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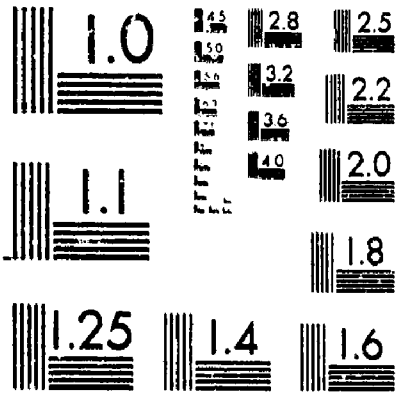

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Production Version of the Extended NASA-Langley Vortex Lattice FORTRAN Computer Program - Volume I - User's Guide

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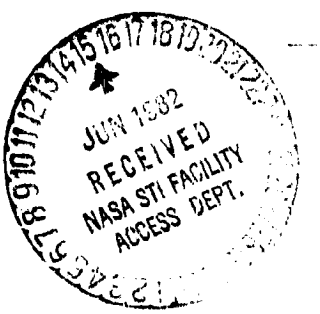

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2 INTRODUCTION

The NASA - Langley Vortex Lattice FORTRAN Program (VLM) is designed to estimate the subsonic aerodynamic characteristics of up to four complex planforms. The concepts embodied in this program are mostly detailed in references 1 and 2; this document is intended to serve as an update to these references and include the additional concept of reference 3 for users of this program.

Basically, the VLM program is a segmented program designed to run on the CDC computers with the NOS operating system, as described in reference 4. The run time will vary with different applications, but the field length is constant and requires 130K (octal) words of memory. This document describes the input to the program, sample cases (Appendix A) and the required NOS job card setup.

3 MODELING THE CONFIGURATION

The configuration can be modeled with up to four planforms, all of which must extend to the plane of symmetry (Y = 0.0). The fuselage is represented by its planar projection; experience to date indicates that this produces acceptable global forces and moments for most wing-body-tail configurations.

Winglets can be modeled, but the dihedral angle must be less than 90.0 degrees and greater than -90.0 degrees. Both upper (positive dihedral) and lower (negative dihedral) winglets can be accounted for in this code. The program uses as its solution surface the chord plane which may be inclined due to dihedral. Moreover, the only out of "X-Y plane" displacement specifically allowed for is dihedral. Local camber and twist is assumed to be small and can be represented by its slope projection to the local solution surface. The wind and body axes are assumed to be coincidental in the code.

4 RUNNING THE PROGRAM

4.1 INPUT DATA SETUP

The very first card of input is the Title card, and the user can have up to 80 characters of free field information on it about the data being run. This is only used by the program as a header for output. Note that there is only one title card per input deck. The actual input data to VLM is organized into two distinct groups - group 1 defines the reference planform(s), and group 2 defines the details for the particular solution. See figure 1 for the input data layout. The individual details of the items in the deck layout are given in the following sections.

4.2 GROUP 1 DATA

This group of data defines the planform(s) projected into the X-Y plane, with all the coordinates being given for the left half of the configuration. The axis system is shown in figure 2. The Y = 0 intercept coincides with the plane of symmetry and is positive to the right of this plane. The X = 0 intercept may be taken to occur anywhere along the symmetry plane of the configuration; X is positive pointing into the wind. All cards use the 8F10.6 format for the group 1 data. The fields in this group are as follows:

1. (Cols.1-10) PLAN - Number of planforms for this configuration; PLAN can assume values of 1.0, 2.0, 3.0, or 4.0.

2. (Cols.11-20) TOTAL - Number of sets of group 2 data specified for this configuration. The maximum number of data sets is limited by the computation time (specified by the user) and the print limit (50000 lines).

3. (Cols.21-30) CREF - Reference chord of the configuration. This chord is used only to nondimensionalize the pitching-moment terms and must be greater than zero.

4. (Cols.31-40) SREF - Reference area; this is used only to nondimensionalize the computed output data such as lift and pitching moment and must always be greater than zero.

5. (Cols.41-50) XLOCTN - Pitching moment reference point location relative to the coordinate origin and along the X axis.

6. (Cols.51-60) CTILDA - Characteristic chord in the augmented vortex lift computations (see reference 3.)

7. (Cols.61-70) XTILDA - X location of the centroid of augmented vortex lift.

8. (Cols.71-80) DISTALE - Distance along the leading edge where

the vortex flow is developed that leads to the augmented vortex lift.

The data required to define the planform(s) is provided in the next set of group 1 cards as follows:

1. (Cols.1-10) AAN - Number of line segments used to define the left half of the planform (does not include the innermost streamwise edge). A maximum of 24 line segments may be used per planform, and each planform must extend to the plane of symmetry.

2. (Cols.11-20) XS - X location of the pivot; use 0.0 for a fixed planform.

3. (Cols.21-30) YS - Y location of the pivot; use 0.0 for a fixed planform.

4. (Cols.31-40) RTCDHT - Vertical distance of the particular planform being read in with respect to the reference planform root chord height; use 0. for the reference planform.

5. (Cols.41-50) STLOIND - Streamwise load indicator; Set this value to 0. if the loading along the entire outer streamwise edge or at the outermost breakpoint of this planform is to be 0.0. If the loading is to be non-zero along the entire edge, or at the outermost breakpoint, set this indicator to 1.0

The rest of this set of data describes the breakpoints used to define the AAN line segments on this planform. There are ANN + 1 breakpoints and all data subsequently described are required on all except the last card of this set; the last card uses only the first two variables in the following list:

1. (Cols.1-10) XREG(I) - X location of the ith breakpoint. The first breakpoint is located at the most inboard location of the leading edge for the left-hand side of this planform. The

other breakpoints are numbered around the planform perimeter in increasing order for each intersection of lines in a counterclockwise direction.

2. (Cols.11-20) YREG(I) - Y location of the ith breakpoint. Once the absolute value of Y starts to decrease, it cannot be increased.

3. (Cols.21-30) DIH(I) - Dihedral angle (degrees) in the Y-Z plane of the line from breakpoint i to i+1, positive upward. Note that along a streamwise line, the dihedral angle is not defined, so use 0.0. for these lines. Note the sign of the dihedral angle is the same along the leading and trailing edges.

4. (Cols.31-40) AMCD - The move code; this number indicates whether the line segment is on the movable panel of a variable-sweep wing. Use 1.0 for a fixed line (defaults to 1.0 if not set), or 2.0 for a movable line.

4.3 GROUP 2 DATA

There are five different sections of data that comprise the group 2 data. All five cannot be used together. However, the first section of data must always be used, either alone or in combination with one or more of the others. This first section is a single card that describes the details of the particular configuration for which the loading is desired. This card requires a format of: 2A10, 8F5.2, 7F2.0.

4.3.1

Section one data is to be supplied in the following order:

1. (Cols.1-20) CONFIG - An arbitrary configuration designation of up to 20 alphanumeric characters.

2. (Cols.21-25) SCW - The number of chordwise horseshoe vortices to be used at a spanwise station for each planform. The maximum value for this variable is 20. If varying values of chordwise horseshoe vorticies are desired due to either multiple planforms or large discontinuities in chord across the span, the user can input a value of 0. that will cause the program to expect user-supplied data at this point in the input stream. The data are in the form of a table that contains the number of chordwise horseshoe vortices from the tip to root, and is called TBLSCW(I). This SCW=0. option can only be used for planforms without dihedral and for coplanar configurations. SCW must be greater than, or equal to, 2. for cambered wing vortex flow aerodynamic and KV,se solutions.

3. (Cols.26-30) VIC - The nominal number of spanwise stations at which chordwise horseshoe vortices will be located. This variable must not cause more than 100 spanwise stations to be used by the program in describing the left half of the configuration. In addition, the product of the stations spanwise and SCW cannot exceed 400. If SCW is 0., then the sum of the values in TBLSCW(I) cannot exceed 400. The use of variable VIC is discussed in references 1 and 2. VIC should always be greater than, or equal to, 10. so that the near-field drag or vortex flow forces on cambered configurations can be properly computed.

4. (Cols.31-35) MACH - Mach number; use a value other than 0.0 only if the Prandtl-Glauert compressibility correction factor is to be applied. The value used should be less than that of the critical Mach number.

5. (Cols.36-40) CLDES - Desired lift coefficient, CL,d. The number specified here is used to obtain the span load distribution at a particular lift coefficient. If the drag polar is required over a CL range from -0.1 to 1.0, use CLDES = 11.; if the vortex flow aerodynamic characteristics are required on a cambered and/or twisted configuration, use CLDES=100.0 (see page 19).

6. (Cols.41-45) SA(1) - Variable sweep angle for the first planform. Specify the leading edge sweep-angle (in degrees)

for the first movable line adjacent to the fixed portion of the planform. For a fixed planform, this quantity may be omitted.

7. (Cols.46-50) SA(2) - same, for the second planform.

8. (Cols.51-55) SA(3) - same, for the third planform.

9. (Cols.56-60) SA(4) - same, for the fourth planform.

10. (Cols.61-62) TWIST(1) - Twist code for the first planform. If this planform has no twist and/or camber, use a value of 0.; otherwise, specify a value of 1. or 2. Use 1. if the data in section four is in radians; use a 2. if the data is in degrees.

11. (Cols.63-64) TWIST(2) - same, for the second planform.

12. (Cols.65-66) TWIST(3) - same, for the third planform.

13. (Cols.67-68) TWIST(4) - same, for the fourth planform.

14. (Cols.69-70) PTEST - Clp indicator; if the damping-in-roll parameter is desired, use 1.0 for this quantity. Except for the Delta Cp and Clp, all other aerodynamic data will be omitted. Use a 0. if Clp is not required.

15. (Cols.71-72) QTEST - CLq and Cmq indicator; if these stabilty derivatives are desired, use a 1.0 for this quantity. Except for Delta Cp, CLq, and Cmq, all other aerodynamic data will be omitted. It should be noted that both PTEST and QTEST cannot be set equal to 1. simultaneously for a particluar configuration. Use 0. if CLq and Cmq are not required.

16. (Cols.73-74) ATPCOD - Set to 0., it will cause only linear aerodynamic results to be printed out. Set to 1., this will cause the program to print out the contributions to the lift, drag and moment from the separated flow around the leading/side edges. Set to 2., it will provide the local flow field velocities away from the configuration, and set to 3., it will provide the attached flow longitudinal load distribution (see page 19).

Section one data can exist alone, or in combination with sections two, three, four or five data.

4.3.2

The second section of data consists of two cards and is required if ATPCOD=1. These cards contain the limits of integration used in the computations of the wing leading-edge and side-edge suction values. If the configuration does not have side edges, input zeroes for the values of XL(I) and XT(I) on the second card. The format of these two cards is 8F10.6 and the fields are as follows:

First Card -

1. (Cols.1-10) YINNER(1) - Represents the Y inner for the first planform.
2. (Cols.11-20) YOUTER(1) - Represents the Y outer for the first planform.
3. (Cols.21-30,31-40) YINNER(2), YOUTER(2) - same, for the second planform.
4. (Cols.41-50,51-60) YINNER(3), YOUTER(3) - same, for the third planform.
5. (Cols.61-70,71-80) YINNER(4), YOUTER(4) - same, for the fourth planform.

Second Card -

1. (Cols.1-10) XL(1) - The leading edge tip X-coordinate for the first planform.
2. (Cols.11-20) XT(1) - The trailing edge tip X-coordinate for the first planform.
3. (Cols.21-30,31-40) XL(2), XT(2) - same, for the second planform.

4. (Cols.41-50,51-60) XL(3), XT(3) - same, for the third planform.

5. (Cols.61-70,71-80) XL(4), XT(4) - same, for the fourth planform.

4.3.3

The third section of data is required when SCW = 0.0 and the number of horseshoe vortices used at each spanwise station is not constant; this data set consists of two or more cards. The first card for each planform set contains the number of spanwise stations, STA, for that planform and is followed by the cards containing the values of TBLSCW(I) for that planform. The format of these cards is 16F5.1 and the fields are as follows:

1. (Cols.1-5) STA - Number of spanwise stations of horseshoe vortices on the left half of the planform. This variable sets the number of TBLSCW values read in for that planform.

2. (Cols.1-5,6-10,etc.) TBLSCW(I) - Number of horseshoe vortices at each spanwise station beginning at the station nearest the tip of the first planform and proceeding toward the station nearest the root.

These sets of STA and TBLSCW(I) cards are to be repeated for each planform. The sum of all the STA values cannot exceed 100.

4.3.4

Section four data are described as follows: if the configuration has

twist and/or camber (TWIST(I) $\neq$ 0.), the local angles of attack are to be specified. If the configuration has no twist/camber, the program will set them equal to zero. If the configuration consists of more than one planform, local angles of attack may be specified for any or all of the planforms. A nonzero twist code requires that these values be input to the program. The format is 8F10.6.

1. (Cols.1-10,11-20,etc.) ALP - Local streamwise angles of attack, eg. camber slope, twist and/or flap deflection, in radians if TWIST = 1., or in degrees if TWIST = 2. These are the values at the control point for each horseshoe vortex on the planform when the innermost streamwise edge of the reference planform has an angle of attack of 0. degrees. The volume of this data will usually require several input cards. For the first value on the first card, use the local angle of attack for the horseshoe vortex nearest the first planform leading edge at the tip; for the second value, use the angle of attack for the horseshoe vortex immediately behind in the chordwise direction. Continue in the same manner for the rest of the horseshoe vortices at the tip. Begin a new card for the next inboard station and input the data in the same chordwise manner. Repeat for all successive inboard spanwise stations on that planform. For each planform with twist/camber, start the data on a new card and specify the data from the tip and proceed chordwise and then inboard, as detailed above.

4.3.5

Section five data is used if the flow field option is to be exercised; i.e., ATPCOD = 2. and CLDES is not equal to 11. or 100. The data consists of two or more cards; the number of field lines where the flow is to be determined will go on the first card by itself, and will be followed by the specific details of each field line on succeeding

cards. The format of these cards is 8F10.6 and the fields are as follows:

1. (Cols.1-10) TOTFL - Total number of field lines. This also controls the reading of the field line data cards (maximum of 60); each of which contains the following items:

1. (Cols.1-10) XDOWN - X location where the field line intersects the plane of symmetry. (positive forward)

2. (Cols.11-20) SWEP - Sweep angle of field line in X-Y plane in degrees. (sweepback is positive and -90. deg. < SWEP < 90. deg.)

3. (Cols.21-30) ZREF - Z height of the field line at the plane of symmetry. (positive down)

4. (Cols.31-40) DIHED - Dihedral angle of the field line in the Y-Z plane, in degrees. (standard convention is employed to determine the positive angle and -90. deg. < DIHED < 90. deg.)

5 OUTPUT DATA

The printed results of this computer program appear in two parts: geometry data and aerodynamic data.

5.1 GEOMETRY DATA

The geometry data are described in the order that they are found on the printout.

5.1.1

The first group of the data describes the basic configuration: it states the numbers of lines used to describe each planform, the root chord height, pivot position, and then lists the breakpoints, sweep and dihedral angles, and move codes. These data are basically a listing of input data except that the X coordinates are adjusted to the reference point location and the sweep angle is computed from the input.

5.1.2

The second group of data describes the particular configuration for which the aerodynamic data are being computed. Included are the configuration designation, sweep position, a listing of the breakpoints of the planform (X,Y,and Z), the sweep and dihedral angles, and the move codes. The data are listed primarily for variable-sweep wings to provide a definition of the planform where the outer panel sweep is different from that of the reference planform. This is followed by a "printer plot" of the approximate configuration.

5.1.3

The third group of data presents a detailed description of the horseshoe vortices used to represent the configuration. These data are listed in nine columns with each line describing one elemental panel of the configuration (see figure 3) in the same order that the twist

and/or camber angles of attack are to be provided. The following items of data are presented for each elemental panel:

1. X C/4 - X location of quarter-chord at the horseshoe vortex midspan.
2. X 3C/4 - X location of three-quarter-chord at the horseshoe vortex midspan. This is the X location of the control point.
3. Y - Y location of the horseshoe vortex midspan.
4. Z - Z location of the horseshoe vortex midspan.
5. S - Semiwidth of horseshoe vortex.
6. C/4 SWEEP ANGLE - Sweep angle of the quarter-chord of the elemental panel and horseshoe vortex.
7. DIHEDRAL ANGLE - Dihedral angle of elemental panel.
8. LOCAL ALPHA IN RADIANS - Local angle of attack in radians at control point (X @ 3C/4,Y,Z).
9. DELTA CP AT DESIRED CL - Delta Cp or Net Cp normal to the surface at dihedral for each elemental panel when the total lift is CL,d.

5.1.4

The fourth group of data presents the following geometric results:

1. REF.CHORD - Reference chord of the configuration.
2. C AVERAGE - Average chord, cav, true configuration area divided by true span.
3. TRUE AREA - True area computed from the configuration listed in second group of geometry data.
4. REF. AREA - Reference area.
5. B/2 - Maximum semispan of all planforms listed in second group of geometry data.

6. REF.AR - Reference aspect ratio computed from reference planform area and true span.

7. MACH NUMBER - Mach number.

5.2 AERODYNAMIC DATA

If PTEST = 1. or QTEST = 1. on the configuration card, then either Clp or CLq and Cmq are computed and printed, followed by program termination. Otherwise, the aerodynamic data are described by at least two groups of results. The first is always present, but the second depends on what is requested on the configuration card. The following items of the first group of data are given in the order that they are found on the printout. Note that CL ALPHA, CL(TWIST), CM/CL, CMO, CDI/CL**2 are based on the specified reference dimensions. Many of the items that follow are for the complete configuration.

5.2.1

1. DESIRED CL - Desired lift coefficient, CL,d, specified in Input Data for complete configuration.

2. COMPUTED ALPHA - Angle of attack at which the desired lift is developed: CL,d/(CL ALPHA) + ALPHA at CL=0.

3. CL(WB) - That portion of desired lift coefficient developed by the planform with the maximum span when multiple planforms are specified. When one planform is specified, this is the desired lift coefficient. (If two or more planforms have the same span, and this value is equal to the maximum, the planform used here is the latter one read in).

4. CDI AT CL(WB) - Induced drag coefficient for lift cofficient

in the previous item. When two or more planforms are specified, this is the induced drag coefficient of only the planform with the maximum span. This result is based on the far-field solution.

5. CDI/(CL(WB)**2) - Induced drag parameter computed from the two previous items.

6. 1/(PI*AR REF) - Induced drag parameter for an elliptic load distribution based on reference aspect ratio.

7. CL ALPHA - Lift-curve slope per radian, and per degree.

8. CL(TWIST) - Lift coefficient due to twist and/or camber at zero angle of attack (CL,tc).

9. ALPHA AT CL=0 - Angle of attack at zero lift in degrees; nonzero only when twist and/or camber is specified.

10. Y CP - Spanwise distance in fraction of semispan from root chord to center of pressure on left wing panel.

11. CM/CL - Longitudinal stability parameter based on a moment center about the reference point.

12. CMO - Pitching-moment coefficient at CL=0.

13. CL ALPHA, CL(TWIST), ALPHA, and Y CP are also printed for each planform.

For each spanwise station, the following data are presented; from the left tip towards the root:

1. 2Y/B - Location of midpoint of each spanwise station in fraction of wing semispan.

The next two columns of data describe the additional (or angle of attack) wing loading at a lift coefficient of 1. (based on the total lift achieved and the true configuration area). The third column is the chord ratio result, and the other columns detail specific kinds of span loadings and local centers of pressure for the configuration. The

preceeding is done on a planform basis.

1. SL COEF - span-load coefficient, clc/CLcav.

2. CL RATIO - Ratio of local lift to total lift, cl/CL.

3. C RATIO - Ratio of local chord to average chord, c/cav.

4. LOAD DUE TO TWIST - Distribution of Span-load coefficient due to twist and camber at 0. degrees angle of attack for the configuration.

5. ADD. LOAD AT CL= - Distribution of additional span-load coefficient at CL,tc.

6. BASIC LOAD AT CL=0 - Basic span-load-coefficient distribution at zero lift coefficient. These data are the difference of the previous two columns of data.

7. SPAN LOAD AT DESIRED CL - Distribution of the combination of the basic span load and additional span-load coefficients at the desired CL.

8. AT CL DES - X LOCATION OF LOCAL CENT PR - The X location of the local center of pressure for the resulting span load at CL,d as a function of 2Y/b.

5.2.2

The other options available as group two aerodynamic data are accessed based on the values of CLDES and ATPCOD. For instance, with CLDES=11., and ATPCOD=0.0, the program will produce a drag polar, CDI at CL(WB) versus CL(WB), based on the linear aerodynamics in the middle of the first part of group one aerodynamic data. This, and other combinations, are given in the table below, along with their purposes:

COMBINATION	CLDES	ATPCOD	PURPOSE
i	100. > CL,d >0.	0.	Determine linear aerodynamics
ii	11.	0.	Linear aerodynamic drag polar
iii	100.	0.	not valid
iv	100. > CL,d >0.	1.	Planar-wing vortex-flow aerodynamics

COMBINATION	CLDES	ATPCOD	PURPOSE
v	11.	1.	not valid
vi	100.	1.	Cambered-wing vortex-flow aerodynamics
vii	100. ≥ CL,d >0.	2.	Determine flow field off wing
viii	11.	2.	not valid
ix	100.	2.	not valid
x	100. ≥ CL,d >0.	3.	Determine longitudinal load distribution
xi	11.	3.	not valid
xii	100.	3.	not valid

For combinations i,iv, and x , the induced drag, leading-edge thrust, and suction coefficient characteristics computed from a near-field solution for the additional loading at CL,d at each spanwise station are presented. This is valid only for planforms without twist and/or camber; similar information can be generated for those wings with twist and/or camber by setting CLDES (CL,d) = 100. on input.

1. L. E. SWEEP ANGLE - Leading-edge sweep angle in degrees.
2. CDII C/2B - Nondimensional section induced-drag-coefficient term.
3. CT C/2B - Nondimensional section leading-edge thrust-coefficient term.
4. CS C/2B - Nondimensional section leading-edge suction-coefficient term.
5. CDII/CL**2 - Total drag coefficient over $(CL,d)^2$
6. CT - Total leading-edge thrust coefficient.
7. CS - Total leading-edge suction coefficient.

This completes the printout for combination i ; however, for combination iv additional printout is produced. In particular, Kp and Kv values, and respective centroids in both chordwise and spanwise directions, and the associated limits of integration for the leading-edge and side-edge values of Kv. (The item entitled "Sum of the positive side edge contributions" which appears here on the printout is indicative of the contribution to the side-edge forces for that particular planform which were oppositely-signed to those that contributed in a manner to increase Kv,se. The value of Kv,se does contain these positive contributions provided the sweep angle is positive. They should not be, and therefore are not added in for the planform with a swept forward leading edge). Furthermore, aerodynamic performance values for each planform and for the entire configuration will be listed over an angle of attack range by the use of the Polhamus Suction Analogy. The headings are explained below:

KP	Kp
KVLE	Kv,le
KV SE	Kv,se
ALPHA	α
CN	CN,tot
CLP	CL,p
CLVLE	CL,vle
CLVSE	Kv,se | sin α | sin α | cos α
CMP	pitching-moment coefficient due to CL,p
CMVLE	pitching-moment coefficient due to CL,vle
CMVSE	pitching-moment coefficient due to CL,vse
CM	total pitching moment
CD	CL,tot*tan α
CL**2/(PI*AR)	$(CL,tot)^2$ /(Pi*(Aspect Ratio))

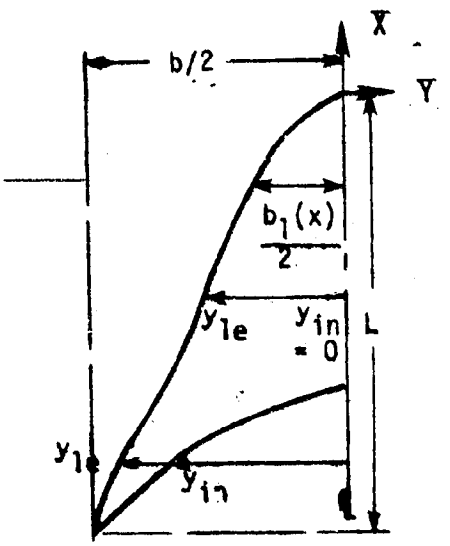
The additional printout associated with <u>combination x</u> , which determines the longitudinal load distribution, is as follows:

1. X - The X location at which the spanwise integration of Delta Cp or Net Cp is to occur.

2. Y - The Y value at which Delta Cp or Net Cp is interpolated.

3. INTERPOLATED DELTA CP - The values of Delta Cp interpolated from the chordwise arrangement to that of a spanwise one.

4. BL(X) - Local span. $(b_1(x))$



5. $$CNL = \frac{2b_1(x)}{b} \int_{\frac{2y_{le}}{b_1(x)}}^{\frac{2y_{in}}{b_1(x)}} \Delta C_p \, d\left(\frac{2y}{b_1(x)}\right)$$

6. CN FOR PLANFORM I -

$$CN(I) = \frac{L(b/2)}{S_{ref}} \int_0^1 CNL \; d\,(x/L)$$

7. TOTAL CN - Total value of CN for the configuration where

$$CN,tot = \sum_{I=1}^{PLAN} CN(I)$$

The vortex flow aerodynamics for cambered wings are determined when combination vi is specified, and is done from a solution in the body axis system of the leading-edge suction force acting on a deflected surface, over a range of angles of attack. Kv,le is not solved for in this solution, but its effect is calculated at each internally prescribed body axis angle of attack. Kv,se is solved for in the manner described in reference 2, and is tabulated.

The headings on the printout are divided into attached flow and separated flow regions. Under the attached flow heading are the lift, drag, and pitching moment (CL, CD, CM) coefficients for both zero leading-edge suction and full leading-edge suction over the angle of attack range. These items include all the appropriate trigonometric terms. Regarding the vortex induced separated flow terms, some headings include the potential flow terms and some do not. Those which include the potential flow terms lead to "total" results whereas those which are isolated, such as side-edge or augmented vortex lift terms, do not lead to "total" values. The augmented vortex lift is described in reference 3. Combination vii determines the flow field around the configuration in the attached flow. First the elemental panel circulation values, Gamma/U, associated with the basic load and the additional load at CL=1.0 are listed, followed by those associated with the total load and the additional load at the desired CL. This is followed by a heading which lists out the geometric data for the prescribed field line, along with the desired CL and the required configuration angle of attack from linear attached-flow aerodynamics.

Then from near the plane of symmetry to approximately three times the configuration semispan, the flow field properties are determined along that line. The X, Y, and Z coordinates of each field point and the associated normalized downwash (w/U), sidewash (v/U), and backwash (u/U) values are then listed. Note that the positive directions for these are downward for w/U, out the right wing for v/U, and forward for u/U. These are followed by the induced downwash angles DWNWH, arctan(w/U) in degrees, Epsilon, d(Epsilon)/d(Alpha), the ratio of local dynamic pressure to free-stream dynamic pressure, Q(LOCAL)/Q(INF), and the sidewash angle SIGMA, arctan(v/U) in degrees. Epsilon is a particular kind of downwash angle, given in degrees and defined by:

Epsilon = Alpha - arctan (sin(Alpha) - (w/U))/(cos(Alpha) - (u/U))

d(Epsilon)/d(Alpha) is just the differential of the above equation with respect to Alpha and may be useful in certain wing-tail-body problems.

6 NOS JOB CARD SETUP

The VLM program is run on the CDC equipment, and while the user must supply the appropriate JOB, USER, and CHARGE information, all commands needed to retrieve and execute the VLM program are contained on the CYBER Control Language (CCL) procedure file RUNVLMF. This file is shown in Appendix B, and stored on User Number

UN=503400N. This procedure, by default, expects the data to be on the file INPUT, and produces an output file, OUTPUT. To use this file in executing the VLM program, the job control card setup would be as follows:

```
JOB,T500,CM130000.              BINXX J.USER
USER,XXXXXXX.
CHARGE,YYYYYYY,LRC.
GET,RUNVLMF/UN=503400N.
BEGIN,,RUNVLMF.
PLOT.device   (if plotting is to be done)
EXIT.
7/8/9
TITLE CARD
CONFIGURATION 1 DATA
CONFIGURATION 2 DATA
    etc.
6/7/8/9
```

Note that any plot device currently available on NOS can be specified. If the user has the data contained on some alternate file, or wishes the output to be written to some alternate file, the job control cards can be specified as follows:

```
GET,datafile.   (File containing the input to VLM)
GET,RUNVLMF/UN=503400N.
BEGIN,,RUNVLMF,datafile,outfile.
```

where - datafile - contains the input, and - outfile - will contain the printed output from the program at the end of the run.

APPENDIX A - SAMPLE CASES WITH OUTPUT

SAMPLE CASE 1 - TEST DATA FOR 4 PLANFORMS (DEFLECTED PLANFORMS - LINEAR AERODYNAMICS)

SAMPLE CASE 2 - TEST DATA FOR 4 PLANFORMS INVOLVING V-S, DIHEDRAL AND VERTICAL DISPLACEMENT

SAMPLE CASE 3 - TEST DATA FOR 3 PLANFORMS (CAMBERED WING VORTEX FLOW AERODYNAMICS PLUS AUGMENTED TERMS)

SAMPLE CASE 4 - TEST DATA FOR LONGITUDINAL LOAD DISTRIBUTION

SAMPLE CASE 5 - TEST DATA FOR STRAKE WING
(LINEAR AERODYNAMICS - FLOWFIELD ANALYSIS)

INPUT DATA

```
 1. TEST DATA FOR 4 PLANFORMS (DEFLECTED PLANFORMS - LINEAR AERODYNAMICS)
 2.          4.          1.          2.        100.
 3.          3.
 4.          0.          0.
 5.          0.         -3.
 6.         -2.         -3.
 7.         -2.          0.
 8.          3.
 9.         -3.          0.
10.         -3.         -9.
11.         -5.         -9.
12.         -5.          0.
13.          3.
14.         -6.          0.
15.         -6.         -6.
16.         -8.         -6.
17.         -8.          0.
18.          3.
19.         -9.          0.
20.         -9.        -12.
21.        -11.        -12.
22.        -11.          0.
23. FOUR DEFLECTED WINGS0.   12.  .1   1.   0.   0.   0.   0.   2.1.2.0.    0.
24.    3.
25.    3.    3.    3.
26.    9.
27.    4.    4.    4.    4.    4.    4.    4.    4.    4.
28.    6.
29.    2.    2.    2.    2.    2.    2.
30.   12.
31.    5.    5.    5.    5.    5.    5.    5.    5.    5.    5.    5.    5.
32.          5.          5.          5.
33.          5.          5.          5.
34.          5.          5.          5.
35.      .01745      .01745      .01745      .01745
36.      .01745      .01745      .01745      .01745
37.      .01745      .01745      .01745      .01745
38.      .01745      .01745      .01745      .01745
39.      .01745      .01745      .01745      .01745
40.      .01745      .01745      .01745      .01745
41.      .01745      .01745      .01745      .01745
42.      .01745      .01745      .01745      .01745
43.      .01745      .01745      .01745      .01745
44.       -10.0       -10.0
45.       -10.0       -10.0
46.       -10.0       -10.0
```

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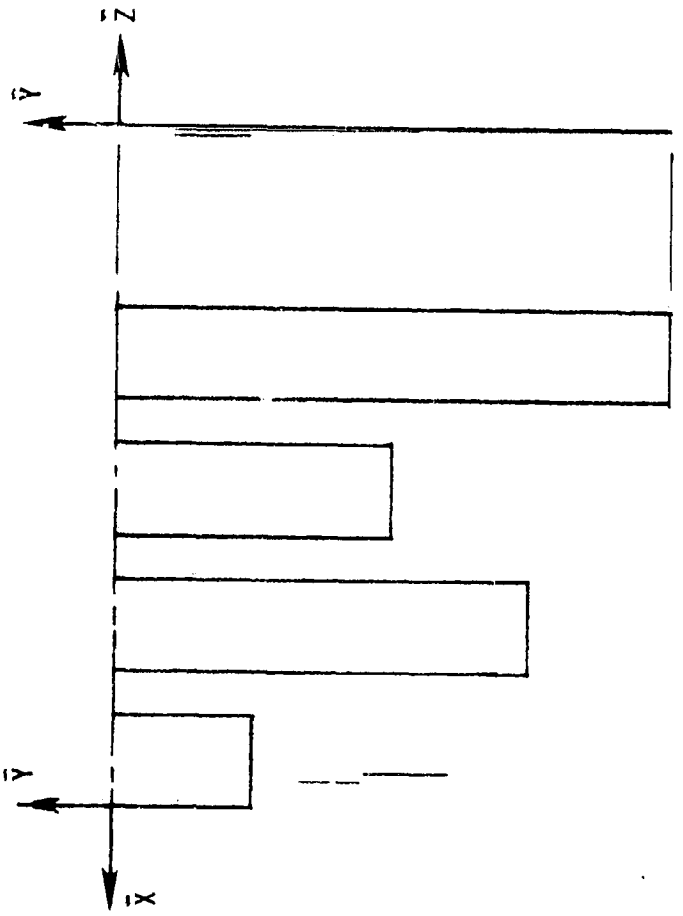

47.	-10.0	-10.0
48.	-10.0	-10.0
49.	-10.0	-10.0

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47.	-10.0	-10.0
48.	-10.0	-10.0
49.	-10.0	-10.0

GEOMETRY DATA

FIRST REFERENCE PLANFORM HAS 3 CURVES

ROOT CHORD HEIGHT = 0.00000 VARIABLE SWEEP PIVOT POSITION X(S) = 0.00000 Y(S) = 0.00000

BREAK POINTS FOR THE REFERENCE PLANFORM

POINT	X REF	Y REF	SWEEP ANGLE	DIHEDRAL ANGLE	MOVE CODE
1	0.00000	0.00000	0.00000	0.00000	1
2	0.00000	-3.00000	90.00000	0.00000	1
3	-2.00000	-3.00000	0.00000	0.00000	1
4	-2.00000	0.00000			

SECOND REFERENCE PLANFORM HAS 3 CURVES

ROOT CHORD HEIGHT = 0.00000 VARIABLE SWEEP PIVOT POSITION X(S) = 0.00000 Y(S) = 0.00000

BREAK POINTS FOR THE REFERENCE PLANFORM

POINT	X REF	Y REF	SWEEP ANGLE	DIHEDRAL ANGLE	MOVE CODE
1	-3.00000	0.00000	0.00000	0.00000	1
2	-3.00000	-9.00000	90.00000	0.00000	1
3	-5.00000	-9.00000	0.00000	0.00000	1
4	-5.00000	0.00000			

THIRD REFERENCE PLANFORM HAS 3 CURVES

ROOT CHORD HEIGHT = 0.00000 VARIABLE SWEEP PIVOT POSITION X(S) = 0.00000 Y(S) = 0.00000

BREAK POINTS FOR THE REFERENCE PLANFORM

POINT	X REF	Y REF	SWEEP ANGLE	DIHEDRAL ANGLE	MOVE CODE
1	-6.00000	0.00000	0.00000	0.00000	1
2	-6.00000	-6.00000	90.00000	0.00000	1

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3	-8.00000	-6.00000	0.00000	0.00000	1
4	-8.00000	0.00000			

FOURTH REFERENCE PLANFORM HAS 3 CURVES

ROOT CHORD HEIGHT = 0.00000 VARIABLE SWEEP PIVOT POSITION X(S) = 0.00000 Y(S) = 0.00000

BREAK POINTS FOR THE REFERENCE PLANFORM

POINT	X REF	Y REF	SWEEP ANGLE	DIHEDRAL ANGLE	MOVE CODE
1	-9.00000	0.00000	0.00000	0.00000	1
2	-9.00000	-12.00000	90.00000	0.00000	1
3	-11.00000	-12.00000	0.00000	0.00000	1
4	-11.00000	0.00000			

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CONFIGURATION : FOUR DEFLECTED WINGS

CURVE 1 IS SWEPT 0.00000 DEGREES ON PLANFORM 1

CURVE 1 IS SWEPT 0.00000 DEGREES ON PLANFORM 2

CURVE 1 IS SWEPT 0.00000 DEGREES ON PLANFORM 3

CURVE 1 IS SWEPT 0.00000 DEGREES ON PLANFORM 4

BREAK POINTS FOR THIS CONFIGURATION

POINT	X	Y	Z	SWEEP ANGLE	DIHEDRAL ANGLE	
			FIRST	PLANFORM BREAK POINTS:		
1	0.00000	0.00000	0.00000	0.00000	0.00000	
2	0.00000	-3.00000	0.00000	90.00000	0.00000	
3	-2.00000	-3.00000	0.00000	0.00000	0.00000	1
4	-2.00000	0.00000	0.00000			
			SECOND	PLANFORM BREAK POINTS		
1	-3.00000	0.00000	0.00000	0.00000	0.00000	1
2	-3.00000	-3.00000	0.00000	0.00000	0.00000	1
3	-3.00000	-6.00000	0.00000	0.00000	0.00000	1
4	-3.00000	-9.00000	0.00000	90.00000	0.00000	1
5	-5.00000	-9.00000	0.00000	0.00000	0.00000	1
6	-5.00000	0.00000	0.00000			
			THIRD	PLANFORM BREAK POINTS		
1	-6.00000	0.00000	0.00000	0.00000	0.00000	1
2	-6.00000	-3.00000	0.00000	0.00000	0.00000	1
3	-6.00000	-6.00000	0.00000	90.00000	0.00000	1
4	-8.00000	-6.00000	0.00000	0.00000	0.00000	1
5	-8.00000	0.00000	0.00000			
			FOURTH	PLANFORM BREAK POINTS		
1	-9.00000	0.00000	0.00000	0.00000	0.00000	1
2	-9.00000	-3.00000	0.00000	0.00000	0.00000	1
3	-9.00000	-6.00000	0.00000	0.00000	0.00000	1

4	-9.00000	-9.00000	0.00000	0.00000	0.00000	1
5	-9.00000	-12.00000	0.00000	90.00000	0.00000	1
6	-11.00000	-12.00000	0.00000	0.00000	0.00000	1
7	-11.00000	0.00000	0.00000			

HORSESHOE VORTEX SUMMARY TABLE

117 HORSESHOE VORTICIES USED ON THE LEFT HALF OF THIS CONFIGURATION

PLANFORM	TOTAL	SPANWISE
1	9	3
2	36	9
3	12	6
4	60	12

TABLE OF HORSESHOE VORTICES IN EACH CHORDWISE ROW (FROM TIP TO ROOT BEGINNING WITH FIRST PLANFORM)

3. 3. 3. 4. 4. 4. 4. 4. 4. 4. 4. 2. 2. 2. 2. 2. 2. 5. 5. 5. 5. 5. 5. 5.
5. 5. 5. 5. 5.

