMX(K)	LOD1140
170	CALL FORCE (II,AM,CLT,CMT,CDT,SECT,CL,CM,CD,XLL,XTT,CPWW,CPF,GAMP,LOD1150	LOD1150
	IGAMB,GAMB,CAMLEF,CAMLEF,CREF,CYR,CLB,CNR,CLP,CYP,CNP,CYR,CLRR,CNR,LOD1160	LOD1160
	ZCT)	LOD1170
	IF (I.EQ.1) GO TO 180	LOD1180
	IF (I.EQ.2) GO TO 190	LOD1190
	GO TO 210	LOD1200
180	CLW=CLT	LOD1210
	CMWT=CMT	LOD1220
	CDW=CDT	LOD1230
	GO TO 210	LOD1240
190	CLW=CLT	LOD1250
	CMWT=CMT	LOD1260
	CDW=CDT	LOD1270
	CYF=CYP	LOD1280
	CLPW=CLP	LOD1290
	CNP=CNP	LOD1300
	CLPW=CLP	LOD1310
	CYP=CYP	LOD1320
	CNP=CNP	LOD1330
	CYP=CYP	LOD1340
	CLRR=CLRR	LOD1350
	CNR=CNR	LOD1360
	DO 200 K=1,NCS	LOD1370
	X(4,K)=CL(K)	LOD1380
	X(6,K)=CD(K)	LOD1390
200	X(7,K)=CM(K)	LOD1400
	ITAPE=7	LOD1410
	ITAPG=8	LOD1420
210	CONTINUE	LOD1430
	READ (OR) (CG(IS),IS=1,LWFJ)	LOD1440

	CDCL2=CDT/(CLT*CLT)	LOD1450
	IF (CLWW.LE.0.001) GO TO 220	LOD1460
	CDWL2=CDWW/(CLWW*CLWW)	LOD1470
	GO TO 230	LOD1480
220	CDWL2=0.	LOD1490
230	CONTINUE	LOD1500
	WRITE (6,470)	LOD1510
	K1=0	LOD1520
	JJ1=0	LOD1530
	DO 310 I=1,NCS	LOD1540
	IF (NW(2).EQ.0) GO TO 250	LOD1550
	II=I+NCS	LOD1560
	IF (NW(3).NE.0) GO TO 240	LOD1570
	CHORD=CH(I)+CH(II)	LOD1580
	GO TO 260	LOD1590
240	III=II+NCS	LOD1600
	CHORD=CH(I)+CH(II)+CH(III)	LOD1610
	GO TO 260	LOD1620
250	CHCRD=CH(I)	LOD1630
260	CONTINUE	LOD1640
	DO 300 J=1,NCW	LOD1650
	JJ=JJ1+J	LOD1660
	KK=K1+J	LOD1670
	IF (NW(2).EQ.0) GO TO 280	LOD1680
	IF (J.LE.NW(1)) GO TO 280	LOD1690
	IF (J.GT.NW2) GO TO 270	LOD1700
	LL=LPAN1+NW(2)*(I-1)+J-NW(1)	LOD1710
	GO TO 290	LOD1720
270	LL=LPAN2+NW(3)*(I-1)+J-NW2	LOD1730
	GO TO 290	LOD1740
280	LL=J	LOD1750
290	CONTINUE	LOD1760
	XI=(XV(LL)-XLE(I))/CHORD	LOD1770
	ETA=YV(LL)/HALFR	LOD1780
	CPW=2.*GAM(2,LL)*ALPC	LOD1790
	CPT=CP(LL)*2.	LOD1800
300	WRITE (6,480) KK,XI,ETA,CPT,CPW	LOD1810
	JJ1=(NCW-NW3)*I	LOD1820
	K1=K1+NCW	LOD1830
310	CONTINUE	LOD1840
	WRITE (6,490)	LOD1850
	DO 320 I=1,NCS	LOD1860
	YE=YLF(I)/HALFR	LOD1870
320	WRITE (6,500) YE,CL(I),CM(I),CT(I),CD(I),X(4,I),X(7,I),X(6,I)	LOD1880
	WRITE (6,510) CLT	LOD1890
	WRITE (6,520) CDT	LOD1900
	WRITE (6,530) CDCL2	LOD1910
	WRITE (6,540) CMT	LOD1920
	IF (IUSP.NF.1) GO TO 370	LOD1930

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	IF (DFJ.LE.0.001) GO TO 370	LOD1940
	IF (ZJET.GT.0.01) GO TO 370	LOD1950
	SDFJ=SIN(DFJ)	LOD1960
	CDFJ=CCS(DFJ)	LOD1970
	CLR=CMU*SIN(DFJ+ALP)	LOD1980
	CDR=CMU*(VMU-COS(DFJ+ALP))	LOD1990
	CF=CCS(TDF)	LOD2000
	SF=SIN(TDF)	LOD2010
	IF (NNJ.EQ.1) CDR=-CMU*COS(DFJ+ALP)	LOD2020
	IJ=(NSJ+1)/2-1	LOD2030
	IF (ISYM.EQ.0) IJ=NSJ/2-1	LOD2040
	IF (NW(3).NE.0) GO TO 330	LOD2050
	IF (NW(2).EQ.0) GO TO 340	LOD2060
	IZ=ACS+(MJW1(2,NJP)-LPAN1-1)/NW(2)+1	LOD2070
	KJ=MJW1(2,NJP)	LOD2080
	NN=NW(2)	LOD2090
	GO TO 350	LOD2100
330	I7=ACS*2+(MJW1(3,NJP)-LPAN2-1)/NW(3)+1	LOD2110
	KJ=MJW1(3,NJP)	LOD2120
	NN=NW(3)	LOD2130
	GO TO 350	LOD2140
340	I7=LC(1)	LOD2150
	KJ=MJW1(1,NJP)	LOD2160
	NN=NW(1)	LOD2170
350	CONTINUE	LOD2180
	CM1=0.	LOD2190
	DO 360 I=1,IJ	LOD2200
	YDIF=YN(KJ,2)-YN(KJ,1)	LOD2210
	CM1=CM1+YDIF/WIDTH(MJW(NJP))*((XLF(IZ)+CH(IZ)*CF)*SDFJ-CP(IZ)*SF*CL	LOD2220
	LODFJ)	LOD2230
	KJ=KJ+NN	LOD2240
360	I7=I7+1	LOD2250
	CMR=-CM1*CMU/CRF	LOD2260
	IF (NNJ.NE.1) WRITE (6,550) CLR	LOD2270
	IF (NNJ.EQ.1) WRITE (6,560) CLR	LOD2280
	IF (NNJ.NE.1) WRITE (6,570) CDR	LOD2290
	IF (NNJ.EQ.1) WRITE (6,580) CDR	LOD2300
	IF (NNJ.NE.1) WRITE (6,590) CMR	LOD2310
	IF (NNJ.EQ.1) WRITE (6,600) CMR	LOD2320
370	CONTINUE	LOD2330
	IF (IUSP.EQ.1.AND.ITN.EQ.0) GO TO 380	LOD2340
	WRITE (6,610) CLW	LOD2350
	WRITE (6,620) CDW	LOD2360
	WRITE (6,630) CMWT	LOD2370
380	CONTINUE	LOD2380
	WRITE (6,640) CLWW	LOD2390
	WRITE (6,650) CDWW	LOD2400
	WRITE (6,660) CMWWT	LOD2410
	WRITE (6,670) CDWLP	LOD2420