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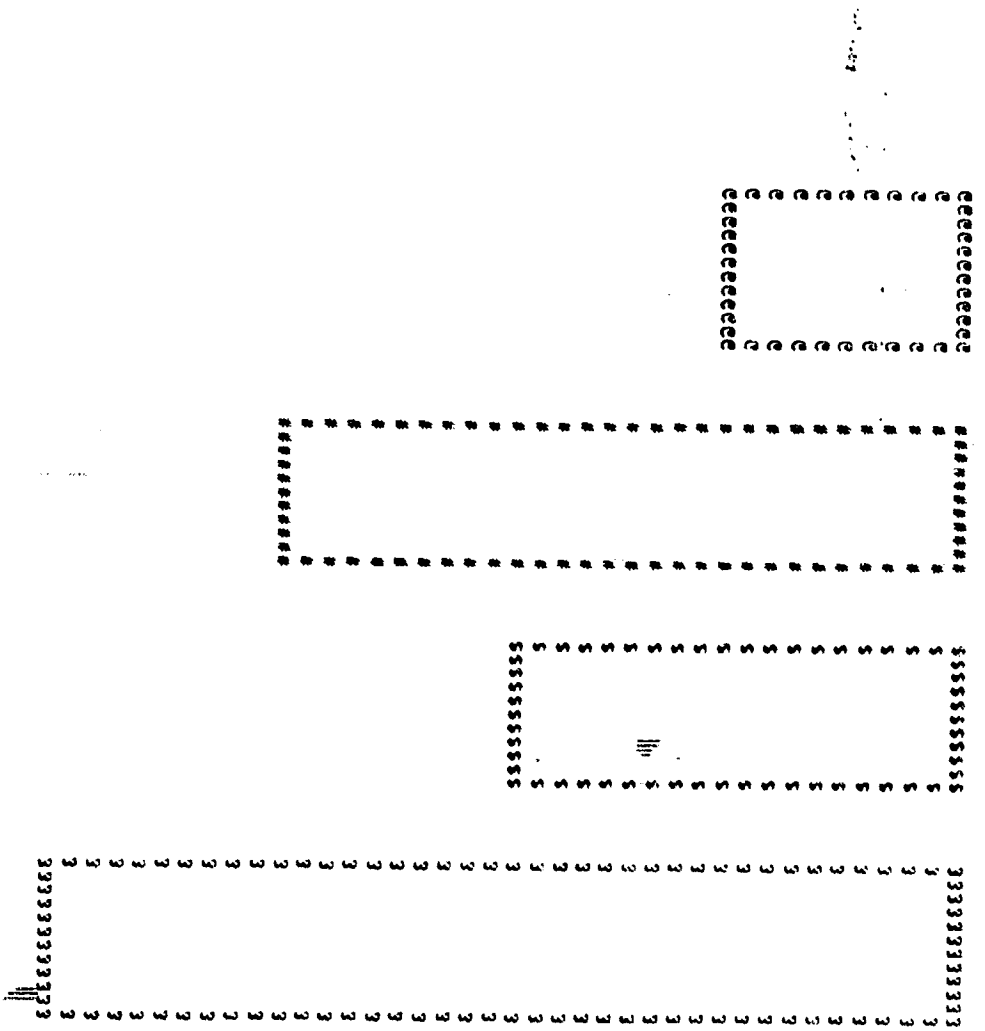
APPROXIMATE PLANFORM CONFIGURATION



PLANFORM 1 IS A
PLANFORM 2 IS B
PLANFORM 3 IS S
PLANFORM 4 IS C

AERODYNAMIC DATA

CONFIGURATION : FOUR DEFLECTED WINGS

STATIC LONGITUDINAL AERODYNAMIC COEFFICIENTS ARE COMPUTED

X C/4	X 3C/4	Y	Z	S	C/4 SWEEP ANGLE	DIHEDRAL ANGLE	LOCAL ALPHA IN RADIANS	DELTA CP AT DESIRED CL = 1.00000
FIRST PLANFORM HORSESHOE VORTEX DESCRIPTIONS								
-.16667	-.50000	-2.50000	0.00000	.50000	0.00000	0.00000	.08727	2.26361
-.83333	-1.16667	-2.50000	0.00000	.50000	0.00000	0.00000	.08727	.78877
-1.50000	-1.83333	-2.50000	0.00000	.50000	0.00000	0.00000	.08727	.41929
-.16667	-.50000	-1.50000	0.00000	.50000	0.00000	0.00000	.08727	2.80798
-.83333	-1.16667	-1.50000	0.00000	.50000	0.00000	0.00000	.08727	1.07577
-1.50000	-1.83333	-1.50000	0.00000	.50000	0.00000	0.00000	.08727	.55553
-.16667	-.50000	-.50000	0.00000	.50000	0.00000	0.00000	.08727	2.99628
-.83333	-1.16667	-.50000	0.00000	.50000	0.00000	0.00000	.08727	1.17602
-1.50000	-1.83333	-.50000	0.00000	.50000	0.00000	0.00000	.08727	.60605
SECOND PLANFORM HORSESHOE VORTEX DESCRIPTIONS								
-3.12500	-3.37500	-8.50000	0.00000	.50000	0.00000	0.00000	.01745	2.15662
-3.62500	-3.87500	-8.50000	0.00000	.50000	0.00000	0.00000	.01745	.79349
-4.12500	-4.37500	-8.50000	0.00000	.50000	0.00000	0.00000	.01745	.43492
-4.62500	-4.87500	-8.50000	0.00000	.50000	0.00000	0.00000	.01745	.23353
-3.12500	-3.37500	-7.50000	0.00000	.50000	0.00000	0.00000	.01745	2.75200
-3.62500	-3.87500	-7.50000	0.00000	.50000	0.00000	0.00000	.01745	1.11856
-4.12500	-4.37500	-7.50000	0.00000	.50000	0.00000	0.00000	.01745	.64450
-4.62500	-4.87500	-7.50000	0.00000	.50000	0.00000	0.00000	.01745	.35002
-3.12500	-3.37500	-6.50000	0.00000	.50000	0.00000	0.00000	.01745	3.09221
-3.62500	-3.87500	-6.50000	0.00000	.50000	0.00000	0.00000	.01745	1.29539
-4.12500	-4.37500	-6.50000	0.00000	.50000	0.00000	0.00000	.01745	.76247
-4.62500	-4.87500	-6.50000	0.00000	.50000	0.00000	0.00000	.01745	.41838
-3.12500	-3.37500	-5.50000	0.00000	.50000	0.00000	0.00000	.01745	3.36127
-3.62500	-3.87500	-5.50000	0.00000	.50000	0.00000	0.00000	.01745	1.42010
-4.12500	-4.37500	-5.50000	0.00000	.50000	0.00000	0.00000	.01745	.83905
-4.62500	-4.87500	-5.50000	0.00000	.50000	0.00000	0.00000	.01745	.46025
-3.12500	-3.37500	-4.50000	0.00000	.50000	0.00000	0.00000	.01745	3.66707
-3.62500	-3.87500	-4.50000	0.00000	.50000	0.00000	0.00000	.01745	1.52553
-4.12500	-4.37500	-4.50000	0.00000	.50000	0.00000	0.00000	.01745	.88449

-4.62500	-4.87500	-4.50000	0.00000	.50000	0.00000	0.00000	.01745	.47786
-3.12500	-3.37500	-3.50000	0.00000	.50000	0.00000	0.00000	.01745	4.25545
-3.62500	-3.87500	-3.50000	0.00000	.50000	0.00000	0.00000	.01745	1.54404
-4.12500	-4.37500	-3.50000	0.00000	.50000	0.00000	0.00000	.01745	.83813
-4.62500	-4.87500	-3.50000	0.00000	.50000	0.00000	0.00000	.01745	.44141
-3.12500	-3.37500	-2.50000	0.00000	.50000	0.00000	0.00000	.01745	1.35054
-3.62500	-3.87500	-2.50000	0.00000	.50000	0.00000	0.00000	.01745	.80047
-4.12500	-4.37500	-2.50000	0.00000	.50000	0.00000	0.00000	.01745	.54593
-4.62500	-4.87500	-2.50000	0.00000	.50000	0.00000	0.00000	.01745	.31852
-3.12500	-3.37500	-1.50000	0.00000	.50000	0.00000	0.00000	.01745	.99374
-3.62500	-3.87500	-1.50000	0.00000	.50000	0.00000	0.00000	.01745	.55654
-4.12500	-4.37500	-1.50000	0.00000	.50000	0.00000	0.00000	.01745	.38964
-4.62500	-4.87500	-1.50000	0.00000	.50000	0.00000	0.00000	.01745	.23434
-3.12500	-3.37500	-.50000	0.00000	.50000	0.00000	0.00000	.01745	.92579
-3.62500	-3.87500	-.50000	0.00000	.50000	0.00000	0.00000	.01745	.49324
-4.12500	-4.37500	-.50000	0.00000	.50000	0.00000	0.00000	.01745	.33789
-4.62500	-4.87500	-.50000	0.00000	.50000	0.00000	0.00000	.01745	.20133

THIRD PLANFORM HORSESHOE VORTEX DESCRIPTIONS

-6.25000	-6.75000	-5.50000	0.00000	.50000	0.00000	0.00000	-.17453	-.05619
-7.25000	-7.75000	-5.50000	0.00000	.50000	0.00000	0.00000	-.17453	.09939
-6.25000	-6.75000	-4.50000	0.00000	.50000	0.00000	0.00000	-.17453	-.06502
-7.25000	-7.75000	-4.50000	0.00000	.50000	0.00000	0.00000	-.17453	.10279
-6.25000	-6.75000	-3.50000	0.00000	.50000	0.00000	0.00000	-.17453	-.12016
-7.25000	-7.75000	-3.50000	0.00000	.50000	0.00000	0.00000	-.17453	.08642
-6.25000	-6.75000	-2.50000	0.00000	.50000	0.00000	0.00000	-.17453	-.22409
-7.25000	-7.75000	-2.50000	0.00000	.50000	0.00000	0.00000	-.17453	.05940
-6.25000	-6.75000	-1.50000	0.00000	.50000	0.00000	0.00000	-.17453	-.31566
-7.25000	-7.75000	-1.50000	0.00000	.50000	0.00000	0.00000	-.17453	.03387
-6.25000	-6.75000	-.50000	0.00000	.50000	0.00000	0.00000	-.17453	-.36318
-7.25000	-7.75000	-.50000	0.00000	.50000	0.00000	0.00000	-.17453	.01925

FOURTH PLANFORM HORSESHOE VORTEX DESCRIPTIONS

-9.10000	-9.30000	-11.50000	0.00000	.50000	0.00000	0.00000	0.00000	2.57069
-9.50000	-9.70000	-11.50000	0.00000	.50000	0.00000	0.00000	0.00000	1.00065
-9.90000	-10.10000	-11.50000	0.00000	.50000	0.00000	0.00000	0.00000	.58012
-10.30000	-10.50000	-11.50000	0.00000	.50000	0.00000	0.00000	0.00000	.35981
-10.70000	-10.90000	-11.50000	0.00000	.50000	0.00000	0.00000	0.00000	.20061
-9.10000	-9.30000	-10.50000	0.00000	.50000	0.00000	0.00000	0.00000	3.44229
-9.50000	-9.70000	-10.50000	0.00000	.50000	0.00000	0.00000	0.00000	1.43218
-9.90000	-10.10000	-10.50000	0.00000	.50000	0.00000	0.00000	0.00000	.65999
-10.30000	-10.50000	-10.50000	0.00000	.50000	0.00000	0.00000	0.00000	.53942
-10.70000	-10.90000	-10.50000	0.00000	.50000	0.00000	0.00000	0.00000	.29991
-9.10000	-9.30000	-9.50000	0.00000	.50000	0.00000	0.00000	0.00000	4.35082
-9.50000	-9.70000	-9.50000	0.00000	.50000	0.00000	0.00000	0.00000	1.66872
-9.90000	-10.10000	-9.50000	0.00000	.50000	0.00000	0.00000	0.00000	.95951
-10.30000	-10.50000	-9.50000	0.00000	.50000	0.00000	0.00000	0.00000	.59224

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-10.70000	-10.90000	-9.50000	0.00000	.50000	0.00000	0.00000	0.00000	.32816
-9.10000	-9.30000	-8.50000	0.00000	.50000	0.00000	0.00000	0.00000	2.05598
-9.50000	-9.70000	-8.50000	0.00000	.50000	0.00000	0.00000	0.00000	1.03402
-9.90000	-10.10000	-8.50000	0.00000	.50000	0.00000	0.00000	0.00000	.70414
-10.30000	-10.50000	-8.50000	0.00000	.50000	0.00000	0.00000	0.00000	.47969
-10.70000	-10.90000	-8.50000	0.00000	.50000	0.00000	0.00000	0.00000	.28128
-9.10000	-9.30000	-7.50000	0.00000	.50000	0.00000	0.00000	0.00000	1.88295
-9.50000	-9.70000	-7.50000	0.00000	.50000	0.00000	0.00000	0.00000	.88767
-9.90000	-10.10000	-7.50000	0.00000	.50000	0.00000	0.00000	0.00000	.59685
-10.30000	-10.50000	-7.50000	0.00000	.50000	0.00000	0.00000	0.00000	.41038
-10.70000	-10.90000	-7.50000	0.00000	.50000	0.00000	0.00000	0.00000	.24409
-9.10000	-9.30000	-6.50000	0.00000	.50000	0.00000	0.00000	0.00000	1.92656
-9.50000	-9.70000	-6.50000	0.00000	.50000	0.00000	0.00000	0.00000	.87294
-9.90000	-10.10000	-6.50000	0.00000	.50000	0.00000	0.00000	0.00000	.57174
-10.30000	-10.50000	-6.50000	0.00000	.50000	0.00000	0.00000	0.00000	.38754
-10.70000	-10.90000	-6.50000	0.00000	.50000	0.00000	0.00000	0.00000	.22909
-9.10000	-9.30000	-5.50000	0.00000	.50000	0.00000	0.00000	0.00000	1.90080
-9.50000	-9.70000	-5.50000	0.00000	.50000	0.00000	0.00000	0.00000	.85962
-9.90000	-10.10000	-5.50000	0.00000	.50000	0.00000	0.00000	0.00000	.56063
-10.30000	-10.50000	-5.50000	0.00000	.50000	0.00000	0.00000	0.00000	.37828
-10.70000	-10.90000	-5.50000	0.00000	.50000	0.00000	0.00000	0.00000	.22287
-9.10000	-9.30000	-4.50000	0.00000	.50000	0.00000	0.00000	0.00000	1.89033
-9.50000	-9.70000	-4.50000	0.00000	.50000	0.00000	0.00000	0.00000	.85164
-9.90000	-10.10000	-4.50000	0.00000	.50000	0.00000	0.00000	0.00000	.55377
-10.30000	-10.50000	-4.50000	0.00000	.50000	0.00000	0.00000	0.00000	.37280
-10.70000	-10.90000	-4.50000	0.00000	.50000	0.00000	0.00000	0.00000	.21930
-9.10000	-9.30000	-3.50000	0.00000	.50000	0.00000	0.00000	0.00000	1.86648
-9.50000	-9.70000	-3.50000	0.00000	.50000	0.00000	0.00000	0.00000	.84040
-9.90000	-10.10000	-3.50000	0.00000	.50000	0.00000	0.00000	0.00000	.54618
-10.30000	-10.50000	-3.50000	0.00000	.50000	0.00000	0.00000	0.00000	.36754
-10.70000	-10.90000	-3.50000	0.00000	.50000	0.00000	0.00000	0.00000	.21614
-9.10000	-9.30000	-2.50000	0.00000	.50000	0.00000	0.00000	0.00000	1.83431
-9.50000	-9.70000	-2.50000	0.00000	.50000	0.00000	0.00000	0.00000	.82649
-9.90000	-10.10000	-2.50000	0.00000	.50000	0.00000	0.00000	0.00000	.53753
-10.30000	-10.50000	-2.50000	0.00000	.50000	0.00000	0.00000	0.00000	.36194
-10.70000	-10.90000	-2.50000	0.00000	.50000	0.00000	0.00000	0.00000	.21295
-9.10000	-9.30000	-1.50000	0.00000	.50000	0.00000	0.00000	0.00000	1.80430
-9.50000	-9.70000	-1.50000	0.00000	.50000	0.00000	0.00000	0.00000	.81374
-9.90000	-10.10000	-1.50000	0.00000	.50000	0.00000	0.00000	0.00000	.52978
-10.30000	-10.50000	-1.50000	0.00000	.50000	0.00000	0.00000	0.00000	.35703
-10.70000	-10.90000	-1.50000	0.00000	.50000	0.00000	0.00000	0.00000	.21021
-9.10000	-9.30000	-.50000	0.00000	.50000	0.00000	0.00000	0.00000	1.78653
-9.50000	-9.70000	-.50000	0.00000	.50000	0.00000	0.00000	0.00000	.80620
-9.90000	-10.10000	-.50000	0.00000	.50000	0.00000	0.00000	0.00000	.52520
-10.30000	-10.50000	-.50000	0.00000	.50000	0.00000	0.00000	0.00000	.35415
-10.70000	-10.90000	-.50000	0.00000	.50000	0.00000	0.00000	0.00000	.20861

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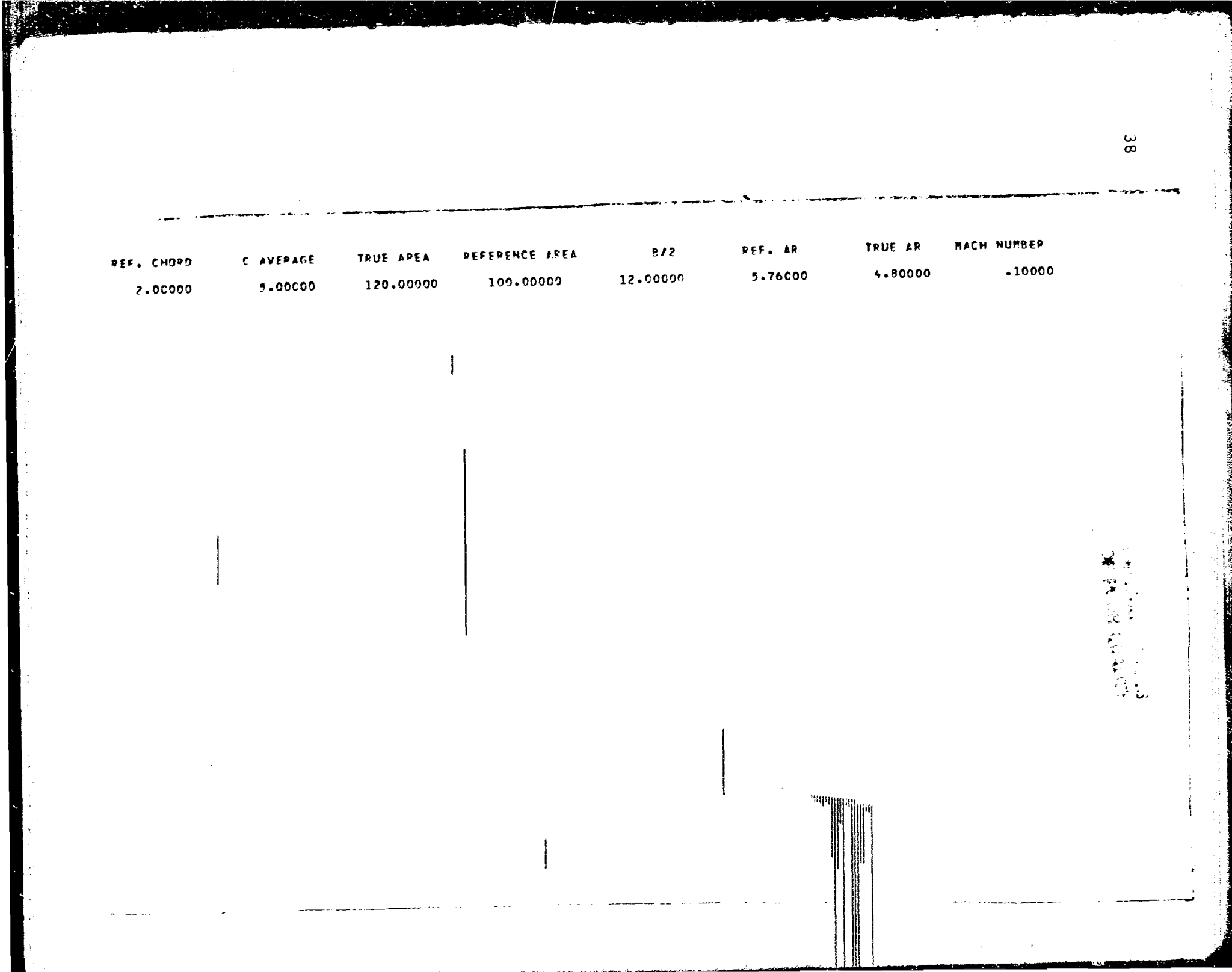
REF. CHORD	C AVERAGE	TRUE AREA	REFERENCE AREA	B/2	REF. AR	TRUE AR	MACH NUMBER
2.00000	5.00000	120.00000	100.00000	12.00000	5.76000	4.80000	.10000



COMPLETE CONFIGURATION

DESIRED CL	COMPUTED ALPHA
1.00000	13.67663

WING-BODY CHARACTERISTICS

LIFT

CL(WB)
.43653

INDUCED DRAG (FAR FIELD SOLUTION)

CDI AT CL(WB)	CDI/(CL(WB)**2) (1/PI*AR REF) = .05526)
.02266	.11893

COMPLETE CONFIGURATION CHARACTERISTICS

	CL ALPHA PER RADIAN	CL ALPHA PER DEGREE	CL(TWIST)	ALPHA AT CL=0	Y CP	CM/CL	CMO
	4.63350	.08087	-.10603	1.31107	-.41813	-2.78734	.00155
FIRST PLANFORM	.59017	.01030	.02832	-2.74903	-.11640		
SECOND PLANFORM	1.85079	.03230	-.03264	1.01048	-.39176		
THIRD PLANFORM	.60863	.01062	-.16014	15.07590	-.24597		
FOURTH PLANFORM	1.58391	.02764	.05844	-2.11411	-.62751		

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STATION	2Y/B	ADDITIONAL LOADING WITH CL BASED ON S(TRUE) SL COEF	CL RATIO	C RATIO	LOAD DUE TO TWIST	ADD. LOAD AT CL= -.10603	BASIC LOAD AT CL=0	SPAN LOAD AT DESIRED CL	-AT CL DES- X LOCATION OF LOCAL CENT PR
FIRST PLANFORM SPAN LOAD DISTRIBUTION									
1	-.20833	.41798	1.04494	.40000	.07765	-.03693	.11458	.46289	-.47917
2	-.12500	.53469	1.33672	.40000	.09909	-.04724	.14633	.59190	-.49507
3	-.04167	.57578	1.43945	.40000	.10643	-.05087	.15730	.63711	-.49985
SECOND PLANFORM SPAN LOAD DISTRIBUTION									
4	-.70833	.38513	.96282	.40000	.00689	-.03403	.04091	.36186	-3.45164
5	-.62500	.52213	1.30533	.40000	.00527	-.04613	.05140	.48651	-3.48035
6	-.54167	.60415	1.51037	.40000	.00001	-.05338	.05339	.55684	-3.49094
7	-.45833	.66717	1.66792	.40000	-.00685	-.05895	.05210	.60807	-3.49329
8	-.37500	.72415	1.81038	.40000	-.01195	-.06398	.05204	.65550	-3.48565
9	-.29167	.78223	1.95558	.40000	-.01307	-.06911	.05604	.70790	-3.44599
10	-.20833	.42286	1.05715	.40000	-.08820	-.03736	-.05084	.30155	-3.59722
11	-.12500	.35145	.87863	.40000	-.10650	-.03105	-.07545	.21743	-3.59386
12	-.04167	.33398	.83495	.40000	-.11200	-.02951	-.08249	.19583	-3.57770
THIRD PLANFORM SPAN LOAD DISTRIBUTION									

13	-.45833	.21605	.54012	.40000	-.19049	-.01909	-.17140	.00864	-8.55085
14	-.37500	.27493	.68732	.40000	-.24564	-.02429	-.22155	.00755	-8.97156
15	-.29167	.28830	.72075	.40000	-.27247	-.02547	-.24700	-.00675	-3.68875
16	-.20833	.27792	.69479	.40000	-.28909	-.02456	-.26453	-.03294	-5.88933
17	-.12500	.26364	.65911	.40000	-.29935	-.02329	-.27606	-.05636	-6.12979
18	-.04167	.25541	.63852	.40000	-.30419	-.02257	-.28163	-.06879	-6.19403

FOURTH PLANFORM SPAN LOAD DISTRIBUTION

19	-.95833	.42088	1.05220	.40000	-.01097	-.03719	.02622	.37695	-9.44320
20	-.87500	.58975	1.47438	.40000	-.01766	-.05211	.03444	.52590	-9.46326
21	-.79167	.71280	1.78200	.40000	-.02503	-.06298	.03795	.63196	-9.43810
22	-.70833	.44080	1.10199	.40000	-.04187	-.03895	-.00292	.36441	-9.53964
23	-.62500	.40874	1.02185	.40000	-.05497	-.03611	-.01886	.32175	-9.52655
24	-.54167	.42324	1.05810	.40000	-.07107	-.03740	-.03368	.31902	-9.51078
25	-.45833	.23236	.58090	.40000	.09961	-.02053	.12014	.31378	-9.50867
26	-.37500	.19095	.47737	.40000	.13503	-.01687	.15190	.31103	-9.50689
27	-.29167	.17754	.44385	.40000	.14330	-.01569	.15899	.30694	-9.50659
28	-.20833	.17143	.42858	.40000	.14385	-.01515	.15900	.30186	-9.50699
29	-.12500	.16775	.41937	.40000	.14259	-.01482	.15741	.29720	-9.50755
30	-.04167	.16583	.41458	.40000	.14161	-.01465	.15626	.29446	-9.50791

INDUCED DRAG, LEADING EDGE THRUST AND SUCTION COEFFICIENT CHARACTERISTICS
COMPUTED AT THE DESIRED CL FROM A NEAR FIELD SOLUTION

SECTION COEFFICIENTS

STATION	2Y/B	L. E. SWEEP ANGLE	CDII C/2B	CT C/2B	CS C/2B
	CONTRIBUTION OF THE FIRST		PLANFORM TO THE CHORD OR DRAG FORCE		
1	-.20833	0.00000	.00504	.01068	.01068
2	-.12500	0.00000	.00484	.01526	.01526
3	-.04167	0.00000	.00452	.01712	.01712
	CONTRIBUTION OF THE SECOND		PLANFORM TO THE CHORD OR DRAG FORCE		
4	-.70833	0.00000	.00264	.00702	.00702
5	-.62500	0.00000	.00227	.01071	.01071
6	-.54167	0.00000	.00155	.01331	.01331
7	-.45833	0.00000	.00059	.01564	.01564
8	-.37500	0.00000	-.00116	.01865	.01865
9	-.29167	0.00000	-.00889	.02778	.02778
10	-.20833	0.00000	.00639	.00165	.00165
11	-.12500	0.00000	.00470	.00110	.00110

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12	-.04167	0.00000	.00421	.00102	.00102

CONTRIBUTION OF THE THIRD PLANFORM TO THE CHORD OR DRAG FORCE

13	-.45833	0.00000	.00002	.00003	.00003
14	-.37500	0.00000	.00001	.00004	.00004
15	-.29167	0.00000	-.00014	.00009	.00009
16	-.20833	0.00000	-.00048	.00026	.00026
17	-.12500	0.00000	-.00083	.00046	.00046
18	-.04167	0.00000	-.00104	.00058	.00058

CONTRIBUTION OF THE FOURTH PLANFORM TO THE CHORD OR DRAG FORCE

19	-.95833	0.00000	.00163	.00774	.00774
20	-.87500	0.00000	-.00014	.01322	.01322
21	-.79167	0.00000	-.00681	.02252	.02252
22	-.70833	0.00000	.00503	.00403	.00403
23	-.62500	0.00000	.00427	.00373	.00373
24	-.54167	0.00000	.00392	.00402	.00402
25	-.45833	0.00000	.00390	.00390	.00390
26	-.37500	0.00000	.00387	.00387	.00387
27	-.29167	0.00000	.00386	.00377	.00377
28	-.20833	0.00000	.00386	.00364	.00364
29	-.12500	0.00000	.00387	.00352	.00352
30	-.04167	0.00000	.00387	.00345	.00345

TOTAL COEFFICIENTS

CDII/CL**2 = .05314 CT= .21006 CS= .21006

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INPUT DATA

```
 1. TEST DATA FOR 4 PLANFORMS INVOLVING V-S, DIHEDRAL AND VERTICAL DISPLACEMENT
 2.    4.0        1.0         2.0       100.0
 3.    3.0        0.0         0.0         2.0
 4.    0.0        0.0       -10.0         0.0
 5.    0.0       -3.0         0.0         0.0
 6.   -2.0       -3.0       -10.0         0.0
 7.   -2.0        0.0
 8.    3.0        0.0         0.0        -3.0
 9.   -3.0        0.0        15.0         0.0
10.   -3.0       -9.0         0.0         0.0
11.   -5.0       -9.0        15.0         0.0
12.   -5.0        0.0
13.    3.0        0.0         0.0        -6.0
14.   -6.0        0.0        -5.0         0.0
15.   -6.0       -6.0         0.0         0.0
16.   -8.0       -6.0        -5.0         0.0
17.   -8.0        0.0
18.    5.0      -10.0        -6.0         0.0
19.   -9.0        0.0         0.0         1.0
20.   -9.0       -6.0         0.0         2.0
21.   -9.0      -12.0         0.0         2.0
22.  -11.0      -12.0         0.0         2.0
23.  -11.0       -6.0         0.0         0.0
24.  -11.0        0.0
25.  4-PLAN,V-S,DIH,DISP 4.0 12.0  0.2  0.3  0.0  0.0  0.0 30.0 0.0.0.0.0.0.0.
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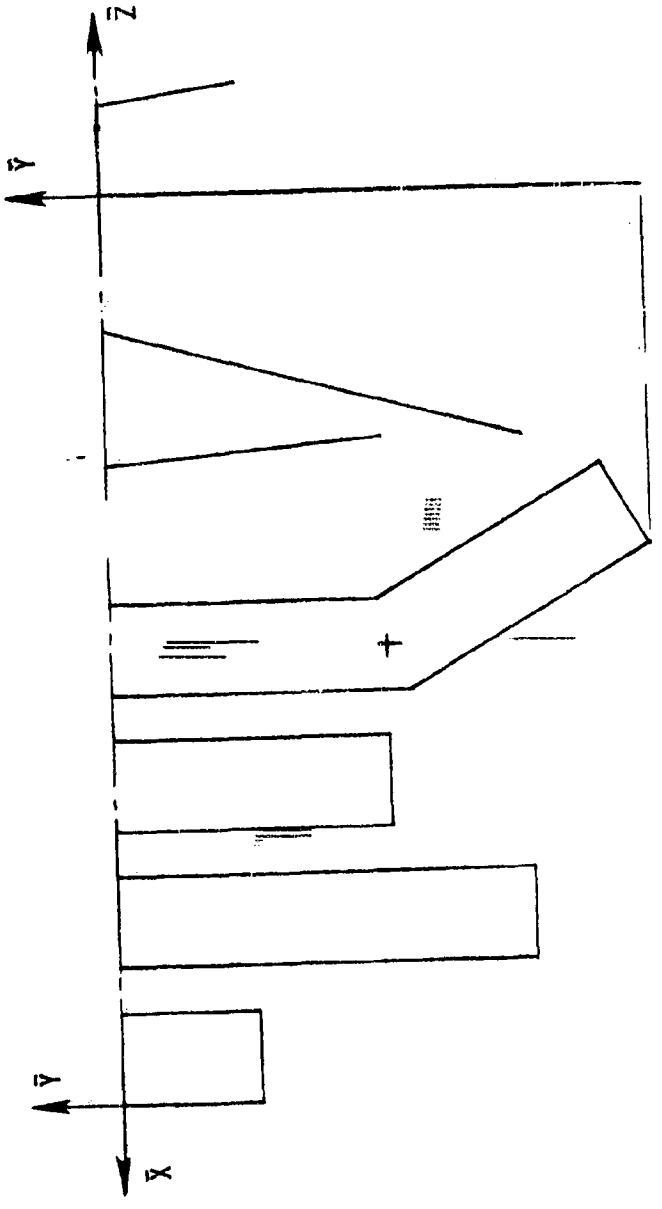

GEOMETRY DATA

FIRST REFERENCE PLANFORM HAS 3 CURVES

ROOT CHORD HEIGHT = 2.00000 VARIABLE SWEEP PIVOT POSITION X(S) = 0.00000 Y(S) = 0.00000

BREAK POINTS FOR THE REFERENCE PLANFORM

POINT	X REF	Y REF	SWEEP ANGLE	DIHEDRAL ANGLE	MOVE CODE
1	0.00000	0.00000	0.00000	-10.00000	1
2	0.00000	-3.00000	90.00000	0.00000	1
3	-2.00000	-3.00000	0.00000	-10.00000	1
4	-2.00000	0.00000			

SECOND REFERENCE PLANFORM HAS 3 CURVES

ROOT CHORD HEIGHT = -3.00000 VARIABLE SWEEP PIVOT POSITION X(S) = 0.00000 Y(S) = 0.00000

BREAK POINTS FOR THE REFERENCE PLANFORM

POINT	X REF	Y REF	SWEEP ANGLE	DIHEDRAL ANGLE	MOVE CODE
1	-3.00000	0.00000	0.00000	15.00000	1
2	-3.00000	-9.00000	90.00000	0.00000	1
3	-5.00000	-9.00000	0.00000	15.00000	1
4	-5.00000	0.00000			

THIRD REFERENCE PLANFORM HAS 3 CURVES

ROOT CHORD HEIGHT = -6.00000 VARIABLE SWEEP PIVOT POSITION X(S) = 0.00000 Y(S) = 0.00000

BREAK POINTS FOR THE REFERENCE PLANFORM

POINT	X REF	Y REF	SWEEP ANGLE	DIHEDRAL ANGLE	MOVE CODE
1	-6.00000	0.00000	0.00000	-5.00000	1
2	-6.00000	-6.00000	90.00000	0.00000	1

3	-8.00000	-6.00000	0.00000	-5.00000	1
4	-8.00000	0.00000			

FOURTH REFERENCE PLANFORM HAS 5 CURVES

ROOT CHORD HEIGHT = 0.00000 VARIABLE SWEEP PIVOT POSITION X(S) = -10.00000 Y(S) = -6.00000

BREAK POINTS FOR THE REFERENCE PLANFORM

POINT	X REF	Y REF	SWEEP ANGLE	DIHEDRAL ANGLE	MOVE CODE
1	-9.00000	0.00000	0.00000	0.00000	1
2	-9.00000	-6.00000	0.00000	0.00000	2
3	-9.00000	-12.00000	90.00000	0.00000	2
4	-11.00000	-12.00000	0.00000	0.00000	2
5	-11.00000	-6.00000	0.00000	0.00000	1
6	-11.00000	0.00000			

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CONFIGURATION : 4-PLAN,V-S,DIH,DISP

CURVE 1 IS SWEPT 0.00000 DEGREES ON PLANFORM 1

CURVE 1 IS SWEPT 0.00000 DEGREES ON PLANFORM 2

CURVE 1 IS SWEPT 0.00000 DEGREES ON PLANFORM 3

CURVE 2 IS SWEPT 30.00000 DEGREES ON PLANFORM 4

BREAK POINTS FOR THIS CONFIGURATION

POINT	X	Y	Z	SWEEP ANGLE	DIHEDRAL ANGLE	MOVE CODE
			FIRST	PLANFORM BREAK	POINTS	
1	0.00000	0.00000	2.00000	0.00000	-10.00000	1
2	0.00000	-3.00000	2.52898	90.00000	0.00000	1
3	-2.00000	-3.00000	2.52898	0.00000	-10.00000	1
4	-2.00000	0.00000	2.00000			
			SECOND	PLANFORM BREAK	POINTS	
1	-3.00000	0.00000	-3.00000	0.00000	15.00000	1
2	-3.00000	-3.00000	-3.80385	0.00000	15.00000	1
3	-3.00000	-5.73205	-4.53590	0.00000	15.00000	1
4	-3.00000	-6.00000	-4.60770	0.00000	15.00000	1
5	-3.00000	-6.26795	-4.67949	0.00000	15.00000	1
6	-3.00000	-9.00000	-5.41154	90.00000	0.00000	1
7	-5.00000	-9.00000	-5.41154	0.00000	15.00000	1
8	-5.00000	0.00000	-3.00000			
			THIRD	PLANFORM BREAK	POINTS	
1	-6.00000	0.00000	-6.00000	0.00000	-5.00000	1
2	-6.00000	-3.00000	-5.73753	0.00000	-5.00000	1
3	-6.00000	-5.73205	-5.49851	0.00000	-5.00000	1
4	-6.00000	-6.00000	-5.47507	90.00000	0.00000	1
5	-8.00000	-6.00000	-5.47507	0.00000	-5.00000	1
6	-8.00000	0.00000	-6.00000			
			FOURTH	PLANFORM BREAK	POINTS	

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1	-9.00000	0.00000	0.00000	0.00000	0.00000	1
2	-9.00000	-3.00000	0.00000	0.00000	0.00000	1
3	-9.00000	-6.00000	0.00000	0.00000	0.00000	1
4	-9.00000	-6.26795	0.00000	30.00000	0.00000	2
5	-10.57735	-9.00000	0.00000	30.00000	0.00000	2
6	-12.13397	-11.59615	0.00000	-60.00000	0.00000	2
7	-13.86603	-10.59615	0.00000	30.00000	0.00000	2
8	-11.00000	-5.73205	0.00000	0.00000	0.00000	1
9	-11.00000	0.00000	0.00000			

HORSESHOE VORTEX SUMMARY TABLE
140 HORSESHOE VORTICIES USED ON THE LEFT HALF OF THIS CONFIGURATION

PLANFORM	TOTAL	SPANWISE
1	12	3
2	44	11
3	28	7
4	56	14

4 HORSESHOE VORTICES IN EACH CHORDWISE ROW

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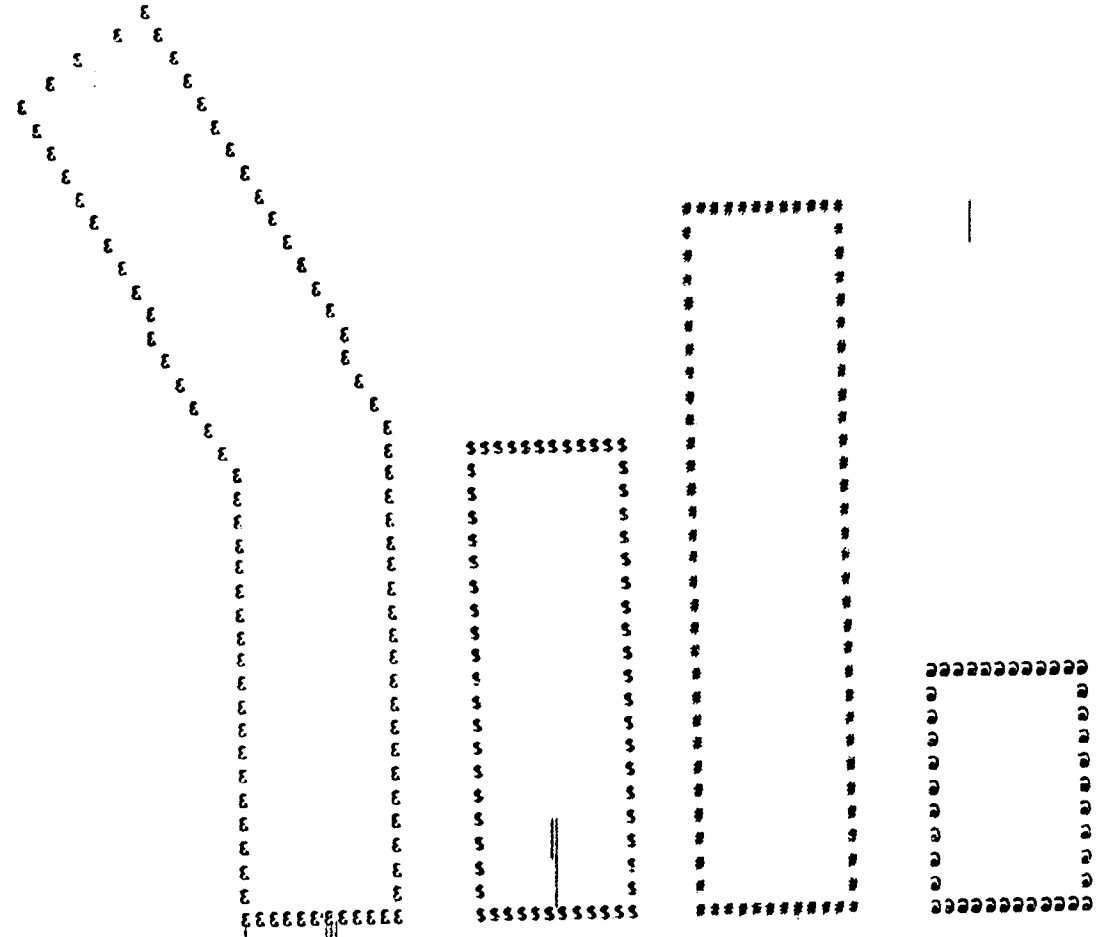
APPROXIMATE PLANFORM CONFIGURATION

PLANFORM 1 IS @
PLANFORM 2 IS #
PLANFORM 3 IS $
PLANFORM 4 IS £



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AERODYNAMIC DATA

CONFIGURATION : 4-PLAN,V-S,DIH,DISP

STATIC LONGITUDINAL AERODYNAMIC COEFFICIENTS ARE COMPUTED

X C/4	Y 3C/4	Y	Z	S	C/4 SWEEP ANGLE	DIHEDRAL ANGLE	LOCAL ALPHA IN RADIANS	DELTA CP AT DESIRED CL = .30000
FIRST PLANFORM HORSESHOE VORTEX DESCRIPTIONS								
-.12500	-.37500	-2.52006	2.44436	.48734	0.00000	-10.00000	0.00000	.44307
-.62500	-.87500	-2.52006	2.44436	.48734	0.00000	-10.00000	0.00000	.15452
-1.12500	-1.37500	-2.52006	2.44436	.48734	0.00000	-10.00000	0.00000	.07979
-1.62500	-1.87500	-2.52006	2.44436	.48734	0.00000	-10.00000	0.00000	.04009
-.12500	-.37500	-1.56019	2.27510	.48734	0.00000	-10.00000	0.00000	.54869
-.62500	-.87500	-1.56019	2.27510	.48734	0.00000	-10.00000	0.00000	.21324
-1.12500	-1.37500	-1.56019	2.27510	.48734	0.00000	-10.00000	0.00000	.11685
-1.62500	-1.87500	-1.56019	2.27510	.48734	0.00000	-10.00000	0.00000	.06008
-.12500	-.37500	-.54013	2.09524	.54846	0.00000	-10.00000	0.00000	.59088
-.62500	-.87500	-.54013	2.09524	.54846	0.00000	-10.00000	0.00000	.23720
-1.12500	-1.37500	-.54013	2.09524	.54846	0.00000	-10.00000	0.00000	.13307
-1.62500	-1.87500	-.54013	2.09524	.54846	0.00000	-10.00000	0.00000	.06932
SECOND PLANFORM HORSESHOE VORTEX DESCRIPTIONS								
-3.12500	-3.37500	-8.52927	-5.28541	.48734	0.00000	15.00000	0.00000	.48943
-3.62500	-3.87500	-8.52927	-5.28541	.48734	0.00000	15.00000	0.00000	.17695
-4.12500	-4.37500	-8.52927	-5.28541	.48734	0.00000	15.00000	0.00000	.09558
-4.62500	-4.87500	-8.52927	-5.28541	.48734	0.00000	15.00000	0.00000	.05056
-3.12500	-3.37500	-7.58780	-5.03314	.48734	0.00000	15.00000	0.00000	.61920
-3.62500	-3.87500	-7.58780	-5.03314	.48734	0.00000	15.00000	0.00000	.24867
-4.12500	-4.37500	-7.58780	-5.03314	.48734	0.00000	15.00000	0.00000	.14185
-4.62500	-4.87500	-7.58780	-5.03314	.48734	0.00000	15.00000	0.00000	.07643
-3.12500	-3.37500	-6.69251	-4.79325	.43953	0.00000	15.00000	0.00000	.68126
-3.62500	-3.87500	-6.69251	-4.79325	.43953	0.00000	15.00000	0.00000	.28243
-4.12500	-4.37500	-6.69251	-4.79325	.43953	0.00000	15.00000	0.00000	.16526
-4.62500	-4.87500	-6.69251	-4.79325	.43953	0.00000	15.00000	0.00000	.09051
-3.12500	-3.37500	-6.13397	-4.64359	.13870	0.00000	15.00000	0.00000	.70488
-3.62500	-3.87500	-6.13397	-4.64359	.13870	0.00000	15.00000	0.00000	.29491
-4.12500	-4.37500	-6.13397	-4.64359	.13870	0.00000	15.00000	0.00000	.17386
-4.62500	-4.87500	-6.13397	-4.64359	.13870	0.00000	15.00000	0.00000	.09553

ORIGINAL PAGE IS OF POOR QUALITY

-3.12500	-3.37500	-5.86603	-4.57180	.13870	0.00000	15.00000	0.00000	.71985
-3.62500	-3.87500	-5.86603	-4.57180	.13870	0.00000	15.00000	0.00000	.30309
-4.12500	-4.37500	-5.86603	-4.57180	.13870	0.00000	15.00000	0.00000	.17930
-4.62500	-4.87500	-5.86603	-4.57180	.13870	0.00000	15.00000	0.00000	.09854
-3.12500	-3.37500	-5.26132	-4.40977	.48734	0.00000	15.00000	0.00000	.73742
-3.62500	-3.87500	-5.26132	-4.40977	.48734	0.00000	15.00000	0.00000	.31230
-4.12500	-4.37500	-5.26132	-4.40977	.48734	0.00000	15.00000	0.00000	.18540
-4.62500	-4.87500	-5.26132	-4.40977	.48734	0.00000	15.00000	0.00000	.10176
-3.12500	-3.37500	-4.31985	-4.15750	.48734	0.00000	15.00000	0.00000	.75284
-3.62500	-3.87500	-4.31985	-4.15750	.48734	0.00000	15.00000	0.00000	.31975
-4.12500	-4.37500	-4.31985	-4.15750	.48734	0.00000	15.00000	0.00000	.18989
-4.62500	-4.87500	-4.31985	-4.15750	.48734	0.00000	15.00000	0.00000	.10376
-3.12500	-3.37500	-3.42456	-3.91761	.43953	0.00000	15.00000	0.00000	.75919
-3.62500	-3.87500	-3.42456	-3.91761	.43953	0.00000	15.00000	0.00000	.32275
-4.12500	-4.37500	-3.42456	-3.91761	.43953	0.00000	15.00000	0.00000	.19150
-4.62500	-4.87500	-3.42456	-3.91761	.43953	0.00000	15.00000	0.00000	.10431
-3.12500	-3.37500	-2.52927	-3.67771	.48734	0.00000	15.00000	0.00000	.76002
-3.62500	-3.87500	-2.52927	-3.67771	.48734	0.00000	15.00000	0.00000	.32337
-4.12500	-4.37500	-2.52927	-3.67771	.48734	0.00000	15.00000	0.00000	.19180
-4.62500	-4.87500	-2.52927	-3.67771	.48734	0.00000	15.00000	0.00000	.10437
-3.12500	-3.37500	-1.58780	-3.42545	.48734	0.00000	15.00000	0.00000	.75722
-3.62500	-3.87500	-1.58780	-3.42545	.48734	0.00000	15.00000	0.00000	.32282
-4.12500	-4.37500	-1.58780	-3.42545	.48734	0.00000	15.00000	0.00000	.19169
-4.62500	-4.87500	-1.58780	-3.42545	.48734	0.00000	15.00000	0.00000	.10441
-3.12500	-3.37500	-.55853	-3.14966	.57823	0.00000	15.00000	0.00000	.75329
-3.62500	-3.87500	-.55853	-3.14966	.57823	0.00000	15.00000	0.00000	.32335
-4.12500	-4.37500	-.55853	-3.14966	.57823	0.00000	15.00000	0.00000	.19228
-4.62500	-4.87500	-.55853	-3.14966	.57823	0.00000	15.00000	0.00000	.10467

THIRD PLANFORM HORSESHOE VORTEX DESCRIPTIONS

-6.12500	-6.37500	-5.86603	-5.48679	.13449	0.00000	-5.00000	0.00000	.17366
-6.62500	-6.87500	-5.86603	-5.48679	.13449	0.00000	-5.00000	0.00000	.06147
-7.12500	-7.37500	-5.86603	-5.48679	.13449	0.00000	-5.00000	0.00000	.03488
-7.62500	-7.87500	-5.86603	-5.48679	.13449	0.00000	-5.00000	0.00000	.01893
-6.12500	-6.37500	-5.24657	-5.54098	.48734	0.00000	-5.00000	0.00000	.28059
-6.62500	-6.87500	-5.24657	-5.54098	.48734	0.00000	-5.00000	0.00000	.11142
-7.12500	-7.37500	-5.24657	-5.54098	.48734	0.00000	-5.00000	0.00000	.06300
-7.62500	-7.87500	-5.24657	-5.54098	.48734	0.00000	-5.00000	0.00000	.03359
-6.12500	-6.37500	-4.27560	-5.62593	.48734	0.00000	-5.00000	0.00000	.35180
-6.62500	-6.87500	-4.27560	-5.62593	.48734	0.00000	-5.00000	0.00000	.14552
-7.12500	-7.37500	-4.27560	-5.62593	.48734	0.00000	-5.00000	0.00000	.08448
-7.62500	-7.87500	-4.27560	-5.62593	.48734	0.00000	-5.00000	0.00000	.04558
-6.12500	-6.37500	-3.39505	-5.70297	.39656	0.00000	-5.00000	0.00000	.39359
-6.62500	-6.87500	-3.39505	-5.70297	.39656	0.00000	-5.00000	0.00000	.16432
-7.12500	-7.37500	-3.39505	-5.70297	.39656	0.00000	-5.00000	0.00000	.09629
-7.62500	-7.87500	-3.39505	-5.70297	.39656	0.00000	-5.00000	0.00000	.05232
-6.12500	-6.37500	-2.51451	-5.78001	.48734	0.00000	-5.00000	0.00000	.42333
-6.62500	-6.87500	-2.51451	-5.78001	.48734	0.00000	-5.00000	0.00000	.17720

-7.12500	-7.37500	-2.51451	-5.78001	.48734	0.00000	-5.00000	0.00000	.10418
-7.62500	-7.87500	-2.51451	-5.78001	.48734	0.00000	-5.00000	0.00000	.05678
-6.12500	-6.37500	-1.54354	-5.86496	.48734	0.00000	-5.00000	0.00000	.44403
-6.62500	-6.87500	-1.54354	-5.86496	.48734	0.00000	-5.00000	0.00000	.18562
-7.12500	-7.37500	-1.54354	-5.86496	.48734	0.00000	-5.00000	0.00000	.10916
-7.62500	-7.87500	-1.54354	-5.86496	.48734	0.00000	-5.00000	0.00000	.05956
-6.12500	-6.37500	-.52903	-5.95372	.53105	0.00000	-5.00000	0.00000	.45550
-6.62500	-6.87500	-.52903	-5.95372	.53105	0.00000	-5.00000	0.00000	.19015
-7.12500	-7.37500	-.52903	-5.95372	.53105	0.00000	-5.00000	0.00000	.11171
-7.62500	-7.87500	-.52903	-5.95372	.53105	0.00000	-5.00000	0.00000	.06093

FOURTH PLANFORM HORSESHOE VORTEX DESCRIPTIONS

-11.91747	-12.06181	-11.19615	0.00000	.50000	23.41322	0.00000	0.00000	.72002
-12.20614	-12.35048	-11.19615	0.00000	.50000	-8.21321	0.00000	0.00000	.30683
-12.49482	-12.63916	-11.19615	0.00000	.50000	-35.81753	0.00000	0.00000	.13993
-12.78349	-12.92783	-11.19615	0.00000	.50000	-52.41091	0.00000	0.00000	.05601
-11.41960	-11.70827	-10.20881	0.00000	.48734	30.00000	0.00000	0.00000	.55463
-11.99695	-12.28562	-10.20881	0.00000	.48734	30.00000	0.00000	0.00000	.21148
-12.57430	-12.86297	-10.20881	0.00000	.48734	30.00000	0.00000	0.00000	.11078
-13.15165	-13.44032	-10.20881	0.00000	.48734	30.00000	0.00000	0.00000	.05280
-10.92996	-11.21863	-9.36074	0.00000	.36074	30.00000	0.00000	0.00000	.57694
-11.50731	-11.79598	-9.36074	0.00000	.36074	30.00000	0.00000	0.00000	.23445
-12.08466	-12.37333	-9.36074	0.00000	.36074	30.00000	0.00000	0.00000	.13173
-12.66201	-12.95069	-9.36074	0.00000	.36074	30.00000	0.00000	0.00000	.06801
-10.44032	-10.72900	-8.51266	0.00000	.48734	30.00000	0.00000	0.00000	.57695
-11.01767	-11.30635	-8.51266	0.00000	.48734	30.00000	0.00000	0.00000	.24200
-11.59502	-11.88370	-8.51266	0.00000	.48734	30.00000	0.00000	0.00000	.14140
-12.17237	-12.46105	-8.51266	0.00000	.48734	30.00000	0.00000	0.00000	.07615
-9.87759	-10.16627	-7.53798	0.00000	.48734	30.00000	0.00000	0.00000	.55962
-10.45494	-10.74362	-7.53798	0.00000	.48734	30.00000	0.00000	0.00000	.24037
-11.03229	-11.32097	-7.53798	0.00000	.48734	30.00000	0.00000	0.00000	.14412
-11.60964	-11.89832	-7.53798	0.00000	.48734	30.00000	0.00000	0.00000	.07953
-9.37028	-9.65896	-6.65930	0.00000	.39135	30.00000	0.00000	0.00000	.52524
-9.94763	-10.23631	-6.65930	0.00000	.39135	30.00000	0.00000	0.00000	.23736
-10.52498	-10.81366	-6.65930	0.00000	.39135	30.00000	0.00000	0.00000	.14661
-11.10233	-11.39101	-6.65930	0.00000	.39135	30.00000	0.00000	0.00000	.08230
-9.13950	-9.41851	-6.13397	0.00000	.13397	2.06659	0.00000	0.00000	.52286
-9.69752	-9.97652	-6.13397	0.00000	.13397	10.22739	0.00000	0.00000	.24165
-10.25553	-10.53453	-6.13397	0.00000	.13397	17.99170	0.00000	0.00000	.15046
-10.81354	-11.09255	-6.13397	0.00000	.13397	25.13114	0.00000	0.00000	.08514
-9.12983	-9.38850	-5.86603	0.00000	.13397	2.06659	0.00000	0.00000	.56348
-9.68917	-9.94884	-5.86603	0.00000	.13397	10.22739	0.00000	0.00000	.24795
-10.16851	-10.42818	-5.86603	0.00000	.13397	17.99170	0.00000	0.00000	.15413
-10.69785	-10.94752	-5.86603	0.00000	.13397	25.13114	0.00000	0.00000	.08882
-9.12500	-9.37500	-5.24471	0.00000	.48734	0.00000	0.00000	0.00000	.58970
-9.62500	-9.87500	-5.24471	0.00000	.48734	0.00000	0.00000	0.00000	.25102
-10.12500	-10.37500	-5.24471	0.00000	.48734	0.00000	0.00000	0.00000	.15223
-10.62500	-10.87500	-5.24471	0.00000	.48734	0.00000	0.00000	0.00000	.08642

ORIGINAL PAGE IS
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-9.12500	-9.37500	-4.27003	0.00000	.48734	0.00000	0.00000	0.00000	.57719
-9.62500	-9.87500	-4.27003	0.00000	.48734	0.00000	0.00000	0.00000	.24412
-10.12500	-10.37500	-4.27003	0.00000	.48734	0.00000	0.00000	0.00000	.14570
-10.62500	-10.87500	-4.27003	0.00000	.48734	0.00000	0.00000	0.00000	.08099
-9.12500	-9.37500	-3.39135	0.00000	.39135	0.00000	0.00000	0.00000	.54528
-9.62500	-9.87500	-3.39135	0.00000	.39135	0.00000	0.00000	0.00000	.23165
-10.12500	-10.37500	-3.39135	0.00000	.39135	0.00000	0.00000	0.00000	.13847
-10.62500	-10.87500	-3.39135	0.00000	.39135	0.00000	0.00000	0.00000	.07691
-9.12500	-9.37500	-2.51266	0.00000	.48734	0.00000	0.00000	0.00000	.50385
-9.62500	-9.87500	-2.51266	0.00000	.48734	0.00000	0.00000	0.00000	.21650
-10.12500	-10.37500	-2.51266	0.00000	.48734	0.00000	0.00000	0.00000	.13037
-10.62500	-10.87500	-2.51266	0.00000	.48734	0.00000	0.00000	0.00000	.07273
-9.12500	-9.37500	-1.53798	0.00000	.48734	0.00000	0.00000	0.00000	.46277
-9.62500	-9.87500	-1.53798	0.00000	.48734	0.00000	0.00000	0.00000	.20158
-10.12500	-10.37500	-1.53798	0.00000	.48734	0.00000	0.00000	0.00000	.12255
-10.62500	-10.87500	-1.53798	0.00000	.48734	0.00000	0.00000	0.00000	.06879
-9.12500	-9.37500	-.52532	0.00000	.52532	0.00000	0.00000	0.00000	.43932
-9.62500	-9.87500	-.52532	0.00000	.52532	0.00000	0.00000	0.00000	.19243
-10.12500	-10.37500	-.52532	0.00000	.52532	0.00000	0.00000	0.00000	.11769
-10.62500	-10.87500	-.52532	0.00000	.52532	0.00000	0.00000	0.00000	.06634

REF. CHORD	C AVERAGE	TRUE AREA	REFERENCE AREA	B/2	REF. AR	TRUE AR	MACH NUMBER
2.00000	5.12989	120.00000	100.00000	11.69615	5.47200	4.56000	.20000

ORIGINAL PAGE IS
OF POOR QUALITY

COMPLETE CONFIGURATION

DESIRED CL	COMPUTED ALPHA
.30000	3.58332

WING-BODY CHARACTERISTICS

LIFT

CL(WB)
.11842

INDUCED DRAG (FAR FIELD SOLUTION)

CDI AT CL(WB)	CDI/(CL(WB)**2) (1/PI*AR REF) = .05817)
.00107	.07634

COMPLETE CONFIGURATION CHARACTERISTICS

		CL ALPHA PER RADIAN	CL ALPHA PER DEGREE	CL(TWIST)	ALPHA AT CL=0	Y CP	CM/CL	CMO
		4.79688	.08372	0.00000	0.00000	-.38059	-3.14279	0.00000
FIRST	PLANFORM	.43220	.00754	0.00000	0.00000	-.11839		
SECOND	PLANFORM	1.81584	.03169	0.00000	0.00000	-.35937		
THIRD	PLANFORM	.65551	.01144	0.00000	0.00000	-.22850		
FOURTH	PLANFORM	1.89352	.03305	0.00000	0.00000	-.51344		

STATION	2Y/B	ADDITIONAL LOADING WITH CL BASED ON S(TRUE) SL COEF	CL RATIO	C RATIO	LOAD DUE TO TWIST	ADD. LOAD AT CL= 0.00000	BASIC LOAD AT CL=0	SPAN LOAD AT DESIRED CL	-AT CL DES- X LOCATION OF LOCAL CENT PR
				FIRST PLANFORM SPAN LOAD DISTRIBUTION					
1	-.21546	.27972	.71748	.38987	0.00000	0.00000	0.00000	.06993	-.42772
2	-.13339	.36603	.93885	.38987	0.00000	0.00000	0.00000	.09151	-.45900
3	-.04618	.40175	1.03046	.38987	0.00000	0.00000	0.00000	.10044	-.47013
				SECOND PLANFORM SPAN LOAD DISTRIBUTION					
4	-.72924	.31678	.81252	.38987	0.00000	0.00000	0.00000	.07919	-3.44486
5	-.64874	.42346	1.08615	.38987	0.00000	0.00000	0.00000	.10586	-3.47563
6	-.57220	.47543	1.21945	.38987	0.00000	0.00000	0.00000	.11886	-3.48765
7	-.52444	.49482	1.26918	.38987	0.00000	0.00000	0.00000	.12370	-3.49107
8	-.50153	.50714	1.30079	.38987	0.00000	0.00000	0.00000	.12678	-3.49298
9	-.44983	.52121	1.33687	.38987	0.00000	0.00000	0.00000	.13030	-3.49466
10	-.36934	.53266	1.36624	.38987	0.00000	0.00000	0.00000	.13316	-3.49492
11	-.29279	.53714	1.37774	.38987	0.00000	0.00000	0.00000	.13429	-3.49469
12	-.21625	.53785	1.37956	.38987	0.00000	0.00000	0.00000	.13446	-3.49471
13	-.13575	.53652	1.37613	.38987	0.00000	0.00000	0.00000	.13413	-3.49539
14	-.04775	.53553	1.37360	.38987	0.00000	0.00000	0.00000	.13388	-3.49699

THIRD PLANFORM SPAN LOAD DISTRIBUTION

15	-.50153	.11265	.28894	.38987	0.00000	0.00000	0.00000	.02816	-6.45035
16	-.44857	.19049	.48860	.38987	0.00000	0.00000	0.00000	.04762	-6.47108
17	-.38556	.24459	.62737	.38987	0.00000	0.00000	0.00000	.06115	-6.48460
18	-.29027	.27545	.70652	.38987	0.00000	0.00000	0.00000	.06886	-6.48866
19	-.21499	.29688	.76149	.38987	0.00000	0.00000	0.00000	.07422	-6.49002
20	-.13197	.31126	.79837	.38987	0.00000	0.00000	0.00000	.07782	-6.48989
21	-.04523	.31903	.81830	.38987	0.00000	0.00000	0.00000	.07976	-6.48939

FOURTH PLANFORM SPAN LOAD DISTRIBUTION

22	-.95725	.27524	1.22279	.22509	0.00000	0.00000	0.00000	.06881	-12.09564
23	-.87284	.41853	.92969	.45019	0.00000	0.00000	0.00000	.10463	-11.78689
24	-.80033	.45519	1.01112	.45019	0.00000	0.00000	0.00000	.11380	-11.33076
25	-.72782	.46662	1.03650	.45019	0.00000	0.00000	0.00000	.11665	-10.85990
26	-.64448	.46083	1.02364	.45019	0.00000	0.00000	0.00000	.11521	-10.31030
27	-.55936	.44637	.99152	.45019	0.00000	0.00000	0.00000	.11159	-9.82301
28	-.52444	.43516	1.00011	.43511	0.00000	0.00000	0.00000	.10879	-9.58475
29	-.50153	.42697	1.05437	.40495	0.00000	0.00000	0.00000	.10674	-9.53504
30	-.44841	.42082	1.07937	.38987	0.00000	0.00000	0.00000	.10520	-9.50242
31	-.38508	.40859	1.04800	.38987	0.00000	0.00000	0.00000	.10215	-9.49642
32	-.28995	.38687	.99231	.38987	0.00000	0.00000	0.00000	.09672	-9.49752
33	-.21493	.36003	.92345	.38987	0.00000	0.00000	0.00000	.09001	-9.50154
34	-.13149	.33361	.85568	.38987	0.00000	0.00000	0.00000	.08340	-9.50659
35	-.04491	.31766	.81478	.38987	0.00000	0.00000	0.00000	.07942	-9.50966

INDUCED DRAG, LEADING EDGE THRUST AND SUCTION COEFFICIENT CHARACTERISTICS
COMPUTED AT THE DESIRED CL FROM A NEAR FIELD SOLUTION

STATION	2Y/B	L. E. SWEEP ANGLE	CDII C/2B	CT C/2B	CS C/2B
	CONTRIBUTION OF THE FIRST		PLANFORM TO THE CHORD OR DRAG FORCE		
1	-.21546	0.00000	.00038	.00012	.00012
2	-.13339	0.00000	.00025	.00035	.00035
3	-.04618	0.00000	.00020	.00047	.00047
	CONTRIBUTION OF THE SECOND		PLANFORM TO THE CHORD OR DRAG FORCE		
4	-.72924	0.00000	.00022	.00031	.00031
5	-.64874	0.00000	.00016	.00054	.00054
6	-.57220	0.00000	.00013	.00066	.00066

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7	-.52444	0.00000	.00011	.00071	.00071
8	-.50153	0.00000	.00011	.00072	.00072
9	-.44983	0.00000	.00011	.00075	.00075
10	-.36934	0.00000	.00009	.00079	.00079
11	-.29279	0.00000	.00008	.00081	.00081
12	-.21625	0.00000	.00008	.00081	.00081
13	-.13575	0.00000	.00008	.00080	.00080
14	-.04775	0.00000	.00009	.00079	.00079

CONTRIBUTION OF THE THIRD PLANFORM TO THE CHORD OR DRAG FORCE

15	-.50153	0.00000	.00020	.00004	.00004
16	-.44857	0.00000	.00022	.00010	.00010
17	-.36556	0.00000	.00024	.00017	.00017
18	-.29027	0.00000	.00025	.00022	.00022
19	-.21499	0.00000	.00025	.00025	.00025
20	-.13197	0.00000	.00025	.00028	.00028
21	-.04523	0.00000	.00025	.00029	.00029

CONTRIBUTION OF THE FOURTH PLANFORM TO THE CHORD OR DRAG FORCE

22	-.95725	30.00000	-.00003	.00048	.00055
23	-.87284	30.00000	.00009	.00061	.00070
24	-.80033	30.00000	.00013	.00064	.00074
25	-.72782	30.00000	.00017	.00062	.00072
26	-.64448	30.00000	.00022	.00057	.00066
27	-.56936	30.00000	.00029	.00047	.00051
28	-.52444	0.00000	.00032	.00042	.00043
29	-.50153	0.00000	.00030	.00044	.00044
30	-.44841	0.00000	.00025	.00047	.00047
31	-.36508	0.00000	.00022	.00047	.00047
32	-.28995	0.00000	.00023	.00043	.00043
33	-.21483	0.00000	.00025	.00037	.00037
34	-.13149	0.00000	.00027	.00030	.00030
35	-.04491	0.00000	.00028	.00026	.00026

TOTAL COEFFICIENTS

CDII/CL**2 = .05672 CT= .01330 CS= .01372

ORIGINAL PAGE IS
OF POOR QUALITY

ORIGINAL PAGE IS
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END OF FILE ENCOUNTERED AFTER CONFIGURATION 4-PLAN,V-S,DIH,DISP

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INPUT DATA

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 1. TEST DATA FOR 3 PLANFORMS (CAMBERED WING VORTEX FLOW AERO. PLUS AUG. TERMS)
 2.   3.0       1.0       13.44     506.69     -32.0       4.18     -39.84      26.09
 3.   3.0
 4.   0.0       0.0
 5.  -4.5      -2.4
 6. -17.5      -2.4
 7. -17.5       0.0
 8.   5.0
 9. -17.5       0.0
10. -17.5      -2.4
11. -37.75    -18.85
12. -41.93    -18.85
13. -41.93     -2.4
14. -41.93      0.0
15.   5.0
16. -41.93      0.0
17. -41.93     -2.4
18. -47.8      -2.4
19. -54.42     -8.0
20. -56.24     -8.0
21. -55.36     -2.4
22. -55.36      0.0
23. CAMBERED WING        16.0 12.0 0.85 100.0 0.0  0.0  0.0       0.2.0.  0.0.1.
24.   0.0       0.0       -2.4      -18.85      0.0       0.0
25.   0.0       0.0      -37.75     -41.93     -54.42     -56.24
26. -20.0     -18.0      -16.0      -10.0      -4.0       0.0       2.0       4.0
27.   6.0       8.0       10.0       12.0       14.0      16.0      18.0      20.0
28. -20.0     -18.0      -16.0      -10.0      -4.0       0.0       2.0       4.0
29.   6.0       8.0       10.0       12.0       14.0      16.0      18.0      20.0
30. -20.0     -18.0      -16.0      -10.0      -4.0       0.0       2.0       4.0
31.   6.0       8.0       10.0       12.0       14.0      16.0      18.0      20.0
32. -20.0     -18.0      -16.0      -10.0      -4.0       0.0       2.0       4.0
33.   6.0       8.0       10.0       12.0       14.0      16.0      18.0      20.0
34. -20.0     -18.0      -16.0      -10.0      -4.0       0.0       2.0       4.0
35.   6.0       8.0       10.0       12.0       14.0      16.0      18.0      20.0
36. -20.0     -18.0      -16.0      -10.0      -4.0       0.0       2.0       4.0
37.   6.0       8.0       10.0       12.0       14.0      16.0      18.0      20.0
38. -20.0     -18.0      -16.0      -10.0      -4.0       0.0       2.0       4.0
39.   6.0       8.0       10.0       12.0       14.0      16.0      18.0      20.0
40. -20.0     -18.0      -16.0      -10.0      -4.0       0.0       2.0       4.0
41.   6.0       8.0       10.0       12.0       14.0      16.0      18.0      20.0
42. -20.0     -18.0      -16.0      -10.0      -4.0       0.0       2.0       4.0
43.   6.0       8.0       10.0       12.0       14.0      16.0      18.0      20.0
44. -20.0     -18.0      -16.0      -10.0      -4.0       0.0       2.0       4.0
45.   6.0       8.0       10.0       12.0       14.0      16.0      18.0      20.0
46. -20.0     -18.0      -16.0      -10.0      -4.0       0.0       2.0       4.0
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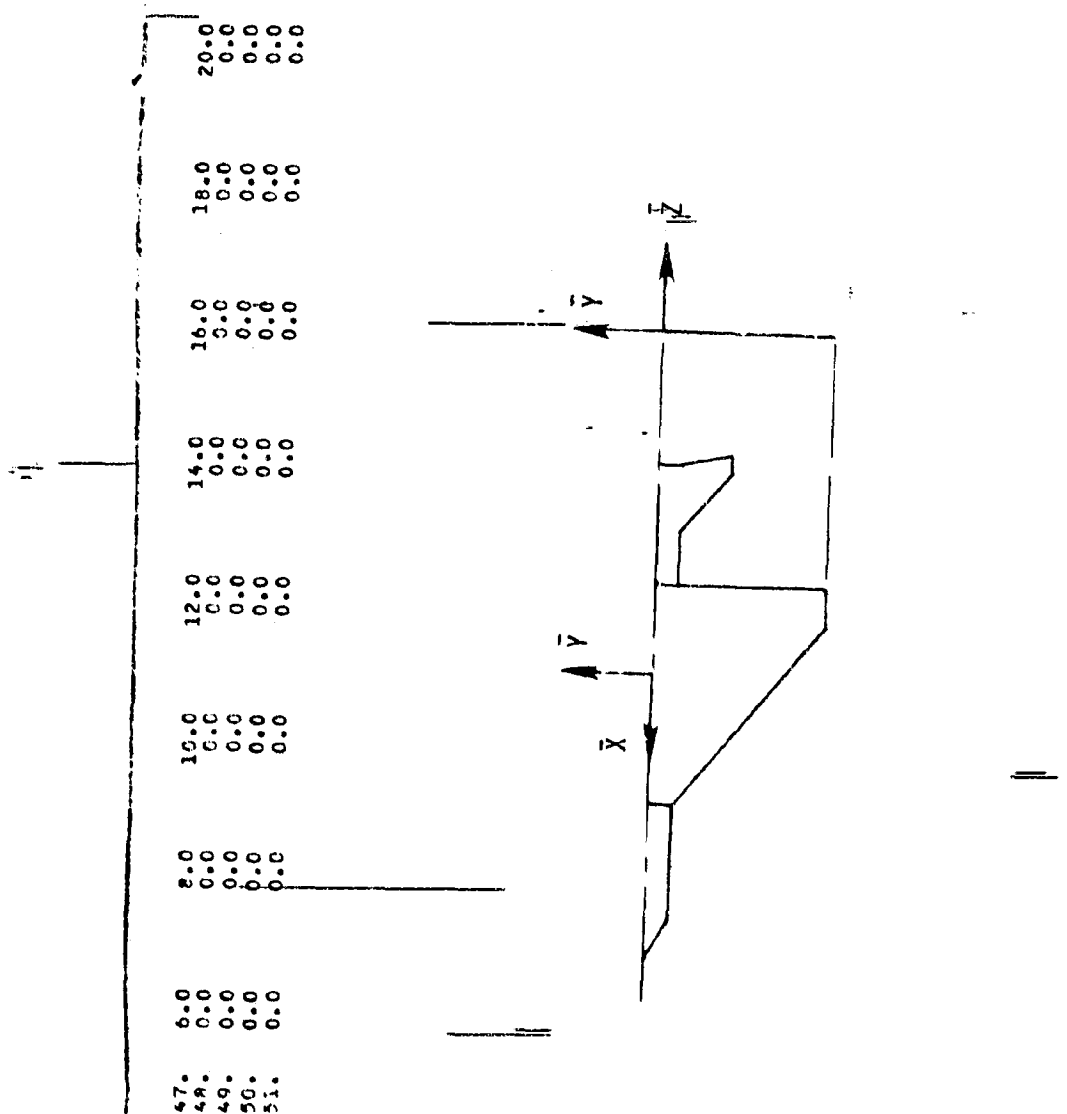

GEOMETRY DATA

FIRST REFERENCE PLANFORM HAS 3 CURVES

ROOT CHORD HEIGHT = 0.00000 VARIABLE SWEEP PIVOT POSITION X(S) = 0.00000 Y(S) = 0.00000

BREAK POINTS FOR THE REFERENCE PLANFORM

POINT	X REF	Y REF	SWEEP ANGLE	DIHEDRAL ANGLE	MOVE CODE
1	32.00000	0.00000	61.92751	0.00000	1
2	27.50000	-2.40000	90.00000	0.00000	1
3	14.50000	-2.40000	0.00000	0.00000	1
4	14.50000	0.00000			

SECOND REFERENCE PLANFORM HAS 5 CURVES

ROOT CHORD HEIGHT = 0.00000 VARIABLE SWEEP PIVOT POSITION X(S) = 0.00000 Y(S) = 0.00000

BREAK POINTS FOR THE REFERENCE PLANFORM

POINT	X REF	Y REF	SWEEP ANGLE	DIHEDRAL ANGLE	MOVE CODE
1	14.50000	0.00000	0.00000	0.00000	1
2	14.50000	-2.40000	50.91147	0.00000	1
3	-5.75000	-18.85000	90.00000	0.00000	1
4	-9.93000	-18.85000	0.00000	0.00000	1
5	-9.93000	-2.40000	0.00000	0.00000	1
6	-9.93000	0.00000			

THIRD REFERENCE PLANFORM HAS 6 CURVES

ROOT CHORD HEIGHT = 0.00000 VARIABLE SWEEP PIVOT POSITION X(S) = 0.00000 Y(S) = 0.00000

BREAK POINTS FOR THE REFERENCE PLANFORM

POINT	X REF	Y REF	SWEEP ANGLE	DIHEDRAL ANGLE	MOVE CODE

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1	-9.93000	0.00000	0.00000	0.00000	1
2	-9.93000	-2.40000	90.00000	0.00000	1
3	-15.80000	-2.40000	49.77140	0.00000	1
4	-22.42000	-8.00000	90.00000	0.00000	1
5	-24.24000	-8.00000	8.93059	0.00000	1
6	-23.36000	-2.40000	0.00000	0.00000	1
7	-23.36000	0.00000			

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CONFIGURATION : CAMBERED WING

CURVE 1 IS SWEPT 61.92751 DEGREES ON PLANFORM 1

CURVE 1 IS SWEPT 0.00000 DEGREES ON PLANFORM 2

CURVE 1 IS SWEPT 0.00000 DEGREES ON PLANFORM 3

BREAK POINTS FOR THIS CONFIGURATION

POINT	X	Y	Z	SWEEP ANGLE	DIHEDRAL ANGLE	MOVE CODE
			FIRST	PLANFORM BREAK POINTS		
1	32.00000	0.00000	0.00000	61.92751	0.00000	1
2	27.50000	-2.40000	0.00000	90.00000	0.00000	1
3	14.50000	-2.40000	0.00000	0.00000	0.00000	1
4	14.50000	0.00000	0.00000			
			SECOND	PLANFORM BREAK POINTS		
1	14.50000	0.00000	0.00000	0.00000	0.00000	1
2	14.50000	-2.40000	0.00000	50.91147	0.00000	1
3	7.60638	-8.00000	0.00000	50.91147	0.00000	1
4	-5.75000	-18.85000	0.00000	90.00000	0.00000	1
5	-9.93000	-18.85000	0.00000	0.00000	0.00000	1
6	-9.93000	-2.40000	0.00000	0.00000	0.00000	1
7	-9.93000	0.00000	0.00000			
			THIRD	PLANFORM BREAK POINTS		
1	-9.93000	0.00000	0.00000	0.00000	0.00000	1
2	-9.93000	-2.40000	0.00000	90.00000	0.00000	1
3	-15.80000	-2.40000	0.00000	49.77140	0.00000	1
4	-22.42000	-8.00000	0.00000	90.00000	0.00000	1
5	-24.24000	-8.00000	0.00000	8.93059	0.00000	1
6	-23.36000	-2.40000	0.00000	0.00000	0.00000	1
7	-23.36000	0.00000	0.00000			

HORSESHOE VORTEX SUMMARY TABLE

336 HORSESHOE VORTICIES USED ON THE LEFT HALF OF THIS CONFIGURATION

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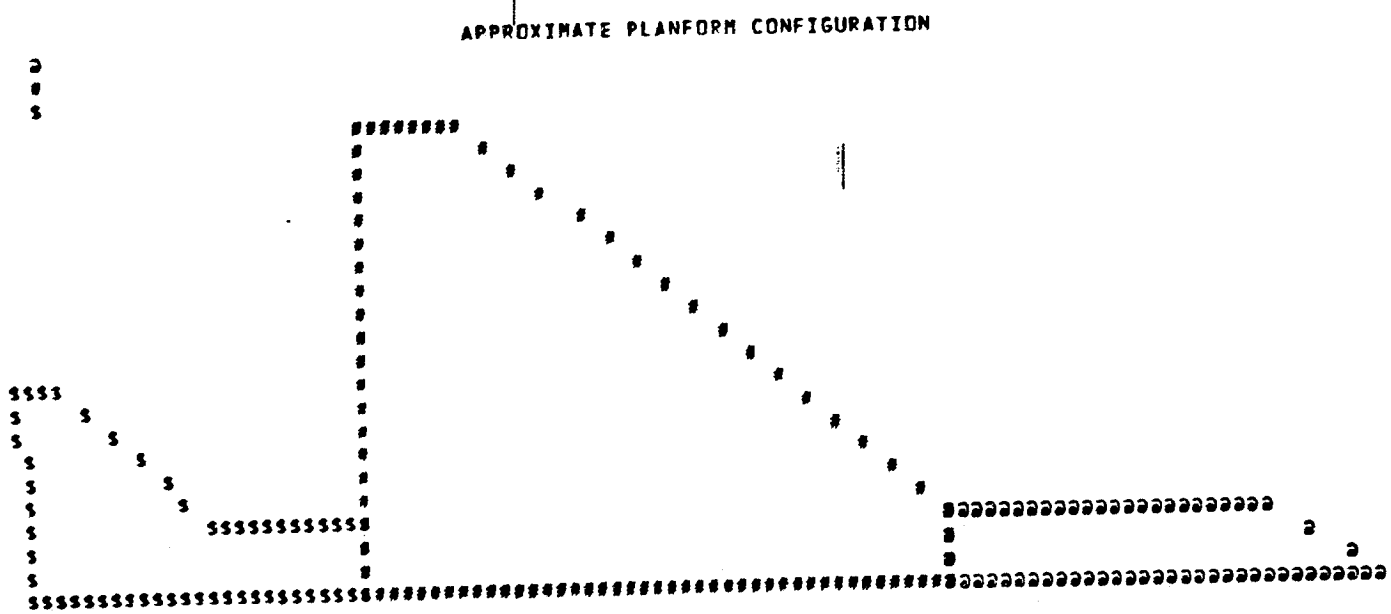
PLANFORM	TOTAL	SPANWISE
1	32	2
2	208	13
3	96	6

16 HORSESHOE VORTICES IN EACH CHORDWISE ROW

APPROXIMATE PLANFORM CONFIGURATION

PLANFORM 1 IS a
PLANFORM 2 IS #
PLANFORM 3 IS $



AERODYNAMIC DATA

CONFIGURATION : CAMBERED WING

STATIC LONGITUDINAL AERODYNAMIC COEFFICIENTS ARE COMPUTED

X C/4	X 3C/4	Y	Z	S	C/4 SWEEP ANGLE	DIHEDRAL ANGLE	LOCAL ALPHA IN RADIANS	DELTA CP AT DESIRED CL = 1.00000
FIRST PLANFORM HORSESHOE VORTEX DESCRIPTIONS								
28.74552	28.29425	-1.61458	0.00000	.78542	61.55121	0.00000	0.00000	.33899
27.84198	27.38971	-1.61458	0.00000	.78542	59.94929	0.00000	0.00000	.15134
26.93744	26.48517	-1.61458	0.00000	.78542	58.17601	0.00000	0.00000	.08297
26.03290	25.58063	-1.61458	0.00000	.78542	56.20636	0.00000	0.00000	.04606
25.12836	24.67609	-1.61458	0.00000	.78542	54.01130	0.00000	0.00000	.02637
24.22382	23.77155	-1.61458	0.00000	.78542	51.55751	0.00000	0.00000	.01582
23.31927	22.86700	-1.61458	0.00000	.78542	48.80714	0.00000	0.00000	.01020
22.41473	21.96246	-1.61458	0.00000	.78542	45.71823	0.00000	0.00000	.00723
21.51019	21.05792	-1.61458	0.00000	.78542	42.24583	0.00000	0.00000	.00566
20.60565	20.15338	-1.61458	0.00000	.78542	38.34455	0.00000	0.00000	.00475
19.70111	19.24884	-1.61458	0.00000	.78542	33.97320	0.00000	0.00000	.00402
18.79657	18.34430	-1.61458	0.00000	.78542	29.10209	0.00000	0.00000	.00304
17.89203	17.43976	-1.61458	0.00000	.78542	23.72324	0.00000	0.00000	.00119
16.98749	16.53522	-1.61458	0.00000	.78542	17.86235	0.00000	0.00000	-.00278
16.08295	15.63068	-1.61458	0.00000	.78542	11.58942	0.00000	0.00000	-.01191
15.17841	14.72614	-1.61458	0.00000	.78542	5.02285	0.00000	0.00000	-.03474
30.95136	30.43878	-.41458	0.00000	.41458	61.55121	0.00000	0.00000	.23423
29.91620	29.39362	-.41458	0.00000	.41458	59.94929	0.00000	0.00000	.14385
28.87103	28.34845	-.41458	0.00000	.41458	58.17601	0.00000	0.00000	.11100
27.82587	27.30328	-.41458	0.00000	.41458	56.20636	0.00000	0.00000	.07894
26.78070	26.25812	-.41458	0.00000	.41458	54.01130	0.00000	0.00000	.04999
25.73553	25.21295	-.41458	0.00000	.41458	51.55751	0.00000	0.00000	.02955
24.69037	24.16779	-.41458	0.00000	.41458	48.80714	0.00000	0.00000	.01754
23.64520	23.12262	-.41458	0.00000	.41458	45.71823	0.00000	0.00000	.01109
22.60004	22.07745	-.41458	0.00000	.41458	42.24583	0.00000	0.00000	.00779
21.55487	21.03229	-.41458	0.00000	.41458	38.34455	0.00000	0.00000	.00609
20.50970	19.98712	-.41458	0.00000	.41458	33.97320	0.00000	0.00000	.00509
19.46454	18.94196	-.41458	0.00000	.41458	29.10209	0.00000	0.00000	.00409
18.41937	17.89679	-.41458	0.00000	.41458	23.72324	0.00000	0.00000	.00234
17.37421	16.85162	-.41458	0.00000	.41458	17.86235	0.00000	0.00000	-.00157
16.32904	15.80646	-.41458	0.00000	.41458	11.58942	0.00000	0.00000	-.01102

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15.28387	14.76129	-.41458	0.00000	.41458	5.02285	0.00000	0.00000	-.03414

SECOND PLANFORM HORSESHOE VORTEX DESCRIPTIONS

-4.86357	-5.02441	-18.06458	0.00000	.78542	50.46919	0.00000	-.34907	2.13932
-5.18525	-5.34609	-18.06458	0.00000	.78542	48.61387	0.00000	-.31416	1.58576
-5.50693	-5.66776	-18.06458	0.00000	.78542	46.61144	0.00000	-.27925	1.60796