	IF (KF.FQ.0) GO TO 400	LOD2430
	WRITE (6,680)	LOD2440
	WRITE (6,690)	LOD2450
	REWIND 07	LOD2460
	REWIND 08	LOD2470
	S=XTEF-XLEF	LOD2480
	SS=SIN(ALP)	LOD2490
	CS=COS(ALP)	LOD2500
	X1=YCN(6)	LOD2510
	CALL CPFUS (NCUM,NT,CG,CPF,NF,S,XLEF,XF,XAS,LPANEL,LPAN1,NKF,NW,B1	LOD2520
	1,AM,SS,CS,SNP,F0,F10,WARD,LAST,LPAN2,CREF,NCJ,MJJ,LAST,0,NJF,NP)	LOD2530
	CALL FUSLFT (CPF,HALFSW,CREF,SS,CS,0,X1)	LOD2540
	WRITE (6,700)	LOD2550
	DO 390 I=1,LWF	LOD2560
390	CPWW(I)=GAM(2,I)*ALPC	LOD2570
	SS=SIN(ALP)	LOD2580
	CS=COS(ALP)	LOD2590
	CALL CPFUS (NCUM,NT,CPWW,CPF,NF,S,XLEF,XF,XAS,LPANEL,LPAN1,NKF,NW,	LOD2600
	1R1,AM,SS,CS,SNP,F0,F10,WARD,0,LPAN2,CREF,NCJ,MJJ,LAST,0,NJF,NP)	LOD2610
	CALL FUSLFT (CPF,HALFSW,CREF,SS,CS,0,X1)	LOD2620
400	IF (LAT.NE.1) GO TO 440	LOD2630
	WRITE (6,710)	LOD2640
	WRITE (6,720) ALPH	LOD2650
	WRITE (6,730) AM1	LOD2660
	JL=LAST	LOD2670
	REWIND 01	LOD2680
	DO 430 I=1,2	LOD2690
	G10=0.	LOD2700
	SS=0.	LOD2710
	CS=1.	LOD2720
	IF (KF.FQ.0) GO TO 410	LOD2730
	IF (I.EG.1) REWIND 08	LOD2740
	IF (I.EG.2) REWIND 07	LOD2750
	CALL CPFUS (NCUM,NT,GAMB,CPF,NF,S,XLEF,XF,XAS,LPANEL,LPAN1,NKF,NW,	LOD2760
	1R1,AM,SS,CS,SNP,F0,G10,WARD,JL,LPAN2,CREF,NCJ,MJJ,LAST,2,NJF,NP)	LOD2770
	CALL FUSLFT (CPF,HALFSW,CREF,SS,CS,2,X1)	LOD2780
	CYB=SS/BK+CYR	LOD2790
	CNP=CS/BK*CREF/(2.*HALFB)+CNR	LOD2800
	SS=0.	LOD2810
	CS=1.	LOD2820
	IF (I.EG.1) REWIND 08	LOD2830
	IF (I.EG.2) REWIND 07	LOD2840
	CALL CPFUS (NCUM,NT,GAMP,CPF,NF,S,XLEF,XF,XAS,LPANEL,LPAN1,NKF,NW,	LOD2850
	1R1,AM,SS,CS,SNP,F0,G10,WARD,JL,LPAN2,CREF,NCJ,MJJ,LAST,3,NJF,NP)	LOD2860
	CALL FUSLFT (CPF,HALFSW,CREF,SS,CS,3,X1)	LOD2870
	CYR=SS+CYR	LOD2880
	CNP=CS*CREF/(2.*HALFB)+CNR	LOD2890
410	CONTINUE	LOD2900
	WRITE (6,740) CYB,CLB,CNR	LOD2910

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	WRITE (6,750) CYP,CLP,CNP	LOD2920
	WRITE (6,760) CYR,CLRR,CNR	LOD2930
	WRITE (6,770)	LOD2940
	CYPP=CYP	LOD2950
	CYPP=CYP+CYR*ALP	LOD2960
	CYPP=CYP-CYR*ALP	LOD2970
	CLPP=CLB+CNR*ALP	LOD2980
	CLPP=CLP+(CLRR+CNP)*ALP	LOD2990
	CLPP=CLRR-(CLP-CNP)*ALP	LOD3000
	CNRP=CNR-CLB*ALP	LOD3010
	CNRP=CNP-(CLP-CNR)*ALP	LOD3020
	CNRP=CNR-(CLRR+CNP)*ALP	LOD3030
	WRITE (6,740) CYPP,CLPP,CNRP	LOD3040
	WRITE (6,750) CYPP,CLPP,CNRP	LOD3050
	WRITE (6,760) CYPP,CLPP,CNRP	LOD3060
	JL=0	LOD3070
	CYB=CYPW	LOD3080
	CLP=CLRW	LOD3090
	CNB=CNBW	LOD3100
	CLP=CLPW	LOD3110
	CYP=CYPW	LOD3120
	CNP=.NPW	LOD3130
	CYR=CYPW	LOD3140
	CLRR=CLRRW	LOD3150
	CNR=CNRW	LOD3160
	IF (I.EQ.2) GO TO 430	LOD3170
	READ (01) (GAMP(K),K=1,LWF)	LOD3180
	READ (01) (GAMP(K),K=1,LWF)	LOD3190
	READ (01) (GAMP(K),K=1,LWF)	LOD3200
	DO 420 K=1,LPANEL	LOD3210
	GAMP(K)=GAMP(K)-YV(K)/HALFR*GAM(2,K)-XV(K)/HALFR*GAMXW(K)	LOD3220
420	GAMP(K)=GAMB(K)-(SCWASH(K)-RK)*GAMXW(K)	LOD3230
	IF (I.EQ.1) WRITE (6,780)	LOD3240
	WRITE (6,720) ALPW	LOD3250
	WRITE (6,730) AM1	LOD3260
430	CONTINUE	LOD3270
440	CONTINUE	LOD3280
	RETURN	LOD3290
C		LOD3300
450	FORMAT (1H0,26X,7HALPHA =,F10.3,3X,7HDFGREFS)	LOD3310
460	FORMAT (1H0,20X,40XX)	LOD3320
470	FORMAT (1H0,3X,6HVORTEX,14X,2HXV,17X,2HYV,19X,2HCP,19X,3HCPW)	LOD3330
480	FORMAT (6X,I3,4(10X,F10.5))	LOD3340
490	FORMAT (1H0,9X,4 Y/SP,11X,2HCL,13X,2HCM,17X,2HCT,13X,3HCCI,12X,3HCL	LOD3350
	1LW,12X,3HCMW,12X,3HCDW)	LOD3360
500	FORMAT (8(5X,F10.5))	LOD3370
510	FORMAT (1H0,22HTHE LIFT COEFFICIENT =,F10.5)	LOD3380
520	FORMAT (1H0,32HTOTAL INDUCED DRAG COEFFICIENT =,F10.5)	LOD3390
530	FORMAT (1H0,28HTHE INDUCED DRAG PARAMETER =,F10.5)	LOD3400

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540   FORMAT (1H0,35HTOTAL PITCHING MOMENT COEFFICIENT =,F10.5)           LOD3410
550   FORMAT (1H0,34HTHE COANDA LIFT COEFFICIENT, CLR =,F10.5)           LOD3420
560   FORMAT (1H0,47HTHE LIFT COEFFICIENT DUE TO JET REACTION, CLJ =,F10.5) LOD3430
1.5)                               LOD3440
570   FORMAT (1H0,34HTHE COANDA DRAG COEFFICIENT, CDR =,F10.5)           LOD3450
580   FORMAT (1H0,47HTHE DRAG COEFFICIENT DUE TO JET REACTION, CDJ =,F10.5) LOD3460
1.5)                               LOD3470
590   FORMAT (1H0,36HTHE COANDA MOMENT COEFFICIENT, CMR =,F10.5)           LOD3480
600   FORMAT (1H0,58HTHE PITCHING MOMENT COEFFICIENT DUE TO JET REACTION, CMJ =,F10.5) LOD3490
1.5)                               LOD3500
610   FORMAT (1H0,2X,49HTHE LIFT COEFFICIENT WITH JET ENTRAINMENT ALONE, CLJ =,F10.5) LOD3510
1.5)                               LOD3520
620   FORMAT (1H0,2X,57HTHE INDUCED DRAG COEFFICIENT WITH JET ENTRAINMENT ALONE, CDJ =,F10.5) LOD3530
1.5)                               LOD3540
630   FORMAT (1H0,2X,60HTHE PITCHING MOMENT COEFFICIENT WITH JET ENTRAINMENT ALONE, CMJ =,F10.5) LOD3550
1.5)                               LOD3560
640   FORMAT (1H0,40HTHE LIFT COEFFICIENT FOR THE WING ALONE, CLW =,F10.5) LOD3570
650   FORMAT (1H0,48HTHE INDUCED DRAG COEFFICIENT FOR THE WING ALONE, CDW =,F10.5) LOD3580
1.5)                               LOD3590
660   FORMAT (1H0,51HTHE PITCHING MOMENT COEFFICIENT FOR THE WING ALONE, CMW =,F10.5) LOD3600
1.5)                               LOD3610
670   FORMAT (1H0,46HTHE INDUCED DRAG PARAMETER FOR THE WING ALONE, CDW =,F10.5) LOD3620
1.5)                               LOD3630
680   FORMAT (//1X,58H***FUSELAGE AERODYNAMIC CHARACTERISTICS ARE GIVEN, 1RELCW*** LOD3640
1.5)                               LOD3650
690   FORMAT (/5X,26H***JET-ON CONFIGURATION***)                       LOD3660
700   FORMAT (/5X,27H***JET-OFF CONFIGURATION***)                     LOD3670
710   FORMAT (//1X,56HLATERAL-DIRECTIONAL STABILITY CHARACTERISTICS WITH 1JET ON) LOD3680
1.5)                               LOD3690
720   FORMAT (//45H***STABILITY DERIVATIVES EVALUATED AT ALPHA =,F8.3,2X,1.4HDEF.) LOD3700
1.5)                               LOD3710
730   FORMAT (/3X,16HAND AT MACH NO.=,F8.3,22H,BASED ON BODY AXES***) LOD3720
740   FORMAT (/5X,5HCYP =,F12.7,2X,5HCLB =,F12.7,2X,5HCNB =,F12.7)     LOD3730
750   FORMAT (/5X,5HCYP =,F12.7,2X,5HCLP =,F12.7,2X,5HCNP =,F12.7)     LOD3740
760   FORMAT (/5X,5HCYP =,F12.7,2X,5HCLP =,F12.7,2X,5HCNR =,F12.7)     LOD3750
770   FORMAT (//51H***STABILITY DERIVATIVES BASED ON STABILITY AXES***) LOD3760
780   FORMAT (//1X,57HLATERAL-DIRECTIONAL STABILITY CHARACTERISTICS WITH 1JET OFF) LOD3770
1.5)                               LOD3780
ENC                                  LOD3790-
SUPROUTINE UTFW (X,Y,7,SF,CF,LAST,LPANFL,R1,LPAN1,NW,GAMMA,VX,VT,JUTW 10
1L,LPAN2,NCJ,MJJ,L,AJH,MP)         UTW 20
DIMENSION W(2), NW(1), GAMMA(1), U(2), NCJ(1), MJJ(1)                 UTW 30
COMMON /GEOM/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTUTW 40
1E(50),PSI(20),CP(95),XV(200),YV(100),SN(A,8),XN(200,2),YN(200,2),ZUTW 50
2N(200,2),WIDTH(8),YCON(25),SWEEP(50),HALFR,SJ(21,8),EX(95,2),TX(95UTW 60
3,2),SC(160,5),SI(160,5),LC(3)   UTW 70
PI=3.14159265                     UTW 80
ICCN=LPANFL                        UTW 90
IF (JL.EG.LAST) ICCN=LAST          UTW 100

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	IA=2*(LAST-LPANFL)	UTW 110
	IR=LAST-LPANFL	UTW 120
	JCOT=XTE(50)	UTW 130
	IP=1	UTW 140
	IZ=1	UTW 150
	IFF=1	UTW 160
	ISN=1	UTW 170
	JKT=1	UTW 180
	MM=NW(1)	UTW 190
	NN=NW(1)	UTW 200
	IND=1	UTW 210
	L1=LPANEL+1	UTW 220
	LAST1=LAST-1	UTW 230
	FACTOR=1.	UTW 240
	IF (L.GE.2) FACTOR=-1.	UTW 250
	VX=0.	UTW 260
	VT=0.	UTW 270
	DO 130 J=1,ICCN	UTW 280
	MI=J-IFF+1	UTW 290
	FN=NN	UTW 300
	IF (J.GT.LPANFL) GO TO 40	UTW 310
	IF (J.FG.(LPAN1+1).OR.J.FG.(LPAN2+1)) IP=1	UTW 320
	IF (JCOT.EQ.1.AND.J.GT.LPANEL) GO TO 10	UTW 330
	GO TO 20	UTW 340
10	IF (JKT.EQ.1.OP.JKT.FG.(NJH+1)) IP=1	UTW 350
20	CONTINUE	UTW 360
	IF (J.GT.LPAN1.AND.J.LF.LPAN2) ISN=2	UTW 370
	IF (J.GT.LPAN2.AND.J.LF.LPANEL) ISN=3	UTW 380
	IF (J.GE.LPAN1.AND.J.LT.LPANEL) GO TO 30	UTW 390
	GO TO 40	UTW 400
30	NN=NW(2)	UTW 410
	IF (J.GE.LPAN2.AND.J.LT.LPANEL) NN=NW(3)	UTW 420
40	CONTINUE	UTW 430
	IF (J.GE.LPANEL.AND.J.LT.MJJ(IND)) NN=NCJ(IND)	UTW 440
	IF (JL.EQ.0) GO TO 70	UTW 450
	IF (J.EQ.L1) GO TO 50	UTW 460
	GO TO 60	UTW 470
50	ISN=ISN+1	UTW 480
	L1=MJJ(IND)+1	UTW 490
60	NL=MJJ(IND)-1	UTW 500
	IF (NL.EQ.LAST1) GO TO 70	UTW 510
	IF (J.EQ.NL) IND=IND+1	UTW 520
70	CONTINUE	UTW 530
	JJ=J	UTW 540
	IF (J.LE.LPANEL.AND.JL.EQ.LAST) JJ=J+IA	UTW 550
	IF (J.GT.LPANEL.AND.JL.EQ.LAST) JJ=J+IR-LPANEL	UTW 560
	CHORD=CH(IZ)	UTW 570
	X1=XN(J,1)-X	UTW 580
	X2=XN(J,2)-X	UTW 590