-5.82860	-5.98944	-18.06458	0.00000	.78542	44.44919	0.00000	-.17453	1.82113
-6.15028	-6.31112	-18.06458	0.00000	.78542	42.11414	0.00000	-.06981	1.85100
-6.47196	-6.63280	-18.06458	0.00000	.78542	39.59348	0.00000	0.00000	1.70560
-6.79364	-6.95448	-18.06458	0.00000	.78542	36.87512	0.00000	.03491	1.50445
-7.11532	-7.27616	-18.06458	0.00000	.78542	33.94863	0.00000	.06981	1.39114
-7.43699	-7.59783	-18.06458	0.00000	.78542	30.80623	0.00000	.10472	1.30643
-7.75867	-7.91951	-18.06458	0.00000	.78542	27.44418	0.00000	.13963	1.23637
-8.08035	-8.24119	-18.06458	0.00000	.78542	23.86420	0.00000	.17453	1.17179
-8.40203	-8.56287	-18.06458	0.00000	.78542	20.07503	0.00000	.20944	1.10504
-8.72371	-8.88455	-18.06458	0.00000	.78542	16.09372	0.00000	.24435	1.02823
-9.04539	-9.20622	-18.06458	0.00000	.78542	11.94638	0.00000	.27925	.93060
-9.36706	-9.52790	-18.06458	0.00000	.78542	7.66824	0.00000	.31416	.79270
-9.68874	-9.84958	-18.06458	0.00000	.78542	3.30249	0.00000	.34907	.56648
-2.96008	-3.18135	-16.49375	0.00000	.78542	50.46919	0.00000	-.34907	1.41169
-3.40262	-3.62388	-16.49375	0.00000	.78542	48.61387	0.00000	-.31416	1.28397
-3.84515	-4.06642	-16.49375	0.00000	.78542	46.61144	0.00000	-.27925	1.45752
-4.28769	-4.50895	-16.49375	0.00000	.78542	44.44919	0.00000	-.17453	1.78664
-4.73022	-4.95149	-16.49375	0.00000	.78542	42.11414	0.00000	-.06981	1.91435
-5.17275	-5.39402	-16.49375	0.00000	.78542	39.59348	0.00000	0.00000	1.84716
-5.61529	-5.83656	-16.49375	0.00000	.78542	36.87512	0.00000	.03491	1.70580
-6.05782	-6.27909	-16.49375	0.00000	.78542	33.94863	0.00000	.06981	1.63316
-6.50036	-6.72163	-16.49375	0.00000	.78542	30.80623	0.00000	.10472	1.56963
-6.94289	-7.16416	-16.49375	0.00000	.78542	27.44418	0.00000	.13963	1.50430
-7.38543	-7.60669	-16.49375	0.00000	.78542	23.86420	0.00000	.17453	1.43270
-7.82796	-8.04923	-16.49375	0.00000	.78542	20.07503	0.00000	.20944	1.35059
-8.27050	-8.49176	-16.49375	0.00000	.78542	16.09372	0.00000	.24435	1.25134
-8.71303	-8.93430	-16.49375	0.00000	.78542	11.94638	0.00000	.27925	1.12341
-9.15556	-9.37683	-16.49375	0.00000	.78542	7.66824	0.00000	.31416	.94487
-9.59810	-9.81937	-16.49375	0.00000	.78542	3.30249	0.00000	.34907	.66311
-1.05660	-1.33829	-14.92292	0.00000	.78542	50.46919	0.00000	-.34907	.75707
-1.61999	-1.90168	-14.92292	0.00000	.78542	48.61387	0.00000	-.31416	.97178
-2.18338	-2.46507	-14.92292	0.00000	.78542	46.61144	0.00000	-.27925	1.24780
-2.74677	-3.02846	-14.92292	0.00000	.78542	44.44919	0.00000	-.17453	1.63435
-3.31016	-3.59185	-14.92292	0.00000	.78542	42.11414	0.00000	-.06981	1.80362
-3.87355	-4.15525	-14.92292	0.00000	.78542	39.59348	0.00000	0.00000	1.77364
-4.43694	-4.71864	-14.92292	0.00000	.78542	36.87512	0.00000	.03491	1.66934
-5.00033	-5.28203	-14.92292	0.00000	.78542	33.94863	0.00000	.06981	1.63229
-5.56372	-5.84542	-14.92292	0.00000	.78542	30.80623	0.00000	.10472	1.59940
-6.12711	-6.40881	-14.92292	0.00000	.78542	27.44418	0.00000	.13963	1.55724
-6.69050	-6.97220	-14.92292	0.00000	.78542	23.86420	0.00000	.17453	1.50029
-7.25389	-7.53559	-14.92292	0.00000	.78542	20.07503	0.00000	.20944	1.42456
-7.81728	-8.09898	-14.92292	0.00000	.78542	16.09372	0.00000	.24435	1.32440

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-8.38068	-8.66237	-14.92292	0.00000	.78542	11.94638	0.00000	.27925	1.18927
-8.94407	-9.22576	-14.92292	0.00000	.78542	7.66824	0.00000	.31416	.99776
-9.50746	-9.78915	-14.92292	0.00000	.78542	3.30249	0.00000	.34907	.69698
.84689	.50477	-13.35208	0.00000	.78542	50.46919	0.00000	-.34907	.23015
.16284	-.17948	-13.35208	0.00000	.78542	48.61387	0.00000	-.31416	.71207
-.52160	-.86373	-13.35208	0.00000	.78542	46.61144	0.00000	-.27925	1.06210
-1.20585	-1.54797	-13.35208	0.00000	.78542	44.44919	0.00000	-.17453	1.48505
-1.89010	-2.23222	-13.35208	0.00000	.78542	42.11414	0.00000	-.06981	1.67984
-2.57434	-2.91647	-13.35208	0.00000	.78542	39.59348	0.00000	0.00000	1.67204
-3.25859	-3.60072	-13.35208	0.00000	.78542	36.87512	0.00000	.03491	1.58925
-3.94284	-4.28496	-13.35208	0.00000	.78542	33.94863	0.00000	.06981	1.57344
-4.62709	-4.96921	-13.35208	0.00000	.78542	30.80623	0.00000	.10472	1.56104
-5.31133	-5.65346	-13.35208	0.00000	.78542	27.44418	0.00000	.13963	1.53780
-5.99558	-6.33770	-13.35208	0.00000	.78542	23.86420	0.00000	.17453	1.49677
-6.67983	-7.02195	-13.35208	0.00000	.78542	20.07503	0.00000	.20944	1.43277
-7.36407	-7.70620	-13.35208	0.00000	.78542	15.09372	0.00000	.24435	1.33962
-8.04832	-8.39044	-13.35208	0.00000	.78542	11.94638	0.00000	.27925	1.20687
-8.73257	-9.07469	-13.35208	0.00000	.78542	7.66824	0.00000	.31416	1.01368
-9.41681	-9.75894	-13.35208	0.00000	.78542	3.30249	0.00000	.34907	.70772
2.75038	2.34783	-11.78125	0.00000	.78542	50.46919	0.00000	-.34907	-.19114
1.94527	1.54272	-11.78125	0.00000	.78542	48.61387	0.00000	-.31416	.49883
1.14017	.73762	-11.78125	0.00000	.78542	46.61144	0.00000	-.27925	.90110
.33507	-.06748	-11.78125	0.00000	.78542	44.44919	0.00000	-.17453	1.34977
-.47004	-.87259	-11.78125	0.00000	.78542	42.11414	0.00000	-.06981	1.56262
-1.27514	-1.67769	-11.78125	0.00000	.78542	39.59348	0.00000	0.00000	1.56983
-2.08024	-2.48279	-11.78125	0.00000	.78542	36.87512	0.00000	.03491	1.50135
-2.88535	-3.28790	-11.78125	0.00000	.78542	33.94863	0.00000	.06981	1.49992
-3.69045	-4.09300	-11.78125	0.00000	.78542	30.80623	0.00000	.10472	1.50160
-4.49555	-4.89810	-11.78125	0.00000	.78542	27.44418	0.00000	.13963	1.49233
-5.30066	-5.70321	-11.78125	0.00000	.78542	23.86420	0.00000	.17453	1.46451
-6.10576	-6.50831	-11.78125	0.00000	.78542	20.07503	0.00000	.20944	1.41205
-6.91086	-7.31341	-11.78125	0.00000	.78542	16.09372	0.00000	.24435	1.32796
-7.71597	-8.11852	-11.78125	0.00000	.78542	11.94638	0.00000	.27925	1.20143
-8.52107	-8.92362	-11.78125	0.00000	.78542	7.66824	0.00000	.31416	1.01175
-9.32617	-9.72872	-11.78125	0.00000	.78542	3.30249	0.00000	.34907	.70727
4.65386	4.19088	-10.21042	0.00000	.78542	50.46919	0.00000	-.34907	-.52479
3.72790	3.26492	-10.21042	0.00000	.78542	48.61387	0.00000	-.31416	.32231
2.80194	2.33896	-10.21042	0.00000	.78542	46.61144	0.00000	-.27925	.75972
1.87598	1.41300	-10.21042	0.00000	.78542	44.44919	0.00000	-.17453	1.22661
.95003	.48705	-10.21042	0.00000	.78542	42.11414	0.00000	-.06981	1.45222
.02407	-.43891	-10.21042	0.00000	.78542	39.59348	0.00000	0.00000	1.47025
-.90189	-1.36487	-10.21042	0.00000	.78542	36.87512	0.00000	.03491	1.41241
-1.82785	-2.29083	-10.21042	0.00000	.78542	33.94963	0.00000	.06981	1.42158
-2.75381	-3.21679	-10.21042	0.00000	.78542	30.80623	0.00000	.10472	1.43411
-3.67977	-4.14275	-10.21042	0.00000	.78542	27.44418	0.00000	.13963	1.43576
-4.60573	-5.06871	-10.21042	0.00000	.78542	23.86420	0.00000	.17453	1.41878
-5.53169	-5.99467	-10.21042	0.00000	.78542	20.07503	0.00000	.20944	1.37663
-6.45765	-6.92063	-10.21042	0.00000	.78542	16.09372	0.00000	.24435	1.30175
-7.38361	-7.84659	-10.21042	0.00000	.78542	11.94638	0.00000	.27925	1.18293

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-8.30957	-8.77255	-10.21042	0.00000	.78542	7.66824	0.00000	.31416	.99950
-9.23553	-9.69851	-10.21042	0.00000	.78542	3.30249	0.00000	.34907	.70036
6.46899	5.94839	-8.71250	0.00000	.71250	50.46919	0.00000	.34907	-.77856
5.42779	4.90718	-8.71250	0.00000	.71250	48.61387	0.00000	-.31416	.18094
4.38658	3.86598	-8.71250	0.00000	.71250	46.61144	0.00000	-.27925	.63887
3.34537	2.82477	-8.71250	0.00000	.71250	44.44919	0.00000	-.17453	1.11764
2.30417	1.78357	-8.71250	0.00000	.71250	42.11414	0.00000	-.06981	1.35138
1.26296	.74236	-8.71250	0.00000	.71250	39.59348	0.00000	0.00000	1.37706
.22176	-.29885	-8.71250	0.00000	.71250	36.87512	0.00000	.03491	1.32752
-.81945	-1.34005	-8.71250	0.00000	.71250	33.94863	0.00000	.06981	1.34536
-1.86065	-2.38126	-8.71250	0.00000	.71250	30.80623	0.00000	.10472	1.36661
-2.90186	-3.42246	-8.71250	0.00000	.71250	27.44418	0.00000	.13963	1.37715
-3.94307	-4.46367	-8.71250	0.00000	.71250	23.86420	0.00000	.17453	1.36917
-4.98427	-5.50489	-8.71250	0.00000	.71250	20.07503	0.00000	.20944	1.33589
-6.02548	-6.54608	-8.71250	0.00000	.71250	16.09372	0.00000	.24435	1.26949
-7.06668	-7.58729	-8.71250	0.00000	.71250	11.94638	0.00000	.27925	1.15860
-8.10789	-8.62849	-8.71250	0.00000	.71250	7.66824	0.00000	.31416	.98261
-9.14910	-9.66970	-8.71250	0.00000	.71250	3.30249	0.00000	.34907	.69076
8.28412	7.70589	-7.21458	0.00000	.78542	50.46919	0.00000	-.34907	-.93659
7.12767	6.54944	-7.21458	0.00000	.78542	48.61387	0.00000	-.31416	.05363
5.97122	5.39299	-7.21458	0.00000	.78542	46.61144	0.00000	-.27925	.51751
4.81476	4.23654	-7.21458	0.00000	.78542	44.44919	0.00000	-.17453	1.00493
3.65831	3.08009	-7.21458	0.00000	.78542	42.11414	0.00000	-.06981	1.24757
2.50186	1.92363	-7.21458	0.00000	.78542	39.59348	0.00000	0.00000	1.28183
1.34541	.76718	-7.21458	0.00000	.78542	36.87512	0.00000	.03491	1.24039
.18896	-.38927	-7.21458	0.00000	.78542	33.94863	0.00000	.06981	1.26626
-.96750	-1.54572	-7.21458	0.00000	.78542	30.80623	0.00000	.10472	1.29568
-2.12395	-2.70217	-7.21458	0.00000	.78542	27.44418	0.00000	.13963	1.31444
-3.28040	-3.85863	-7.21458	0.00000	.78542	23.86420	0.00000	.17453	1.31466
-4.43685	-5.01508	-7.21458	0.00000	.78542	20.07503	0.00000	.20944	1.28948
-5.59330	-6.17153	-7.21458	0.00000	.78542	16.09372	0.00000	.24435	1.23104
-6.74976	-7.32798	-7.21458	0.00000	.78542	11.94638	0.00000	.27925	1.12816
-7.90621	-8.48443	-7.21458	0.00000	.78542	7.66824	0.00000	.31416	.96075
-9.06266	-9.64089	-7.21458	0.00000	.78542	3.30249	0.00000	.34907	.67851
10.18761	9.54895	-5.64375	0.00000	.78542	50.46919	0.00000	-.34907	-.99598
8.91030	8.27164	-5.64375	0.00000	.78542	48.61387	0.00000	-.31416	-.05164
7.63299	6.99434	-5.64375	0.00000	.78542	46.61144	0.00000	-.27925	.39077
6.35568	5.71703	-5.64375	0.00000	.78542	44.44919	0.00000	-.17453	.87653
5.07837	4.43972	-5.64375	0.00000	.78542	42.11414	0.00000	-.06981	1.12685
3.80106	3.16241	-5.64375	0.00000	.78542	39.59348	0.00000	0.00000	1.17122
2.52376	1.88510	-5.64375	0.00000	.78542	36.87512	0.00000	.03491	1.13958
1.24645	.60779	-5.64375	0.00000	.78542	33.94863	0.00000	.06981	1.17450
-.03086	-.66951	-5.64375	0.00000	.78542	30.80623	0.00000	.10472	1.21245
-1.30817	-1.94682	-5.64375	0.00000	.78542	27.44418	0.00000	.13963	1.23950
-2.58548	-3.22413	-5.64375	0.00000	.78542	23.86420	0.00000	.17453	1.24782
-3.86279	-4.50144	-5.64375	0.00000	.78542	20.07503	0.00000	.20944	1.23055
-5.14009	-5.77875	-5.64375	0.00000	.78542	16.09372	0.00000	.24435	1.17993
-6.41740	-7.05606	-5.64375	0.00000	.78542	11.94638	0.00000	.27925	1.08538
-7.69471	-8.33336	-5.64375	0.00000	.78542	7.66824	0.00000	.31416	.92834

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-8.97202	-9.61067	-5.64375	0.00000	.78542	3.30249	0.00000	.34907	.66059
12.09109	11.39201	-4.07292	0.00000	.78542	50.46919	0.00000	-.34907	-.88248
10.69293	9.99385	-4.07292	0.00000	.78542	48.61387	0.00000	-.31416	-.12723
9.29476	8.59568	-4.07292	0.00000	.78542	46.61144	0.00000	-.27925	.24654
7.89660	7.19752	-4.07292	0.00000	.78542	44.44919	0.00000	-.17453	.71428
6.49843	5.79935	-4.07292	0.00000	.78542	42.11414	0.00000	-.06981	.97489
5.10027	4.40119	-4.07292	0.00000	.78542	39.59348	0.00000	0.00000	1.03846
3.70211	3.00302	-4.07292	0.00000	.78542	36.87512	0.00000	.03491	1.02231
2.30394	1.60486	-4.07292	0.00000	.78542	33.94863	0.00000	.06981	1.06856
.90578	.20669	-4.07292	0.00000	.78542	30.80623	0.00000	.10472	1.11588
-.49239	-1.19147	-4.07292	0.00000	.78542	27.44418	0.00000	.13963	1.15151
-1.89055	-2.58964	-4.07292	0.00000	.78542	23.86420	0.00000	.17453	1.16797
-3.28872	-3.98780	-4.07292	0.00000	.78542	20.07503	0.00000	.20944	1.15832
-4.68688	-5.38596	-4.07292	0.00000	.78542	16.09372	0.00000	.24435	1.11485
-6.08505	-6.78413	-4.07292	0.00000	.78542	11.94638	0.00000	.27925	1.02776
-7.48321	-8.18229	-4.07292	0.00000	.78542	7.66824	0.00000	.31416	.88134
-8.88138	-9.58046	-4.07292	0.00000	.78542	3.30249	0.00000	.34907	.63437
13.59056	12.83419	-2.84375	0.00000	.44375	50.46919	0.00000	-.34907	-.49926
12.08783	11.34146	-2.84375	0.00000	.44375	48.61387	0.00000	-.31416	-.15629
10.59509	9.84872	-2.84375	0.00000	.44375	46.61144	0.00000	-.27925	.10189
9.10236	8.35599	-2.84375	0.00000	.44375	44.44919	0.00000	-.17453	.50716
7.60962	6.86326	-2.84375	0.00000	.44375	42.11414	0.00000	-.06981	.77272
6.11689	5.37052	-2.84375	0.00000	.44375	39.59348	0.00000	0.00000	.87652
4.62416	3.87779	-2.84375	0.00000	.44375	36.87512	0.00000	.03491	.89710
3.13142	2.38505	-2.84375	0.00000	.44375	33.94863	0.00000	.06981	.95818
1.63869	.89232	-2.84375	0.00000	.44375	30.80623	0.00000	.10472	1.01443
.14595	-.60041	-2.84375	0.00000	.44375	27.44418	0.00000	.13963	1.05667
-1.34678	-2.09315	-2.84375	0.00000	.44375	23.86420	0.00000	.17453	1.07842
-2.83951	-3.58588	-2.84375	0.00000	.44375	20.07503	0.00000	.20944	1.07321
-4.33225	-5.07861	-2.84375	0.00000	.44375	16.09372	0.00000	.24435	1.03372
-5.82498	-6.57135	-2.84375	0.00000	.44375	11.94638	0.00000	.27925	.95099
-7.31772	-8.06408	-2.84375	0.00000	.44375	7.66824	0.00000	.31416	.81217
-8.81045	-9.55682	-2.84375	0.00000	.44375	3.30249	0.00000	.34907	.58942
14.11828	13.35484	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	-.11563
12.59141	11.82797	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	-.10962
11.06453	10.30109	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	.03165
9.53766	8.77422	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	.25555
8.01078	7.24734	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	.47888
6.48391	5.72047	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	.64194
4.95703	4.19359	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	.74377
3.43016	2.66672	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	.82094
1.90328	1.13984	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	.88387
.37641	-.38703	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	.93022
-1.15047	-1.91391	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	.95522
-2.67734	-3.44078	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	.95287
-4.20422	-4.96766	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	.91604
-5.73109	-6.49453	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	.83618
-7.25797	-8.02141	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	.70248
-8.78484	-9.54828	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	.50179

14.11828	13.35484	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	-.08715
12.59141	11.82797	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	-.08154
11.06453	10.30109	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	.04113
9.53766	8.77422	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	.23990
8.01078	7.24734	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	.44645
6.48391	5.72047	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	.60752
4.95703	4.19359	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	.71618
3.43016	2.66672	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	.79698
1.90328	1.13984	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	.86097
.37641	-.38703	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	.90751
-1.15047	-1.91391	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	.93241
-2.67734	-3.44078	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	.92990
-4.20422	-4.96766	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	.89304
-5.73109	-6.49453	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	.81352
-7.25797	-8.02141	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	.68152
-8.78484	-9.54828	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	.48994

THIRD PLANFORM HORSESHOE VORTEX DESCRIPTIONS

-21.53254	-21.61457	-7.21458	0.00000	.78542	49.38561	0.00000	0.00000	-4.22262
-21.69661	-21.77864	-7.21458	0.00000	.78542	47.77979	0.00000	0.00000	-2.09598
-21.86067	-21.94271	-7.21458	0.00000	.78542	46.06826	0.00000	0.00000	-1.54912
-22.02474	-22.10677	-7.21458	0.00000	.78542	44.24362	0.00000	0.00000	-1.25953
-22.18880	-22.27084	-7.21458	0.00000	.78542	42.29835	0.00000	0.00000	-1.06081
-22.35287	-22.43490	-7.21458	0.00000	.78542	40.22503	0.00000	0.00000	-.90296
-22.51694	-22.59897	-7.21458	0.00000	.78542	38.01660	0.00000	0.00000	-.76734
-22.68100	-22.76303	-7.21458	0.00000	.78542	35.66662	0.00000	0.00000	-.64824
-22.84507	-22.92710	-7.21458	0.00000	.78542	33.16972	0.00000	0.00000	-.54402
-23.00913	-23.09117	-7.21458	0.00000	.78542	30.52210	0.00000	0.00000	-.45322
-23.17320	-23.25523	-7.21458	0.00000	.78542	27.72203	0.00000	0.00000	-.37411
-23.33727	-23.41930	-7.21458	0.00000	.78542	24.77048	0.00000	0.00000	-.30494
-23.50133	-23.58336	-7.21458	0.00000	.78542	21.67175	0.00000	0.00000	-.24390
-23.66540	-23.74743	-7.21458	0.00000	.78542	18.43399	0.00000	0.00000	-.18900
-23.82946	-23.91150	-7.21458	0.00000	.78542	15.06963	0.00000	0.00000	-.13751
-23.99353	-24.07556	-7.21458	0.00000	.78542	11.59556	0.00000	0.00000	-.08399
-19.70075	-19.83310	-5.64375	0.00000	.78542	49.38561	0.00000	0.00000	-3.20718
-19.96545	-20.09780	-5.64375	0.00000	.78542	47.77979	0.00000	0.00000	-1.59456
-20.23014	-20.36249	-5.64375	0.00000	.78542	46.06826	0.00000	0.00000	-1.18345
-20.49484	-20.62719	-5.64375	0.00000	.78542	44.24362	0.00000	0.00000	-.96907
-20.75954	-20.89189	-5.64375	0.00000	.78542	42.29835	0.00000	0.00000	-.82655
-21.02424	-21.15659	-5.64375	0.00000	.78542	40.22503	0.00000	0.00000	-.72034
-21.28893	-21.42128	-5.64375	0.00000	.78542	38.01660	0.00000	0.00000	-.63539
-21.55363	-21.68598	-5.64375	0.00000	.78542	35.66662	0.00000	0.00000	-.56323
-21.81833	-21.95068	-5.64375	0.00000	.78542	33.16972	0.00000	0.00000	-.49867
-22.08303	-22.21537	-5.64375	0.00000	.78542	30.52210	0.00000	0.00000	-.43846
-22.34772	-22.48007	-5.64375	0.00000	.78542	27.72203	0.00000	0.00000	-.38073
-22.61242	-22.74477	-5.64375	0.00000	.78542	24.77048	0.00000	0.00000	-.32457
-22.87712	-23.00947	-5.64375	0.00000	.78542	21.67175	0.00000	0.00000	-.26959
-23.14181	-23.27416	-5.64375	0.00000	.78542	18.43399	0.00000	0.00000	-.21534

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-23.40651	-23.53886	-5.64375	0.00000	.78542	15.06963	0.00000	0.00000	-.16039
-23.67121	-23.80356	-5.64375	0.00000	.78542	11.59556	0.00000	0.00000	-.09968
-17.86896	-18.05162	-4.07292	0.00000	.78542	49.38561	0.00000	0.00000	-2.23893
-18.23429	-18.41695	-4.07292	0.00000	.78542	47.77979	0.00000	0.00000	-1.11292
-18.59962	-18.78228	-4.07292	0.00000	.78542	46.06826	0.00000	0.00000	-.83377
-18.96495	-19.14761	-4.07292	0.00000	.78542	44.24362	0.00000	0.00000	-.69561
-19.33027	-19.51294	-4.07292	0.00000	.78542	42.29835	0.00000	0.00000	-.60844
-19.69560	-19.87827	-4.07292	0.00000	.78542	40.22503	0.00000	0.00000	-.54482
-20.06093	-20.24360	-4.07292	0.00000	.78542	38.01660	0.00000	0.00000	-.49330
-20.42626	-20.60892	-4.07292	0.00000	.78542	35.66662	0.00000	0.00000	-.44818
-20.79159	-20.97425	-4.07292	0.00000	.78542	33.16972	0.00000	0.00000	-.40636
-21.15692	-21.33958	-4.07292	0.00000	.78542	30.52210	0.00000	0.00000	-.36603
-21.52225	-21.70491	-4.07292	0.00000	.78542	27.72203	0.00000	0.00000	-.32597
-21.88758	-22.07024	-4.07292	0.00000	.78542	24.77048	0.00000	0.00000	-.28539
-22.25290	-22.43557	-4.07292	0.00000	.78542	21.67175	0.00000	0.00000	-.24346
-22.61823	-22.80090	-4.07292	0.00000	.78542	18.43399	0.00000	0.00000	-.19954
-22.98356	-23.16623	-4.07292	0.00000	.78542	15.06963	0.00000	0.00000	-.15201
-23.34889	-23.53155	-4.07292	0.00000	.78542	11.59556	0.00000	0.00000	-.09619
-16.43559	-16.65763	-2.84375	0.00000	.44375	49.38561	0.00000	0.00000	-1.11645
-16.87967	-17.10170	-2.84375	0.00000	.44375	47.77979	0.00000	0.00000	-.61756
-17.32374	-17.54577	-2.84375	0.00000	.44375	46.06826	0.00000	0.00000	-.52468
-17.76781	-17.98985	-2.84375	0.00000	.44375	44.24362	0.00000	0.00000	-.48970
-18.21188	-18.43392	-2.84375	0.00000	.44375	42.29835	0.00000	0.00000	-.44419
-18.65596	-18.87799	-2.84375	0.00000	.44375	40.22503	0.00000	0.00000	-.42325
-19.10003	-19.32206	-2.84375	0.00000	.44375	38.01660	0.00000	0.00000	-.38825
-19.54410	-19.76614	-2.84375	0.00000	.44375	35.66662	0.00000	0.00000	-.36827
-19.98817	-20.21021	-2.84375	0.00000	.44375	33.16972	0.00000	0.00000	-.33870
-20.43224	-20.65428	-2.84375	0.00000	.44375	30.52210	0.00000	0.00000	-.31277
-20.87632	-21.09835	-2.84375	0.00000	.44375	27.72203	0.00000	0.00000	-.28537
-21.32039	-21.54243	-2.84375	0.00000	.44375	24.77048	0.00000	0.00000	-.25086
-21.76446	-21.98650	-2.84375	0.00000	.44375	21.67175	0.00000	0.00000	-.22253
-22.20853	-22.43057	-2.84375	0.00000	.44375	18.43399	0.00000	0.00000	-.17972
-22.65261	-22.87464	-2.84375	0.00000	.44375	15.06963	0.00000	0.00000	-.14478
-23.09668	-23.31871	-2.84375	0.00000	.44375	11.59556	0.00000	0.00000	-.08960
-10.13984	-10.55953	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	.27345
-10.97922	-11.39891	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	.15516
-11.81859	-12.23828	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	.10027
-12.65797	-13.07766	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	.06278
-13.49734	-13.91703	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	.03107
-14.33672	-14.75641	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	-.00426
-15.17609	-15.59578	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	-.06031
-16.01547	-16.43516	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	-.17528
-16.85484	-17.27453	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	-.26324
-17.69422	-18.11391	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	-.29959
-18.53359	-18.95328	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	-.30477
-19.37297	-19.79266	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	-.29082
-20.21234	-20.63203	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	-.26364
-21.05172	-21.47141	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	-.22519
-21.89109	-22.31078	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	-.17562

-22.73047	-23.15016	-1.61458	0.00000	.78542	0.00000	0.00000	0.00000	-.11169
-10.13984	-10.55953	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	.30279
-10.97922	-11.39891	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	.17962
-11.81859	-12.23828	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	.11691
-12.65797	-13.07766	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	.07308
-13.49734	-13.91703	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	.03576
-14.33672	-14.75641	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	-.00535
-15.17609	-15.59578	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	-.06355
-16.01547	-16.43516	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	-.14831
-16.85484	-17.27453	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	-.22231
-17.69422	-18.11391	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	-.26369
-18.53359	-18.95328	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	-.27672
-19.37297	-19.79266	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	-.26936
-20.21234	-20.63203	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	-.24707
-21.05172	-21.47141	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	-.21249
-21.89109	-22.31078	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	-.16631
-22.73047	-23.15016	-.41458	0.00000	.41458	0.00000	0.00000	0.00000	-.10569

REF. CHORD	C AVERAGE	TRUE AREA	REFERENCE AREA	B/2	REF. AR	TRUE AR	MACH NUMBER
13.44000	20.63901	778.09050	506.69000	18.85000	2.80505	1.82664	.85000

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COMPLETE CONFIGURATION

DESIRED CL	COMPUTED ALPHA
1.00000	3.63553

WING-BODY CHARACTERISTICS

LIFT CL(WB)	INDUCED DRAG (FAR FIELD SOLUTION) CDI AT CL(WB)	CDI/(CL(WB)**2) (1/PI*AR REF) = .11348)
1.07077	.13685	.11936

COMPLETE CONFIGURATION CHARACTERISTICS

		CL ALPHA PER RADIAN	CL ALPHA PER DEGREE	CL(TWIST)	ALPHA AT CL=0	Y CP	CM/CL	CMO
		3.96676	.06923	.74830	-10.80845	-.42753	.16116	-.25611
FIRST	PLANFORM	.11724	.00205	-.00156	.76412	-.06159		
SECOND	PLANFORM	3.76155	.06565	.83209	-12.67438	-.44447		
THIRD	PLANFORM	.08797	.00154	-.08223	53.55666	-.19106		

STATION	2Y/B	ADDITIONAL LOADING WITH CL BASED ON S(TRUE) SL COEF	CL RATIO	C RATIO	LOAD DUE TO TWIST	ADD. LOAD AT CL= .74830	BASIC LOAD AT CL=0	SPAN LOAD AT DESIRED CL	-AT CL DES- Y LOCATION OF LOCAL CENT PR
				FIRST PLANFORM SPAN LOAD DISTRIBUTION					
1	-.08565	.22007	.31384	.70123	-.00766	.10724	-.11490	.02841	28.46212
2	-.02199	.25499	.31470	.81025	-.00863	.12425	-.13288	.03316	29.86400
				SECOND PLANFORM SPAN LOAD DISTRIBUTION					
3	-.95833	.43266	1.73496	.24937	.26799	.21083	.05716	.33890	-6.85254
4	-.87500	.63267	1.84416	.34307	.38689	.30830	.07860	.49059	-5.98108
5	-.79167	.77153	1.76648	.43676	.46807	.37596	.09212	.59453	-5.17356
6	-.70833	.87819	1.65555	.53045	.52908	.42793	.10114	.67301	-4.42982
7	-.62500	.96343	1.54361	.62414	.57589	.46947	.10642	.73380	-3.75111
8	-.54167	1.03243	1.43826	.71783	.61098	.50310	.10788	.78020	-3.13767
9	-.46220	1.08664	1.34622	.80718	.63464	.52951	.10513	.81275	-2.61866
10	-.38274	1.13098	1.26152	.89652	.64885	.55112	.09773	.83422	-2.15562
11	-.29940	1.16670	1.17823	.99021	.65146	.56852	.08294	.84269	-1.70953
12	-.21607	1.19307	1.10072	1.08390	.63819	.58137	.05682	.83374	-1.25982
13	-.15086	1.20792	1.04382	1.15721	.60245	.58861	.01384	.80043	-.76086
14	-.08565	.99871	.94374	1.18368	.53365	.48666	.04699	.69735	-.58260
15	-.02199	.96740	.81728	1.18368	.52119	.47141	.04978	.67975	-.54026

THIRD PLANFORM SPAN LOAD DISTRIBUTION

16	-.38274	.03479	.27357	.12719	-.12365	.01696	-.14060	-.11795	-22.09613
17	-.29940	.04834	.23556	.20520	-.16294	.02355	-.18650	-.15502	-20.72168
18	-.21607	.05582	.19710	.28321	-.16936	.02720	-.19656	-.16021	-19.40895
19	-.15086	.05910	.17168	.34426	-.14302	.02880	-.17182	-.13333	-18.68952
20	-.08565	.06115	.09398	.65071	-.07313	.02980	-.10293	-.06310	-22.15751
21	-.02199	.06178	.09494	.65071	-.06189	.03010	-.09199	-.05176	-23.45778

ORIGINAL PAGE IS
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ORIGINAL PAGE IS
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AERODYNAMIC CHARACTERISTICS FOR CAMBERED AND TWISTED WINGS
WITH VORTEX LIFT AT VARIOUS ANGLES OF ATTACK

PLANFORM 1 HAS LEADING EDGE VORTEX FLOW ASSUMED FROM 0.00000 TO 0.00000
AND ATTACHED FLOW ELSEWHERE ACROSS THE SPAN

PLANFORM 2 HAS LEADING EDGE VORTEX FLOW ASSUMED FROM 0.00000 TO 0.00000
AND ATTACHED FLOW ELSEWHERE ACROSS THE SPAN

PLANFORM 3 HAS LEADING EDGE VORTEX FLOW ASSUMED FROM 0.00000 TO 0.00000
AND ATTACHED FLOW ELSEWHERE ACROSS THE SPAN

ZERO PERCENT LEADING EDGE SUCTION ASSUMED

ANGLE OF ATTACK = -10.00000 DEGREES

STATION	2Y/B	SECTIONAL CHARACTERISTICS CL*C/CAVE	CD*C/CAVE	(CM*C**2)/(CAVE*CREF) ABOUT C.G.	CL VORT LE*C/CAVE
		DISTRIBUTIONS FOR THE FIRST PLANFORM			
1	-.08565	-.11549	.02036	-.22276	0.00000
2	-.02199	-.11549	.02036	-.22276	0.00000

FIRST PLANFORM CHARACTERISTICS

CL = -.01364 CD = .00241 CM = -.02631

		DISTRIBUTIONS FOR THE SECOND PLANFORM			
3	-.95833	.08980	.02958	-.06298	0.00000
4	-.87500	.13079	.04775	-.09564	0.00000
5	-.79167	.15916	.06384	-.12306	0.00000
6	-.70833	.18125	.07963	-.15040	0.00000
7	-.62500	.19787	.09517	-.17887	0.00000
8	-.54167	.20883	.11037	-.20909	0.00000
9	-.46220	.21294	.12450	-.23990	0.00000
10	-.38274	.20881	.13797	-.27257	0.00000
11	-.29940	.19170	.15102	-.30864	0.00000
12	-.21607	.14549	.16396	-.34824	0.00000
13	-.15086	.11567	.10586	-.33474	0.00000
14	-.08565	.09672	.02673	-.28889	0.00000
15	-.02199	.07987	-.02936	-.23698	0.00000

SECOND PLANFORM CHARACTERISTICS

CL = .24531 CD = .13695 CM = -.32995

		DISTRIBUTIONS FOR THE THIRD PLANFORM			
16	-.38274	-.14480	.02553	.24340	0.00000
17	-.29940	-.17263	.03044	.26991	0.00000
18	-.21607	-.18050	.03183	.26549	0.00000
19	-.15086	-.15156	.02672	.21402	0.00000
20	-.08565	-.11295	.01992	.16075	0.00000

ORIGINAL PAGE IS OF POOR QUALITY

21	-.02199	-.08149	.01437	.12953	0.00000

THIRD PLANFORM CHARACTERISTICS

CL = -.08700 CD = .01534 CM = .13072

TOTAL CHARACTERISTICS

CL = .14467 CD = .15470 CM = -.22553

ORIGINAL PAGE IS
OF POOR QUALITY

ANGLE OF ATTACK = 0.00000 DEGREES

STATION	2Y/B	SECTIONAL CHARACTERISTICS CL*C/CAVE	CD*C/CAVE	(CM*C**2)/(CAVE*CREF) ABOUT C.G.	CL VORT LE*C/CAVE
		DISTRIBUTIONS FOR THE FIRST PLANFORM			
1	-.08565	-.00840	0.00000	-.00905	0.00000
2	-.02199	-.00840	0.00000	-.00905	0.00000

FIRST PLANFORM CHARACTERISTICS

CL = -.00099 CD = 0.00000 CM = -.00107

		DISTRIBUTIONS FOR THE SECOND PLANFORM			
3	-.95833	.26150	.01035	-.13921	0.00000
4	-.87500	.38468	.02855	-.18353	0.00000
5	-.79167	.46581	.04679	-.19909	0.00000
6	-.70833	.52801	.06495	-.20236	0.00000
7	-.62500	.57659	.08266	-.19857	0.00000
8	-.54167	.61385	.09970	-.19082	0.00000
9	-.46220	.63942	.11510	-.18178	0.00000
10	-.38274	.65431	.12898	-.17210	0.00000
11	-.29940	.65615	.14066	-.16147	0.00000
12	-.21607	.63695	.14646	-.14854	0.00000
13	-.15086	.59499	.09993	-.12776	0.00000
14	-.08565	.54980	.03638	-.10384	0.00000
15	-.02199	.51555	-.01269	-.08329	0.00000

SECOND PLANFORM CHARACTERISTICS

CL = .83549 CD = .12111 CM = -.25403

		DISTRIBUTIONS FOR THE THIRD PLANFORM			
16	-.38274	-.13273	0.00000	.21960	0.00000
17	-.29940	-.15673	0.00000	.24130	0.00000
18	-.21607	-.16133	0.00000	.23376	0.00000
19	-.15086	-.12992	0.00000	.18200	0.00000
20	-.08565	-.08920	0.00000	.12911	0.00000

ORIGINAL PAGE IS
OF POOR QUALITY

21	-.02199	-.05525	0.00000	.09812	0.00000

THIRD PLANFORM CHARACTERISTICS

CL = -.07531 CD = 0.00000 CM = .11280

TOTAL CHARACTERISTICS

CL = .75919 CD = .12111 CM = -.14230

ORIGINAL PAGE IS
OF POOR QUALITY

ANGLE OF ATTACK = 10.00000 DEGREES

STATION	2Y/B	SECTIONAL CHARACTERISTICS CL*C/CAVE	CD*C/CAVE	(CM*C**2)/(CAVE*CREF) ABOUT C.G.	CL VORT LE*C/CAVE
	DISTRIBUTIONS FOR THE FIRST PLANFORM				
1	-.08565	.09919	.01749	.20493	0.00000
2	-.02199	.09919	.01749	.20493	0.00000

FIRST PLANFORM CHARACTERISTICS

CL = .01172 CD = .00207 CM = .02421

	DISTRIBUTIONS FOR THE SECOND PLANFORM				
3	-.95833	.46323	.04605	-.22326	0.00000
4	-.87500	.66830	.09159	-.27439	0.00000
5	-.79167	.79896	.12972	-.27250	0.00000
6	-.70833	.89724	.16393	-.24543	0.00000
7	-.62500	.97322	.19491	-.20571	0.00000
8	-.54167	1.03213	.22309	-.15620	0.00000
9	-.46220	1.07462	.24751	-.10463	0.00000
10	-.38274	1.10366	.26892	-.05113	0.00000
11	-.29940	1.11880	.28675	.00564	0.00000
12	-.21607	1.11678	.29802	.06204	0.00000
13	-.15086	1.05537	.25809	.09205	0.00000
14	-.08565	.97701	.19964	.09316	0.00000
15	-.02199	.91759	.15225	.06985	0.00000

SECOND PLANFORM CHARACTERISTICS

CL = 1.43652 CD = .30227 CM = -.16293

	DISTRIBUTIONS FOR THE THIRD PLANFORM				
16	-.38274	-.11265	-.01986	.18913	0.00000
17	-.29940	-.13137	-.02316	.20534	0.00000
18	-.21607	-.13243	-.02335	.19494	0.00000
19	-.15086	-.10044	-.01771	.14446	0.00000
20	-.08565	-.06008	-.01059	.09355	0.00000