	X12=XN(J,2)-XN(J,1)	UTW 600
	Y12=YN(J,2)-YN(J,1)	UTW 610
	Z12=ZN(J,2)-ZN(J,1)	UTW 620
	Z1=ZN(J,1)-Z	UTW 630
	Z2=ZN(J,2)-Z	UTW 640
	XZJ=X1*Z12-Z1*X12	UTW 650
	DO 120 II=1,2	UTW 660
	FCP=1.	UTW 670
	IF (II.EQ.2) FCP=-1.	UTW 680
	YC=Y*FCP	UTW 690
	Y1=YN(J,1)-YC	UTW 700
	Y2=YN(J,2)-YC	UTW 710
	XYK=X1*Y12-Y1*X12	UTW 720
	Y7I=Y1*Z12-Z1*Y12	UTW 730
	ALP1=XYK*XYK+XZJ*XZJ+R1*Y7I*Y7I	UTW 740
	R1P1=SQRT(X1*X1+P1*Y1*Y1+R1*Z1*Z1)	UTW 750
	R2P1=SQRT(X2*X2+P1*Y2*Y2+R1*Z2*Z2)	UTW 760
	UUB1=(X2*X12+P1*Y2*Y12+R1*Z2*Z12)/R2P1-	UTW 770
	(X1*X12+P1*Y1*Y12+R1*Z1*Z12)/R1P1	UTW 780
	IF (IP.EQ.1) GO TO 90	UTW 790
80	CONTINUE	UTW 800
	G1P1=(1.-X1/R1P1)/(Y1*Y1+Z1*Z1)	UTW 810
	GO TO 100	UTW 820
90	IF (L.GF.2) GO TO 80	UTW 830
	G1P1=0.	UTW 840
100	CONTINUE	UTW 850
	G2P1=(1.-X2/R2P1)/(Y2*Y2+Z2*Z2)	UTW 860
	F12=UUB1*XYK/ALP1	UTW 870
	G12=-Y2*G2P1+Y1*G1P1	UTW 880
	F13=UUB1*XZJ/ALP1	UTW 890
	G13=Z2*G2P1-Z1*G1P1	UTW 900
	F1=-F13*CF*FCP-F12*SF	UTW 910
	F2=G13*CF*FCP-G12*SF	UTW 920
	F3=UUB1*Y7I/ALP1	UTW 930
	IF (J.LE.LPANEL) GO TO 110	UTW 940
	F1=2.*F1	UTW 950
	F2=2.*F2	UTW 960
	F3=2.*F3	UTW 970
110	CONTINUE	UTW 980
	U(II)=F3*CHORD*SN(MI,ISN)*GAMMA(JJ)/(R.*FN)	UTW 990
120	W(II)=(F1+F2)*CHORD*SN(MI,ISN)*GAMMA(JJ)/(R.*FN)	UTW1000
	VT=W(1)+FACTOR*W(2)+VT	UTW1010
	VX=U(1)+FACTOR*U(2)+VX	UTW1020
	IF (J.LT.MM) GO TO 130	UTW1030
	IP=IP+1	UTW1040
	I7=I7+1	UTW1050
	IFF=MM+1	UTW1060
	MM=MM+NN	UTW1070
	IF (J.GT.LPANEL) JKT=JKT+1	UTW1080

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	DO 100 I=1,NCS	FRC 460
	IF (NW(2).EQ.0) GO TO 20	FRC 470
	II=I+NCS	FRC 480
	IF (NW(3).NE.0) GO TO 10	FRC 490
	CHORD=CH(I)+CH(II)	FRC 500
	GO TO 30	FRC 510
10	III=II+NCS	FRC 520
	CHORD=CH(I)+CH(II)+CH(III)	FRC 530
	GO TO 30	FRC 540
20	CHORD=CH(I)	FRC 550
30	CONTINUE	FRC 560
	CML=0.	FRC 570
	CL(I)=0.	FRC 580
	CM(I)=0.	FRC 590
	CD(I)=0.	FRC 600
	CYPS=0.	FRC 610
	CLPS=0.	FRC 620
	CNPS=0.	FRC 630
	CLPS=0.	FRC 640
	CYPS=0.	FRC 650
	CNPS=0.	FRC 660
	CYRS=0.	FRC 670
	CLRS=0.	FRC 680
	CNRS=0.	FRC 690
	IF (YLE(I).GT.YE(KW)) GO TO 40	FRC 700
	GO TO 50	FRC 710
40	KW=KW+1	FRC 720
	SK=ENG(KW)	FRC 730
	CK1=SQRT(1.-SK*SK)	FRC 740
50	CONTINUE	FRC 750
	DO 140 J=1,NCW	FRC 760
	NN=J+MM	FRC 770
	IF (NW(2).EQ.0) GO TO 70	FRC 780
	IF (J.LE.NW(1)) GO TO 70	FRC 790
	IF (J.GT.NW2) GO TO 60	FRC 800
	LL=LPAN1+NW(2)*(I-1)+J-NW(1)	FRC 810
	IL=II	FRC 820
	JLL=J-NW(1)	FRC 830
	L=2	FRC 840
	FN=NW(2)	FRC 850
	GO TO 80	FRC 860
60	LL=LPAN2+NW(3)*(I-1)+J-NW2	FRC 870
	IL=III	FRC 880
	JLL=J-NW2	FRC 890
	L=3	FRC 900
	FN=NW(3)	FRC 910
	GO TO 80	FRC 920
70	LL=NN	FRC 930
	IL=I	FRC 940

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	JLL=J	FRC 950
	L=1	FRC 960
	FN=NW(1)	FRC 970
80	CONTINUE	FRC 980
	XC=(XV(LL)-XLE(I))/CHORD	FRC 990
	AZ=7CR(XC)	FRC1000
	BZ=7CT(XC)	FRC1010
	GRS=CP(LL)*SN(JLL,L)*CH(IL)/FN	FRC1020
	IF (DF(NL).LE.0.001) GO TO 90	FRC1030
	IF (PTIAL.LE.0.1) GO TO 100	FRC1040
	IF (NW(3).EQ.0) GO TO 120	FRC1050
	IF (LL.GE.MJW1(3,NL).AND.LL.LE.MJW2(3,NL)) GO TO 110	FRC1060
90	CAM=A7-(AZ-BZ)*YV(LL)/HALFR	FRC1070
	EPHA=XLL(I)-ATAN(CAM)	FRC1080
	CS=COS(EPHA)	FRC1090
	SS=SIN(EPHA)	FRC1100
	SC1=SIN(EPHA-XLL(I))	FRC1110
	CC1=COS(EPHA-XLL(I))	FRC1120
	GO TO 130	FRC1130
100	IF (NW(2).NE.0.AND.LL.LE.LPAN1) GO TO 90	FRC1140
	IF (NW(3).NE.0.AND.LL.LE.LPAN2) GO TO 90	FRC1150
110	EP=XLL(I)+DF(NL)	FRC1160
	CAM=A7-(AZ-BZ)*YV(LL)/HALFR	FRC1170
	EP=EP-ATAN(CAM)	FRC1180
	CS=COS(EP)	FRC1190
	SS=SIN(EP)	FRC1200
	SC1=SIN(EP-XLL(I))	FRC1210
	CC1=COS(EP-XLL(I))	FRC1220
	GO TO 130	FRC1230
120	IF (LL.GE.MJW1(2,NL).AND.LL.LE.MJW2(2,NL)) GO TO 110	FRC1240
	GO TO 90	FRC1250
130	CONTINUE	FRC1260
	CL(I)=CL(I)+GBS*CS	FRC1270
	CM(I)=CM(I)-GBS*XV(LL)*CS	FRC1280
	CD(I)=CD(I)+GBS*SS	FRC1290
	IF (LAT.NE.1.OP.ID.EQ.1) GO TO 140	FRC1300
	JJ=LL+IA	FRC1310
	WP=GAMP(JJ)*SN(JLL,L)*CH(IL)/FN	FRC1320
	WB=GAMB(JJ)*SN(JLL,L)*CH(IL)/FN	FRC1330
	WR=GAMR(JJ)*SN(JLL,L)*CH(IL)/FN	FRC1340
	CLPS=CLBS+WR*CK1*CC1	FRC1350
	CLPS=CLPS+WP*CK1*CC1	FRC1360
	CNPS=CNPS+WP*SC1*YLE(I)+WP*XV(LL)*SK*CC1	FRC1370
	CLPS=CLPS+WR*CK1*CC1	FRC1380
	CNPS=CNPS+WB*SC1*YLE(I)+WR*XV(LL)*SK*CC1	FRC1390
	CNPS=CNPS+WR*SC1*YLE(I)+WR*XV(LL)*SK*CC1	FRC1400
	CYRS=CYRS+GBS*SS*XV(LL)/HALFR	FRC1410
	CYRS=-CD(I)	FRC1420
140	CONTINUE	FRC1430

	CAMLE=CAMLER-(CAMLER-CAMLET)*YLF(I)/HALFR	FRC1440
	EPHA=XLL(I)-ATAN(CAMLE)	FRC1450
	CZ=COS(EPHA)	FRC1460
	DZ=SIN(EPHA)	FRC1470
	CL(I)=CL(I)*PI/CHORD+SECT(I)*DZ	FRC1480
	CM(I)=CM(I)*PI/(CREF*CHORD)	FRC1490
	CD(I)=CD(I)*PI/CHORD-SFCT(I)*CZ	FRC1500
	IF (LAT.NE.1.OR.ID.EQ.1) GO TO 150	FRC1510
	FS=COS(SWEEP(I))	FRC1520
	CTH=PI/2.*SQRT(1.-AM*AM*FS*FS)/FS	FRC1530
	CLRS=CLPS*PI/CHORD	FRC1540
	CLPS=CLPS*PI/CHORD	FRC1550
	CNPS=CNPS*PI/CHORD	FRC1560
	CNRS=CNRS*PI/CHORD	FRC1570
	CYPS=CYPS*BK*PI/CHORD	FRC1580
	CYRS=CYRS*PI/CHORD	FRC1590
	SSN=SIN(SWEEP(I))	FRC1600
	TAN=SSN/FS	FRC1610
	CTHS=CTH*TAN	FRC1620
	SIDE=CTHS*2.*CPF(1,I)*CPF(3,I)	FRC1630
	SIDF2=0.	FRC1640
	SIDF3=0.	FRC1650
	CNPS=CNPS*PI/CHORD-CTH*2.*CPF(1,I)*CPF(3,I)*YLF(I)	FRC1660
	CNPS=CNPS-SIDE*(CK1*XLE(I))	FRC1670
	CYPS=-CLPS*SK/CK1+SIDE*CK1	FRC1680
	CNRS=CNRS-SIDE2*YLE(I)-SIDF2*CK1*XLE(I)*TAN	FRC1690
	CNRS=CNRS-SIDF3*YLE(I)-SIDE3*CK1*XLE(I)*TAN	FRC1700
	CYRS=-CLRS*SK/CK1+CYRS	FRC1710
	CYRS=-CLRS*SK/CK1+CYRS	FRC1720
	CYPS=CYRS+SIDF2*CK1*TAN	FRC1730
	CYRS=CYRS+SIDF3*CK1*TAN	FRC1740
	CLPS=CLPS*PI/CHORD	FRC1750
150	CONTINUE	FRC1760
	IF (I.LT.NCOL) GO TO 160	FRC1770
	KLL=NCOL-1	FRC1780
	KC=KC+1	FRC1790
	NCOL=NCOL+M1(KC)-1	FRC1800
160	KL=I-KLL	FRC1810
	FM=M1(KC)	FRC1820
	AA=CHORD*SJ(KL,KC)*WIDTH(KC)/FM	FRC1830
	CLT=CLT+CL(I)*AA	FRC1840
	CMT=CMT+CM(I)*AA	FRC1850
	CDT=CDT+CD(I)*AA	FRC1860
	IF (LAT.NE.1.OR.ID.EQ.1) GO TO 170	FRC1870
	CYB=CYB+CYRS*AA	FRC1880
	CLB=CLB+CLPS*AA*YLE(I)	FRC1890
	CNP=CNP+CNRS*AA	FRC1900
	CLP=CLP+CLPS*AA*YLE(I)	FRC1910
	CYP=CYP+CYPS*AA	FRC1920

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	CNF=CNP+CNPS*AA	FRC1930
	CYR=CYR+CYRS*AA	FRC1940
	CLRF=CLRR+CLRS*AA*YLE(I)	FRC1950
	CNR=CNR+CNRS*AA	FRC1960
170	CONTINUE	FRC1970
	MM=(NCW-NW3)*I	FRC1980
	IF (LL.EG.MJW2(IU,NL)) NL=NL+1	FRC1990
180	CONTINUE	FRC2000
	IF (LAT.NE.1.OR.ID.FQ.1) GO TO 220	FRC2010
	SUM1=0.	FRC2020
	SUM2=0.	FRC2030
	SUM3=0.	FRC2040
	SUM4=0.	FRC2050
	SUM5=0.	FRC2060
	SUM6=0.	FRC2070
	KD=NDG	FRC2080
	ISN=1	FRC2090
	FN=NW(1)	FRC2100
	K1=1	FRC2110
	DO 210 J=1,NCW	FRC2120
	JJ=J	FRC2130
	IF (J.LE.NW(1)) GO TO 200	FRC2140
	IF (J.GT.(NW(1)+NW(2))) GO TO 190	FRC2150
	ISN=2	FRC2160
	FN=NW(2)	FRC2170
	JJ=J-NW(1)	FRC2180
	K1=2	FRC2190
	GO TO 200	FRC2200
190	ISN=3	FRC2210
	FN=NW(3)	FRC2220
	JJ=J-NW(1)-NW(2)	FRC2230
	K1=3	FRC2240
200	FJJ=JJ	FRC2250
	XQ=YCN(K1)+0.5*CHORDT(K1)*(1.-COS((2.*FJJ-1.)*PI/(2.*FN)))	FRC2260
	CK=CHORDT(K1)*2.*CPF(2,J)*CPF(4,J)*SN(JJ,ISN)/FN	FRC2270
	CK2=CHORDT(K1)*2.*CPF(2,J)*CPF(6,J)*SN(JJ,ISN)/FN	FRC2280
	CK3=CHORDT(K1)*2.*CPF(2,J)*CPF(8,J)*SN(JJ,ISN)/FN	FRC2290
	COT=SQRT(1.-SNG(KD)*SNG(KD))	FRC2300
	CK=CK*COT	FRC2310
	CK2=CK2*COT	FRC2320
	CK3=CK3*COT	FRC2330
	SUM1=SUM1+CK	FRC2340
	SUM3=SUM3+CK2	FRC2350
	SUM4=SUM4+CK2*XQ	FRC2360
	SUM5=SUM5+CK3	FRC2370
	SUM6=SUM6+CK3*XQ	FRC2380
210	SUM2=SUM2+CK*XQ	FRC2390
	SUM1=SUM1*PI*2.	FRC2400
	SUM2=SUM2*PI*2.	FRC2410