ORIGINAL PAGE IS
OF POOR QUALITY

21	-.02199	-.02762	-.00487	.06372	0.00000

THIRD PLANFORM CHARACTERISTICS

CL = -.05908 CD = -.01042 CM = .09143

TOTAL CHARACTERISTICS

CL = 1.38916 CD = .29391 CM = -.04729

ORIGINAL PAGE IS
OF POOR QUALITY

ANGLE OF ATTACK = 20.00000 DEGREES

STATION	2Y/B	SECTIONAL CHARACTERISTICS CL*C/CAVE	CD*C/CAVE	(CM*C**2)/(CAVE*CREF) ABOUT C.G.	CL VORT LE*C/CAVE
	DISTRIBUTIONS FOR THE FIRST PLANFORM				
1	-.08565	.18507	.06736	.39338	0.00000
2	-.02199	.18507	.06736	.39338	0.00000

FIRST PLANFORM CHARACTERISTICS

CL = .02186 CD = .00796 CM = .04647

	DISTRIBUTIONS FOR THE SECOND PLANFORM				
3	-.95833	.65734	.14712	-.30534	0.00000
4	-.87500	.92692	.24446	-.35743	0.00000
5	-.79167	1.09294	.31671	-.33441	0.00000
6	-.70833	1.21498	.37717	-.27714	0.00000
7	-.62500	1.30726	.42901	-.19932	0.00000
8	-.54167	1.37785	.47420	-.10933	0.00000
9	-.46220	1.42849	.51216	-.01775	0.00000
10	-.38274	1.46322	.54477	.07568	0.00000
11	-.29940	1.48269	.57230	.17254	0.00000
12	-.21607	1.48355	.59485	.25843	0.00000
13	-.15086	1.39913	.55247	.29857	0.00000
14	-.08565	1.28799	.48568	.27856	0.00000
15	-.02199	1.20178	.43152	.20408	0.00000

SECOND PLANFORM CHARACTERISTICS

CL = 1.92505 CD = .66592 CM = -.06757

	DISTRIBUTIONS FOR THE THIRD PLANFORM				
16	-.38274	-.08837	-.03216	.15536	0.00000
17	-.29940	-.10139	-.03690	.16607	0.00000
18	-.21607	-.09935	-.03616	.15337	0.00000
19	-.15086	-.06888	-.02507	.10566	0.00000
20	-.08565	-.03136	-.01141	.05818	0.00000

21	-.02199	-.00137	-.00050	.03036	0.00000

THIRD PLANFORM CHARACTERISTICS

CL = -.04146 CD = -.01509 CM = .06907

TOTAL CHARACTERISTICS

CL = 1.90544 CD = .65878 CM = .04797

ORIGINAL PAGE IS
OF POOR QUALITY

ANGLE OF ATTACK = 30.00000 DEGREES

STATION	2Y/B	SECTIONAL CHARACTERISTICS CL*C/CAVE	CD*C/CAVE	(CM*C**2)/(CAVE*CREF) ABOUT C.G.	CL VORT LE*C/CAVE
		DISTRIBUTIONS FOR THE FIRST PLANFORM			
1	-.08565	.23271	.13436	.53363	0.00000
2	-.02199	.23271	.13436	.53363	0.00000

FIRST PLANFORM CHARACTERISTICS

CL = .02749 CD = .01587 CM = .06304

		DISTRIBUTIONS FOR THE SECOND PLANFORM			
3	-.95833	.80422	.30455	-.37557	0.00000
4	-.87500	1.10708	.46726	-.42229	0.00000
5	-.79167	1.28638	.57944	-.37677	0.00000
6	-.70833	1.41432	.66917	-.29016	0.00000
7	-.62500	1.50784	.74309	-.17952	0.00000
8	-.54167	1.57726	.80554	-.05532	0.00000
9	-.46220	1.62526	.85660	.06884	0.00000
10	-.38274	1.65591	.89937	.19343	0.00000
11	-.29940	1.66992	.93507	.31953	0.00000
12	-.21607	1.65913	.96686	.41767	0.00000
13	-.15086	1.55366	.91122	.46757	0.00000
14	-.08565	1.41811	.82370	.43050	0.00000
15	-.02199	1.31037	.75482	.30351	0.00000

SECOND PLANFORM CHARACTERISTICS

CL = 2.19798 CD = 1.13933 CM = .02130

		DISTRIBUTIONS FOR THE THIRD PLANFORM			
16	-.38274	-.06375	-.03680	.12147	0.00000
17	-.29940	-.07160	-.04134	.12722	0.00000
18	-.21607	-.06748	-.03896	.11313	0.00000
19	-.15086	-.04051	-.02339	.06955	0.00000
20	-.08565	-.00804	-.00464	.02673	0.00000

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21	-.02199	.01779	.01027	.00166	0.00000

THIRD PLANFORM CHARACTERISTICS

CL = -.02540 CD = -.01466 CM = .04793

TOTAL CHARACTERISTICS

CL = 2.20007 CD = 1.14053 CM = .13227

ORIGINAL PAGE IS
OF POOR QUALITY

ANGLE OF ATTACK = 40.00000 DEGREES

STATION	2Y/B	SECTIONAL CHARACTERISTICS CL*C/CAVE	CD*C/CAVE	(CM*C**2)/(CAVE*CREF) ABOUT C.G.	CL VORT LE*C/CAVE
		DISTRIBUTIONS FOR THE FIRST PLANFORM			
1	-.08565	.23549	.19760	.60880	0.00000
2	-.02199	.23549	.19760	.60880	0.00000

FIRST PLANFORM CHARACTERISTICS

CL = .02782 CD = .02354 CM = .07191

		DISTRIBUTIONS FOR THE SECOND PLANFORM			
3	-.95833	.87266	.49119	-.42508	0.00000
4	-.87500	1.17078	.71656	-.46033	0.00000
5	-.79167	1.33858	.86315	-.39340	0.00000
6	-.70833	1.45336	.97615	-.28274	0.00000
7	-.62500	1.53286	1.06588	-.14757	0.00000
8	-.54167	1.58864	1.13945	.00037	0.00000
9	-.46220	1.62404	1.19787	.14561	0.00000
10	-.38274	1.64215	1.24499	.28873	0.00000
11	-.29940	1.64289	1.28270	.42968	0.00000
12	-.21607	1.60978	1.31494	.52159	0.00000
13	-.15086	1.49112	1.23650	.57966	0.00000
14	-.08565	1.34599	1.12071	.53141	0.00000
15	-.02199	1.22760	1.03312	.35668	0.00000

SECOND PLANFORM CHAPACTERISTICS

CL = 2.20029 CD = 1.60868 CM = .09433

		DISTRIBUTIONS FOR THE THIRD PLANFORM			
16	-.38274	-.04188	-.03514	.09009	0.00000
17	-.29940	-.04576	-.03839	.09188	0.00000
18	-.21607	-.04084	-.03427	.07750	0.00000
19	-.15086	-.01898	-.01593	.03928	0.00000
20	-.08565	.00686	.00576	.00216	0.00000

ORIGINAL PAGE IS
OF POOR QUALITY

Z'	-.02199	.02732	.02292	-.01958	0.00000

THIRD PLANFORM CHARACTERISTICS

CL = -.01292 CD = -.01085 CM = .02983

TOTAL CHARACTERISTICS

CL = 2.21518 CD = 1.62118 CM = .19608

AERODYNAMIC CHARACTERISTICS FOR CAMBERED AND TWISTED WINGS
WITH VORTEX LIFT AT VARIOUS ANGLES OF ATTACK

PLANFORM 1 HAS LEADING EDGE VORTEX FLOW ASSUMED FROM 0.00000 TO 0.00000
AND ATTACHED FLOW ELSEWHERE ACROSS THE SPAN

PLANFORM 2 HAS LEADING EDGE VORTEX FLOW ASSUMED FROM 0.00000 TO 0.00000
AND ATTACHED FLOW ELSEWHERE ACROSS THE SPAN

PLANFORM 3 HAS LEADING EDGE VORTEX FLOW ASSUMED FROM 0.00000 TO 0.00000
AND ATTACHED FLOW ELSEWHERE ACROSS THE SPAN

ONE HUNDRED PERCENT LEADING EDGE SUCTION ASSUMED

ORIGINAL PAGE IS
OF POOR QUALITY

ANGLE OF ATTACK = -10.00000 DEGREES

STATION	2Y/B	SECTIONAL CHARACTERISTICS CL*C/CAVE	CD*C/CAVE	(CM*C**2)/(CAVE*CREF) ABOUT C.G.	CL VORT LE*C/CAVE
DISTRIBUTIONS FOR THE FIRST PLANFORM					
1	-.08565	-.11554	.02008	-.22276	0.00000
2	-.02199	-.11554	.02008	-.22276	0.00000

FIRST PLANFORM CHARACTERISTICS

CL = -.01365 CD = .00237 CM = -.02631

DISTRIBUTIONS FOR THE SECOND PLANFORM					
3	-.95833	.06739	-.01046	-.05764	0.00000
4	-.87500	.09674	-.01306	-.09087	0.00000
5	-.79167	.11463	-.01570	-.12115	0.00000
6	-.70833	.12696	-.01733	-.15332	0.00000
7	-.62500	.13505	-.01703	-.18833	0.00000
8	-.54167	.13913	-.01413	-.22631	0.00000
9	-.46220	.13890	-.00775	-.26497	0.00000
10	-.38274	.13398	.00432	-.30474	0.00000
11	-.29940	.12200	.02652	-.34524	0.00000
12	-.21607	.09798	.06124	-.38389	0.00000
13	-.15086	.09040	.06000	-.35112	0.00000
14	-.08565	.09043	.02153	-.29927	0.00000
15	-.02199	.07845	-.03814	-.23695	0.00000

SECOND PLANFORM CHARACTERISTICS

CL = .17187 CD = .00498 CM = -.34969

DISTRIBUTIONS FOR THE THIRD PLANFORM					
16	-.38274	-.15085	-.00763	.24340	0.00000
17	-.29940	-.17731	.00392	.26991	0.00000
18	-.21607	-.18190	.02446	.26549	0.00000
19	-.15086	-.15452	.03594	.21402	0.00000
20	-.08565	-.11576	.03397	.16075	0.00000

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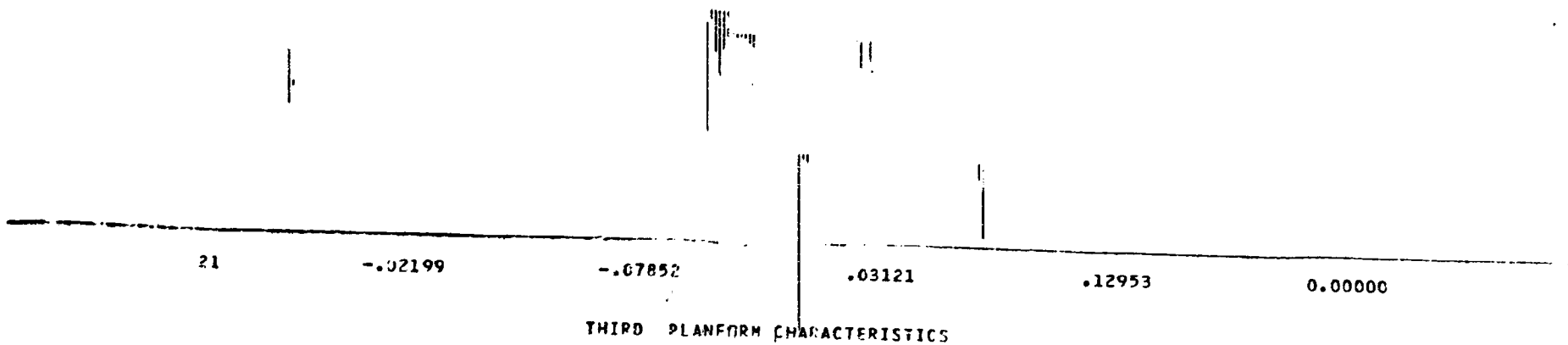

21	-.02199	-.07852	.03121	.12953	0.00000

THIRD PLANFORM CHARACTERISTICS

CL = -.06861 CD = .00623 CM = .13073

TOTAL CHARACTERISTICS

CL = .06961 CD = .01358 CM = -.24527

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ANGLE OF ATTACK = 0.00000 DEGREES

SECTIONAL CHARACTERISTICS

STATION	2Y/B	CL*C/CAVE	CD*C/CAVE	(CM*C**2)/(CAVE*CREF) ABOUT C.G.	CL VORT LE*C/CAVE
		DISTRIBUTIONS FOR THE FIRST PLANFORM			
1	-.08565	-.00840	.00006	-.00905	0.00000
2	-.02199	-.00840	.00006	-.00905	0.00000

FIRST PLANFORM CHARACTERISTICS

CL = -.00099 CD = .00001 CM = -.00107

		DISTRIBUTIONS FOR THE SECOND PLANFORM			
3	-.95833	.25626	-.00466	-.13734	0.00000
4	-.87500	.38003	.01524	-.18256	0.00000
5	-.79167	.45974	.02939	-.19871	0.00000
6	-.70833	.52005	.04214	-.20303	0.00000
7	-.62500	.56624	.05300	-.20092	0.00000
8	-.54167	.60096	.06278	-.19558	0.00000
9	-.46220	.62434	.07190	-.18940	0.00000
10	-.38274	.63772	.08147	-.18271	0.00000
11	-.29940	.63981	.09386	-.17421	0.00000
12	-.21607	.62336	.10752	-.16103	0.00000
13	-.15086	.58903	.08237	-.13353	0.00000
14	-.08565	.54963	.03419	-.10402	0.00000
15	-.02199	.51561	.01579	-.08323	0.00000

SECOND PLANFORM CHARACTERISTICS

CL = .82130 CD = .08001 CM = -.26051

		DISTRIBUTIONS FOR THE THIRD PLANFORM			
16	-.38274	-.13273	-.02712	.21960	0.00000
17	-.29940	-.15673	-.02312	.24130	0.00000
18	-.21607	-.16133	-.01455	.23376	0.00000
19	-.15086	-.12992	-.00542	.18200	0.00000
20	-.08565	-.08920	-.00033	.12911	0.00000

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2	-.02199	-.05625	-.00032	.09812	0.00000

THIRD PLANFORM CHARACTERISTICS

CL = -.07531 CD = -.00698 CM = .11280

TOTAL CHARACTERISTICS

CL = .74500 CD = .07304 CM = -.14879

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ANGLE OF ATTACK = 10.00000 DEGREES

STATION	2Y/B	SECTIONAL CHARACTERISTICS CL*C/CAVE	CD*C/CAVE	(CM*C**2)/(CAVE*CREF) ABOUT C.G.	CL VORT LE*C/CAVE
	DISTRIBUTIONS FOR THE FIRST PLANFORM				
1	-.08565	.09965	.01488	.20493	0.00000
2	-.02199	.09965	.01488	.20493	0.00000
	FIRST PLANFORM CHARACTERISTICS				
CL =	.01177	CD = .00176		CM = .02421	
	DISTRIBUTIONS FOR THE SECOND PLANFORM				
3	-.95433	.44842	-.04499	-.21241	0.00000
4	-.87500	.65651	.01908	-.26920	0.00000
5	-.79167	.78920	.06970	-.27105	0.00000
6	-.70833	.88951	.11640	-.24754	0.00000
7	-.62500	.96709	.15724	-.20840	0.00000
8	-.54167	1.02716	.19259	-.15984	0.00000
9	-.45220	1.07058	.22272	-.10872	0.00000
10	-.38274	1.10055	.24980	-.05514	0.00000
11	-.29940	1.11752	.27887	.00373	0.00000
12	-.21607	1.12486	.34768	.07810	0.00000
13	-.13286	1.06287	.17010	.08264	0.00000
14	-.08565	.97311	.09643	.07007	0.00000
15	-.02199	.89724	.31143	.07791	0.00000
	SECOND PLANFORM CHARACTERISTICS				
CL =	1.42839	CD = .24532		CM = -.16462	
	DISTRIBUTIONS FOR THE THIRD PLANFORM				
16	-.34274	-.10895	-.04082	.18913	0.00000
17	-.29940	-.12799	-.04234	.20534	0.00000
18	-.21607	-.12912	-.04212	.19494	0.00000
19	-.13286	-.10080	-.01680	.14446	0.00000
20	-.08565	-.06176	-.00107	.09355	0.00000

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OF POOR QUALITY

21	-.02199	-.02616	-.01317	.06372	0.00000

THIRD PLANFORM CHAPACTERISTICS

CL = -.05817 CD = -.01555 CM = .09143

TOTAL CHAPACTEPISTICS

CL = 1.38198 CD = .23153 CM = -.04898

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ANGLE OF ATTACK = 20.00000 DEGREES

STATION	2Y/B	SECTIONAL CHARACTERISTICS CL*C/CAVE	CD*C/CAVE	(CM*C**2)/(CAVE*CREF) ABOUT C.G.	CL VORT LE*C/CAVE
DISTRIBUTIONS FOR THE FIRST PLANFORM					
1	-.09565	.18788	.05966	.39338	0.00000
2	-.02199	.18788	.05966	.39338	0.00000

FIRST PLANFORM CHARACTERISTICS

CL = .02219 CD = .00705 CM = .04647

DISTRIBUTIONS FOR THE SECOND PLANFORM					
3	-.95833	.66090	-.12246	-.27368	0.00000
4	-.87500	.93015	.00012	-.34024	0.00000
5	-.79167	1.09590	.10069	-.32933	0.00000
6	-.70833	1.21739	.19501	-.28141	0.00000
7	-.62500	1.30923	.27987	-.20983	0.00000
8	-.54167	1.37944	.35467	-.12337	0.00000
9	-.46220	1.42971	.41989	-.03268	0.00000
10	-.38274	1.46407	.48059	.06249	0.00000
11	-.29940	1.48300	.54840	.16685	0.00000
12	-.21607	1.48170	.73508	.30320	0.00000
13	-.15086	1.46347	.30649	.27094	0.00000
14	-.04565	1.32722	.19621	.21267	0.00000
15	-.02199	1.06270	.87704	.22707	0.00000

SECOND PLANFORM CHARACTERISTICS

CL = 1.93050 CD = .47265 CM = -.07368

DISTRIBUTIONS FOR THE THIRD PLANFORM					
16	-.38274	-.08279	-.04749	.15536	0.00000
17	-.29940	-.09589	-.05202	.16607	0.00000
18	-.21607	-.09217	-.05589	.15337	0.00000
19	-.15086	-.08957	-.02317	.10566	0.00000
20	-.04565	-.08407	.00151	.05918	0.00000

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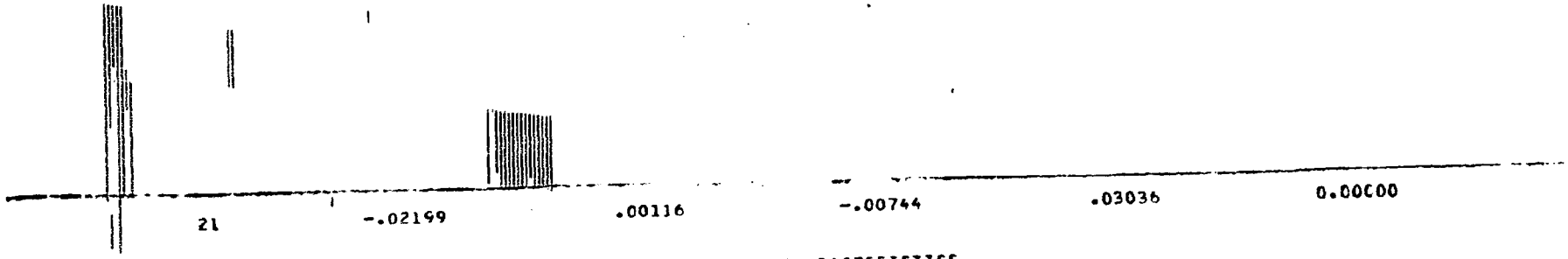

THIRD PLANFORM CHARACTERISTICS

CL = -.04010 CD = -.01884 CM = .06907

TOTAL CHARACTERISTICS

CL = 1.91259 CD = .46086 CM = .04186

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ANGLE OF ATTACK = 30.00000 DEGREES

STATION	2Y/B	SECTIONAL CHARACTERISTICS CL*C/CAVE	CD*C/CAVE	(CM*C**2)/(CAVE*CREF) ABOUT C.6.	CL VORT LF*C/CAVE
		DISTRIBUTIONS FOR THE FIRST PLANFORM			
1	-.09565	.24072	.12049	.53363	0.00000
2	-.02199	.24072	.12049	.53363	0.00000

FIRST PLANFORM CHARACTERISTICS

CL = .02843 CD = .01423 CM = .06304

		DISTRIBUTIONS FOR THE SECOND PLANFORM			
3	-.95833	.90320	-.21641	-.31335	0.00000
4	-.87500	1.20224	-.03358	-.38650	0.00000
5	-.79167	1.37378	.11945	-.36589	0.00000
6	-.70833	1.49123	.26440	-.29993	0.00000
7	-.62500	1.57357	.39713	-.20446	0.00000
8	-.54167	1.63230	.51585	-.09007	0.00000
9	-.44220	1.66994	.62144	.02995	0.00000
10	-.38274	1.68946	.72278	.15630	0.00000
11	-.29940	1.68796	.84013	.29557	0.00000
12	-.21607	1.61969	1.17444	.48581	0.00000
13	-.13086	1.75633	.45817	.40873	0.00000
14	-.06565	1.58161	.30900	.30776	0.00000
15	-.02199	.90452	1.53855	.34634	0.00000

SECOND PLANFORM CHARACTERISTICS

CL = 2.28432 CD = .71159 CM = .00189

		DISTRIBUTIONS FOR THE THIRD PLANFORM			
16	-.38274	-.05741	-.04742	.12147	0.00000
17	-.29940	-.06508	-.05263	.12722	0.00000
18	-.21607	-.05717	-.05681	.11313	0.00000
19	-.13086	-.03978	-.02466	.05955	0.00000
20	-.06565	-.01433	.00425	.02673	0.00000

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21	-.02199	.01702	.01161	.00166	0.00000

THIRD PLANFORM CHAPACTERISTICS

CL = -.02376 CD = -.01740 CM = .04793

TOTAL CHARACTERISTICS

CL = 2.28899 CD = .70833 CM = .11286

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ANGLE OF ATTACK = 40.00000 DEGREES

STATION	2Y/B	SECTIONAL CHARACTERISTICS CL*C/CAVE	CD*C/CAVE	(CM*C**2)/(CAVE*CREF) ABOUT C.G.	CL VORT LE*C/CAVE
	DISTRIBUTIONS FOR THE FIRST		PLANFORM		
1	-.08565	.25172	.17825	.60880	0.00000
2	-.02199	.25172	.17825	.60980	0.00000

FIRST PLANFORM CHARACTERISTICS

CL = .02973 CD = .02106 CM = .07191

	DISTRIBUTIONS FOR THE SECOND		PLANFORM		
3	-.95833	1.17247	-.29984	-.32586	0.00000
4	-.87500	1.46988	-.06992	-.40136	0.00000
5	-.79167	1.61842	.12482	-.37518	0.00000
6	-.70833	1.70567	.31047	-.29977	0.00000
7	-.62500	1.75400	.48243	-.19190	0.00000
8	-.54167	1.77880	.63775	-.06302	0.00000
9	-.46220	1.78327	.77777	.07244	0.00000
10	-.38274	1.76723	.91498	.21561	0.00000
11	-.29940	1.72057	1.07750	.37464	0.00000
12	-.21607	1.52244	1.54539	.60231	0.00000
13	-.15086	1.92383	.58334	.47995	0.00000
14	-.08565	1.71910	.40383	.34597	0.00000
15	-.02199	.40085	2.11339	.42142	0.00000

SECOND PLANFORM CHARACTERISTICS

CL = 2.47549 CD = .90146 CM = .05411

	DISTRIBUTIONS FOR THE THIRD		PLANFORM		
16	-.38274	-.03602	-.04212	.09009	0.00000
17	-.29940	-.03907	-.04636	.09188	0.00000
18	-.21607	-.02898	-.04840	.07750	0.00000
19	-.15086	-.01360	-.02234	.03928	0.00000
20	-.08565	.00215	.01138	.00216	0.00000

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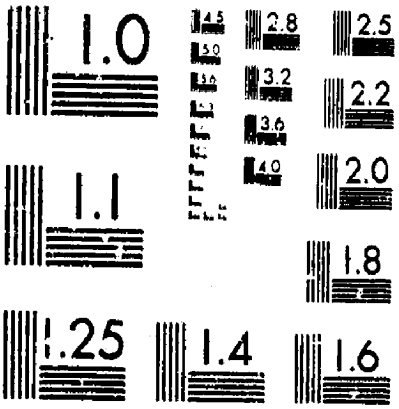

MICROCOPY RESOLUTION TEST CHART
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21	-.02199	.01687	.03538	-.01958	0.00000

THIRD PLANFORM CHARACTERISTICS

CL = -.01101 CD = -.01313 CM = .02983

TOTAL CHARACTERISTICS

CL = 2.49422 CD = .90938 CM = .15585

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AERODYNAMIC CHARACTERISTICS FOR CAMBERED AND TWISTED WINGS
WITH VORTEX LIFT AT VARIOUS ANGLES OF ATTACK

PLANFORM 1 HAS LEADING EDGE VORTEX FLOW ASSUMED FROM 0.00000 TO 0.00000
AND ATTACHED FLOW ELSEWHERE ACROSS THE SPAN

PLANFORM 2 HAS LEADING EDGE VORTEX FLOW ASSUMED FROM -2.40000 TO -18.85000
AND ATTACHED FLOW ELSEWHERE ACROSS THE SPAN

PLANFORM 3 HAS LEADING EDGE VORTEX FLOW ASSUMED FROM 0.00000 TO 0.00000
AND ATTACHED FLOW ELSEWHERE ACROSS THE SPAN

ANGLE OF ATTACK = -10.00000 DEGREES

STATION	2Y/B	SECTIONAL CHARACTERISTICS CL*C/CAVE	CD*C/CAVE	(CM*C**2)/(CAVE*CREF) ABOUT C.G.	CL VORT LE*C/CAVE
DISTRIBUTIONS FOR THE FIRST PLANFORM					
1	-.03565	-.11554	.02008	-.22276	0.00000
2	-.02199	-.11554	.02008	-.22276	0.00000

FIRST PLANFORM CHARACTERISTICS

CL = -.01365 CD = .00237 CM = -.02631

C SUCTION = 0.00000

DISTRIBUTIONS FOR THE SECOND PLANFORM					
3	-.95833	.02630	.06512	-.03871	-.06350
4	-.87500	.03434	.10175	-.07395	-.09645
5	-.79167	.03302	.13448	-.11438	-.12614
6	-.70833	.02747	.16572	-.15970	-.15377
7	-.62500	.01992	.19480	-.22183	-.17795
8	-.54167	.01137	.22092	-.29730	-.19746
9	-.45820	.00319	.24193	-.35382	-.20975
10	-.37474	-.00317	.25665	-.41875	-.21197
11	-.29940	-.00575	.26156	-.47494	-.19745
12	-.23667	-.01742	.25516	-.51024	-.16291
13	-.15[illegible]	.04529	.14299	-.40800	-.06972
14	-.[illegible]565	.09543	.02153	-.28927	0.00000
15	-.[illegible]2199	.07845	-.03814	-.23685	0.00000

SECOND PLANFORM CHARACTERISTICS

CL = .[illegible]782 CD = .25160 CM = -.41938

C SUCTION = .23744

DISTRIBUTIONS FOR THE THIRD PLANFORM

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16	-.33274	-.15065	-.00763	.24340	0.00000
17	-.29940	-.17731	.00392	.26991	0.00000
18	-.21667	-.18180	.02446	.26549	0.00000
19	-.15086	-.15452	.00994	.21492	0.00000
20	-.08585	-.11576	.00397	.15075	0.00000
21	-.02199	-.07852	.03121	.12953	0.00000

THIRD PLANFORM CHARACTERISTICS

CL = -.06861 CD = .00623 CM = .13073

C SUCTION = 0.00000

TOTAL CHARACTERISTICS

CL = -.06443 CD = .26020 CM = -.31496

C SUCTION = .23744

ORIGINAL PAGE IS
OF POOR QUALITY

ANGLE OF ATTACK = 0.00000 DEGREES

STATION	2Y/B	SECTIONAL CHARACTERISTICS CL*C/CAVE	CD*C/CAVE	(CM*C**2)/(CAVE*CREF) ABOUT C.G.	CL VORT LE*C/CAVE
DISTRIBUTIONS FOR THE FIRST PLANFORM					
1	-.98965	-.00240	.00006	-.03905	0.00000
2	-.92199	-.00240	.00006	-.00905	0.00000

FIRST PLANFORM CHARACTERISTICS

CL = -.00099 CD = .00001 CM = -.00107

C SUCTION = 0.00000

DISTRIBUTIONS FOR THE SECOND PLANFORM					
3	-.95833	.28362	.00263	-.14732	.02212
4	-.87900	.38357	.03592	-.17914	-.02111
5	-.79167	.43820	.05643	-.19737	-.02761
6	-.70833	.49184	.07756	-.20537	-.03617
7	-.62500	.52954	.09909	-.20924	-.04705
8	-.54167	.55529	.12014	-.21245	-.05856
9	-.46220	.57090	.13902	-.21638	-.06851
10	-.38274	.57895	.15529	-.22032	-.07536
11	-.29340	.58193	.16657	-.21933	-.07423
12	-.21607	.57519	.16902	-.20528	-.06176
13	-.15000	.56849	.16818	-.15339	-.02835
14	-.08965	.54963	.03419	-.10402	0.00000
15	-.02199	.51561	-.01579	-.08323	0.00000

SECOND PLANFORM CHARACTERISTICS

CL = .77083 CD = .14104 CM = -.28042

C SUCTION = .06813

DISTRIBUTIONS FOR THE THIRD PLANFORM

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16	-.38274	-.13273	-.02712	.21960	0.00000
17	-.29940	-.15673	-.02312	.24130	0.00000
18	-.21607	-.16133	-.01455	.23376	0.00000
19	-.15086	-.12992	-.00542	.18200	0.00000
20	-.08965	-.08920	-.00033	.12911	0.00000
21	-.02199	-.05625	-.00032	.09812	0.00000

THIRD PLANFORM CHARACTERISTICS

CL = -.07531 CD = -.00698 CM = .11280

C SUCTION = 0.00000

TOTAL CHARACTERISTICS

CL = .70050 CD = .13407 CM = -.17369

C SUCTION = .06813

ORIGINAL PAGE IS
OF POOR QUALITY

ANGLE OF ATTACK = 10.00000 DEGREES

STATION	2Y/B	SECTIONAL CHARACTERISTICS CL*C/CAVE	CD*C/CAVE	(CM*C**2)/(CAVE*CREF) ABOUT C.G.	CL VORT LE*C/CAVE
		DISTRIBUTIONS FOR THE FIRST PLANFORM			
1	-.09565	.09965	.01488	.20493	0.00000
2	-.02149	.09965	.01488	.20493	0.00000

FIRST PLANFORM CHARACTERISTICS

CL = .01177 CD = .00176 CM = .02421

C SUCTION = 0.00000

		DISTRIBUTIONS FOR THE SECOND PLANFORM			
3	-.95833	.60762	.02255	-.27255	.14439
4	-.87500	.78330	.07287	-.29796	.11499
5	-.79167	.89415	.11423	-.27911	.09516
6	-.70833	.97261	.15168	-.24139	.07537
7	-.62500	1.03297	.18519	-.19350	.05975
8	-.54167	1.08050	.21522	-.13967	.04838
9	-.45820	1.11395	.24111	-.08605	.03933
10	-.37274	1.13398	.26399	-.03293	.03032
11	-.29940	1.13131	.28472	.01432	.01251
12	-.21507	1.03902	.31084	-.01094	-.07876
13	-.13086	1.00465	.14515	.02244	-.05335
14	-.07585	.97311	.09643	.07007	0.00000
15	-.02149	.89724	.31143	.07791	0.00000

SECOND PLANFORM CHARACTERISTICS

CL = 1.50919 CD = .27579 CM = -.17989

C SUCTION = .06598

DISTRIBUTIONS FOR THE THIRD PLANFORM

16	-.38274	-.10895	-.04082	.18913	0.00000
17	-.29940	-.12799	-.04234	.20534	0.00000
18	-.21567	-.12912	-.04212	.19494	0.00000
19	-.15386	-.10060	-.01680	.14446	0.00000
20	-.04565	-.06176	-.00107	.09355	0.00000
21	-.02199	-.02616	-.01317	.06372	0.00000

THIRD PLANFORM CHARACTERISTICS

CL = -.05317 CD = -.01555 CM = .09143

C SUCTION = 0.00000

TOTAL CHARACTERISTICS

CL = 1.45378 CD = .26200 CM = -.06425

C SUCTION = .06598

ORIGINAL PAGE IS
OF POOR QUALITY

ANGLE OF ATTACK = 20.00000 DEGREES

STATION	2Y/B	SECTIONAL CHARACTERISTICS CL*C/CAVE	CD*C/CAVE	(CM*C**2)/(CAVE*CREF) ABOUT C.G.	CL VORT LE*C/CAVE
		DISTRIBUTIONS FOR THE FIRST PLANFORM			
1	-.08565	.18788	.05966	.39338	0.00000
2	-.02199	.18788	.05966	.39338	0.00000

FIRST PLANFORM CHARACTERISTICS

CL = .02219 CD = .00705 CM = .04647

C SUCTION = 0.00000

		DISTRIBUTIONS FOR THE SECOND PLANFORM			
3	-.95833	1.08488	.15277	-.44920	.42754
4	-.87500	1.31444	.24958	-.43555	.38752
5	-.79167	1.43555	.32124	-.35747	.34261
6	-.70833	1.50388	.38099	-.25779	.28890
7	-.62500	1.54379	.43213	-.15158	.23653
8	-.54167	1.56743	.47671	-.04557	.19957
9	-.45220	1.57483	.51409	.05012	.14634
10	-.38274	1.56503	.54612	.13561	.10180
11	-.29940	1.52060	.57280	.19842	.03791
12	-.21607	1.26114	.59191	.05503	-.22241
13	-.15086	1.31458	.20958	.10329	-.15054
14	-.04561	1.32722	.19621	.21267	0.00000
15	-.02199	1.06270	.87704	.22707	0.00000

SECOND PLANFORM CHARACTERISTICS

CL = 2.16437 CD = .62447 CM = -.11013

C SUCTION = .23586

DISTRIBUTIONS FOR THE THIRD PLANFORM

ORIGINAL PAGE IS OF POOR QUALITY

16	-.38274	-.08279	-.04749	.15536	0.00000
17	-.29940	-.09589	-.05202	.16607	0.00000
18	-.21507	-.09217	-.05589	.15337	0.00000
19	-.15086	-.06957	-.02317	.10566	0.00000
20	-.08565	-.03607	.00151	.05918	0.00000
21	-.02199	.00116	-.00744	.03036	0.00000

THIRD PLANFORM CHARACTERISTICS

CL = -.04010 CD = -.01884 CM = .06907

C SUCTION = 0.00000

TOTAL CHARACTERISTICS

CL = 2.14646 CD = .61269 CM = .00541

C SUCTION = .23586

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ANGLE OF ATTACK = 30.00000 DEGREES

STATION	2Y/B	SECTIONAL CHARACTERISTICS CL*C/CAVE	CD*C/CAVE	(CM*C**2)/(CAVE*CREF) ABOUT C.G.	CL VORT LE*C/CAVE
DISTRIBUTIONS FOR THE FIRST PLANFORM					
1	-.08565	.24072	.12049	.53363	0.00000
2	-.02199	.24072	.12049	.53363	0.00000

FIRST PLANFORM CHARACTERISTICS

CL = .02843 CD = .01423 CM = .06304

C SUCTION = 0.00000

DISTRIBUTIONS OR THE SECOND PLANFORM					
3	-.95833	1.63045	.46153	-.65829	.82623
4	-.87500	1.90141	.61818	-.59491	.79433
5	-.79167	2.01593	.71805	-.42618	.72954
6	-.70833	2.05630	.79115	-.24574	.64198
7	-.62500	2.05652	.84734	-.06620	.54869
8	-.54167	2.03671	.89283	.10259	.45944
9	-.45220	1.99823	.92746	.24555	.37297
10	-.38274	1.93597	.95258	.36213	.28006
11	-.29940	1.82050	.96368	.42641	.15058
12	-.21607	1.32991	.90431	.10905	-.32922
13	-.15346	1.54556	.26169	.13733	-.23945
14	-.04565	1.58161	.30900	.30776	0.00000
15	-.02199	.90452	1.53855	.34634	0.00000

SECOND PLANFORM CHARACTERISTICS

CL = 2.77542 CD = 1.16473 CM = -.02154

C SUCTION = .56214

DISTRIBUTIONS FOR THE THIRD PLANFORM

ORIGINAL PAGE IS
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101

16	-.38274	-.05761	-.04742	.12147	0.00000
17	-.29940	-.06508	-.05263	.12722	0.00000
18	-.21067	-.05717	-.05681	.11313	0.00000
19	-.15086	-.03978	-.02466	.06955	0.00000
20	-.08565	-.01433	.00625	.02673	0.00000
21	-.02199	.01702	.01161	.00166	0.00000

THIRD PLANFORM CHARACTERISTICS

CL = -.02376 CD = -.01749 CM = .04793

C SUCTION = 0.00000

TOTAL CHARACTERISTICS

CL = 2.77509 CD = 1.16147 CM = .08943

C SUCTION = .56214

ORIGINAL PAGE IS
OF POOR QUALITY

ANGLE OF ATTACK = 40.00000 DEGREES

STATION	2Y/B	SECTIONAL CHARACTERISTICS CL*C/CAVE	CD*C/CAVE	(CM*C**2)/(CAVE*CREF) ABOUT C.G.	CL VORT LE*C/CAVE
DISTRIBUTIONS FOR THE FIRST PLANFORM					
1					
2	-.08565	.25172	.17825	.60880	0.00000
	-.02199	.25172	.17825	.60880	0.00000

FIRST PLANFORM CHARACTERISTICS

CL = .02973 CD = .02106 CM = .07191

C SUCTION = 0.00000

DISTRIBUTIONS FOR THE SECOND PLANFORM					
3	-.95833	2.12721	.96669	-.87587	1.25455
4	-.87500	2.41814	1.18934	-.72827	1.24738
5	-.79167	2.50957	1.30698	-.47619	1.17099
6	-.70833	2.50914	1.37631	-.20535	1.05577
7	-.62500	2.45821	1.41661	.05387	.92535
8	-.54167	2.38434	1.44104	.28840	.79570
9	-.46220	2.29031	1.45040	.47805	.66627
10	-.38274	2.16554	1.44337	.62096	.52340
11	-.29340	1.96833	1.40604	.67979	.32544
12	-.21607	1.24429	1.17641	.15482	-.36549
13	-.15066	1.70019	.28667	.12999	-.29387
14	-.08565	1.71910	.40383	.34597	0.00000
15	-.02199	.40085	2.11339	.42142	0.00000

SECOND PLANFORM CHARACTERISTICS

CL = 3.19495 CD = 1.85588 CM = .07905

C SUCTION = 1.01103

DISTRIBUTIONS FOR THE THIRD PLANFORM

16	-.38274	-.03502	-.04212	.09009	0.00000
17	-.29940	-.03907	-.04636	.09188	0.00000
18	-.21567	-.02898	-.04840	.07750	0.00000
19	-.15088	-.01360	-.02234	.03923	0.00000
20	-.09565	.00215	.01138	.00216	0.00000
21	-.02199	.01687	.03538	-.01958	0.00000

CL = -.01101

THIRD PLANFORM CHARACTERISTICS

CD = -.01313 CM = .02983

C SUCTION = 0.00000

TOTAL CHARACTERISTICS

CL = 3.21369

CD = 1.86380 CM = .18080

C SUCTION = 1.01103

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KVSE AND RESPECTIVE CHORDWISE CENTROID FOR EACH PLANFORM

PLANFORM NO. 1

LIMITS OF INTEGRATION		KV SE	LOCATION CHORDWISE	LOCATION SPANWISE
32.00000 (LEADING)	32.00000 (TRAILING)	0.00000	0.00000	-2.40000

PLANFORM NO. 2

LIMITS OF INTEGRATION		KV SE	LOCATION CHORDWISE	LOCATION SPANWISE
-5.75000 (LEADING)	-9.93000 (TRAILING)	.76177	-7.75305	-18.85000

PLANFORM NO. 3

LIMITS OF INTEGRATION		KV SE	LOCATION CHORDWISE	LOCATION SPANWISE
-22.42000 (LEADING)	-24.24000 (TRAILING)	.15436	-23.06428	-8.00000

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TOTAL PERFORMANCE CHARACTERISTICS

	ATTACHED FLOW			FULL LEADING EDGE SUCTION			SEPARATED FLOW PLUS POTENTIAL CONTRIBUTIONS					
	ZERO LEADING EDGE SUCTION						LEADING EDGE			SIDE EDGE		
ALPHA	CL	CD	CM	CL	CD	CM	CL	CD	CM	CL VSE	CD VSE	CM VSE
-10.00000	.14457	.15470	-.22553	.06961	.01358	-.24527	-.06443	.26020	-.31496	-.02721	.00480	.02124
-8.00000	.26030	.13295	-.21036	.20421	.01720	-.22684	.08944	.21184	-.28633	-.01757	.00247	.01364
-6.00000	.38050	.11827	-.19436	.33964	.02492	-.20788	.24376	.17526	-.25752	-.00996	.00105	.00770
-4.00000	.50436	.11116	-.17763	.47531	.03679	-.18848	.39707	.15052	-.22871	-.00445	.00031	.00343
-2.00000	.63093	.11200	-.16025	.61063	.05284	-.16875	.54791	.13753	-.20003	-.00112	.00004	.00086
0.00000	.75919	.12111	-.14230	.74500	.07304	-.14879	.70050	.13407	-.17369	0.00000	0.00000	0.00000
2.00000	.88811	.13868	-.12388	.87782	.09729	-.12869	.85674	.13940	-.14856	.00112	.00004	-.00086
4.00000	1.01664	.16481	-.10507	1.00849	.12548	-.10856	1.01496	.15408	-.12191	.00445	.00031	-.00343
6.00000	1.14370	.19948	-.08598	1.13645	.15741	-.08850	1.16690	.16004	-.09596	.00996	.00105	-.00770
8.00000	1.26822	.24259	-.06668	1.26112	.19285	-.06861	1.32765	.21338	-.06581	.01757	.00247	-.01364
10.00000	1.38916	.29391	-.04729	1.38198	.23153	-.04898	1.45378	.26200	-.06425	.02721	.00480	-.02124
12.00000	1.50548	.35312	-.02788	1.49852	.27313	-.02972	1.59110	.31628	-.05180	.03874	.00823	-.03045
14.00000	1.61619	.41979	-.00857	1.61027	.31728	-.01091	1.73006	.37829	-.03855	.05203	.01297	-.04122
16.00000	1.72034	.49337	.01058	1.71678	.36357	.00734	1.86963	.44827	-.02457	.06691	.01919	-.05351
18.00000	1.81703	.57328	.02945	1.81767	.41159	.02496	2.00879	.52638	-.00990	.08320	.02703	-.06726
20.00000	1.90544	.65878	.04797	1.91259	.46086	.04186	2.14646	.61268	.00541	.10070	.03665	-.08239
22.00000	1.98482	.74911	.06604	2.00124	.51089	.05795	2.28157	.70711	.02129	.11920	.04816	-.09884
24.00000	2.05450	.84339	.08359	2.08337	.56119	.07317	2.41304	.80952	.03769	.13846	.06165	-.11652
26.00000	2.11391	.94071	.10053	2.15879	.61121	.08744	2.53980	.91964	.05455	.15824	.07718	-.13535
28.00000	2.16256	1.04010	.11678	2.22736	.66044	.10069	2.66082	1.03711	.07182	.17828	.09480	-.15524
30.00000	2.20007	1.14053	.13227	2.28899	.70833	.11286	2.77569	1.16147	.08943	.19835	.11452	-.17609
32.00000	2.22619	1.24097	.14693	2.34366	.75435	.12390	2.88164	1.29214	.10733	.21817	.13633	-.19779
34.00000	2.24075	1.34023	.16070	2.39141	.79797	.13376	2.97958	1.42849	.12547	.23750	.16019	-.22024
36.00000	2.24370	1.43753	.17352	2.43231	.83868	.14240	3.06807	1.56977	.14380	.25607	.18604	-.24334
38.00000	2.23512	1.53150	.18533	2.46652	.87597	.14977	3.14633	1.71517	.16225	.27364	.21379	-.26697
40.00000	2.21518	1.62118	.19608	2.49422	.90938	.15585	3.21369	1.86380	.18080	.28997	.24331	-.29102

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S E P A R A T E D F L O W C O N T I N U E D

	AUGMENTED			PLUS POTENTIAL CONTRIBUTIONS								
				LEADING EDGE + SIDE EDGE			LEADING EDGE + AUGMENTED			LE + SE + AUGMENTED		
ALPHA	CL AUG	CD AUG	CM AUG	CL	CD	CM	CL	CD	CM	CL	CD	CM
-10.00000	-.03746	.00661	.02219	-.09164	.26500	-.29372	-.10190	.26681	-.29277	-.12910	.27160	-.27153
-8.00000	-.03033	.00426	.01786	.07187	.21431	-.27269	.05912	.21611	-.26846	.04154	.21857	-.25482
-6.00000	-.02403	.00253	.01410	.23381	.17631	-.24983	.21973	.17779	-.24343	.20978	.17883	-.23573
-4.00000	-.01866	.00131	.01091	.39263	.15083	-.22528	.37641	.15182	-.21779	.37396	.15213	-.21437
-2.00000	-.01427	.00050	.00833	.54680	.13756	-.19917	.53364	.13802	-.19170	.53252	.13806	-.19084
0.00000	-.01092	0.00000	.00637	.70050	.13407	-.17369	.68958	.13407	-.16732	.68958	.13407	-.16732
2.00000	-.00863	-.00030	.00503	.85786	.13944	-.14942	.84812	.13910	-.14352	.84923	.13914	-.14438
4.00000	-.00743	-.00052	.00434	1.01941	.15439	-.12534	1.00754	.15356	-.11757	1.01198	.15387	-.12099
6.00000	-.00733	-.00077	.00430	1.17686	.18108	-.10365	1.15957	.17927	-.09166	1.16953	.18031	-.09935
8.00000	-.00833	.00117	-.00491	1.34527	.21585	-.07945	1.33598	.21455	-.07072	1.35355	.21702	-.08436
10.00000	-.01041	.00184	-.00617	1.48099	.26680	-.08549	1.46419	.26383	-.07041	1.49140	.26863	-.09165
12.00000	-.01354	.00288	-.00808	1.62984	.32452	-.08224	1.60464	.31916	-.05987	1.64338	.32739	-.09032
14.00000	-.01768	.00441	-.01063	1.78208	.39126	-.07978	1.74773	.38269	-.04918	1.79976	.39566	-.09040
16.00000	-.02277	.00653	-.01381	1.93654	.46745	-.07808	1.89240	.45479	-.03838	1.95931	.47398	-.09120
18.00000	-.02874	.00934	-.01762	2.09199	.55341	-.07716	2.03753	.53572	-.02752	2.12073	.56275	-.09478
20.00000	-.03551	.01292	-.02204	2.24717	.64933	-.07698	2.18197	.62560	-.01664	2.28268	.66226	-.09903
22.00000	-.04306	.01737	-.02705	2.40077	.75527	-.07755	2.32457	.72448	-.00576	2.44377	.77264	-.10460
24.00000	-.05110	.02275	-.03263	2.55150	.87116	-.07883	2.46414	.83227	.00506	2.60260	.89391	-.11146
26.00000	-.05971	.02912	-.03875	2.69804	.99682	-.08080	2.59951	.94876	.01580	2.75775	1.02594	-.11955
28.00000	-.06872	.03654	-.04540	2.83911	1.13191	-.08342	2.72954	1.07365	.02642	2.90782	1.16844	-.12882
30.00000	-.07830	.04503	-.05254	2.97344	1.27598	-.08665	2.85309	1.20650	.03689	3.05143	1.32101	-.13919
32.00000	-.08743	.05463	-.06014	3.09982	1.42847	-.09046	2.96907	1.34677	.04720	3.18724	1.48310	-.15059
34.00000	-.09685	.06535	-.06817	3.21708	1.58868	-.09477	3.07646	1.49384	.05731	3.31396	1.65403	-.16294
36.00000	-.10623	.07718	-.07659	3.32413	1.75581	-.09955	3.17429	1.64695	.06720	3.43036	1.83299	-.17614
38.00000	-.11534	.09011	-.08538	3.41997	1.92896	-.10472	3.26167	1.80528	.07687	3.53531	2.01907	-.19010