	CYP=CYP+SUM1	FRC2420
	CNP=CNP-SUM2	FRC2430
	CYP=CYP+SUM3*PI*2.	FRC2440
	CNP=CNP-SUM4*PI*2.	FRC2450
	CYP=CYP+SUM5*PI*2.	FRC2460
	CNP=CNP-SUM6*PI*2.	FRC2470
220	CONTINUE	FRC2480
	CLT=CLT*PI/(2.*HALFSW)	FRC2490
	CMT=CMT*PI/(2.*HALFSW)	FRC2500
	CDT=CDT*PI/(2.*HALFSW)	FRC2510
	IF (LAT.NE.1.OP.ID.EQ.1) GO TO 230	FRC2520
	CYP=CYP*PI/(2.*HALFSW)/BK	FRC2530
	CLP=-CLP*PI/(4.*HALFSW*HALFB)	FRC2540
	CNP=CNP*PI/(4.*HALFSW*HALFB)/PK	FRC2550
	CLP=-CLP*PI/(4.*HALFSW*HALFB)	FRC2560
	CYP=CYP*PI/(2.*HALFSW)	FRC2570
	CNP=CNP*PI/(4.*HALFSW*HALFB)	FRC2580
	CYP=CYP*PI/(2.*HALFSW)	FRC2590
	CLRR=-CLRR*PI/(4.*HALFSW*HALFB)	FRC2600
	CNP=CNP*PI/(4.*HALFSW*HALFB)	FRC2610
	CLB=CLP/PK	FRC2620
230	CONTINUE	FRC2630
	RETURN	FRC2640
	END	FRC2650-
	SUBROUTINE FUSLFT (CPF,HALFSW,CFFF,SS,CS,L,X1)	FLF 10
	DIMENSION AW(21), CST(15), CTL(20), RP(20), (PF(10,1), CA(20)	FLF 20
	COMMON /FUS/ XF(20),XCF(20),RF(20),SNP(5,20),XLEF,XTEF,WA'D(20),NCFLF	FLF 30
	IUM,NF,NT,CSF(5,10),XAS(6),AKF(5),F0,F10,KF,NTL	FLF 40
	PI=3.14159265	FLF 50
	SLEATH=XTEF-XLEF	FLF 60
	TH1=SNP(5,20)	FLF 70
	NH1=SNP(5,19)	FLF 80
	DO 10 I=1,NF	FLF 90
	XC=XF(I)	FLF 100
10	RP(I)=FUR(XC)	FLF 110
	IF (L.NE.0) GO TO 20	FLF 120
20	CONTINUE	FLF 130
	CNF=0.	FLF 140
	CAF=0.	FLF 150
	CMF=0.	FLF 160
	DO 50 I=1,NCUM	FLF 170
	IF (NH1.NE.0.AND.I.LE.NH1) GO TO 30	FLF 180
	FI=I-NH1	FLF 190
	FCUM=NCUM-NH1	FLF 200
	PP=PI-TH1	FLF 210
	TP=TH1	FLF 220
	GO TO 40	FLF 230
30	FI=I	FLF 240
	FCUM=NH1	FLF 250

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	PP=TH1	FLF 260
	TP=0.	FLF 270
40	CONTINUE	FLF 280
	THETA=(2.*FI-1.)*PP/(2.*FCUM)+TP	FLF 290
	IF (L.GE.?) CST(I)=SIN(THETA)	FLF 300
50	IF (L.LT.?) CST(I)=COS(THETA)	FLF 310
	FNK=NKF(1)	FLF 320
	SL=XAS(2)-XAS(1)	FLF 330
	MM=NKF(1)	FLF 340
	NC=1	FLF 350
	NN=0	FLF 360
	DO 90 I=1,NF	FLF 370
	CPTL=0.	FLF 380
	IP=I-NN	FLF 390
	DO 80 K=1,NCUM	FLF 400
	IF (NH1.NE.0.AND.K.LE.NH1) GO TO 60	FLF 410
	FCUM=NCUM-NH1	FLF 420
	PP=PI-TH1	FLF 430
	GO TO 70	FLF 440
60	FCUM=NH1	FLF 450
	PP=T-1	FLF 460
70	CONTINUE	FLF 470
80	CPTL=CPTL+CPF(K,I)*CST(K)*PP/FCUM	FLF 480
	CTL(I)=-2.*CPTL	FLF 490
	GB=RP(I)*SNP(NC,IP)*CTL(I)*SL/(2.*FNK)	FLF 500
	CA(I)=GE*FNK/SL	FLF 510
	X=XF(I)	FLF 520
	S=SLFNTF	FLF 530
	DRX=SLOP(X)/RP(I)	FLF 540
	CAF=CAF+GB*DRX	FLF 550
	CNF=CNF+GP	FLF 560
	CMF=CMF+GR*XF(I)	FLF 570
	IF (I.LT.MM.OR.I.EQ.NF) GO TO 90	FLF 580
	NC=NC+1	FLF 590
	NN=MM	FLF 600
	MM=MM+NKF(NC)	FLF 610
	SL=XAS(NC+1)-XAS(NC)	FLF 620
	FNK=NKF(NC)	FLF 630
90	CONTINUE	FLF 640
	ICK=0	FLF 650
	IF (ABS((XAS(2)-XTEF)/SLFNTF).GT.0.01) GO TO 130	FLF 660
	ICK=1	FLF 670
	FNF=NF	FLF 680
	NF1=NF+1	FLF 690
	DO 110 J=1,NF1	FLF 700
	AW(J)=0.	FLF 710
	FJ=J	FLF 720
	DO 100 K=1,NF	FLF 730
	FK=K	FLF 740

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100  AW(J)=AW(J)+CA(K)*COS((FJ-1.)*(2.*FK-1.)*PI/(2.*FNF))      FLF 750
      IF (J.EQ.1) AW(J)=AW(J)/FNF                                  FLF 760
      IF (J.NE.1) AW(J)=AW(J)*2./FNF                              FLF 770
110  CONTINUE                                                       FLF 780
C                                          FLF 790
C * EMPIRICAL METHOD TO FIND THE STATION AT WHICH THE FLOW CEASES TO REFL F 800
C POTENTIAL. SEE DATCOM *                                          FLF 810
      X0=0.37P+0.527*X1                                           FLF 820
      TH=ACOS(1.-2.*X0)                                           FLF 830
      SUM=AW(1)*TH                                                FLF 840
      SMM=-AW(1)*SIN(TH)-0.5*AW(2)*(TH+0.5*SIN(2.*TH))          FLF 850
      DO 120 J=1,NF                                               FLF 860
      FJ=J                                                           FLF 870
      IF (J.GE.2) SMM=SMM-0.5*AW(J+1)*(SIN((FJ-1.)*TH)/(FJ-1.)+SIN((FJ+1 FLF 880
1.)*TH)/(FJ+1.))                                                FLF 890
120  SUM=SUM+AW(J+1)*SIN(FJ*TH)/FJ                                FLF 900
      SMM=SMM+SUM                                                  FLF 910
      SUM=SUM*SLENTH/(2.*HALFSW)                                   FLF 920
      SMM=-SMM*SLENTH**2/(4.*HALFSW*CPFF)                         FLF 930
      SMM=SMM-XLFF/CPFF*SUM                                        FLF 940
130  CONTINUE                                                       FLF 950
      IF (L.NE.0) GO TO 150                                         FLF 960
      WRITE (6,190)                                                FLF 970
      WRITE (6,200)                                                FLF 980
      DO 140 I=1,NF                                               FLF 990
      XC=XF(I)/SLENTH                                             FLF1000
140  WRITE (6,180) XC,RP(I),CTL(I)                                FLF1010
150  CONTINUE                                                       FLF1020
      CLF=CNF*CS+CAF*SS                                           FLF1030
      CDF=CNF*SS-CAF*CS                                           FLF1040
      CDF=CDF*PI/(2.*HALFSW)                                       FLF1050
      CLF=CLF*PI/(2.*HALFSW)                                       FLF1060
      CMF=-CMF*PI/(2.*HALFSW*CPFF)                                  FLF1070
      SS=CLF                                                         FLF1080
      CS=CMF                                                         FLF1090
      IF (ICK.EQ.0) GO TO 160                                       FLF1100
      CLF=SUM                                                       FLF1110
      SS=CLF                                                         FLF1120
      CS=SMM                                                         FLF1130
160  CONTINUE                                                       FLF1140
      IF (L.NE.0) GO TO 170                                       FLF1150
      WRITE (6,220) CLF                                           FLF1160
      WRITE (6,210) CMF                                           FLF1170
170  CONTINUE                                                       FLF1180
      RETURN                                                         FLF1190
C                                          FLF1200
180  FORMAT (11F12.5)                                             FLF1210
190  FORMAT (/5X,63HTOTAL PRESSURE LOADING AT EACH X-STATION, BASED ON FLF1220
      1LOCAL RADIUS)                                             FLF1230

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	J=0	CPF 460
	IF (L.NE.0) J=1	CPF 470
20	CONTINUE	CPF 480
	II=I+NF*(J-1)+LTCTAL	CPF 490
	FNK=NKF(1)	CPF 500
	SL=XAS(2)-XAS(1)	CPF 510
	MM=NKF(1)	CPF 520
	NC=1	CPF 530
	NN=0	CPF 540
	FJ=J	CPF 550
	U(J+1)=0.	CPF 560
	V(J+1)=0.	CPF 570
	IF (J.GT.2.AND.I.EQ.NF) GO TO 70	CPF 580
	RFL=-((A1+A2)/RF(I))**J/A2	CPF 590
	RF0=-((XP+A6)/RF(I))**J/A6	CPF 600
	IF (J.LT.2) GO TO 30	CPF 610
	RFTL=0.	CPF 620
	RFT0=0.	CPF 630
30	CONTINUE	CPF 640
	DO 60 KC=1,NF	CPF 650
	IP=KC-NN	CPF 660
	B1=XF(I)-XF(KC)	CPF 670
	P2=SQRT(B1*P1+PP*RF(I)*RF(I))	CPF 680
	RFX=-((P1+B2)/RF(I))**J/P2	CPF 690
	KK=KC+NF*(J-1)+LTCTAL	CPF 700
	IF (J.EQ.0) GO TO 40	CPF 710
	U(J+1)=U(J+1)-(P(KK)-P(II))*RFX*SNP(NC,IP)*SL/FNK	CPF 720
	IF (J.EQ.0) GO TO 50	CPF 730
	RFTX=-((B1+B2)/RF(I))**J/FJ	CPF 740
	V(J+1)=V(J+1)+P(KK)*SNP(NC,IP)*(RFTX-RFTL)*SL/FNK	CPF 750
	GO TO 50	CPF 760
40	U(J+1)=U(J+1)-(WARD(KC)-WARD(I))*RFX*SNP(NC,IP)*SL/FNK	CPF 770
50	IF (KC.LT.MM.OR.KC.EQ.NF) GO TO 60	CPF 780
	NC=NC+1	CPF 790
	NN=MM	CPF 800
	MM=MM+NKF(NC)	CPF 810
	SL=XAS(NC+1)-XAS(NC)	CPF 820
	FNK=NKF(NC)	CPF 830
60	CONTINUE	CPF 840
	IF (J.EQ.1) V(J+1)=(-V(J+1)*0.5*PI+(RFTL-RFT0)*F10)/(4.*PI)	CPF 850
	IF (J.GT.1) V(J+1)=(-V(J+1)*0.5*PI)/(4.*PI)	CPF 860
	IF (J.EQ.0) U(J+1)=-((FL*RFL-F0*RF0+U(J+1)*0.5*PI-WARD(I)*ALCG((A1+CP	CPF 870
	1A2)/(XP+A6)))/(4.*PI)	CPF 880
	IF (J.EQ.1) L(J+1)=-((FL1*PFL-F10*RF0+U(J+1)*0.5*PI+B(II)/FJ*(RFL*AC	CPF 890
	12-RF0*A6)))/(4.*PI)	CPF 900
	IF (J.GT.1) L(J+1)=-((U(J+1)*0.5*PI+B(II)/FJ*(RFL*A2-RF0*A6)))/(4.*P	CPF 910
	1I)	CPF 920
	V(J+1)=V(J+1)/RF(I)	CPF 930
70	CONTINUE	CPF 940

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	J=J+1	CPF 950
	IF (J,LE,N) GO TO 20	CPF 960
	N1=2	CPF 970
	IF (L,NE,0) N1=N+1	CPF 980
	DO 140 K=1,NT	CPF 990
	IF (NH1,NE,0.AND,K,LE,NH1) GO TO #0	CPF1000
	FK=K-NH1	CPF1010
	FT=NT-NH1	CPF1020
	PP=PI-TH1	CPF1030
	TP=TH1	CPF1040
	GO TO 90	CPF1050
80	FK=K	CPF1060
	FT=NH1	CPF1070
	PP=TH1	CPF1080
	TP=0.	CPF1090
90	CONTINUE	CPF1100
	THETA=(2.*FK-1.)*PP/(2.*FT)+TP	CPF1110
	SINTA=SIN(THETA)	CPF1120
	COSTA=COS(THETA)	CPF1130
	PHIX=0.	CPF1140
	PHIT=0.	CPF1150
	DO 100 J=NZ,#1	CPF1160
	FJ=J	CPF1170
	IF (L,LE,1) PHIX=PHIX+U(J)*COS((FJ-1.)*THETA)	CPF1180
	IF (L,GT,1) PHIX=PHIX+U(J)*SIN((FJ-1.)*THETA)	CPF1190
	IF (L,LE,1) PHIT=PHIT+V(J)*(FJ-1.)*SIN((FJ-1.)*THETA)	CPF1200
100	IF (L,GT,1) PHIT=PHIT-V(J)*(FJ-1.)*COS((FJ-1.)*THETA)	CPF1210
	X=XF(I)	CPF1220
	Y=RF(I)*SINTA	CPF1230
	Z=RF(I)*COSTA	CPF1240
	CALL UFW (X,Y,Z,SINTA,COSTA,LAST,LPAFL,BB,LPA1,NW,B,VX,VT,JL,LPC	CPF1250
	IAN2,NCJ,MJJ,L,NJF,NP)	CPF1260
	PHIX=PHIX+VX	CPF1270
	PHIT=PHIT+VT	CPF1280
	IF (L,NE,0) GO TO 110	CPF1290
	DRX=SLOP(X)	CPF1300
	DRX=DRX/RF(I)	CPF1310
	SRX=1./SQRT(1.+DRX*DRX)	CPF1320
	DRX=(CS+U(1))*DRX*SRX	CPF1330
	UVFL=CS+PHIX	CPF1340
	VDIF=1.-UVFL**2-DRX**2	CPF1350
	PHIT=PHIT-SS*SINTA	CPF1360
	IF (JL,EG,LAST) WRITE (06) PHIX,PHIT	CPF1370
	IF (JL,EG,0) WRITE (07) PHIX,PHIT	CPF1380
	GO TO 120	CPF1390
110	IF (JL,EG,LAST) READ (08) PX,PT	CPF1400
	IF (JL,EG,0) READ (07) PX,PT	CPF1410
C	VDIF=-2.*(1.+PX)*PHIX+2.*AM*AM*PX*PHIX	CPF1420
	VDIF=-2.*PHIX	CPF1430