40.00000	-.12409	.10412	-.09449	3.50366	2.10711	-.11022	3.33778	1.96792	.08631	3.62774	2.21123	-.20471

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INDUCED DRAG POLAR SHAPE FACTOR

1/(PI*AP) = .11348

	ZERO LE SUCTION		FULL LE SUCTION		POTENT.+VORTEX(LE+SE+AUG)	
	CLO .50436	CDMIN .11116	CLO 0.00000	CDMIN .01358	CLO .68958	CDMIN .13407
ALPHA	CL	(CD-CDMIN)/((CL-CLO)**2)	CL	(CD-CDMIN)/((CL-CLO)**2)	CL	(CD-CDMIN)/((CL-CLO)**2
-10.00000	.14467	.33654	.06961	0.00000	-.12910	.20520
-8.00000	.28030	.34583	.20421	.08688	.04154	.20122
-6.00000	.39650	.46372	.33964	.09828	.20978	.19444
-4.00000	.50436	100.00000	.47531	.10274	.37396	.18134
-2.00000	.63093	.05278	.61063	.10530	.53252	.16185
0.00000	.75919	.15326	.74500	.10713	.68958	100.00000
2.00000	.88811	.18688	.87782	.10864	.84923	.19876
4.00000	1.01664	.20443	1.00849	.11002	1.01198	.19052
6.00000	1.14370	.21609	1.13645	.11137	1.16953	.20075
8.00000	1.26822	.22526	1.26112	.11272	1.35355	.18316
10.00000	1.38918	.23345	1.38198	.11412	1.49140	.20930
12.00000	1.50548	.24142	1.49852	.11558	1.64338	.21250
14.00000	1.61619	.24967	1.61027	.11712	1.79976	.21225
16.00000	1.72034	.25850	1.71678	.11875	1.95931	.21083
18.00000	1.81703	.26819	1.81767	.12047	2.12073	.20930
20.00000	1.90544	.27897	1.91259	.12227	2.28268	.20811
22.00000	1.98462	.29107	2.00124	.12417	2.44377	.20752
24.00000	2.05450	.30472	2.08337	.12616	2.60260	.20763
26.00000	2.11391	.32021	2.15879	.12824	2.75775	.20951
28.00000	2.16256	.33785	2.22736	.13039	2.90782	.21021
30.00000	2.20007	.35796	2.28899	.13260	3.05243	.21278
32.00000	2.22619	.38109	2.34366	.13486	3.18724	.21625
34.00000	2.24079	.40768	2.39141	.13716	3.31396	.22069
36.00000	2.24370	.43843	2.43231	.13947	3.43036	.22616
38.00000	2.23512	.47416	2.46652	.14175	3.53531	.23277
40.00000	2.21510	.51591	2.49422	.14399	3.62774	.24061

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INPUT DATA

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 3.    5.0
 4.    0.0        0.0
 5.   -0.5       -0.5
 6.   -1.5       -0.5
 7.   -2.5       -1.5
 8.   -3.0       -1.5
 9.   -3.0        0.0
10.    4.0
11.   -3.0        0.0
12.   -3.0       -0.5
13.   -3.5       -0.5
14.   -7.0       -4.0
15.   -7.0        0.0
16. CANARD DELTA LONG LD  6.0 16.0  0.6  0.5                    3.
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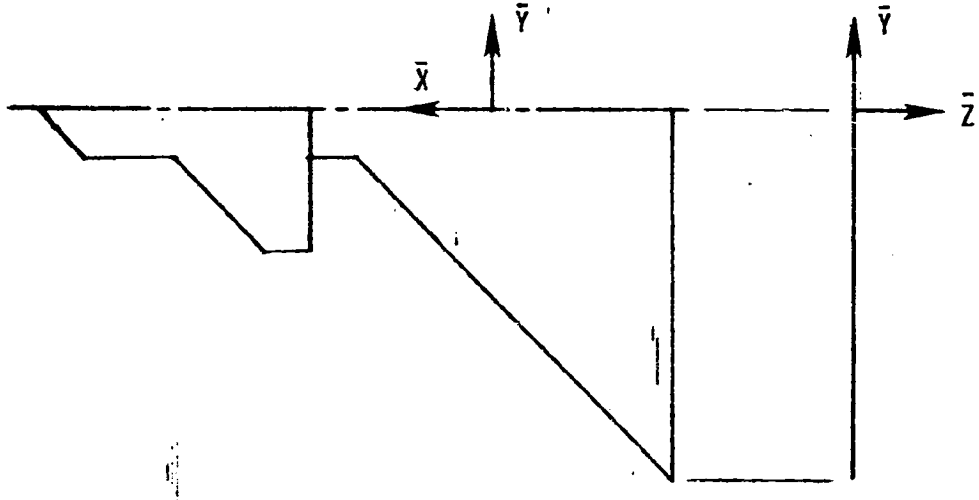

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GEOMETRY DATA

FIRST REFERENCE PLANFORM HAS 5 CURVES

ROOT CHORD HEIGHT = 0.00000 VARIABLE SWEEP PIVOT POSITION X(S) = 0.00000 Y(S) = 0.00000

BREAK POINTS FOR THE REFERENCE PLANFORM

POINT	X REF	Y REF	SWEEP ANGLE	DIHEDRAL ANGLE	MOVE CODE
1	5.00000	0.00000	45.00000	0.00000	1
2	4.50000	-.50000	90.00000	0.00000	1
3	3.50000	-.50000	45.00000	0.00000	1
4	2.50000	-1.50000	90.00000	0.00000	1
5	2.00000	-1.50000	0.00000	0.00000	1
6	2.00000	0.00000			

SECOND REFERENCE PLANFORM HAS 4 CURVES

ROOT CHORD HEIGHT = 0.00000 VARIABLE SWEEP PIVOT POSITION X(S) = 0.00000 Y(S) = 0.00000

BREAK POINTS FOR THE REFERENCE PLANFORM

POINT	X REF	Y REF	SWEEP ANGLE	DIHEDRAL ANGLE	MOVE CODE
1	2.00000	0.00000	0.00000	0.00000	1
2	2.00000	-.50000	90.00000	0.00000	1
3	1.50000	-.50000	45.00000	0.00000	1
4	-2.00000	-4.00000	0.00000	0.00000	1
5	-2.00000	0.00000			

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CONFIGURATION : CANARD DELTA LONG LD

CURVE 1 IS SWEPT 45.00000 DEGREES ON PLANFORM 1

CURVE 1 IS SWEPT 0.00000 DEGREES ON PLANFORM 2

BREAK POINTS FOR THIS CONFIGURATION

POINT	X	Y	Z	SWEEP ANGLE	DIHEDRAL ANGLE	MOVE CODE
			FIRST PLANFORM BREAK POINTS			
1	5.00000	0.00000	0.00000	45.00000	0.00000	1
2	4.50000	-.50000	0.00000	90.00000	0.00000	1
3	3.50000	-.50000	0.00000	45.00000	0.00000	1
4	2.50000	-1.50000	0.00000	90.00000	0.00000	1
5	2.00000	-1.50000	0.00000	0.00000	0.00000	1
6	2.00000	0.00000	0.00000			
			SECOND PLANFORM BREAK POINTS			
1	2.00000	0.00000	0.00000	0.00000	0.00000	1
2	2.00000	-.50000	0.00000	90.00000	0.00000	1
3	1.50000	-.50000	0.00000	45.00000	0.00000	1
4	.50000	-1.50000	0.00000	45.00000	0.00000	1
5	-2.00000	-4.00000	0.00000	0.00000	0.00000	1
6	-2.00000	0.00000	0.00000			

HORSESHOE VORTEX SUMMARY TABLE
132 HORSESHOE VORTICIES USED ON THE LEFT HALF OF THIS CONFIGURATION

PLANFORM	TOTAL	SPANWISE
1	36	6
2	96	16

6 HORSESHOE VORTICES IN EACH CHORDWISE ROW

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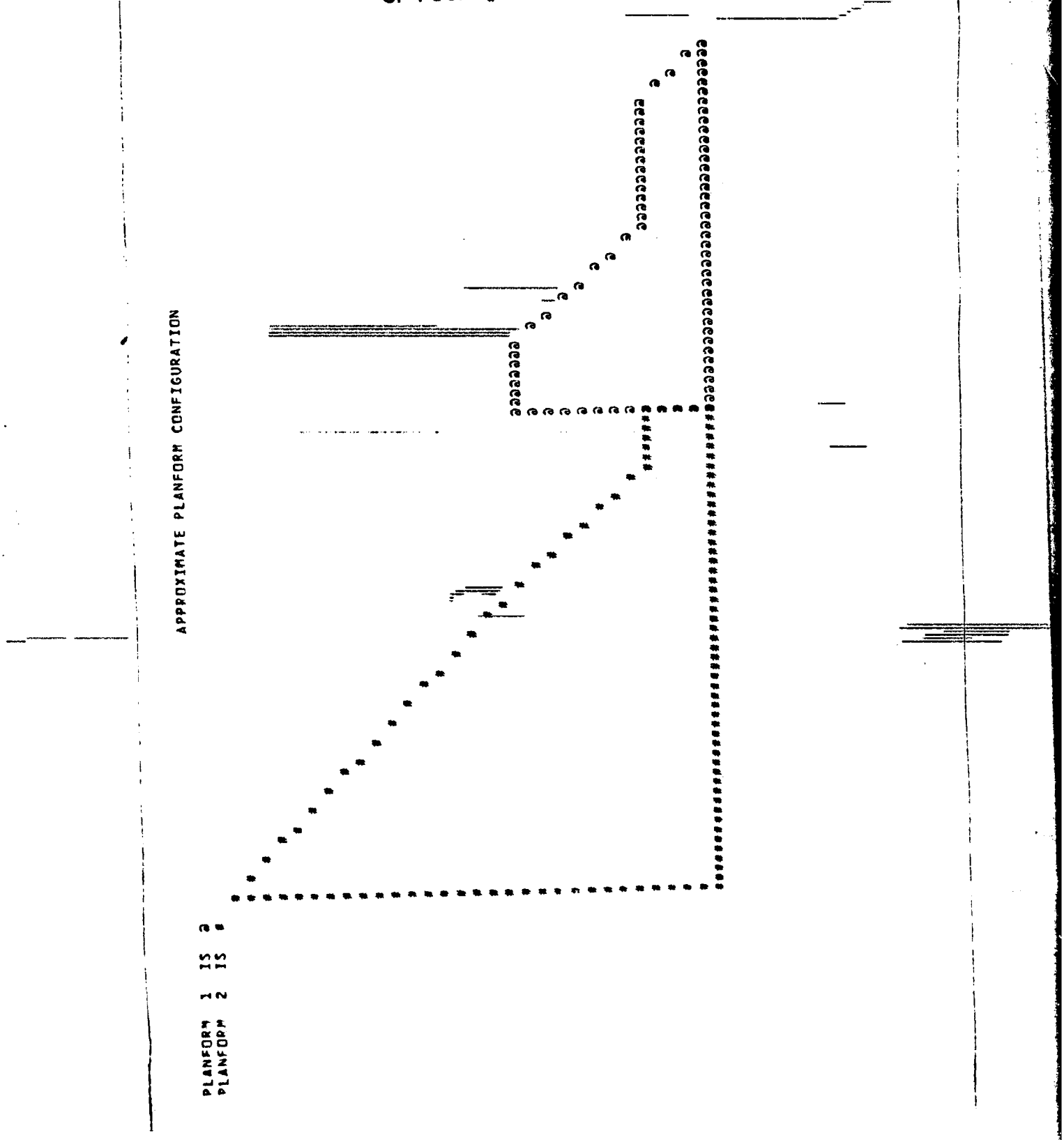

AERODYNAMIC DATA

CONFIGURATION : CANARD DELTA LONG LD

STATIC LONGITUDINAL AERODYNAMIC COEFFICIENTS ARE COMPUTED

X C/4	X 3C/4	Y	Z	S	C/4 SWEEP ANGLE	DIHEDRAL ANGLE	LOCAL ALPHA IN RADIANS	DELTA CP AT DESIRED CL = .50000
FIRST PLANFORM HORSESHOE VORTEX DESCRIPTIONS								
2.59896	2.54688	-1.37500	0.00000	.12500	43.78113	0.00000	0.00000	1.69490
2.49479	2.44271	-1.37500	0.00000	.12500	38.36749	0.00000	0.00000	.71806
2.39063	2.33854	-1.37500	0.00000	.12500	32.00538	0.00000	0.00000	.40191
2.28646	2.23438	-1.37500	0.00000	.12500	24.62356	0.00000	0.00000	.24031
2.18229	2.13021	-1.37500	0.00000	.12500	16.26020	0.00000	0.00000	.14771
2.07813	2.02604	-1.37500	0.00000	.12500	7.12502	0.00000	0.00000	.08267
2.83854	2.76563	-1.12500	0.00000	.12500	43.78113	0.00000	0.00000	1.57275
2.69271	2.61979	-1.12500	0.00000	.12500	38.36749	0.00000	0.00000	.71502
2.54688	2.47396	-1.12500	0.00000	.12500	32.00538	0.00000	0.00000	.45520
2.40104	2.32813	-1.12500	0.00000	.12500	24.62356	0.00000	0.00000	.30272
2.25521	2.18229	-1.12500	0.00000	.12500	16.26020	0.00000	0.00000	.19691
2.10938	2.03646	-1.12500	0.00000	.12500	7.12502	0.00000	0.00000	.11273
3.07813	2.98438	-.87500	0.00000	.12500	43.78113	0.00000	0.00000	1.40775
2.89063	2.79688	-.87500	0.00000	.12500	38.36749	0.00000	0.00000	.64559
2.70313	2.60938	-.87500	0.00000	.12500	32.00538	0.00000	0.00000	.42882
2.51563	2.42188	-.87500	0.00000	.12500	24.62356	0.00000	0.00000	.30203
2.32813	2.23438	-.87500	0.00000	.12500	16.26020	0.00000	0.00000	.20848
2.14063	2.04688	-.87500	0.00000	.12500	7.12502	0.00000	0.00000	.12525
3.31771	3.20313	-.62500	0.00000	.12500	43.78113	0.00000	0.00000	1.26672
3.08854	2.97396	-.62500	0.00000	.12500	38.36749	0.00000	0.00000	.56838
2.85938	2.74479	-.62500	0.00000	.12500	32.00538	0.00000	0.00000	.37977
2.63021	2.51563	-.62500	0.00000	.12500	24.62356	0.00000	0.00000	.28463
2.40104	2.28646	-.62500	0.00000	.12500	16.26020	0.00000	0.00000	.20827
2.17188	2.05729	-.62500	0.00000	.12500	7.12502	0.00000	0.00000	.13133
4.51563	4.26688	-.37500	0.00000	.12500	43.78113	0.00000	0.00000	.47455
4.07813	3.85938	-.37500	0.00000	.12500	38.36749	0.00000	0.00000	.11549
3.64063	3.42188	-.37500	0.00000	.12500	32.00538	0.00000	0.00000	.18627
3.20313	2.98438	-.37500	0.00000	.12500	24.62356	0.00000	0.00000	.36089
2.76563	2.54688	-.37500	0.00000	.12500	16.26020	0.00000	0.00000	.26835
2.32813	2.10938	-.37500	0.00000	.12500	7.12502	0.00000	0.00000	.17314
4.75521	4.51563	-.12500	0.00000	.12500	43.78113	0.00000	0.00000	.48074

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4.27604	4.03646	-.12500	0.00000	.12500	38.36749	0.00000	0.00000	.17345
3.79688	3.55729	-.12500	0.00000	.12500	32.00538	0.00000	0.00000	.15834
3.31771	3.07813	-.12500	0.00000	.12500	24.62356	0.00000	0.00000	.26070
2.83854	2.59896	-.12500	0.00000	.12500	16.26020	0.00000	0.00000	.24245
2.35938	2.11979	-.12500	0.00000	.12500	7.12502	0.00000	0.00000	.16982

SECOND PLANFORM HORSESHOE VORTEX DESCRIPTIONS

-1.88021	-1.89063	-3.87500	0.00000	.12500	43.78113	0.00000	0.00000	3.76205
-1.90104	-1.91146	-3.87500	0.00000	.12500	38.36749	0.00000	0.00000	1.89625
-1.92188	-1.93229	-3.87500	0.00000	.12500	32.00538	0.00000	0.00000	1.39620
-1.94271	-1.95313	-3.87500	0.00000	.12500	24.62356	0.00000	0.00000	1.08974
-1.96354	-1.97396	-3.87500	0.00000	.12500	16.26020	0.00000	0.00000	.81641
-1.98438	-1.99479	-3.87500	0.00000	.12500	7.12502	0.00000	0.00000	.50730
-1.64063	-1.67188	-3.62500	0.00000	.12500	43.78113	0.00000	0.00000	2.80133
-1.70313	-1.73438	-3.62500	0.00000	.12500	38.36749	0.00000	0.00000	1.36727
-1.76563	-1.79688	-3.62500	0.00000	.12500	32.00538	0.00000	0.00000	.95055
-1.82813	-1.85938	-3.62500	0.00000	.12500	24.62356	0.00000	0.00000	.69010
-1.89063	-1.92188	-3.62500	0.00000	.12500	16.26020	0.00000	0.00000	.48336
-1.95313	-1.98438	-3.62500	0.00000	.12500	7.12502	0.00000	0.00000	.28572
-1.40104	-1.45313	-3.37500	0.00000	.12500	43.78113	0.00000	0.00000	2.39112
-1.50521	-1.55729	-3.37500	0.00000	.12500	38.36749	0.00000	0.00000	1.14411
-1.60938	-1.66146	-3.37500	0.00000	.12500	32.00538	0.00000	0.00000	.77705
-1.71354	-1.76563	-3.37500	0.00000	.12500	24.62356	0.00000	0.00000	.55979
-1.81771	-1.86979	-3.37500	0.00000	.12500	16.26020	0.00000	0.00000	.39129
-1.92188	-1.97396	-3.37500	0.00000	.12500	7.12502	0.00000	0.00000	.23077
-1.16146	-1.23438	-3.12500	0.00000	.12500	43.78113	0.00000	0.00000	2.12892
-1.30729	-1.38021	-3.12500	0.00000	.12500	38.36749	0.00000	0.00000	1.00414
-1.45313	-1.52604	-3.12500	0.00000	.12500	32.00538	0.00000	0.00000	.67843
-1.59896	-1.67188	-3.12500	0.00000	.12500	24.62356	0.00000	0.00000	.48772
-1.74479	-1.81771	-3.12500	0.00000	.12500	16.26020	0.00000	0.00000	.33994
-1.89063	-1.96354	-3.12500	0.00000	.12500	7.12502	0.00000	0.00000	.20013
-.92188	-1.01563	-2.87500	0.00000	.12500	43.78113	0.00000	0.00000	1.93654
-1.10938	-1.20313	-2.87500	0.00000	.12500	38.36749	0.00000	0.00000	.90453
-1.29688	-1.39063	-2.87500	0.00000	.12500	32.00538	0.00000	0.00000	.61008
-1.49438	-1.57813	-2.87500	0.00000	.12500	24.62356	0.00000	0.00000	.43779
-1.67188	-1.76563	-2.87500	0.00000	.12500	16.26020	0.00000	0.00000	.30472
-1.85938	-1.95313	-2.87500	0.00000	.12500	7.12502	0.00000	0.00000	.17921
-.69229	-.79688	-2.62500	0.00000	.12500	43.78113	0.00000	0.00000	1.78472
-.91146	-1.02604	-2.62500	0.00000	.12500	38.36749	0.00000	0.00000	.82772
-1.14063	-1.25521	-2.62500	0.00000	.12500	32.00538	0.00000	0.00000	.55735
-1.36979	-1.48438	-2.62500	0.00000	.12500	24.62356	0.00000	0.00000	.39951
-1.59896	-1.71354	-2.62500	0.00000	.12500	16.26020	0.00000	0.00000	.27789
-1.82813	-1.94271	-2.62500	0.00000	.12500	7.12502	0.00000	0.00000	.16334
-.44271	-.57813	-2.37500	0.00000	.12500	43.78113	0.00000	0.00000	1.66024
-.71354	-.84896	-2.37500	0.00000	.12500	38.36749	0.00000	0.00000	.76464
-.98437	-1.11979	-2.37500	0.00000	.12500	32.00538	0.00000	0.00000	.51377
-1.25521	-1.39063	-2.37500	0.00000	.12500	24.62356	0.00000	0.00000	.36809
-1.52604	-1.66146	-2.37500	0.00000	.12500	16.26020	0.00000	0.00000	.25607

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-1.79688	-1.93229	-2.37500	0.00000	.12500	7.12502	0.00000	0.00000	.15053
-.20313	-.35938	-2.12500	0.00000	.12500	43.78113	0.00000	0.00000	1.55721
-.51563	-.67188	-2.12500	0.00000	.12500	38.36749	0.00000	0.00000	.70943
-.82813	-.98438	-2.12500	0.00000	.12500	32.00538	0.00000	0.00000	.47541
-1.14063	-1.29688	-2.12500	0.00000	.12500	24.62356	0.00000	0.00000	.34086
-1.45313	-1.60938	-2.12500	0.00000	.12500	16.26020	0.00000	0.00000	.23751
-1.76563	-1.92188	-2.12500	0.00000	.12500	7.12502	0.00000	0.00000	.13981
.03646	-.14063	-1.87500	0.00000	.12500	43.78113	0.00000	0.00000	1.47511
-.31771	-.49479	-1.87500	0.00000	.12500	38.36749	0.00000	0.00000	.65629
-.67188	-.84896	-1.87500	0.00000	.12500	32.00538	0.00000	0.00000	.43916
-1.02604	-1.20313	-1.87500	0.00000	.12500	24.62356	0.00000	0.00000	.31614
-1.38021	-1.55729	-1.87500	0.00000	.12500	16.26020	0.00000	0.00000	.22126
-1.73438	-1.91146	-1.87500	0.00000	.12500	7.12502	0.00000	0.00000	.13067
.27604	.07813	-1.62500	0.00000	.12500	43.78113	0.00000	0.00000	1.42181
-.11979	-.31771	-1.62500	0.00000	.12500	38.36749	0.00000	0.00000	.59420
-.51563	-.71354	-1.62500	0.00000	.12500	32.00538	0.00000	0.00000	.40189
-.91146	-1.10938	-1.62500	0.00000	.12500	24.62356	0.00000	0.00000	.29280
-1.30729	-1.50521	-1.62500	0.00000	.12500	16.26020	0.00000	0.00000	.20681
-1.70313	-1.90104	-1.62500	0.00000	.12500	7.12502	0.00000	0.00000	.12286
.51563	.29688	-1.37500	0.00000	.12500	43.78113	0.00000	0.00000	.64250
.07813	-.14063	-1.37500	0.00000	.12500	38.36749	0.00000	0.00000	.49402
-.35938	-.57813	-1.37500	0.00000	.12500	32.00538	0.00000	0.00000	.36069
-.79688	-1.01563	-1.37500	0.00000	.12500	24.62356	0.00000	0.00000	.27018
-1.23438	-1.45313	-1.37500	0.00000	.12500	16.26020	0.00000	0.00000	.19396
-1.67188	-1.89063	-1.37500	0.00000	.12500	7.12502	0.00000	0.00000	.11632
.75521	.51563	-1.12500	0.00000	.12500	43.78113	0.00000	0.00000	.44487
.27604	.03646	-1.12500	0.00000	.12500	38.36749	0.00000	0.00000	.36981
-.20313	-.44271	-1.12500	0.00000	.12500	32.00538	0.00000	0.00000	.31562
-.68229	-.92187	-1.12500	0.00000	.12500	24.62356	0.00000	0.00000	.24812
-1.16146	-1.40104	-1.12500	0.00000	.12500	16.26020	0.00000	0.00000	.18272
-1.64063	-1.88021	-1.12500	0.00000	.12500	7.12502	0.00000	0.00000	.11114
.99479	.73438	-.87500	0.00000	.12500	43.78113	0.00000	0.00000	.34535
.47396	.21354	-.87500	0.00000	.12500	38.36749	0.00000	0.00000	.29098
-.04687	-.30729	-.87500	0.00000	.12500	32.00538	0.00000	0.00000	.27207
-.56771	-.82812	-.87500	0.00000	.12500	24.62356	0.00000	0.00000	.22632
-1.08854	-1.34896	-.87500	0.00000	.12500	16.26020	0.00000	0.00000	.17329
-1.60938	-1.86979	-.87500	0.00000	.12500	7.12502	0.00000	0.00000	.10757
1.23438	.95313	-.62500	0.00000	.12500	43.78113	0.00000	0.00000	.28369
.67188	.39063	-.62500	0.00000	.12500	38.36749	0.00000	0.00000	.24562
.10938	-.17188	-.62500	0.00000	.12500	32.00538	0.00000	0.00000	.23025
-.45313	-.73438	-.62500	0.00000	.12500	24.62356	0.00000	0.00000	.20156
-1.01563	-1.29688	-.62500	0.00000	.12500	16.26020	0.00000	0.00000	.16702
-1.57813	-1.85938	-.62500	0.00000	.12500	7.12502	0.00000	0.00000	.10665
1.83333	1.50000	-.37500	0.00000	.12500	0.00000	0.00000	0.00000	.09410
1.16667	.83333	-.37500	0.00000	.12500	0.00000	0.00000	0.00000	.19477
.50000	.16667	-.37500	0.00000	.12500	0.00000	0.00000	0.00000	.22522
-.16667	-.50000	-.37500	0.00000	.12500	0.00000	0.00000	0.00000	.21550
-.83333	-1.16667	-.37500	0.00000	.12500	0.00000	0.00000	0.00000	.16972
-1.50000	-1.83333	-.37500	0.00000	.12500	0.00000	0.00000	0.00000	.10484

1.83333	1.50000	-.12500	0.00000	.12500	0.00000	0.00000	0.00000	.11522
1.16667	.83333	-.12500	0.00000	.12500	0.00000	0.00000	0.00000	.17976
.50000	.16667	-.12500	0.00000	.12500	0.00000	0.00000	0.00000	.21220
-.16667	-.50000	-.12500	0.00000	.12500	0.00000	0.00000	0.00000	.20618
-.83333	-1.16667	-.12500	0.00000	.12500	0.00000	0.00000	0.00000	.16646
-1.50000	-1.83333	-.12500	0.00000	.12500	0.00000	0.00000	0.00000	.10452

REF. CHORD	C AVERAGE	TRUE AREA	REFERENCE AREA	B/2	REF. AR	TRUE AR	MACH NUMBER
5.33333	2.62500	21.00000	16.00000	4.00000	4.00000	3.04762	.60000

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COMPLETE CONFIGURATION

DESIRED CL	COMPUTED ALPHA
.50000	7.50050

WING-BODY CHARACTERISTICS

LIFT	INDUCED DRAG (FAR FIELD SOLUTION)	
CL(WB)	CDI AT CL(WB)	CDI/(CL(WB)**2) (1/PI*AR REF) = .07958)
.39158	.01583	.10325

COMPLETE CONFIGURATION CHARACTERISTICS

		CL ALPHA PER RADIAN	PER DEGREE	CL(TWIST)	ALPHA AT CL=0	Y CP	CM/CL	CMO
		3.81947	.06666	0.00000	0.00000	-.40320	.04734	0.00000
IRST	PLANFORM	.82818	.01445	0.00000	0.00000	-.16482		
ECOND	PLANFORM	2.99129	.05221	0.00000	0.00000	-.46920		

STATION	2Y/B	ADDITIONAL LOADING WITH CL BASED ON S(TRUE) SL COEF	CL RATIO	C RATIO	LOAD DUE TO TWIST	ADD. LOAD AT CL= 0.00000	BASIC LOAD AT CL=0	SPAN LOAD AT DESIRED CL	-AT CL DES- X LOCATION OF LOCAL CENT PR
				FIRST PLANFORM SPAN LOAD DISTRIBUTION					
1	-.34375	.34225	1.43744	.23810	0.00000	0.00000	0.00000	.13038	2.49601
2	-.28125	.48932	1.46796	.33333	0.00000	0.00000	0.00000	.18641	2.66969
3	-.21875	.58461	1.36409	.42857	0.00000	0.00000	0.00000	.22271	2.84543
4	-.15625	.65063	1.24211	.52381	0.00000	0.00000	0.00000	.24786	3.02135
5	-.09375	.69068	.69068	1.00000	0.00000	0.00000	0.00000	.26312	3.54296
6	-.03125	.71180	.64591	1.09524	0.00000	0.00000	0.00000	.27116	3.75812
				SECOND PLANFORM SPAN LOAD DISTRIBUTION					
7	-.96875	.19725	4.14223	.04762	0.00000	0.00000	0.00000	.07514	-1.91049
8	-.90625	.41115	2.87802	.14286	0.00000	0.00000	0.00000	.15663	-1.72329
9	-.84375	.57231	2.40369	.23810	0.00000	0.00000	0.00000	.21802	-1.53559
10	-.78125	.70573	2.11718	.33333	0.00000	0.00000	0.00000	.26885	-1.34783
11	-.71875	.81991	1.91313	.42857	0.00000	0.00000	0.00000	.31235	-1.15997
12	-.65625	.91908	1.75461	.52381	0.00000	0.00000	0.00000	.35013	-.97195
13	-.59375	1.00570	1.62459	.61905	0.00000	0.00000	0.00000	.38312	-.78356
14	-.53125	1.08132	1.51385	.71429	0.00000	0.00000	0.00000	.41193	-.59435
15	-.46875	1.14701	1.41690	.80952	0.00000	0.00000	0.00000	.43696	-.40331
16	-.40625	1.20348	1.33016	.90476	0.00000	0.00000	0.00000	.45847	-.20800
17	-.34375	.90898	.90898	1.00000	0.00000	0.00000	0.00000	.34628	-.19682
18	-.28125	.80129	.73162	1.09524	0.00000	0.00000	0.00000	.30526	-.11356

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19	-.21875	.73728	.61932	1.19048	0.00000	0.00000	0.00000	.28087	-.01521
20	-.15625	.69456	.54021	1.28571	0.00000	0.00000	0.00000	.26459	.08999
21	-.09375	.66944	.43932	1.52381	0.00000	0.00000	0.00000	.25502	.17701
22	-.03125	.65623	.43065	1.52381	0.00000	0.00000	0.00000	.24999	.20034

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LONGITUDINAL LOAD DISTRIBUTION

PLANFORM NUMBER 1

X	Y	INTERPOLATED DELTA CP	BL(X)
4.92500			.15000
4.92500	-.07500	.57444	
4.92500	-.06667	.57177	
4.92500	-.05833	.56928	
4.92500	-.05000	.56698	
4.92500	-.04167	.56485	
4.92500	-.03333	.56290	
4.92500	-.02500	.56113	
4.92500	-.01667	.55955	
4.92500	-.00833	.55814	
4.92500	-.00000	.55691	
			CNL = .02117
4.77500			.45000
4.77500	-.22500	.55609	
4.77500	-.20000	.54101	
4.77500	-.17500	.52490	
4.77500	-.15000	.50866	
4.77500	-.12500	.49349	
4.77500	-.10000	.47993	
4.77500	-.07500	.46799	
4.77500	-.05000	.45768	
4.77500	-.02500	.44898	
4.77500	-.00000	.44190	
			CNL = .05526
4.62500			.75000
4.62500	-.37500	.49253	
4.62500	-.33333	.46622	
4.62500	-.29167	.44594	
4.62500	-.25000	.43024	
4.62500	-.20833	.42003	
4.62500	-.16667	.41140	
4.62500	-.12500	.39555	
4.62500	-.08333	.37461	
4.62500	-.04167	.35867	
4.62500	-.00000	.34773	
			CNL = .07752
4.47500			1.00000
4.47500	-.50000	.60490	
4.47500	-.44444	.54788	
4.47500	-.38889	.48921	
4.47500	-.33333	.42695	

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4.47500	-.27778	.36849
4.47500	-.22222	.32639
4.47500	-.16667	.30330
4.47500	-.11111	.28573
4.47500	-.05556	.27359
4.47500	0.00000	.27252
		CNL = .09598
4.32500		1.00000
4.32500	-.50000	.61211
4.32500	-.44444	.55709
4.32500	-.38889	.36357
4.32500	-.33333	.30036
4.32500	-.27778	.27324
4.32500	-.22222	.24510
4.32500	-.16667	.21303
4.32500	-.11111	.19528
4.32500	-.05556	.19128
4.32500	0.00000	.20002
		CNL = .07625
4.17500		1.00000
4.17500	-.50000	.64695
4.17500	-.44444	.34057
4.17500	-.38889	.16099
4.17500	-.33333	.09843
4.17500	-.27778	.08157
4.17500	-.22222	.09342
4.17500	-.16667	.12468
4.17500	-.11111	.13006
4.17500	-.05556	.12534
4.17500	0.00000	.13422
		CNL = .04204
4.02500		1.00000
4.02500	-.50000	.42263
4.02500	-.44444	.19650
4.02500	-.38889	.14030
4.02500	-.33333	.06483
4.02500	-.27778	.02295
4.02500	-.22222	.04102
4.02500	-.16667	.10124
4.02500	-.11111	.12558
4.02500	-.05556	.13176
4.02500	0.00000	.13415
		CNL = .03011
3.87500		1.00000
3.87500	-.50000	.34697
3.87500	-.44444	.31477
3.87500	-.38889	.15527
3.87500	-.33333	.09899
3.87500	-.27778	.11004

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3.87500	-.22222	.12732
3.87500	-.16667	.13701
3.87500	-.11111	.15093
3.87500	-.05556	.16821
3.87500	0.00000	.20414
		CNL = .042(
3.72500		1.00000
3.72500	-.50000	.62122
3.72500	-.44444	.34469
3.72500	-.38889	.18344
3.72500	-.33333	.11973
3.72500	-.27778	.11035
3.72500	-.22222	.12747
3.72500	-.16667	.15604
3.72500	-.11111	.16944
3.72500	-.05556	.18575
3.72500	0.00000	.22091
		CNL = .04962
3.57500		1.00000
3.57500	-.50000	.66825
3.57500	-.44444	.37112
3.57500	-.38889	.23288
3.57500	-.33333	.15292
3.57500	-.27778	.11104
3.57500	-.22222	.12651
3.57500	-.16667	.17886
3.57500	-.11111	.19949
3.57500	-.05556	.20762
3.57500	0.00000	.23306
		CNL = .05547
3.42500		1.15000
3.42500	-.57500	1.11970
3.42500	-.51111	.85735
3.42500	-.44722	.56025
3.42500	-.38333	.31574
3.42500	-.31944	.25062
3.42500	-.25556	.23513
3.42500	-.19167	.22742
3.42500	-.12778	.23830
3.42500	-.06389	.23530
3.42500	0.00000	.25284
		CNL = .11448
3.27500		1.45000
3.27500	-.72500	1.39031
3.27500	-.64444	1.28567
3.27500	-.56389	1.07130
3.27500	-.48333	.72512
3.27500	-.40278	.42159
3.27500	-.32222	.31701

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3.27500	-.24167	.28607
3.27500	-.16111	.27419
3.27500	-.08056	.26400
3.27500	-.00000	.28116
		CNL = .22048
3.12500		1.75000
3.12500	-.87500	1.42895
3.12500	-.77778	1.21080
3.12500	-.69056	.78054
3.12500	-.58333	.56528
3.12500	-.48611	.43679
3.12500	-.38889	.35582
3.12500	-.29167	.27447
3.12500	-.19444	.26839
3.12500	-.09722	.27061
3.12500	-.00000	.27595
		CNL = .24331
2.97500		2.05000
2.97500	-1.02500	1.54969
2.97500	-.91111	1.15016
2.97500	-.79722	.68179
2.97500	-.68333	.49111
2.97500	-.56944	.36010
2.97500	-.45556	.31802
2.97500	-.34167	.29586
2.97500	-.22778	.26936
2.97500	-.11389	.25707
2.97500	-.00000	.24273
		CNL = .26710
2.82500		2.35000
2.82500	-1.17500	1.61069
2.82500	-1.04444	1.37084
2.82500	-.91389	.65948
2.82500	-.78333	.41280
2.82500	-.65278	.37032
2.82500	-.52222	.32546
2.82500	-.39167	.28880
2.82500	-.26111	.26328
2.82500	-.13056	.24197
2.82500	-.00000	.22407
		CNL = .31669
2.67500		2.65000
2.67500	-1.32500	1.70272
2.67500	-1.17778	.86123
2.67500	-1.03056	.45897
2.67500	-.88333	.39879
2.67500	-.73611	.31803
2.67500	-.58889	.29144
2.67500	-.44167	.25915

2.67500	-.29444	.23398
2.67500	-.14722	.22341
2.67500	-.00000	.20947

CNL = .28811

2.95000

2.52500		
2.52500	-1.47500	1.09929
2.52500	-1.31111	.79575
2.52500	-1.14722	.44596
2.52500	-.98333	.31784
2.52500	-.81944	.29109
2.52500	-.65556	.25535
2.52500	-.49167	.23389
2.52500	-.32778	.21333
2.52500	-.16389	.20365
2.52500	-.00000	.18749

CNL = .27685

3.00000

2.37500		
2.37500	-1.50000	.42284
2.37500	-1.33333	.35115
2.37500	-1.16667	.29046
2.37500	-1.00000	.24717
2.37500	-.83333	.22496
2.37500	-.66667	.20318
2.37500	-.50000	.19253
2.37500	-.33333	.18195
2.37500	-.16667	.17675
2.37500	-.00000	.16174

CNL = .17964

3.00000

2.22500		
2.22500	-1.50000	.18817
2.22500	-1.33333	.17931
2.22500	-1.16667	.17972
2.22500	-1.00000	.17280
2.22500	-.83333	.16069
2.22500	-.66667	.15316
2.22500	-.50000	.14429
2.22500	-.33333	.14392
2.22500	-.16667	.14284
2.22500	-.00000	.13686

CNL = .11990

3.00000

2.07500		
2.07500	-1.50000	.07478
2.07500	-1.33333	.08256
2.07500	-1.16667	.09139
2.07500	-1.00000	.09480
2.07500	-.83333	.09324
2.07500	-.66667	.09612
2.07500	-.50000	.09298
2.07500	-.33333	.09756

2.07500	-.16667	.10596		
2.07500	-.00000	.10979		
			CNL =	.07062

CN FOR PLANFORM 1 = .09901

PLANFORM NUMBER 2

X	Y	INTERPOLATED DELTA CP	BL(X)		
1.90000			1.00000		
1.90000	-.50000	1.30093			
1.90000	-.44444	.77090			
1.90000	-.38889	.37609			
1.90000	-.33333	.13703			
1.90000	-.27778	.07088			
1.90000	-.22222	.09224			
1.90000	-.16667	.11327			
1.90000	-.11111	.10750			
1.90000	-.05556	.12282			
1.90000	0.00000	.17086			
				CNL =	.06865
1.70000			1.00000		
1.70000	-.50000	.16782			
1.70000	-.44444	.08344			
1.70000	-.38889	.06287			
1.70000	-.33333	.12098			
1.70000	-.27778	.19347			
1.70000	-.22222	.19406			
1.70000	-.16667	.14695			
1.70000	-.11111	.13503			
1.70000	-.05556	.17766			
1.70000	0.00000	.25087			
				CNL =	.03630
1.50000			1.00000		
1.50000	-.50000	.19009			
1.50000	-.44444	.17422			
1.50000	-.38889	.19312			
1.50000	-.33333	.27675			
1.50000	-.27778	.33439			
1.50000	-.22222	.37500			
1.50000	-.16667	.22770			
1.50000	-.11111	.15697			
1.50000	-.05556	.18447			
1.50000	0.00000	.23441			
				CNL =	.05908
1.30000			1.40000		

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1.30000	-.70000	.25704
1.30000	-.62222	.27792
1.30000	-.54444	.25461
1.30000	-.46667	.21715
1.30000	-.38889	.19824
1.30000	-.31111	21727
1.30000	-.23333	.22166
1.30000	-.15556	.20535
1.30000	-.07778	.17203
1.30000	-.00000	.19665
1.10000		
1.10000	-.90000	.35294
1.10000	-.80000	.31988
1.10000	-.70000	.30899
1.10000	-.60000	.28801
1.10000	-.50000	.23671
1.10000	-.40000	.20375
1.10000	-.30000	.19248
1.10000	-.20000	.18868
1.10000	-.10000	.19108
1.10000	-.00000	.22870
.90000		
.90000	-1.10000	.31335
.90000	-.97778	.38246
.90000	-.85556	.35153
.90000	-.73333	.31764
.90000	-.61111	.26795
.90000	-.48889	.22318
.90000	-.36667	.21854
.90000	-.24444	.20845
.90000	-.12222	.20744
.90000	-.00000	.24637
.70000		
.70000	-1.30000	1.16382
.70000	-1.15556	.45193
.70000	-1.01111	.40421
.70000	-.86667	.35344
.70000	-.72222	.28016
.70000	-.57778	.23440
.70000	-.43333	.22439
.70000	-.28889	.21881
.70000	-.14444	.20913
.70000	-.00000	.22068
.50000		
.50000	-1.50000	1.24344

CNL = .07740
1.80000

CNL = .11061
2.20000

CNL = .15046
2.60000

CNL = .21521
3.00000

ORIGINAL PAGE IS
OF POOR QUALITY

.50000	-1.33333	.50746
.50000	-1.16667	.40859
.50000	-1.00000	.34187
.50000	-.83333	.28272
.50000	-.66667	.25279
.50000	-.50000	.23590
.50000	-.33333	.22228
.50000	-.16667	.21454
.50000	-.00000	.20744
		CNL = .25869
.30000		3.40000
.30000	-1.70000	1.36211
.30000	-1.51111	1.03877
.30000	-1.32222	.45160
.30000	-1.13333	.37806
.30000	-.94444	.30122
.30000	-.75556	.25523
.30000	-.56667	.23201
.30000	-.37778	.22516
.30000	-.18889	.21755
.30000	-.00000	.21092
		CNL = .36556
.10000		3.80000
.10000	-1.90000	1.47364
.10000	-1.68889	1.22891
.10000	-1.47778	.68023
.10000	-1.26667	.39504
.10000	-1.05556	.32532
.10000	-.84444	.27228
.10000	-.63333	.23103
.10000	-.42222	.22326
.10000	-.21111	.21535
.10000	-.00000	.20759
		CNL = .46497
-.10000		4.20000
-.10000	-2.10000	1.56696
-.10000	-1.86667	1.25046
-.10000	-1.63333	.63130
-.10000	-1.40000	.43930
-.10000	-1.16667	.34003
-.10000	-.93333	.27979
-.10000	-.70000	.24322
-.10000	-.46667	.22187
-.10000	-.23333	.21247
-.10000	0.00000	.20266
		CNL = .52387
-.30000		4.60000
-.30000	-2.30000	1.67011
-.30000	-2.04444	1.22061

ORIGINAL PAGE IS
OF POOR QUALITY

-.30000	-1.78889	.56805
-.30000	-1.53333	.41008
-.30000	-1.27778	.34272
-.30000	-1.02222	.27868
-.30000	-.76667	.23226
-.30000	-.51111	.21023
-.30000	-.25556	.20480
-.30000	-.00000	.19740

CNL = .55876

5.00000

-.50000		
-.50000	-2.50000	1.78989
-.50000	-2.22222	1.03788
-.50000	-1.94444	.54049
-.50000	-1.66667	.42413
-.50000	-1.38889	.33140
-.50000	-1.11111	.27126
-.50000	-.83333	.22637
-.50000	-.55556	.19340
-.50000	-.27778	.19320
-.50000	-.00000	.18677

CNL = .57416

5.40000

-.70000		
-.70000	-2.70000	1.92331
-.70000	-2.40000	.85033
-.70000	-2.10000	.50920
-.70000	-1.80000	.39820
-.70000	-1.50000	.31618
-.70000	-1.20000	.25766
-.70000	-.90000	.21654
-.70000	-.60000	.18450
-.70000	-.30000	.17889
-.70000	-.00000	.17309

CNL = .57604

5.80000

-.90000		
-.90000	-2.90000	2.01067
-.90000	-2.57778	.74650
-.90000	-2.25556	.50068
-.90000	-1.93333	.37283
-.90000	-1.61111	.29271
-.90000	-1.28889	.23848
-.90000	-.96667	.20207
-.90000	-.64444	.17778
-.90000	-.32222	.16317
-.90000	0.00000	.15917

CNL = .58504

6.20000

-1.10000		
-1.10000	-3.10000	2.29165
-1.10000	-2.75556	.66792
-1.10000	-2.41111	.46077

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-1.10000	-2.06667	.33983
-1.10000	-1.72222	.26591
-1.10000	-1.37778	.21764
-1.10000	-1.03333	.18357
-1.10000	-.68889	.16253
-1.10000	-.34444	.14471
-1.10000	-.00000	.14182

CNL = .59673

6.60000

-1.30000		
-1.30000	-3.30000	2.35042
-1.30000	-2.93333	.68599
-1.30000	-2.56667	.41654
-1.30000	-2.20000	.30236
-1.30000	-1.83333	.23586
-1.30000	-1.46667	.19116
-1.30000	-1.10000	.16087
-1.30000	-.73333	.14160
-1.30000	-.36667	.12417
-1.30000	-.00000	.12207

CNL = .60454

7.00000

-1.50000		
-1.50000	-3.50000	2.37511
-1.50000	-3.11111	.55338
-1.50000	-2.72222	.36179
-1.50000	-2.33333	.25809
-1.50000	-1.94444	.19896
-1.50000	-1.55556	.16087
-1.50000	-1.16667	.13556
-1.50000	-.77778	.11915
-1.50000	-.38889	.10530
-1.50000	-.00000	.10413

CNL = .56633

7.40000

-1.70000		
-1.70000	-3.70000	2.62636
-1.70000	-3.28889	.45826
-1.70000	-2.87778	.28639
-1.70000	-2.46667	.20360
-1.70000	-2.05556	.15418
-1.70000	-1.64444	.12510
-1.70000	-1.23333	.10540
-1.70000	-.82222	.09376
-1.70000	-.41111	.08831
-1.70000	-.00000	.08648

CNL = .53600

7.80000

-1.90000		
-1.90000	-3.90000	2.17917
-1.90000	-3.46667	.28478
-1.90000	-3.03333	.16902
-1.90000	-2.60000	.12010

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-1.90000	-2.16667	.09662
-1.90000	-1.73333	.07984
-1.90000	-1.30000	.07009
-1.90000	-.86667	.06722
-1.90000	-.43333	.06773
-1.90000	-.00000	.06787

CNL = .40017

CN FOR PLANFORM 2 = .36613

TOTAL CN = .46514

INDUCED DRAG, LEADING EDGE THRUST AND SUCTION COEFFICIENT CHARACTERISTICS
COMPUTED AT THE DESIRED CL FROM A NEAR FIELD SOLUTION

STATION	2Y/B	L. E. SWEEP ANGLE	SECTION COEFFICIENTS CDII C/2B	CT C/2B	CS C/2B
	CONTRIBUTION OF THE FIRST PLANFORM TO THE CHORD OR DRAG FORCE				
1	-.34375	45.00000	-.00068	.00348	.00492
2	-.28125	45.00000	.00005	.00396	.00560
3	-.21875	45.00000	.00080	.00398	.00563
4	-.15625	45.00000	.00139	.00394	.00557
5	-.09375	45.00000	.00391	.00174	.00247
6	-.03125	45.00000	.00521	.00061	.00086
	CONTRIBUTION OF THE SECOND PLANFORM TO THE CHORD OR DRAG FORCE				
7	-.96875	45.00000	-.00184	.00345	.00489
8	-.90625	45.00000	-.00215	.00552	.00780
9	-.84375	45.00000	-.00183	.00651	.00921
10	-.78125	45.00000	-.00136	.00713	.01009
11	-.71875	45.00000	-.00079	.00749	.01060
12	-.65625	45.00000	-.00019	.00771	.01090
13	-.59375	45.00000	.00033	.00790	.01117
14	-.53125	45.00000	.00073	.00811	.01147
15	-.46875	45.00000	.00096	.00843	.01192
16	-.40625	45.00000	.00060	.00925	.01308
17	-.34375	45.00000	.00669	.00075	.00106
18	-.28125	45.00000	.00600	.00055	.00078
19	-.21875	45.00000	.00565	.00038	.00054
20	-.15625	45.00000	.00604	-.00035	-.00050
21	-.09375	0.00000	.00546	.00001	.00001
22	-.03125	0.00000	.00537	-.00000	-.00000

TOTAL COEFFICIENTS

CDII/CL**2 = .08073 CT= .04527 CS= .06402

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END OF FILE ENCOUNTERED AFTER CONFIGURATION CANARD DELTA LONG LD

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INPUT DATA

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 1. TEST DATA FOR STRAKE WING (LINEAR AERODYNAMICS - FLOWFIELD ANALYSIS)
 2. 2.          1.          9.25M9      216.51      0.
 3. 14.         0.          0.          0.
 4. 0.          0.          0.          1.
 5. -1.5201     -.459       0.          1.
 6. -3.0402     -.7456      0.          1.
 7. -4.5603     -1.2006     0.          1.
 8. -6.0804     -1.605      0.          1.
 9. -7.6005     -1.918      0.          1.
10. -7.2066     -1.631      0.          1.
11. -7.6809     -1.857      0.          1.
12. -8.3021     -2.053      0.          1.