120	CONTINUE	CPF1440
	IF (AM.LE.0.1) GO TO 130	CPF1450
	IF (L.NF.0) GO TO 130	CPF1460
	CPF(K,I)=VDIF+AM*AM*PHIX*PHIX	CPF1470
	GO TO 140	CPF1480
130	CPF(K,I)=VDIF	CPF1490
140	CONTINUE	CPF1500
150	CONTINUE	CPF1510
	RETURN	CPF1520
C		CPF1530
	END	CPF1540-
	SUPROUTINE SDWJ (WK,X,Y,Z,GAMMA,LPANEL,ISYM)	SDW 10
	DIMENSION GAMMA(1)	SDW 20
	COMMON /GEOM/ HALFSW,XCP(200),YCP(200),ZCP(200),XLE(50),YLE(50),XTSDW	SDW 30
	1E(50),PSI(20),CH(95),XV(200),YV(100),SN(8,8),XN(200,2),YN(200,2),ZSDW	SDW 40
	2N(200,2),WIDTH(8),YCON(25),SWFFP(50),HALFR,SJ(21,8),EX(95,2),TX(95	SDW 50
	3,2),SC(160,5),SI(160,5),LC(3)	SDW 60
	COMMON /CONST/ NCS,NCW,M1(8),NSJ,NCJ(5),LAST,MJW1(3,5),MJW2(3,5),JSDW	SDW 70
	1PANEL,MJJ(5),NW(3),NNJ,NJP	SDW 80
	COMMON /AERO/ AM1,AM2,R1,R2,CL(30),CT(30),CD(30),GAM(2,130)	SDW 90
	ISN=1	SDW 100
	I7=NCS	SDW 110
	IF (NW(2).NE.0) IZ=I7+NCS	SDW 120
	IF (NW(3).NE.0) IZ=IZ+NCS	SDW 130
	IZ=IZ+1	SDW 140
	IF (NW(2).NE.0) ISN=ISN+1	SDW 150
	IF (NW(3).NE.0) ISN=ISN+1	SDW 160
	WK=C.	SDW 170
	IFF=LPANEL	SDW 180
	IND=1	SDW 190
	MM=LPANEL+NCJ(1)	SDW 200
	NN=NCJ(1)	SDW 210
	LAST1=LAST-1	SDW 220
	L1=LPANEL+1	SDW 230
	J1=LPANEL+1	SDW 240
	DO 70 J=J1, LAST	SDW 250
	JJ=J-LPANEL+JPANEL	SDW 260
	MI=J-IFF	SDW 270
	FN=NN	SDW 280
	IF (J.LT.MJJ(IND)) NN=NCJ(IND)	SDW 290
	CHCRD=CH(I7)	SDW 300
	IF (J.EQ.L1) GO TO 10	SDW 310
	GO TO 20	SDW 320
10	ISN=ISN+1	SDW 330
	L1=MJJ(IND)+1	SDW 340
20	NL=MJJ(IND)-1	SDW 350
	IF (NL.EQ.LAST1) GO TO 30	SDW 360
	IF (J.EQ.NL) IND=IND+1	SDW 370
30	CONTINUE	SDW 380

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	X1=XN(J,1)-X	SDW 390
	X2=XN(J,2)-X	SDW 400
	X12=XN(J,2)-XN(J,1)	SDW 410
	Y12=YN(J,2)-YN(J,1)	SDW 420
	Z12=ZN(J,2)-ZN(J,1)	SDW 430
	Z1=ZN(J,1)-Z	SDW 440
	Z2=ZN(J,2)-Z	SDW 450
	X7J=X1*Z12-Z1*X12	SDW 460
	DO 60 II=1,2	SDW 470
	FCP=1.	SDW 480
	IF (II,FG.2) FCP=-1.	SDW 490
	YC=Y*FCP	SDW 500
	Y1=YN(J,1)-YC	SDW 510
	Y2=YN(J,2)-YC	SDW 520
	XYK=X1*Y12-Y1*X12	SDW 530
	Y7I=Y1*Z12-Z1*Y12	SDW 540
	ALP1=XYK*XYK+X7J*XZJ+B1*Y7I*YZI	SDW 550
	R1P1=SQRT(X1*X1+R1*Y1*Y1+R1*Z1*Z1)	SDW 560
	R2P1=SQRT(X2*X2+R1*Y2*Y2+R1*Z2*Z2)	SDW 570
	UUP1=(X2*X12+R1*Y2*Y12+R1*Z2*Z12)/R2P1-(X1*X12+R1*Y1*Y12+R1*Z1*Z12)	SDW 580
	1)/R1P1	SDW 590
	G1P1=(1.-X1/R1P1)/(Y1*Y1+Z1*Z1)	SDW 600
	G2P1=(1.-X2/R2P1)/(Y2*Y2+Z2*Z2)	SDW 610
	IF (ALP1.LE.1,F-4) GO TO 40	SDW 620
	F1=-(UUP1*XZJ/ALP1)*2.*FCP	SDW 630
	GO TO 50	SDW 640
40	F1=0.	SDW 650
50	CONTINUE	SDW 660
	F2=(Z2*G2P1-Z1*G1P1)*2.*FCP	SDW 670
50	WK=LK+(F1+F2)*CHCRD*SN(MI,ISN)*GAMMA(JJ)*FCP/(R.*FN)	SDW 680
	IF (J.LT.MM) GO TO 70	SDW 690
	IZ=IZ+1	SDW 700
	IFF=MM	SDW 710
	MM=MM+NN	SDW 720
70	CONTINUE	SDW 730
	RETURN	SDW 740
	END	SDW 750~

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16 Abstract <p>This document describes in detail the necessary information for using a computer program to calculate the aerodynamic characteristics under symmetrical flight conditions and the lateral-directional stability derivatives of wing-body combinations with upper-surface-blowing (USB) or over-wing-blowing (OWB) jets. This program is an updated version of that described in NASA TM X-73987. In addition to the features and restrictions described in NASA TM X-73987, the following new features have been added to the program: (1) a fuselage of arbitrary body of revolution has been included. The effect of wing-body interference can now be investigated, and (2) all nine lateral-directional stability derivatives can be calculated.</p> <p>The program is written in Fortran language and runs on CDC Cyber 175 and Honeywell 66/60 computers. It is available from COSMIC of the University of Georgia, Athens, Georgia.</p>					
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