13. -9.0555     -2.309      0.          1.
14. -9.9492     -2.535      0.          1.
15. -10.9485    -2.7304     0.          1.
16. -12.2546    -2.9444     0.          1.
17. -13.6985    -3.1479     0.          1.
18. -15.7255    -3.3936     0.          1.
19. -18.44      -3.5972     0.          1.
20. -18.44      0.
21. 6.          0.          0.          0.
22. -18.44      0.          0.          1.
23. -18.44      -3.5972     0.          1.
24. -28.25      -13.3243    0.          1.
25. -31.1       -13.3243    0.          1.
26. -28.7       -1.76       0.          1.
27. -28.        -1.4        0.          1.
28. -28.        0.
29. STRAKE WING - FLOW      8.    12.   .90   .4          2.
30. 2.
31. -2.6        48.         .2          0.
32. -5.1        48.         0.          0.
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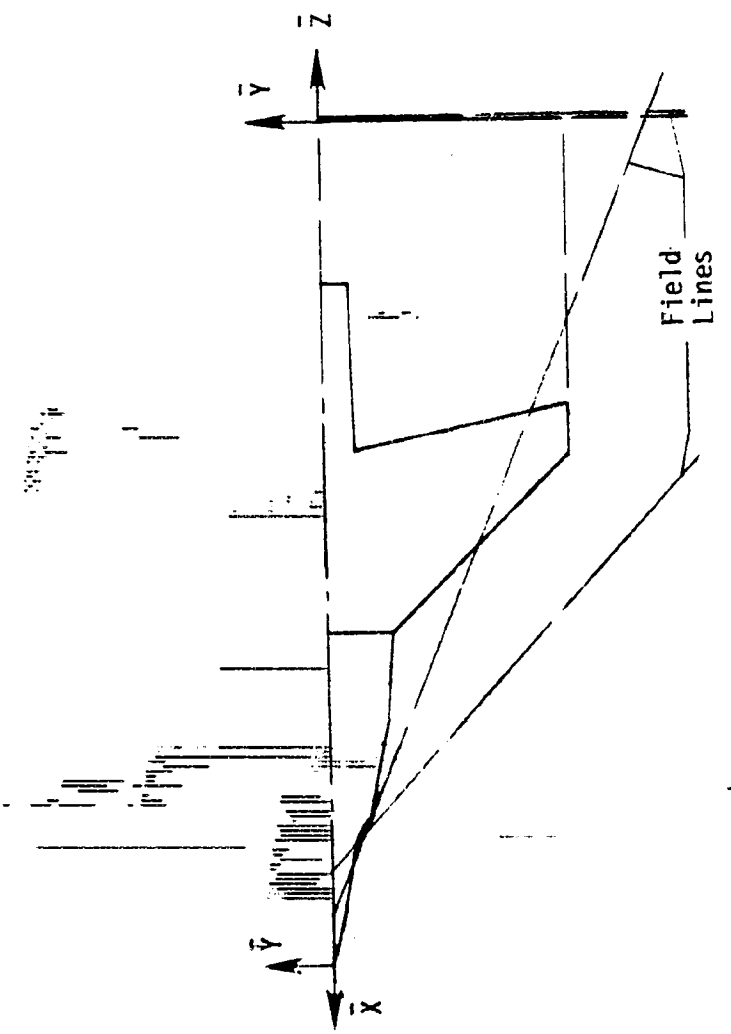

GEOMETRY DATA

FIRST REFERENCE PLANFORM HAS 16 CURVES

ROOT CHORD HEIGHT = 0.00000 VARIABLE SWEEP PIVOT POSITION X(S) = 0.00000 Y(S) = 0.00000

BREAK POINTS FOR THE REFERENCE PLANFORM

POINT	X REF	Y REF	SWEEP ANGLE	DIHEDRAL ANGLE	MOVE CODE
1	0.00000	0.00000	73.19811	0.00000	1
2	-1.52010	-.45600	78.52573	0.00000	1
3	-3.04020	-.76590	80.39074	0.00000	1
4	-5.58030	-1.20060	80.70522	0.00000	1
5	-5.86040	-1.40500	66.40331	0.00000	1
6	-7.01050	-1.51800	80.04788	0.00000	1
7	-7.20660	-1.63100	64.93834	0.00000	1
8	-7.49960	-1.85700	69.73785	0.00000	1
9	-8.30210	-2.08300	73.30215	0.00000	1
10	-9.05550	-2.30900	76.00233	0.00000	1
11	-9.64830	-2.53500	78.27817	0.00000	1
12	-10.16450	-2.73840	80.10529	0.00000	1
13	-10.35480	-2.96440	81.52641	0.00000	1
14	-10.68160	-3.16780	83.66814	0.00000	1
15	-10.72550	-3.39380	85.71479	0.00000	1
16	-10.44000	-3.59720	0.00000	0.00000	1
17	-10.44000	0.00000			

SECOND REFERENCE PLANFORM HAS 6 CURVES

ROOT CHORD HEIGHT = 0.00000 VARIABLE SWEEP PIVOT POSITION X(S) = 0.00000 Y(S) = 0.00000

BREAK POINTS FOR THE REFERENCE PLANFORM

POINT	X REF	Y REF	SWEEP ANGLE	DIHEDRAL ANGLE	MOVE CODE
1	-10.44000	0.00000	0.00000	0.00000	1
2	-10.44000	-3.59720	45.24312	0.00000	1
3	-28.25000	-13.32430	90.00000	0.00000	1
4	-31.10000	-13.32430	11.71461	0.00000	1
5	-[illegible].70000	-1.75000	-87.64472	0.00000	1

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4	-1.40000	0.00000	0.00000
2	0.00000	0.00000	0.00000
1	0.00000	0.00000	0.00000

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CONFIGURATION : STRAKE WING - FLOW

CURVE 1 IS SWEPT 73.19811 DEGREES ON PLANFORM 1

CURVE 1 IS SWEPT 0.00000 DEGREES ON PLANFORM 2

BREAK POINTS FOR THIS CONFIGURATION

THE BREAKPOINT LOCATED SPANWISE AT -1.40000 HAS BEEN ADJUSTED TO -1.40500

THE BREAKPOINT LOCATED SPANWISE AT -1.40000 HAS BEEN ADJUSTED TO -1.40500

FIRST PLANFORM BREAK POINTS

POINT	X	Y	Z	SWEEP ANGLE	DIHEDRAL ANGLE	MOVE CODE
1	0.00000	0.00000	0.00000	73.19811	0.00000	1
2	-1.52010	-.45900	0.00000	78.58573	0.00000	1
3	-3.84020	-.76590	0.00000	80.39074	0.00000	1
4	-6.08030	-1.29060	0.00000	80.70522	0.00000	1
5	-6.80085	-1.40500	0.00000	80.70522	0.00000	1
6	-6.84040	-1.40500	0.00000	56.40331	0.00000	1
7	-7.01050	-1.51900	0.00000	60.04788	0.00000	1
8	-7.20660	-1.63100	0.00000	64.03834	0.00000	1
9	-7.44110	-1.75000	0.00000	64.53834	0.00000	1
10	-7.68050	-1.85700	0.00000	66.73785	0.00000	1
11	-8.30210	-2.08300	0.00000	73.30215	0.00000	1
12	-8.65550	-2.20500	0.00000	76.09233	0.00000	1
13	-8.99820	-2.53500	0.00000	78.27917	0.00000	1
14	-10.54250	-2.73940	0.00000	80.18529	0.00000	1

15	[illegible]	-2.96440	0.00000	81.92641	0.00000	1
16	-13.[illegible]	-3.16780	0.00000	83.66814	0.00000	1
17	-15.72550	-3.39380	0.00000	85.71478	0.00000	1
18	-18.44000	-3.59720	0.00000	0.00000	0.00000	1
19	-18.44000	0.00000	0.00000			

SECOND PLANFORM BREAK POINTS

1	-18.44000	0.00000	0.00000	0.00000	0.00000	1
2	-18.44000	-.45900	0.00000	0.00000	0.00000	1
3	-18.44000	-.76500	0.00000	0.00000	0.00000	1
4	-18.44000	-1.28060	0.00000	0.00000	0.00000	1
5	-18.44000	-1.40500	0.00000	0.00000	0.00000	1
6	-18.44000	-1.51800	0.00000	0.00000	0.00000	1
7	-18.44000	-1.63100	0.00000	0.00000	0.00000	1
8	-18.44000	-1.85700	0.00000	0.00000	0.00000	1
9	-18.44000	-2.08300	0.00000	0.00000	0.00000	1
10	-18.44000	-2.30900	0.00000	0.00000	0.00000	1
11	-18.44000	-2.53500	0.00000	0.00000	0.00000	1
12	-18.44000	-2.73840	0.00000	0.00000	0.00000	1
13	-18.44000	-2.96440	0.00000	0.00000	0.00000	1
14	-18.44000	-3.16780	0.00000	0.00000	0.00000	1
15	-18.44000	-3.39380	0.00000	0.00000	0.00000	1
16	-18.44000	-3.59720	0.00000	45.24312	0.00000	1
17	-28.25000	-13.32430	0.00000	90.00000	0.00000	1
18	-31.10000	-13.32430	0.00000	11.71461	0.00000	1
19	-28.70000	-1.75000	0.00000	-87.84472	0.00000	1
20	-38.00000	-1.40500	0.00000	0.00000	0.00000	1
21	-38.00000	0.00000	0.00000			

HORSESHOE VORTEX SUMMARY TABLE

348 HORSESHOE VORTICIES USED ON THE LEFT HALF OF THIS CONFIGURATION

PLANFORM	TOTAL	SPANWISE
1	128	16
2	200	25

8 HORSESHOE VORTICES IN EACH CHORDWISE ROW

APPROXIMATE PLATFORM CONFIGURATION

PLATFORM 1 IS *
PLATFORM 2 IS *

ORIGINAL PAGE IS
OF POOR QUALITY

ORIGINAL PAGE IS
OF POOR QUALITY

AERODYNAMIC DATA

CONFIGURATION : STRAKE WING - FLOW

STATIC LONGITUDINAL AERODYNAMIC COEFFICIENTS ARE COMPUTED

X C/4	X 3C/4	Y	Z	S	C/4 SWEEP ANGLE	DIHEDRAL ANGLE	LOCAL ALPHA IN RADIANS	DELTA CP AT DESIRED CL = .40000
FIRST PLANFORM HORSESHOE VORTEX DESCRIPTIONS								
-17.12516	-17.20999	-3.49550	0.00000	.10170	85.57709	0.00000	0.00000	.56955
-17.25482	-17.37965	-3.49550	0.00000	.10170	84.92505	0.00000	0.00000	.31176
-17.44448	-17.54939	-3.49550	0.00000	.10170	84.04832	0.00000	0.00000	.25989
-17.63413	-17.71896	-3.49550	0.00000	.10170	82.80733	0.00000	0.00000	.24433
-17.80379	-17.88862	-3.49550	0.00000	.10170	80.91796	0.00000	0.00000	.24961
-17.97345	-18.05827	-3.49550	0.00000	.10170	77.70298	0.00000	0.00000	.27092
-18.14310	-18.22793	-3.49550	0.00000	.10170	71.09155	0.00000	0.00000	.32955
-18.31276	-18.39759	-3.49550	0.00000	.10170	51.36594	0.00000	0.00000	.45924
-14.83330	-15.05710	-3.28080	0.00000	.11300	83.46563	0.00000	0.00000	.42002
-15.29041	-15.52371	-3.28080	0.00000	.11300	82.50788	0.00000	0.00000	.22187
-15.75701	-15.99032	-3.28080	0.00000	.11300	81.22371	0.00000	0.00000	.16699
-16.22362	-16.45692	-3.28080	0.00000	.11300	79.41431	0.00000	0.00000	.13319
-16.49023	-16.92353	-3.28080	0.00000	.11300	76.68194	0.00000	0.00000	.11719
-17.15683	-17.39014	-3.28080	0.00000	.11300	72.10972	0.00000	0.00000	.11972
-17.62344	-17.85674	-3.28080	0.00000	.11300	63.10300	0.00000	0.00000	.14122
-18.09005	-18.32335	-3.28080	0.00000	.11300	40.19347	0.00000	0.00000	.21867
-13.14273	-13.40449	-3.06610	0.00000	.10170	81.66957	0.00000	0.00000	.38046
-13.82625	-14.16801	-3.06610	0.00000	.10170	80.45670	0.00000	0.00000	.18703
-14.50977	-14.85153	-3.06610	0.00000	.10170	78.82571	0.00000	0.00000	.13521
-15.19329	-15.53505	-3.06610	0.00000	.10170	76.56351	0.00000	0.00000	.11598
-15.87680	-16.21856	-3.06610	0.00000	.10170	73.16339	0.00000	0.00000	.10129
-16.56032	-16.90208	-3.06610	0.00000	.10170	67.57616	0.00000	0.00000	.09509
-17.24384	-17.58560	-3.06610	0.00000	.10170	57.03816	0.00000	0.00000	.11139
-17.92736	-18.26912	-3.06610	0.00000	.10170	33.46093	0.00000	0.00000	.18189
-11.81540	-12.24279	-2.85140	0.00000	.11300	79.87513	0.00000	0.00000	.36070
-12.67018	-13.09758	-2.85140	0.00000	.11300	78.41320	0.00000	0.00000	.17191
-13.52497	-13.95237	-2.85140	0.00000	.11300	76.46700	0.00000	0.00000	.12638
-14.37976	-14.80715	-2.85140	0.00000	.11300	73.75604	0.00000	0.00000	.10103
-15.23455	-15.66194	-2.85140	0.00000	.11300	69.74317	0.00000	0.00000	.09281
-16.08933	-16.51673	-2.85140	0.00000	.11300	63.28587	0.00000	0.00000	.08879
-16.94412	-17.37152	-2.85140	0.00000	.11300	51.66193	0.00000	0.00000	.10104

-17.79991	-1[illegible].22630	-2.85140	0.00000	.11300	28.45436	0.00000	0.00000	.16565
-16.70770	-11.20663	-2.63670	0.00000	.10170	77.91100	0.00000	0.00000	.34693
-11.70548	-13.20434	-2.63670	0.00000	.10170	76.18446	0.00000	0.00000	.16058
-13.70319	-13.20204	-2.63670	0.00000	.10170	73.89772	0.00000	0.00000	.11865
-13.70060	-14.19975	-2.63670	0.00000	.10170	70.73790	0.00000	0.00000	.09769
-14.69849	-15.19745	-2.63670	0.00000	.10170	66.12390	0.00000	0.00000	.08693
-15.69631	-16.19516	-2.63670	0.00000	.10170	58.88482	0.00000	0.00000	.08459
-16.69401	-17.19287	-2.63670	0.00000	.10170	46.51358	0.00000	0.00000	.09565
-17.69172	-18.19057	-2.63670	0.00000	.10170	24.31509	0.00000	0.00000	.15584
-9.76035	-10.24834	-2.42200	0.00000	.11300	75.66193	0.00000	0.00000	.33303
-10.69697	-11.44498	-2.42200	0.00000	.11300	73.64452	0.00000	0.00000	.15896
-12.62200	-12.55000	-2.42200	0.00000	.11300	70.99063	0.00000	0.00000	.11536
-13.13991	-13.65692	-2.42200	0.00000	.11300	67.36196	0.00000	0.00000	.09469
-14.25403	-14.81294	-2.42200	0.00000	.11300	62.15477	0.00000	0.00000	.08328
-15.37005	-15.92896	-2.42200	0.00000	.11300	54.23328	0.00000	0.00000	.08145
-16.48607	-17.04498	-2.42200	0.00000	.11300	41.45805	0.00000	0.00000	.09213
-17.60209	-18.16100	-2.42200	0.00000	.11300	20.73711	0.00000	0.00000	.14956
-8.68384	-9.89381	-2.19600	0.00000	.11300	72.79486	0.00000	0.00000	.32557
-10.20309	-11.81406	-2.19600	0.00000	.11300	70.42948	0.00000	0.00000	.15662
-11.42414	-13.03421	-2.19600	0.00000	.11300	67.34657	0.00000	0.00000	.11308
-12.64425	-14.25435	-2.19600	0.00000	.11300	63.19625	0.00000	0.00000	.09229
-13.86444	-15.47451	-2.19600	0.00000	.11300	57.38306	0.00000	0.00000	.08086
-15.08466	-16.69466	-2.19600	0.00000	.11300	48.89042	0.00000	0.00000	.07922
-16.30474	-17.91481	-2.19600	0.00000	.11300	36.10070	0.00000	0.00000	.08586
-17.52480	-19.13496	-2.19600	0.00000	.11300	17.35547	0.00000	0.00000	.14478
-8.32237	-9.97516	-1.97000	0.00000	.11300	69.13972	0.00000	0.00000	.32259
-9.82797	-11.28063	-1.97000	0.00000	.11300	66.36950	0.00000	0.00000	.15275
-11.03338	-12.58613	-1.97000	0.00000	.11300	62.81431	0.00000	0.00000	.11180
-12.23886	-13.89163	-1.97000	0.00000	.11300	58.12897	0.00000	0.00000	.09088
-13.44438	-15.19713	-1.97000	0.00000	.11300	51.77808	0.00000	0.00000	.07926
-14.64988	-16.50263	-1.97000	0.00000	.11300	42.95866	0.00000	0.00000	.07717
-15.85538	-17.80813	-1.97000	0.00000	.11300	30.64932	0.00000	0.00000	.08603
-17.06088	-19.11363	-1.97000	0.00000	.11300	14.24930	0.00000	0.00000	.14166
-7.91501	-9.58404	-1.80350	0.00000	.05350	64.23326	0.00000	0.00000	.32344
-9.27307	-9.95210	-1.80350	0.00000	.05350	61.00415	0.00000	0.00000	.14941
-10.63113	-11.31017	-1.80350	0.00000	.05350	56.95199	0.00000	0.00000	.11110
-11.98920	-12.66823	-1.80350	0.00000	.05350	51.77717	0.00000	0.00000	.08966
-13.34726	-14.02629	-1.80350	0.00000	.05350	45.06924	0.00000	0.00000	.07811
-14.70533	-15.38436	-1.80350	0.00000	.05350	36.31990	0.00000	0.00000	.07580
-16.06339	-16.74242	-1.80350	0.00000	.05350	25.07000	0.00000	0.00000	.08442
-17.42145	-18.10048	-1.80350	0.00000	.05350	11.33659	0.00000	0.00000	.14038
-7.88001	-9.37504	-1.69050	0.00000	.05950	64.23326	0.00000	0.00000	.32708
-9.06018	-9.76331	-1.69050	0.00000	.05950	61.00415	0.00000	0.00000	.14722
-10.45745	-11.15158	-1.69050	0.00000	.05950	56.95199	0.00000	0.00000	.11094
-11.84572	-12.53985	-1.69050	0.00000	.05950	51.77717	0.00000	0.00000	.08928
-13.23400	-13.92812	-1.69050	0.00000	.05950	45.06924	0.00000	0.00000	.07795
-14.62228	-15.31639	-1.69050	0.00000	.05950	36.31990	0.00000	0.00000	.07538
-16.01053	-16.70466	-1.69050	0.00000	.05950	25.07000	0.00000	0.00000	.08396
-17.39880	-18.09293	-1.69050	0.00000	.05950	11.33659	0.00000	0.00000	.14065

-7.66266	-8.17687	-1.57450	0.00000	.05650	59.25477	0.00000	0.00000	.32870
-8.97308	-9.59730	-1.57450	0.00000	.05650	55.66899	0.00000	0.00000	.14464
-10.29552	-11.00374	-1.57450	0.00000	.05650	51.28013	0.00000	0.00000	.11083
-11.71195	-12.42017	-1.57450	0.00000	.05650	45.85759	0.00000	0.00000	.08936
-13.12838	-13.83660	-1.57450	0.00000	.05650	39.12725	0.00000	0.00000	.07795
-14.54481	-15.25303	-1.57450	0.00000	.05650	30.81790	0.00000	0.00000	.07521
-15.96125	-16.66946	-1.57450	0.00000	.05650	20.78768	0.00000	0.00000	.08383
-17.37769	-18.08589	-1.57450	0.00000	.05650	9.24069	0.00000	0.00000	.14118
-7.26528	-8.00454	-1.46150	0.00000	.05650	55.55983	0.00000	0.00000	.32500
-8.72469	-9.44425	-1.46150	0.00000	.05650	51.78535	0.00000	0.00000	.14342
-10.18352	-10.88358	-1.46150	0.00000	.05650	47.25389	0.00000	0.00000	.11227
-11.64234	-12.32290	-1.46150	0.00000	.05650	41.78963	0.00000	0.00000	.09088
-13.04255	-13.76221	-1.46150	0.00000	.05650	35.20733	0.00000	0.00000	.07901
-14.48137	-15.20153	-1.46150	0.00000	.05650	27.35932	0.00000	0.00000	.07577
-15.92119	-16.64085	-1.46150	0.00000	.05650	18.22602	0.00000	0.00000	.08449
-17.36051	-18.08017	-1.46150	0.00000	.05650	8.03270	0.00000	0.00000	.14248
-6.89471	-7.59344	-1.34280	0.00000	.04220	80.41088	0.00000	0.00000	.28817
-8.33217	-9.03090	-1.34280	0.00000	.04220	79.02262	0.00000	0.00000	.14631
-9.82663	-10.57835	-1.34280	0.00000	.04220	77.17221	0.00000	0.00000	.11763
-11.32708	-12.07591	-1.34280	0.00000	.04220	74.58954	0.00000	0.00000	.09495
-12.82454	-13.57327	-1.34280	0.00000	.04220	70.75350	0.00000	0.00000	.08088
-14.32200	-15.07072	-1.34280	0.00000	.04220	64.54043	0.00000	0.00000	.07624
-15.81945	-16.56819	-1.34280	0.00000	.04220	53.19718	0.00000	0.00000	.08466
-17.31691	-18.06564	-1.34280	0.00000	.04220	29.80514	0.00000	0.00000	.14142
-4.69309	-5.04148	-1.02325	0.00000	.25735	80.08682	0.00000	0.00000	.18418
-6.72906	-7.56645	-1.02325	0.00000	.25735	78.65392	0.00000	0.00000	.13869
-8.66353	-9.33141	-1.02325	0.00000	.25735	76.74543	0.00000	0.00000	.12538
-10.15160	-11.04638	-1.02325	0.00000	.25735	74.08487	0.00000	0.00000	.09979
-11.93357	-12.80135	-1.02325	0.00000	.25735	70.14124	0.00000	0.00000	.08024
-13.66854	-14.53632	-1.02325	0.00000	.25735	63.77885	0.00000	0.00000	.07326
-15.40350	-16.27129	-1.02325	0.00000	.25735	52.26158	0.00000	0.00000	.08015
-17.13847	-18.00626	-1.02325	0.00000	.25735	28.97500	0.00000	0.00000	.12883
-2.78815	-3.23514	-.61245	0.00000	.15345	79.22765	0.00000	0.00000	.13910
-4.60513	-5.01512	-.61245	0.00000	.15345	76.54314	0.00000	0.00000	.09544
-6.42211	-7.83510	-.61245	0.00000	.15345	74.31012	0.00000	0.00000	.10603
-8.24209	-9.65508	-.61245	0.00000	.15345	71.22027	0.00000	0.00000	.10403
-10.06507	-11.47506	-.61245	0.00000	.15345	66.69804	0.00000	0.00000	.08427
-11.88505	-13.29504	-.61245	0.00000	.15345	59.57302	0.00000	0.00000	.07338
-13.70503	-15.11502	-.61245	0.00000	.15345	47.29464	0.00000	0.00000	.07598
-15.52501	-16.93500	-.61245	0.00000	.15345	24.90785	0.00000	0.00000	.11753
-1.31255	-2.41755	-.22950	0.00000	.22950	72.69804	0.00000	0.00000	.12005
-3.53254	-4.63754	-.22950	0.00000	.22950	70.30918	0.00000	0.00000	.07943
-5.73254	-6.83754	-.22950	0.00000	.22950	67.21225	0.00000	0.00000	.08916
-7.93253	-9.03753	-.22950	0.00000	.22950	63.04422	0.00000	0.00000	.10609
-10.13252	-11.23752	-.22950	0.00000	.22950	57.21166	0.00000	0.00000	.08811
-12.33252	-13.43751	-.22950	0.00000	.22950	48.70357	0.00000	0.00000	.07201
-14.53251	-15.63751	-.22950	0.00000	.22950	35.92140	0.00000	0.00000	.07157
-16.73250	-17.83750	-.22950	0.00000	.22950	17.24842	0.00000	0.00000	.11101

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SECOND PLANFORM HORSESHOE VORTEX DESCRIPTIONS

-27.79365	-27.69868	-12.76912	0.00000	.55518	44.52298	0.00000	0.00000	1.87788
-28.20490	-28.41082	-12.76912	0.00000	.55518	41.45546	0.00000	0.00000	.79902
-28.61475	-28.82247	-12.76912	0.00000	.55518	38.06785	0.00000	0.00000	.41842
-29.02960	-29.23452	-12.76912	0.00000	.55518	34.33498	0.00000	0.00000	.23110
-29.44065	-29.64637	-12.76912	0.00000	.55518	30.23803	0.00000	0.00000	.13456
-29.85230	-30.05822	-12.76912	0.00000	.55518	25.76925	0.00000	0.00000	.08135
-30.26414	-30.47007	-12.76912	0.00000	.55518	20.93741	0.00000	0.00000	.04907
-30.67505	-30.88192	-12.76912	0.00000	.55518	15.77315	0.00000	0.00000	.02613
-26.70103	-26.96255	-11.65876	0.00000	.55518	44.52298	0.00000	0.00000	1.80865
-27.22409	-27.48560	-11.65876	0.00000	.55518	41.45546	0.00000	0.00000	.85193
-27.74712	-28.00865	-11.65876	0.00000	.55518	38.06785	0.00000	0.00000	.56068
-28.27017	-28.53169	-11.65876	0.00000	.55518	34.33498	0.00000	0.00000	.37878
-28.79322	-29.05474	-11.65876	0.00000	.55518	30.23803	0.00000	0.00000	.24402
-29.31626	-29.57779	-11.65876	0.00000	.55518	25.76925	0.00000	0.00000	.15254
-29.83931	-30.10083	-11.65876	0.00000	.55518	20.93741	0.00000	0.00000	.09145
-30.36236	-30.62388	-11.65876	0.00000	.55518	15.77315	0.00000	0.00000	.04787
-25.60001	-25.92813	-10.54840	0.00000	.55518	44.52298	0.00000	0.00000	1.67296
-26.26335	-26.56037	-10.54840	0.00000	.55518	41.45546	0.00000	0.00000	.80425
-26.87750	-27.19452	-10.54840	0.00000	.55518	38.06785	0.00000	0.00000	.55790
-27.51174	-27.82996	-10.54840	0.00000	.55518	34.33498	0.00000	0.00000	.41006
-28.14596	-28.46311	-10.54840	0.00000	.55518	30.23803	0.00000	0.00000	.29449
-28.78022	-29.09735	-10.54840	0.00000	.55518	25.76925	0.00000	0.00000	.19915
-29.41447	-29.73160	-10.54840	0.00000	.55518	20.93741	0.00000	0.00000	.12445
-30.04872	-30.36584	-10.54840	0.00000	.55518	15.77315	0.00000	0.00000	.06635
-24.51660	-24.89971	-9.43805	0.00000	.55518	44.52298	0.00000	0.00000	1.53895
-25.24243	-25.63515	-9.43805	0.00000	.55518	41.45546	0.00000	0.00000	.74734
-25.96787	-26.38059	-9.43805	0.00000	.55518	38.06785	0.00000	0.00000	.53010
-26.75331	-27.12603	-9.43805	0.00000	.55518	34.33498	0.00000	0.00000	.40743
-27.49175	-27.87148	-9.43805	0.00000	.55518	30.23803	0.00000	0.00000	.30542
-28.24620	-28.61692	-9.43805	0.00000	.55518	25.76925	0.00000	0.00000	.22031
-28.98464	-29.36236	-9.43805	0.00000	.55518	20.93741	0.00000	0.00000	.14545
-29.73308	-30.10780	-9.43805	0.00000	.55518	15.77315	0.00000	0.00000	.07967
-23.42496	-23.85328	-8.32769	0.00000	.55518	44.52298	0.00000	0.00000	1.41326
-24.28160	-24.70992	-8.32769	0.00000	.55518	41.45546	0.00000	0.00000	.69284
-25.13824	-25.56656	-8.32769	0.00000	.55518	38.06785	0.00000	0.00000	.49871
-25.99488	-26.42320	-8.32769	0.00000	.55518	34.33498	0.00000	0.00000	.38730
-26.85152	-27.27984	-8.32769	0.00000	.55518	30.23803	0.00000	0.00000	.30223
-27.70816	-28.13648	-8.32769	0.00000	.55518	25.76925	0.00000	0.00000	.22682
-28.56480	-28.99312	-8.32769	0.00000	.55518	20.93741	0.00000	0.00000	.15634
-29.42144	-29.84976	-8.32769	0.00000	.55518	15.77315	0.00000	0.00000	.08893
-22.33296	-22.81686	-7.21733	0.00000	.55518	44.52298	0.00000	0.00000	1.29514
-23.30078	-23.79470	-7.21733	0.00000	.55518	41.45546	0.00000	0.00000	.64206
-24.26862	-24.77254	-7.21733	0.00000	.55518	38.06785	0.00000	0.00000	.46854
-25.23645	-25.75037	-7.21733	0.00000	.55518	34.33498	0.00000	0.00000	.36055
-26.20429	-26.72821	-7.21733	0.00000	.55518	30.23803	0.00000	0.00000	.29412
-27.17213	-27.70605	-7.21733	0.00000	.55518	25.76925	0.00000	0.00000	.22665
-28.13997	-28.68389	-7.21733	0.00000	.55518	20.93741	0.00000	0.00000	.16117

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-29.10781	-29.59172	-7.21733	0.00000	.55518	15.77315	0.00000	0.00000	.09441
-21.24092	-21.78044	-6.10697	0.00000	.55518	44.52298	0.00000	0.00000	1.18330
-22.31955	-22.85947	-6.10697	0.00000	.55518	41.45546	0.00000	0.00000	.59421
-23.39869	-23.93851	-6.10697	0.00000	.55518	38.06785	0.00000	0.00000	.44027
-24.47803	-25.01754	-6.10697	0.00000	.55518	34.33498	0.00000	0.00000	.35279
-25.55706	-26.09658	-6.10697	0.00000	.55518	30.23803	0.00000	0.00000	.28495
-25.63610	-27.17561	-6.10697	0.00000	.55518	25.76925	0.00000	0.00000	.22375
-27.71513	-28.25465	-6.10697	0.00000	.55518	20.93741	0.00000	0.00000	.16276
-28.79417	-29.33368	-6.10697	0.00000	.55518	15.77315	0.00000	0.00000	.09761
-20.14890	-20.74401	-4.99661	0.00000	.55518	44.52298	0.00000	0.00000	1.07707
-21.23013	-21.82425	-4.99661	0.00000	.55518	41.45546	0.00000	0.00000	.54840
-22.52936	-23.12448	-4.99661	0.00000	.55518	38.06785	0.00000	0.00000	.41325
-23.71960	-24.31471	-4.99661	0.00000	.55518	34.33498	0.00000	0.00000	.33741
-24.90983	-25.50495	-4.99661	0.00000	.55518	30.23803	0.00000	0.00000	.27651
-26.10006	-26.69518	-4.99661	0.00000	.55518	25.76925	0.00000	0.00000	.21955
-27.29030	-27.88541	-4.99661	0.00000	.55518	20.93741	0.00000	0.00000	.16271
-28.48053	-29.07565	-4.99661	0.00000	.55518	15.77315	0.00000	0.00000	.09898
-19.19774	-19.83179	-4.01932	0.00000	.42212	44.52298	0.00000	0.00000	.98969
-20.47585	-21.11990	-4.01932	0.00000	.42212	41.45546	0.00000	0.00000	.50217
-21.74395	-22.40800	-4.01932	0.00000	.42212	38.06785	0.00000	0.00000	.39520
-23.05206	-23.69611	-4.01932	0.00000	.42212	34.33498	0.00000	0.00000	.32390
-24.34016	-24.98421	-4.01932	0.00000	.42212	30.23803	0.00000	0.00000	.27352
-25.62827	-26.27232	-4.01932	0.00000	.42212	25.76925	0.00000	0.00000	.21416
-26.91637	-27.56042	-4.01932	0.00000	.42212	20.93741	0.00000	0.00000	.16190
-28.20448	-28.84853	-4.01932	0.00000	.42212	15.77315	0.00000	0.00000	.09779
-18.77194	-19.43581	-3.49550	0.00000	.10170	.37126	0.00000	0.00000	.68601
-20.05068	-20.76385	-3.49550	0.00000	.10170	1.85570	0.00000	0.00000	.45104
-21.42742	-22.09129	-3.49550	0.00000	.10170	3.33764	0.00000	0.00000	.37589
-22.75516	-23.41903	-3.49550	0.00000	.10170	4.81513	0.00000	0.00000	.30770
-24.08291	-24.74678	-3.49550	0.00000	.10170	6.28623	0.00000	0.00000	.24781
-25.41065	-26.07452	-3.49550	0.00000	.10170	7.74906	0.00000	0.00000	.20581
-26.73839	-27.40226	-3.49550	0.00000	.10170	9.20180	0.00000	0.00000	.15905
-28.06613	-28.73000	-3.49550	0.00000	.10170	10.64270	0.00000	0.00000	.09465
-18.77054	-19.43163	-3.28080	0.00000	.11300	.37126	0.00000	0.00000	.55995
-20.05272	-20.75381	-3.28080	0.00000	.11300	1.85570	0.00000	0.00000	.42099
-21.41490	-22.07599	-3.28080	0.00000	.11300	3.33764	0.00000	0.00000	.36856
-22.73708	-23.39817	-3.28080	0.00000	.11300	4.81513	0.00000	0.00000	.30110
-24.05925	-24.72034	-3.28080	0.00000	.11300	6.28623	0.00000	0.00000	.26636
-25.38143	-26.04252	-3.28080	0.00000	.11300	7.74906	0.00000	0.00000	.20303
-26.70361	-27.36470	-3.28080	0.00000	.11300	9.20180	0.00000	0.00000	.15974
-28.02579	-28.68688	-3.28080	0.00000	.11300	10.64270	0.00000	0.00000	.09382
-18.76915	-19.42745	-3.06610	0.00000	.10170	.37126	0.00000	0.00000	.49242
-20.05077	-20.74407	-3.06610	0.00000	.10170	1.85570	0.00000	0.00000	.39391
-21.40239	-22.06068	-3.06610	0.00000	.10170	3.33764	0.00000	0.00000	.36190
-22.71400	-23.37730	-3.06610	0.00000	.10170	4.81513	0.00000	0.00000	.29406
-24.02562	-24.69391	-3.06610	0.00000	.10170	6.28623	0.00000	0.00000	.26853
-25.33722	-26.01052	-3.06610	0.00000	.10170	7.74906	0.00000	0.00000	.19938
-26.64883	-27.32714	-3.06610	0.00000	.10170	9.20180	0.00000	0.00000	.15990
-27.96044	-28.64375	-3.06610	0.00000	.10170	10.64270	0.00000	0.00000	.09234

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-18.76776	-19.42329	-2.85140	0.00000	.11300	.37126	0.00000	0.00000	.44937
-20.07881	-20.73433	-2.85140	0.00000	.11300	1.85570	0.00000	0.00000	.36889
-21.38986	-22.04538	-2.85140	0.00000	.11300	3.33764	0.00000	0.00000	.35632
-22.70091	-23.35643	-2.85140	0.00000	.11300	4.81513	0.00000	0.00000	.28685
-24.01195	-24.66748	-2.85140	0.00000	.11300	6.28623	0.00000	0.00000	.26897
-25.32300	-25.97852	-2.85140	0.00000	.11300	7.74906	0.00000	0.00000	.19514
-26.63405	-27.28957	-2.85140	0.00000	.11300	9.20180	0.00000	0.00000	.15981
-27.94510	-28.60062	-2.85140	0.00000	.11300	10.64270	0.00000	0.00000	.09031
-18.76637	-19.41911	-2.63670	0.00000	.10170	.37126	0.00000	0.00000	.42273
-20.07185	-20.72459	-2.63670	0.00000	.10170	1.85570	0.00000	0.00000	.34545
-21.37734	-22.03008	-2.63670	0.00000	.10170	3.33764	0.00000	0.00000	.35215
-22.68282	-23.33556	-2.63670	0.00000	.10170	4.81513	0.00000	0.00000	.27958
-23.98830	-24.64104	-2.63670	0.00000	.10170	6.28623	0.00000	0.00000	.26999
-25.29378	-25.94653	-2.63670	0.00000	.10170	7.74906	0.00000	0.00000	.19024
-26.59927	-27.25201	-2.63670	0.00000	.10170	9.20180	0.00000	0.00000	.15983
-27.90475	-28.55749	-2.63670	0.00000	.10170	10.64270	0.00000	0.00000	.08758
-18.76498	-19.41494	-2.42200	0.00000	.11300	.37126	0.00000	0.00000	.40648
-20.06490	-20.71486	-2.42200	0.00000	.11300	1.85570	0.00000	0.00000	.32274
-21.36482	-22.01477	-2.42200	0.00000	.11300	3.33764	0.00000	0.00000	.34922
-22.66473	-23.31469	-2.42200	0.00000	.11300	4.81513	0.00000	0.00000	.27237
-23.96465	-24.61461	-2.42200	0.00000	.11300	6.28623	0.00000	0.00000	.27163
-25.26457	-25.91453	-2.42200	0.00000	.11300	7.74906	0.00000	0.00000	.18468
-26.56449	-27.21445	-2.42200	0.00000	.11300	9.20180	0.00000	0.00000	.15958
-27.86440	-28.51436	-2.42200	0.00000	.11300	10.64270	0.00000	0.00000	.08402
-18.76352	-19.41055	-2.19600	0.00000	.11300	.37126	0.00000	0.00000	.39983
-20.05758	-20.70461	-2.19600	0.00000	.11300	1.85570	0.00000	0.00000	.29978
-21.35164	-21.99867	-2.19600	0.00000	.11300	3.33764	0.00000	0.00000	.34729
-22.64570	-23.29273	-2.19600	0.00000	.11300	4.81513	0.00000	0.00000	.26569
-23.93976	-24.58679	-2.19600	0.00000	.11300	6.28623	0.00000	0.00000	.27383
-25.23382	-25.88085	-2.19600	0.00000	.11300	7.74906	0.00000	0.00000	.17814
-26.52788	-27.17491	-2.19600	0.00000	.11300	9.20180	0.00000	0.00000	.15861
-27.82194	-28.46897	-2.19600	0.00000	.11300	10.64270	0.00000	0.00000	.07901
-18.76205	-19.40615	-1.97000	0.00000	.11300	.37126	0.00000	0.00000	.40346
-20.05025	-20.69435	-1.97000	0.00000	.11300	1.85570	0.00000	0.00000	.27857
-21.33844	-21.98256	-1.97000	0.00000	.11300	3.33764	0.00000	0.00000	.34459
-22.62664	-23.27076	-1.97000	0.00000	.11300	4.81513	0.00000	0.00000	.26257
-23.91484	-24.55896	-1.97000	0.00000	.11300	6.28623	0.00000	0.00000	.27500
-25.20306	-25.84716	-1.97000	0.00000	.11300	7.74906	0.00000	0.00000	.17105
-26.49126	-27.13537	-1.97000	0.00000	.11300	9.20180	0.00000	0.00000	.15483
-27.77947	-28.42357	-1.97000	0.00000	.11300	10.64270	0.00000	0.00000	.07188
-18.76057	-19.40292	-1.80350	0.00000	.05350	.37126	0.00000	0.00000	.41684
-20.04486	-20.68720	-1.80350	0.00000	.05350	1.85570	0.00000	0.00000	.27474
-21.32875	-21.97069	-1.80350	0.00000	.05350	3.33764	0.00000	0.00000	.33463
-22.61263	-23.25458	-1.80350	0.00000	.05350	4.81513	0.00000	0.00000	.27815
-23.89652	-24.53846	-1.80350	0.00000	.05350	6.28623	0.00000	0.00000	.26626
-25.18041	-25.82235	-1.80350	0.00000	.05350	7.74906	0.00000	0.00000	.16557
-26.46429	-27.10624	-1.80350	0.00000	.05350	9.20180	0.00000	0.00000	.13934
-27.74818	-28.39012	-1.80350	0.00000	.05350	10.64270	0.00000	0.00000	.06128
-18.91003	-19.55209	-1.69050	0.00000	.05950	-39.70479	0.00000	0.00000	.37735

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-20.29016	-21.03022	-1.69050	0.00000	.05950	-76.45767	0.00000	0.00000	.27361
-21.77028	-22.51034	-1.69050	0.00000	.05950	-82.37846	0.00000	0.00000	.28642
-23.25041	-23.99047	-1.69050	0.00000	.05950	-84.70731	0.00000	0.00000	.33149
-24.73053	-25.47059	-1.69050	0.00000	.05950	-85.94787	0.00000	0.00000	.19075
-26.21065	-26.95072	-1.69050	0.00000	.05950	-86.71782	0.00000	0.00000	.13420
-27.69078	-28.43084	-1.69050	0.00000	.05950	-87.24208	0.00000	0.00000	.05909
-29.17091	-29.91097	-1.69050	0.00000	.05950	-87.62201	0.00000	0.00000	.02008
-18.89435	-19.83906	-1.57450	0.00000	.05650	-39.70479	0.00000	0.00000	.31727
-20.77176	-21.70447	-1.57450	0.00000	.05650	-76.45767	0.00000	0.00000	.32809
-22.64917	-23.56988	-1.57450	0.00000	.05650	-82.37846	0.00000	0.00000	.23948
-24.52658	-25.43529	-1.57450	0.00000	.05650	-84.70731	0.00000	0.00000	.23669
-26.40400	-27.30070	-1.57450	0.00000	.05650	-85.94787	0.00000	0.00000	.14168
-28.28241	-29.16611	-1.57450	0.00000	.05650	-86.71782	0.00000	0.00000	.05597
-30.09882	-31.03152	-1.57450	0.00000	.05650	-87.24208	0.00000	0.00000	.01150
-31.96623	-32.89693	-1.57450	0.00000	.05650	-87.62201	0.00000	0.00000	.00377
-19.60018	-20.12055	-1.46150	0.00000	.05650	-39.70479	0.00000	0.00000	.28158
-21.24082	-22.26120	-1.46150	0.00000	.05650	-76.45767	0.00000	0.00000	.30321
-23.48145	-24.40201	-1.46150	0.00000	.05650	-82.37846	0.00000	0.00000	.25985
-25.72208	-26.54275	-1.46150	0.00000	.05650	-84.70731	0.00000	0.00000	.17875
-27.96311	-28.68348	-1.46150	0.00000	.05650	-85.94787	0.00000	0.00000	.07066
-30.20364	-31.82421	-1.46150	0.00000	.05650	-86.71782	0.00000	0.00000	.01415
-32.44458	-33.96494	-1.46150	0.00000	.05650	-87.24208	0.00000	0.00000	.00288
-34.68591	-36.10567	-1.46150	0.00000	.05650	-87.62201	0.00000	0.00000	.00181
-19.05125	-20.27375	-1.34290	0.00000	.06220	0.00000	0.00000	0.00000	.26459
-21.49625	-22.71875	-1.34290	0.00000	.06220	0.00000	0.00000	0.00000	.28927
-23.94125	-25.16375	-1.34290	0.00000	.06220	0.00000	0.00000	0.00000	.24290
-26.38625	-27.60875	-1.34290	0.00000	.06220	0.00000	0.00000	0.00000	.15331
-28.83125	-30.05375	-1.34290	0.00000	.06220	0.00000	0.00000	0.00000	.05395
-31.27625	-32.49875	-1.34290	0.00000	.06220	0.00000	0.00000	0.00000	.01144
-33.72125	-34.94375	-1.34290	0.00000	.06220	0.00000	0.00000	0.00000	.00344
-36.16625	-37.38875	-1.34290	0.00000	.06220	0.00000	0.00000	0.00000	.00151
-19.05125	-20.27375	-1.02325	0.00000	.25735	0.00000	0.00000	0.00000	.26429
-21.49625	-22.71875	-1.02325	0.00000	.25735	0.00000	0.00000	0.00000	.28926
-23.94125	-25.16375	-1.02325	0.00000	.25735	0.00000	0.00000	0.00000	.24035
-26.38625	-27.60875	-1.02325	0.00000	.25735	0.00000	0.00000	0.00000	.15084
-28.83125	-30.05375	-1.02325	0.00000	.25735	0.00000	0.00000	0.00000	.05438
-31.27625	-32.49875	-1.02325	0.00000	.25735	0.00000	0.00000	0.00000	.01305
-33.72125	-34.94375	-1.02325	0.00000	.25735	0.00000	0.00000	0.00000	.00451
-36.16625	-37.38875	-1.02325	0.00000	.25735	0.00000	0.00000	0.00000	.00202
-19.05125	-20.27375	-.61245	0.00000	.15345	0.00000	0.00000	0.00000	.26117
-21.49625	-22.71875	-.61245	0.00000	.15345	0.00000	0.00000	0.00000	.28650
-23.94125	-25.16375	-.61245	0.00000	.15345	0.00000	0.00000	0.00000	.23840
-26.38625	-27.60875	-.61245	0.00000	.15345	0.00000	0.00000	0.00000	.15099
-28.83125	-30.05375	-.61245	0.00000	.15345	0.00000	0.00000	0.00000	.05645
-31.27625	-32.49875	-.61245	0.00000	.15345	0.00000	0.00000	0.00000	.01453
-33.72125	-34.94375	-.61245	0.00000	.15345	0.00000	0.00000	0.00000	.00520
-36.16625	-37.38875	-.61245	0.00000	.15345	0.00000	0.00000	0.00000	.00236
-19.05125	-20.27375	-.22950	0.00000	.22950	0.00000	0.00000	0.00000	.25947
-21.49625	-22.71875	-.22950	0.00000	.22950	0.00000	0.00000	0.00000	.28480

-23.94125	-25.16375	-.22950	0.00000	.22950	0.00000	0.00000	0.00000	.23730
-26.38625	-27.60875	-.22950	0.00000	.22950	0.00000	0.00000	0.00000	.15108
-28.83125	-30.05375	-.22950	0.00000	.22950	0.00000	0.00000	0.00000	.05764
-31.27625	-32.49875	-.22950	0.00000	.22950	0.00000	0.00000	0.00000	.01535
-33.72125	-34.94375	-.22950	0.00000	.22950	0.00000	0.00000	0.00000	.00557
-36.16625	-37.38875	-.22950	0.00000	.22950	0.00000	0.00000	0.00000	.00255

REF. CHORD	C AVERAGE	TRUE AREA	REFERENCE AREA	B/2	REF. AR	TRUE AR	MACH NUMBER
9.75800	11.72087	312.58464	216.51000	13.32430	3.27998	2.27186	.90000

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COMPLETE CONFIGURATION

WING-BODY CHARACTERISTICS

LIFT

INDUCED DRAG (FAR FIELD SOLUTION)

DESIRED CL	COMPUTED ALPHA	CL(WB)	CDI AT CL(WB)	CDI/(CL(WB)**2) (1/PI*AR REF) = .09705)
.40000	5.36381	.35652	.01456	.11456

COMPLETE CONFIGURATION CHARACTERISTICS

		CL ALPHA PER RADIAN	CL ALPHA PER DEGREE	CL(TWIST)	ALPHA AT CL=0	Y CP	CM/CL	CM0
		4.27277	.07457	0.00000	0.00000	-.43613	-2.44699	0.00000
FIRST	PLANFORM	.4644[illegible]	.00811	0.00000	0.00000	-.11628		
SECOND	PLANFORM	3.80829	.06647	0.00000	0.00000	-.47514		

STATION	2Y/B	ADDITIONAL LOADING WITH CL BASED ON S(TRUE) CL COEF	CL RATIO	C RATIO	LOAD DUE TO TWIST	ADD. LOAD AT CL= 0.00000	BASIC LOAD AT CL=0	SPAN LOAD AT DESIRED CL	-AT CL DES- X LOCATION OF LOCAL CENT PR
				FIRST PLANFORM SPAN LOAD DISTRIBUTION					
1	-.24234	.14096	1.21583	.11571	0.00000	0.00000	0.00000	.03898	-17.69866
2	-.24623	.22080	.69384	.31823	0.00000	0.00000	0.00000	.06118	-14.15753
3	-.23011	.27517	.59028	.46617	0.00000	0.00000	0.00000	.07624	-15.03790
4	-.21409	.31781	.54515	.58298	0.00000	0.00000	0.00000	.08805	-14.15608
5	-.19789	.35209	.51743	.68046	0.00000	0.00000	0.00000	.09755	-13.42759
6	-.18177	.38099	.50055	.76115	0.00000	0.00000	0.00000	.10556	-12.82247
7	-.16481	.40597	.48784	.83217	0.00000	0.00000	0.00000	.11248	-12.28546
8	-.14755	.42667	.47921	.89038	0.00000	0.00000	0.00000	.11821	-11.83726
9	-.13035	.43975	.47478	.92623	0.00000	0.00000	0.00000	.12184	-11.55592
10	-.12487	.44955	.47479	.94683	0.00000	0.00000	0.00000	.12455	-11.39256
11	-.11817	.45934	.47449	.96803	0.00000	0.00000	0.00000	.12700	-11.25180
12	-.10969	.46659	.47522	.98164	0.00000	0.00000	0.00000	.12925	-11.16572
13	-.10078	.47473	.46483	1.02129	0.00000	0.00000	0.00000	.13153	-11.00483
14	-.07480	.48610	.41080	1.18328	0.00000	0.00000	0.00000	.13468	-10.25080
15	-.04588	.49549	.35966	1.37767	0.00000	0.00000	0.00000	.13728	-9.39010
16	-.01722	.50079	.33225	1.50726	0.00000	0.00000	0.00000	.13875	-8.79701
				SECOND PLANFORM SPAN LOAD DISTRIBUTION					
17	-.55633	.45844	1.63212	.28009	0.00000	0.00000	0.00000	.12702	-28.22015
18	-.37500	.66580	1.86641	.35673	0.00000	0.00000	0.00000	.18446	-27.42625

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10	-.79147	.89598	1.84224	.43257	0.00000	0.00000	.22338	-24.61283
20	-.78733	.61050	1.79147	.50941	0.00000	0.00000	.25237	-25.78863
30	-.76733	.96236	1.49038	.58425	0.00000	0.00000	.27508	-24.96149
40	-.74617	1.05771	1.84239	.46008	0.00000	0.00000	.29305	-24.13940
50	-.72433	1.16446	1.50475	.73662	0.00000	0.00000	.30722	-23.32539
60	-.70133	1.16776	1.41361	.01174	0.00000	0.00000	.31795	-22.52643
70	-.67733	1.17554	1.34279	.87661	0.00000	0.00000	.32487	-21.83728
80	-.65234	1.16454	1.27661	.80466	0.00000	0.00000	.32841	-21.81473
90	-.62634	1.07177	1.21726	.56176	0.00000	0.00000	.24777	-21.97931
100	-.59934	1.02078	1.16454	.49764	0.00000	0.00000	.25295	-22.07246
110	-.57134	.94619	1.09164	.44774	0.00000	0.00000	.24319	-22.13328
120	-.54234	.84441	1.02636	.39026	0.00000	0.00000	.23456	-22.16812
130	-.51234	.82428	.96267	.84267	0.00000	0.00000	.22724	-22.18404
140	-.48134	.75225	.90232	.80267	0.00000	0.00000	.22088	-22.17751
150	-.44934	.77749	.84517	.77564	0.00000	0.00000	.21547	-22.13982
160	-.41634	.70154	.87264	.74264	0.00000	0.00000	.21159	-22.03321
170	-.38234	.74191	.75441	1.00947	0.00000	0.00000	.21111	-22.14542
180	-.34734	.74591	.69206	1.27225	0.00000	0.00000	.21222	-22.34386
190	-.31137	.76732	.58219	1.57922	0.00000	0.00000	.21252	-22.50853
200	-.27437	.74779	.44038	1.86754	0.00000	0.00000	.21270	-22.73541
210	-.23637	.74492	.49641	1.86754	0.00000	0.00000	.21234	-22.76299
220	-.19737	.74497	.42629	1.86754	0.00000	0.00000	.21169	-22.81276
230	-.15737	.74237	.45737	1.86754	0.00000	0.00000	.21131	-22.84073
240	-.11737	.74237	.45737	1.86754	0.00000	0.00000	.21131	-22.84073

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FLOW FIELD INFORMATION

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CONFIGURATION : STRAKE WING - FLOW

STATION	Y	GAMMA/U BASIC AT CL = 0.	ADDITIONAL AT CL = 1.0	TOTAL AT CL = .40	ADDITIONAL AT CL = .40
INPUT VALUES OF CIRCULATION FOR FIRST PLANFORM					
1	-3.49550	0.00000	.12075	.04831	.04831
		0.00000	.06611	.02645	.02645
		0.00000	.05511	.02205	.02205
		0.00000	.05182	.02073	.02073
		0.00000	.05294	.02117	.02117
		0.00000	.05745	.02298	.02298
		0.00000	.06989	.02796	.02796
		0.00000	.09575	.03830	.03830
2	-3.29080	0.00000	.24498	.09799	.09799
		0.00000	.12941	.05176	.05176
		0.00000	.09740	.03896	.03896
		0.00000	.07768	.03107	.03107
		0.00000	.06835	.02734	.02734
		0.00000	.06924	.02770	.02770
		0.00000	.08237	.03295	.03295
		0.00000	.12754	.05102	.05102
3	-3.06410	0.00000	.32504	.13002	.13002
		0.00000	.15980	.06392	.06392
		0.00000	.11052	.04421	.04421
		0.00000	.09909	.03964	.03964
		0.00000	.08656	.03462	.03462
		0.00000	.08125	.03250	.03250
		0.00000	.08517	.03407	.03407
		0.00000	.15541	.06216	.06216
4	-2.85140	0.00000	.38540	.15416	.15416
		0.00000	.18368	.07347	.07347
		0.00000	.13504	.05401	.05401
		0.00000	.10795	.04318	.04318
		0.00000	.09917	.03967	.03967
		0.00000	.09487	.03795	.03795
		0.00000	.10796	.04318	.04318
		0.00000	.17700	.07080	.07080
5	-2.63470	0.00000	.43267	.17307	.17307
		0.00000	.20027	.08011	.08011
		0.00000	.14767	.05919	.05919
		0.00000	.12183	.04873	.04873
		0.00000	.10842	.04337	.04337

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		0.00000	.10549	.04220	.04220
		0.00000	.11929	.04772	.04772
		0.00000	.19435	.07774	.07774
6	-2.42200	0.00000	.46598	.18639	.18639
		0.00000	.22175	.08870	.08870
		0.00000	.16093	.06437	.06437
		0.00000	.13210	.05284	.05284
		0.00000	.11617	.04647	.04647
		0.00000	.11362	.04545	.04545
		0.00000	.12853	.05141	.05141
		0.00000	.20863	.08345	.08345
7	-2.19600	0.00000	.46466	.18662	.18662
		0.00000	.23887	.09555	.09555
		0.00000	.17247	.06899	.06899
		0.00000	.14076	.05631	.05631
		0.00000	.12333	.04933	.04933
		0.00000	.12082	.04833	.04833
		0.00000	.13553	.05421	.05421
		0.00000	.22082	.08833	.08833
8	-1.97000	0.00000	.52643	.21057	.21057
		0.00000	.24927	.09971	.09971
		0.00000	.18245	.07298	.07298
		0.00000	.14830	.05932	.05932
		0.00000	.12935	.05174	.05174
		0.00000	.12594	.05038	.05038
		0.00000	.14038	.05615	.05615
		0.00000	.23117	.09247	.09247
9	-1.80356	0.00000	.54907	.21963	.21963
		0.00000	.25364	.10146	.10146
		0.00000	.18860	.07544	.07544
		0.00000	.15220	.06088	.06088
		0.00000	.13260	.05304	.05304
		0.00000	.12869	.05147	.05147
		0.00000	.14331	.05733	.05733
		0.00000	.23831	.09533	.09533
10	-1.69050	0.00000	.56750	.22704	.22704
		0.00000	.25548	.10219	.10219
		0.00000	.19251	.07700	.07700
		0.00000	.15493	.06197	.06197
		0.00000	.13509	.05404	.05404
		0.00000	.13081	.05232	.05232
		0.00000	.14570	.05828	.05828
		0.00000	.24408	.09763	.09763
11	-1.57450	0.00000	.58198	.23279	.23279
		0.00000	.25609	.10244	.10244
		0.00000	.19623	.07849	.07849
		0.00000	.15822	.06329	.06329
		0.00000	.13801	.05520	.05520
		0.00000	.13316	.05327	.05327

		0.00000	.14842	.05937	.05937
		0.00000	.24996	.09998	.09998
12	-1.46150	0.00000	.58473	.23389	.23389
		0.00000	.25804	.10322	.10322
		0.00000	.20198	.08079	.08079
		0.00000	.16350	.06540	.06540
		0.00000	.14215	.05686	.05686
		0.00000	.13633	.05453	.05453
		0.00000	.15200	.06080	.06080
		0.00000	.25634	.10254	.10254
13	-1.34280	0.00000	.53940	.21576	.21576
		0.00000	.27387	.10955	.10955
		0.00000	.22019	.08808	.08808
		0.00000	.17773	.07109	.07109
		0.00000	.15139	.06056	.06056
		0.00000	.14271	.05709	.05709
		0.00000	.15847	.06339	.06339
		0.00000	.26472	.10589	.10589
14	-1.02325	0.00000	.39944	.15978	.15978
		0.00000	.30079	.12032	.12032
		0.00000	.27191	.10876	.10876
		0.00000	.21641	.08656	.08656
		0.00000	.17402	.06961	.06961
		0.00000	.15858	.06355	.06355
		0.00000	.17383	.06953	.06953
		0.00000	.27940	.11176	.11176
15	-.61245	0.00000	.35123	.14049	.14049
		0.00000	.24100	.09640	.09640
		0.00000	.26772	.10709	.10709
		0.00000	.26267	.10507	.10507
		0.00000	.21783	.08713	.08713
		0.00000	.18528	.07411	.07411
		0.00000	.19034	.07613	.07613
		0.00000	.29677	.11871	.11871
16	-.22950	0.00000	.33163	.13265	.13265
		0.00000	.21665	.08666	.08666
		0.00000	.24830	.09932	.09932
		0.00000	.29306	.11722	.11722
		0.00000	.24339	.09736	.09736
		0.00000	.19893	.07957	.07957
		0.00000	.19771	.07908	.07908
		0.00000	.30667	.12267	.12267

INPUT VALUES OF CIRCULATION FOR SECOND PLANFORM

17	-12.76912	0.00000	.96675	.38670	.38670
		0.00000	.41134	.16454	.16454
		0.00000	.21541	.08616	.08616

		0.00000	.11907	.04759	.04759
		0.00000	.06927	.02771	.02771
		0.00000	.04198	.01675	.01675
		0.00000	.02526	.01010	.01010
		0.00000	.01345	.00538	.00538
18	-11.65875	0.00000	1.18251	.47300	.47300
		0.00000	.55700	.22280	.22280
		0.00000	.36658	.14663	.14663
		0.00000	.24765	.09906	.09906
		0.00000	.16013	.06405	.06405
		0.00000	.09973	.03989	.03989
		0.00000	.05979	.02392	.02392
		0.00000	.03130	.01252	.01252
19	-10.54840	0.00000	1.32633	.53053	.53053
		0.00000	.63761	.25505	.25505
		0.00000	.44231	.17692	.17692
		0.00000	.32510	.13004	.13004
		0.00000	.23347	.09339	.09339
		0.00000	.15789	.06315	.06315
		0.00000	.09883	.03953	.03953
		0.00000	.05260	.02104	.02104
20	-9.43805	0.00000	1.43399	.57360	.57360
		0.00000	.69638	.27855	.27855
		0.00000	.49394	.19758	.19758
		0.00000	.37591	.15037	.15037
		0.00000	.28478	.11391	.11391
		0.00000	.20529	.08212	.08212
		0.00000	.13553	.05421	.05421
		0.00000	.07452	.02981	.02981
21	-8.32769	0.00000	1.51331	.60533	.60533
		0.00000	.74189	.29676	.29676
		0.00000	.53402	.21361	.21361
		0.00000	.41472	.16589	.16589
		0.00000	.32363	.12945	.12945
		0.00000	.24288	.09715	.09715
		0.00000	.16741	.06696	.06696
		0.00000	.09522	.03809	.03809
22	-7.21733	0.00000	1.56696	.62674	.62674
		0.00000	.77676	.31070	.31070
		0.00000	.56694	.22674	.22674
		0.00000	.44708	.17883	.17883
		0.00000	.35583	.14233	.14233
		0.00000	.27420	.10968	.10968
		0.00000	.19499	.07799	.07799
		0.00000	.11422	.04569	.04569
23	-6.10697	0.00000	1.59602	.63841	.63841
		0.00000	.80147	.32059	.32059
		0.00000	.59384	.23754	.23754
		0.00000	.47584	.19034	.19034
		0.00000	.38434	.15374	.15374

QUALITY

		0.00000	.30180	.12072	.12072
		0.00000	.21952	.08781	.08781
		0.00000	.13165	.05266	.05266
24	-4.99661	0.00000	1.60246	.64098	.64098
		0.00000	.81590	.32636	.32636
		0.00000	.61482	.24593	.24593
		0.00000	.50200	.20080	.20080
		0.00000	.41139	.16455	.16455
		0.00000	.32664	.13066	.13066
		0.00000	.24207	.09683	.09683
		0.00000	.14727	.05891	.05891
25	-4.01932	0.00000	1.59352	.63741	.63741
		0.00000	.80855	.32342	.32342
		0.00000	.63633	.25453	.25453
		0.00000	.52153	.20861	.20861
		0.00000	.44040	.17616	.17616
		0.00000	.34432	.13793	.13793
		0.00000	.26068	.10427	.10427
		0.00000	.15745	.06298	.06298
26	-3.49550	0.00000	1.13856	.45542	.45542
		0.00000	.74859	.29943	.29943
		0.00000	.62386	.24954	.24954
		0.00000	.51067	.20427	.20427
		0.00000	.44447	.17779	.17779
		0.00000	.34157	.13663	.13663
		0.00000	.26396	.10559	.10559
		0.00000	.15709	.06283	.06283
27	-3.28080	0.00000	.92543	.37017	.37017
		0.00000	.69578	.27831	.27831
		0.00000	.60913	.24365	.24365
		0.00000	.49764	.19906	.19906
		0.00000	.44352	.17741	.17741
		0.00000	.33555	.13422	.13422
		0.00000	.26400	.10560	.10560
		0.00000	.15505	.06202	.06202
28	-3.06610	0.00000	.81041	.32417	.32417
		0.00000	.64829	.25931	.25931
		0.00000	.55560	.23824	.23824
		0.00000	.48395	.19358	.19358
		0.00000	.44194	.17678	.17678
		0.00000	.32813	.13125	.13125
		0.00000	.26316	.10526	.10526
		0.00000	.15197	.06079	.06079
29	-2.85140	0.00000	.73644	.29457	.29457
		0.00000	.60455	.24182	.24182
		0.00000	.58394	.23358	.23358
		0.00000	.47000	.18804	.18804
		0.00000	.44079	.17631	.17631
		0.00000	.31979	.12792	.12792

		0.00000	.26206	.10482	.10482
		0.00000	.14801	.05920	.05920
30	-2.63670	0.00000	.68983	.27593	.27593
		0.00000	.56372	.22549	.22549
		0.00000	.57465	.22986	.22986
		0.00000	.45623	.18249	.18249
		0.00000	.44058	.17623	.17623
		0.00000	.31045	.12418	.12418
		0.00000	.26082	.10433	.10433
		0.00000	.14292	.05717	.05717
31	-2.42200	0.00000	.66049	.26420	.26420
		0.00000	.52442	.20977	.20977
		0.00000	.56744	.22698	.22698
		0.00000	.44258	.17703	.17703
		0.00000	.44137	.17655	.17655
		0.00000	.30009	.12003	.12003
		0.00000	.25930	.10372	.10372
		0.00000	.13653	.05461	.05461
32	-2.19600	0.00000	.64676	.25871	.25871
		0.00000	.48492	.19397	.19397
		0.00000	.56176	.22471	.22471
		0.00000	.42977	.17191	.17191
		0.00000	.44294	.17718	.17718
		0.00000	.28815	.11526	.11526
		0.00000	.25656	.10262	.10262
		0.00000	.12780	.05112	.05112
33	-1.97000	0.00000	.64967	.25987	.25987
		0.00000	.44857	.17943	.17943
		0.00000	.55407	.22105	.22105
		0.00000	.42280	.16912	.16912
		0.00000	.44282	.17713	.17713
		0.00000	.27544	.11017	.11017
		0.00000	.24932	.09973	.09973
		0.00000	.11574	.04630	.04630
34	-1.80350	0.00000	.66892	.26759	.26759
		0.00000	.44092	.17637	.17637
		0.00000	.53704	.21482	.21482
		0.00000	.44639	.17856	.17856
		0.00000	.42731	.17092	.17092
		0.00000	.26572	.10629	.10629
		0.00000	.22362	.08945	.08945
		0.00000	.09835	.03934	.03934
35	-1.69050	0.00000	.69816	.27927	.27927
		0.00000	.50623	.20249	.20249
		0.00000	.52993	.21197	.21197
		0.00000	.61331	.24532	.24532
		0.00000	.35292	.14117	.14117
		0.00000	.24830	.09932	.09932
		0.00000	.10933	.04373	.04373

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		0.00000	.03715	.01486	.01486
36	-1.57450	0.00000	.73979	.29592	.29592
	1	0.00000	.76503	.30601	.30601
		0.00000	.55840	.22336	.22336
		0.00000	.55190	.22076	.22076
		0.00000	.33037	.13215	.13215
		0.00000	.13051	.05220	.05220
		0.00000	.02681	.01072	.01072
		0.00000	.00870	.00352	.00352
37	-1.46150	0.00000	.78869	.31547	.31547
		0.00000	.84028	.33971	.33971
		0.00000	.72782	.29113	.29113
		0.00000	.50066	.20026	.20026
		0.00000	.19790	.07916	.07916
		0.00000	.03964	.01586	.01586
		0.00000	.00806	.00322	.00322
		0.00000	.00506	.00202	.00202
38	-1.34280	0.00000	.80866	.32346	.32346
		0.00000	.88409	.35363	.35363
		0.00000	.74236	.29694	.29694
		0.00000	.46856	.18742	.18742
		0.00000	.16488	.06595	.06595
		0.00000	.03497	.01399	.01399
		0.00000	.01053	.00421	.00421
		0.00000	.00462	.00185	.00185
39	-1.02325	0.00000	.80773	.32309	.32309
		0.00000	.88406	.35363	.35363
		0.00000	.73458	.29383	.29383
		0.00000	.46101	.18441	.18441
		0.00000	.16620	.06648	.06648
		0.00000	.03980	.01595	.01595
		0.00000	.01379	.00551	.00551
		0.00000	.00619	.00247	.00247
40	-.61245	0.00000	.79819	.31927	.31927
		0.00000	.87560	.35024	.35024
		0.00000	.72862	.29145	.29145
		0.00000	.46145	.18458	.18458
		0.00000	.17252	.06901	.06901
		0.00000	.04440	.01776	.01776
		0.00000	.01589	.00636	.00636
		0.00000	.00722	.00289	.00289
41	-.22950	0.00000	.79301	.31720	.31720
		0.00000	.87041	.34816	.34816
		0.00000	.72524	.29010	.29010
		0.00000	.46173	.18469	.18469
		0.00000	.17615	.07046	.07046
		0.00000	.04693	.01877	.01877
		0.00000	.01703	.00681	.00681
		0.00000	.00778	.00311	.00311

ORIGINAL PAGE IS
OF POOR QUALITY

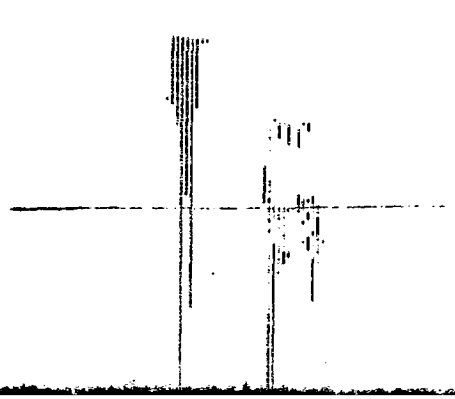
FIELD LINE DATA

FIELD LINE	X	SWEEP,DEGREES	Z	DIHEDRAL,DEGREES	ALPHA,DEGREES	WING CL
1.	-2.90000	68.00000	.20000	0.00000	5.36381	.40000

FIELD POINT	X	Y	Z	W/U	V/U	U/U	DOWNWASH ANGLE, DEGREES	EPSILON, DEGREES	D(EPSILON) D(ALPHA)	Q(LOCAL) Q(INF)	SIGMA DEGREES
1.	-3.36803	-.22950	.20000	*****							
2.	-4.31587	-.61245	.20000	*****							
3.	-5.33263	-1.02325	.20000	*****							
4.	-6.12755	-1.34280	.20000	-.07488	-.10575	.00943	-4.28251	-4.32430	-.80175	1.00715	-6.03681
5.	-6.41734	-1.44150	.20000	-.05307	-.07881	.00763	-4.74842	-4.76750	-.87751	1.00797	-4.50597
6.	-6.65782	-1.52450	.20000	-.04279	-.06158	.00665	-4.73262	-4.74211	-.87114	1.00763	-3.52401
7.	-6.86413	-1.59550	.20000	-.03111	-.04845	.00618	-4.63734	-4.64335	-.85269	1.00699	-2.77381
8.	-7.03302	-1.65350	.20000	-.02296	-.04670	.01173	-4.73861	-4.79915	-.89099	1.00879	-2.67381
9.	-7.67562	-1.87600	.20000	-.00056	-.06400	.01409	-5.17435	-5.25577	-.97698	1.00881	-3.66161
10.	-8.23520	-2.10400	.20000	-.00479	-.06920	.01169	-5.41461	-5.46817	-1.06978	1.00495	-3.95821
11.	-8.79466	-2.42200	.20000	-.00438	-.06039	.00871	-5.39182	-5.41381	-.99413	1.00763	-3.45581
12.	-9.32466	-2.63470	.20000	-.00101	-.04858	.00647	-5.20027	-5.20129	-.95213	1.00874	-2.78101
13.	-9.85746	-2.85140	.20000	-.00454	-.03642	.00449	-4.83217	-4.81856	-.88061	1.00905	-2.08591
14.	-10.33806	-3.06610	.20000	-.00774	-.02765	.00311	-4.42226	-4.40145	-.80402	1.00885	-1.58391
15.	-10.82026	-3.29680	.20000	-.00703	-.02101	.00229	-4.01132	-3.99906	-.72908	1.00820	-1.20341
16.	-11.45167	-3.49550	.20000	-.00347	-.01618	.00162	-3.63171	-3.60898	-.65993	1.00763	-.92691
17.	-12.74516	-4.01932	.20000	-.00095	-.00931	.00089	-2.91683	-2.89764	-.53081	1.00617	-.53351
18.	-15.18755	-4.99681	.20000	-.00032	-.00426	.00049	-2.19458	-2.18085	-.40041	1.00455	-.24401
19.	-17.91529	-6.10007	.20000	-.00007	-.00275	.00093	-2.23176	-2.22094	-.40832	1.00413	-.15731
20.	-20.64362	-7.21733	.20000	-.00247	-.00913	.00441	-4.71433	-4.70172	-.85975	1.00799	-.52331
21.	-23.41175	-8.32760	.20000	*****							
22.	-26.15006	-9.43105	.20000	*****							
23.	-28.90122	-10.54240	.20000	*****							
24.	-31.65645	-11.65574	.20000	.00329	-.06280	.00020	4.76142	4.77758	.89266	.99696	-3.59337
25.	-34.40448	-12.76812	.20000	.07416	-.10261	.00005	4.24148	4.25230	.79303	1.00123	-5.85857
26.	-37.06725	-13.85727	.20000	-.24457	-.07866	.00002	-13.74295	-13.39068	-2.27806	1.06208	-4.49787
27.	-38.41710	-14.39024	.20000	-.14600	-.02357	.00002	-8.30630	-8.16080	-1.44745	1.02838	-1.34997
28.	-39.73624	-14.92272	.20000	-.10433	-.01148	.00001	-5.95610	-5.87347	-1.05686	1.01782	-.65748
29.	-41.05541	-15.45519	.20000	-.08130	-.00689	.00001	-4.64808	-4.59315	-.83234	1.01282	-.39487
30.	-42.37456	-15.98814	.20000	-.06655	-.00464	.00001	-3.80755	-3.76762	-.68560	1.00994	-.26586
31.	-43.69371	-16.52213	.20000	-.05623	-.00334	.00001	-3.21829	-3.18756	-.58165	1.00807	-.19224
32.	-45.01284	-17.05710	.20000	-.04857	-.00255	.00001	-2.78061	-2.75600	-.50389	1.00676	-.14596
33.	-46.33200	-17.59208	.20000	-.04265	-.00200	.00000	-2.44191	-2.42163	-.44340	1.00579	-.11491
34.	-47.65117	-18.12705	.20000	-.03792	-.00162	.00000	-2.17168	-2.15457	-.39406	1.00505	-.09277
35.	-48.97033	-18.66202	.20000	-.03404	-.00134	.00000	-1.95069	-1.93622	-.35525	1.00446	-.07655
36.	-50.28947	-19.19699	.20000	-.03085	-.00112	.00000	-1.76708	-1.75431	-.32211	1.00398	-.06426

37.	-51.60862	-19.71906	.20000	-.02814	-.00095	.00000	-1.61166	-1.60041	-.29404	1.00359	-.05476
38.	-52.92778	-20.25704	.20000	-.02581	-.00082	.00000	-1.47856	-1.46856	-.26995	1.00325	-.04711
39.	-54.24863	-20.78591	.20000	-.02380	-.00072	.00000	-1.36332	-1.35436	-.24907	1.00297	-.04098
40.	-55.56885	-21.31488	.20000	-.02204	-.00063	.00000	-1.26263	-1.25453	-.23080	1.00273	-.03596
41.	-56.88523	-21.85195	.20000	-.02049	-.00055	.00000	-1.17393	-1.16656	-.21469	1.00252	-.03175
42.	-58.20433	-22.38482	.20000	-.01912	-.00049	.00000	-1.09523	-1.08850	-.20038	1.00234	-.02825
43.	-59.52256	-22.91788	.20000	-.01789	-.00044	.00000	-1.02499	-1.01880	-.18760	1.00217	-.02533
44.	-60.84245	-23.45077	.20000	-.01679	-.00040	.00000	-.96193	-.95622	-.17612	1.00203	-.02275
45.	-62.16184	-23.98374	.20000	-.01580	-.00036	.00000	-.90503	-.89975	-.16575	1.00190	-.02061
46.	-63.48000	-24.51671	.20000	-.01490	-.00033	.00000	-.85348	-.84857	-.15635	1.00179	-.01871
47.	-64.80014	-25.04968	.20000	-.01408	-.00030	.00000	-.80657	-.80198	-.14779	1.00168	-.01706
48.	-66.11930	-25.58264	.20000	-.01333	-.00027	.00000	-.76372	-.75944	-.13997	1.00159	-.01561
49.	-67.43845	-26.11563	.20000	-.01264	-.00025	.00000	-.72446	-.72044	-.13280	1.00150	-.01432
50.	-68.75760	-26.64860	.20000	-.01201	-.00023	.00000	-.68836	-.68458	-.12621	1.00142	-.01319
51.	-70.07675	-27.18157	.20000	-.01143	-.00021	.00000	-.65508	-.65152	-.12013	1.00135	-.01217
52.	-71.39590	-27.71454	.20000	-.01090	-.00020	.00000	-.62432	-.62095	-.11451	1.00129	-.01126
53.	-72.71506	-28.24752	.20000	-.01040	-.00018	.00000	-.59581	-.59262	-.10929	1.00122	-.01045
54.	-74.03421	-28.78049	.20000	-.00994	-.00017	.00000	-.56932	-.56631	-.10445	1.00116	-.00972
55.	-75.35336	-29.31346	.20000	-.00951	-.00016	.00000	-.54467	-.54181	-.09994	1.00111	-.00905
56.	-76.67251	-29.84643	.20000	-.00911	-.00015	.00000	-.52167	-.51895	-.09573	1.00106	-.00845
57.	-77.99166	-30.37940	.20000	-.00873	-.00014	.00000	-.50018	-.49759	-.09180	1.00102	-.00791
58.	-79.31082	-30.91238	.20000	-.00838	-.00013	.00000	-.48006	-.47759	-.08811	1.00097	-.00741
59.	-80.62997	-31.44535	.20000	-.00805	-.00012	.00000	-.46119	-.45883	-.08466	1.00093	-.00696
60.	-81.94912	-31.97832	.20000	-.00774	-.00011	.00000	-.44347	-.44121	-.08141	1.00090	-.00655
61.	-83.26827	-32.51129	.20000	-.00745	-.00011	.00000	-.42679	-.42463	-.07836	1.00086	-.00617
62.	-84.58742	-33.04426	.20000	-.00717	-.00010	.00000	-.41108	-.40901	-.07548	1.00083	-.00582
63.	-85.90658	-33.57724	.20000	-.00692	-.00010	.00000	-.39626	-.39427	-.07276	1.00080	-.00549
64.	-87.22573	-34.11021	.20000	-.00667	-.00009	.00000	-.38226	-.38035	-.07020	1.00077	-.00519
65.	-88.54488	-34.64318	.20000	-.00644	-.00009	.00000	-.36902	-.36719	-.06777	1.00074	-.00490
66.	-89.86403	-35.17615	.20000	-.00622	-.00008	.00000	-.35648	-.35472	-.06547	1.00071	-.00464
67.	-91.18319	-35.70912	.20000	-.00601	-.00008	.00000	-.34460	-.34290	-.06329	1.00069	-.00440
68.	-92.50234	-36.24210	.20000	-.00582	-.00007	.00000	-.33332	-.33168	-.06123	1.00067	-.00418
69.	-93.82149	-36.77507	.20000	-.00563	-.00007	.00000	-.32261	-.32103	-.05926	1.00064	-.00397
70.	-95.14064	-37.30804	.20000	-.00545	-.00007	.00000	-.31242	-.31090	-.05739	1.00062	-.00378
71.	-96.45979	-37.84101	.20000	-.00528	-.00006	.00000	-.30273	-.30125	-.05561	1.00060	-.00359
72.	-97.77894	-38.37398	.20000	-.00512	-.00006	.00000	-.29349	-.29207	-.05392	1.00058	-.00343
73.	-99.09810	-38.90696	.20000	-.00497	-.00006	.00000	-.28468	-.28331	-.05230	1.00057	-.00327
74.	-100.41725	-39.43993	.20000	-.00482	-.00005	.00000	-.27628	-.27495	-.05076	1.00055	-.00312
75.	-101.73640	-39.97290	.20000	-.00468	-.00005	.00000	-.26826	-.26696	-.04929	1.00053	-.00298

***** = COMPUTATION OMITTED DUE TO THE POINT PROJECTION LYING WITHIN THE CONFIGURATION BOUNDARY



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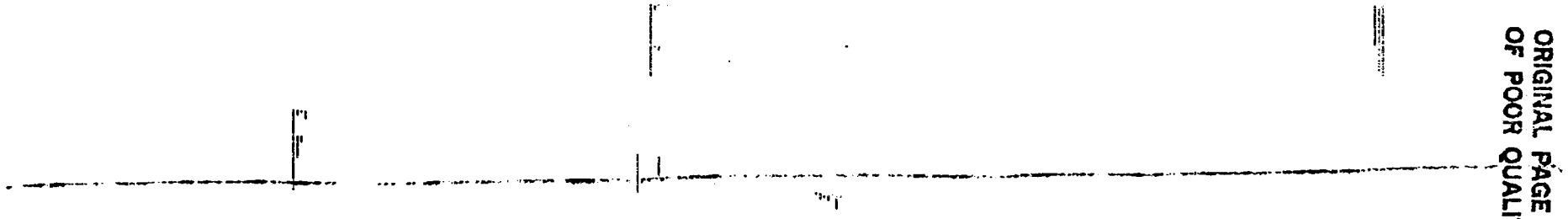

FIELD LINE DATA

FIELD LINE	X	SWEEP,DEGREES	Z	DIHEDRAL,DEGREES	ALPHA,DEGREES	WING CL
2.	-5.10000	48.00000	0.00000	0.00000	5.36381	.40000

FIELD POINT	X	Y	Z	W/U	V/U	U/U	DOWNWASH ANGLE, DEGREES	EPSILON, DEGREES	D(EPSILON) D(ALPHA)	Q(LOCAL) Q(INF)	SIGMA, DEGREES
1.	-5.35489	-.22950	0.00000	*****							
2.	-5.78019	-.61245	0.00000	*****							
3.	-6.22643	-1.02335	0.00000	*****							
4.	-6.50133	-1.34200	0.00000	*****							
5.	-6.72316	-1.66150	0.00000	-.23428	0.00000	0.00000	-13.18538	-12.85772	-2.19790	1.05530	0.00000
6.	-6.84866	-1.87450	0.00000	-.14771	0.00000	0.00000	-8.40221	-8.25358	-1.46294	1.02855	0.00000
7.	-6.97749	-1.99850	0.00000	-.10959	0.00000	0.00000	-6.25411	-6.16429	-1.10727	1.01896	0.00000
8.	-7.10299	-1.90350	0.00000	-.09035	0.00000	0.00000	-5.16242	-5.09712	-.92116	1.01468	0.00000
9.	-7.23791	-1.97000	0.00000	-.07665	0.00000	0.00000	-4.40021	-4.34985	-.78923	1.01194	0.00000
10.	-7.53961	-2.19600	0.00000	-.06574	0.00000	0.00000	-3.76114	-3.72191	-.67742	1.00979	0.00000
11.	-7.75900	-2.42200	0.00000	-.05620	0.00000	0.00000	-3.21664	-3.18589	-.58134	1.00806	0.00000
12.	-8.02235	-2.63870	0.00000	-.04873	0.00000	0.00000	-2.78969	-2.76492	-.50549	1.00679	0.00000
13.	-8.26690	-2.85140	0.00000	-.04268	0.00000	0.00000	-2.44400	-2.42365	-.44377	1.00580	0.00000
14.	-8.50525	-3.06510	0.00000	-.03788	0.00000	0.00000	-2.16958	-2.15247	-.39457	1.00504	0.00000
15.	-8.74370	-3.28050	0.00000	-.03402	0.00000	0.00000	-1.94854	-1.93387	-.35482	1.00445	0.00000
16.	-8.98215	-3.49550	0.00000	-.03087	0.00000	0.00000	-1.76813	-1.75533	-.32230	1.00398	0.00000
17.	-9.54390	-4.01932	0.00000	-.02517	0.00000	0.00000	-1.44197	-1.43229	-.26332	1.00317	0.00000
18.	-10.64930	-4.95661	0.00000	-.01885	0.00000	0.00000	-1.07988	-1.07326	-.19759	1.00230	0.00000
19.	-11.88249	-6.10497	0.00000	-.01495	0.00000	0.00000	-.85665	-.85171	-.15693	1.00179	0.00000
20.	-13.11564	-7.21733	0.00000	-.01262	0.00000	0.00000	-.73438	-.73029	-.13461	1.00152	0.00000
21.	-14.34883	-8.32769	0.00000	-.01175	0.00000	0.00000	-.67316	-.66948	-.12343	1.00139	0.00000
22.	-15.58201	-9.43605	0.00000	-.01146	0.00000	0.00000	-.65662	-.65304	-.12041	1.00135	0.00000
23.	-16.81519	-10.54240	0.00000	-.01152	0.00000	0.00000	-.67698	-.67327	-.12413	1.00140	0.00000
24.	-18.04837	-11.65275	0.00000	-.01269	0.00000	0.00000	-.72677	-.72273	-.13322	1.00150	0.00000
25.	-19.28155	-12.76912	0.00000	-.01387	0.00000	0.00000	-.79458	-.79008	-.14560	1.00165	0.00000
26.	-20.49006	-13.85727	0.00000	-.01513	0.00000	0.00000	-.86670	-.86168	-.15876	1.00182	0.00000
27.	-21.69190	-14.95024	0.00000	-.01573	0.00000	0.00000	-.90119	-.89592	-.16505	1.00189	0.00000
28.	-21.67391	-14.93222	0.00000	-.01630	0.00000	0.00000	-.93396	-.92845	-.17102	1.00197	0.00000
29.	-22.36584	-15.45619	0.00000	-.01683	0.00000	0.00000	-.96426	-.95854	-.17654	1.00204	0.00000
30.	-22.85776	-15.89014	0.00000	-.01731	0.00000	0.00000	-.99141	-.98548	-.18148	1.00210	0.00000
31.	-23.44969	-16.52213	0.00000	-.01771	0.00000	0.00000	-1.01471	-1.00860	-.18573	1.00215	0.00000
32.	-24.04161	-17.05510	0.00000	-.01804	0.00000	0.00000	-1.03344	-1.02718	-.18913	1.00220	0.00000
33.	-24.63354	-17.58806	0.00000	-.01827	0.00000	0.00000	-1.04683	-1.04047	-.19157	1.00223	0.00000
34.	-25.22546	-18.12105	0.00000	-.01840	0.00000	0.00000	-1.05407	-1.04765	-.19289	1.00224	0.00000
35.	-25.81738	-18.65402	0.00000	-.01840	0.00000	0.00000	-1.05433	-1.04791	-.19294	1.00224	0.00000
36.	-26.40931	-19.18699	0.00000	-.01827	0.00000	0.00000	-1.04694	-1.04058	-.19159	1.00223	0.00000

37.	-27.00124	-19.71996	0.00000	-.01801	0.00000	0.00000	-1.03159	-1.02535	-.18880	1.00219	0.00001
38.	-27.59316	-20.25364	0.00000	-.01761	0.00000	0.00000	-1.00865	-1.00259	-.18462	1.00214	0.00001
39.	-28.18508	-20.78691	0.00000	-.01709	0.00000	0.00000	-.97927	-.97343	-.17927	1.00207	0.00001
40.	-28.77701	-21.31861	0.00000	-.01650	0.00000	0.00000	-.94515	-.93956	-.17306	1.00199	0.00001
41.	-29.36894	-21.85185	0.00000	-.01595	0.00000	0.00000	-.90814	-.90283	-.16631	1.00191	0.00001
42.	-29.96087	-22.38482	0.00000	-.01518	0.00000	0.00000	-.86986	-.86483	-.15934	1.00182	0.00001
43.	-30.55278	-22.91750	0.00000	-.01451	0.00000	0.00000	-.83155	-.82679	-.15235	1.00174	0.00001
44.	-31.14472	-23.45077	0.00000	-.01386	0.00000	0.00000	-.79405	-.78955	-.14551	1.00165	0.00001
45.	-31.73664	-23.98374	0.00000	-.01323	0.00000	0.00000	-.75790	-.75365	-.13891	1.00157	0.00001
46.	-32.32857	-24.51671	0.00000	-.01263	0.00000	0.00000	-.72339	-.71937	-.13261	1.00150	0.00001
47.	-32.92049	-25.04968	0.00000	-.01205	0.00000	0.00000	-.69065	-.68686	-.12663	1.00143	0.00001
48.	-33.51242	-25.58265	0.00000	-.01152	0.00000	0.00000	-.65974	-.65615	-.12098	1.00136	0.00001
49.	-34.10434	-26.11563	0.00000	-.01101	0.00000	0.00000	-.63062	-.62721	-.11566	1.00129	0.00001
50.	-34.69627	-26.64860	0.00000	-.01053	0.00000	0.00000	-.60322	-.59999	-.11065	1.00124	0.00001
51.	-35.28819	-27.18157	0.00000	-.01008	0.00000	0.00000	-.57747	-.57440	-.10594	1.00118	0.00001
52.	-35.88012	-27.71454	0.00000	-.00966	0.00000	0.00000	-.55326	-.55034	-.10151	1.00113	0.00001
53.	-36.47204	-28.24752	0.00000	-.00926	0.00000	0.00000	-.53049	-.52771	-.09734	1.00108	0.00001
54.	-37.06397	-28.78049	0.00000	-.00889	0.00000	0.00000	-.50908	-.50643	-.09343	1.00103	0.00001
55.	-37.65589	-29.31346	0.00000	-.00853	0.00000	0.00000	-.48893	-.48640	-.08974	1.00099	0.00001
56.	-38.24782	-29.84643	0.00000	-.00820	0.00000	0.00000	-.46994	-.46752	-.08626	1.00095	0.00001
57.	-38.83975	-30.37940	0.00000	-.00789	0.00000	0.00000	-.45204	-.44973	-.08298	1.00091	0.00001
58.	-39.43167	-30.91238	0.00000	-.00759	0.00000	0.00000	-.43514	-.43293	-.07989	1.00088	0.00001
59.	-40.02360	-31.44535	0.00000	-.00732	0.00000	0.00000	-.41919	-.41707	-.07696	1.00085	0.00001
60.	-40.61552	-31.97832	0.00000	-.00705	0.00000	0.00000	-.40410	-.40206	-.07420	1.00081	0.00001
61.	-41.20745	-32.51129	0.00000	-.00680	0.00000	0.00000	-.38982	-.38787	-.07158	1.00078	0.0000
62.	-41.79937	-33.04426	0.00000	-.00657	0.00000	0.00000	-.37630	-.37442	-.06910	1.00076	0.0000
63.	-42.39130	-33.57724	0.00000	-.00634	0.00000	0.00000	-.36347	-.36167	-.06675	1.00073	0.0000
64.	-42.98322	-34.11021	0.00000	-.00613	0.00000	0.00000	-.35130	-.34957	-.06452	1.00070	0.00001
65.	-43.57515	-34.64318	0.00000	-.00593	0.00000	0.00000	-.33975	-.33807	-.06240	1.00068	0.00001
66.	-44.16707	-35.17615	0.00000	-.00574	0.00000	0.00000	-.32876	-.32714	-.06039	1.00066	0.00001
67.	-44.75900	-35.70912	0.00000	-.00556	0.00000	0.00000	-.31830	-.31674	-.05847	1.00064	0.00001
68.	-45.35093	-36.24210	0.00000	-.00539	0.00000	0.00000	-.30835	-.30684	-.05664	1.00062	0.00001
69.	-45.94285	-36.77507	0.00000	-.00522	0.00000	0.00000	-.29886	-.29740	-.05490	1.00060	0.00001
70.	-46.53478	-37.30804	0.00000	-.00506	0.00000	0.00000	-.28981	-.28840	-.05324	1.00058	0.00001
71.	-47.12670	-37.84101	0.00000	-.00491	0.00000	0.00000	-.28117	-.27981	-.05166	1.00056	0.00001
72.	-47.71863	-38.37398	0.00000	-.00476	0.00000	0.00000	-.27292	-.27160	-.05015	1.00054	0.00001
73.	-48.31055	-38.90696	0.00000	-.00463	0.00000	0.00000	-.26503	-.26376	-.04870	1.00053	0.00001
74.	-48.90248	-39.43993	0.00000	-.00449	0.00000	0.00000	-.25749	-.25625	-.04731	1.00051	0.00001
75.	-49.49440	-39.97290	0.00000	-.00437	0.00000	0.00000	-.25027	-.24907	-.04599	1.00050	0.00001

***** - COMPUTATION OMITTED DUE TO THE POINT PROJECTION LYING WITHIN THE CONFIGURATION BOUNDARY

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APPENDIX B - PROCEDURE FILE RUNVLMF

The RUNVLMF procedure file contains the following cards:

```
.PROC,RUNVLMF,INPUT,OUTPUT.
*
* THIS PROCEDURE RETREIVES
* AND EXECUTES THE  - VLM -
* PROGRAM
*
GET,LGO=VLMLGO/UN=503400N.
MAP,OFF.
GET,SEGDIR/UN=503400N.
ATTACH,LRCGOSF/UN=LIBRARY.
SEGLOAD,I=SEGDIR,B=VLMABS.
LDSET,LIB=LRCGOSF.
LOAD,LGO.
NOGO.
RETURN,LGO,LRCGOSF,SEGDIR.
VLMABS,INPUT,OUTPUT,PL=50000.
RETURN,VLMABS.
REVERT. *** END RUNVLMF ***
```

REFERENCES

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1. Margason, R. J. and Lamar, J. E.: Vortex-Lattice FORTRAN Program for Estimating Subsonic Aerodynamic Characteristics of Complex Planforms. NASA TN D-6142, Feb. 1971.

2. Lamar, J. E., and Gloss, B. B. : Subsonic Aerodynamic Characteristics of Interacting Lifting Surfaces with Separated Flow around Sharp Edges Predicted by a Vortex-Lattice Method. NASA TN D-7921, Sept. 1975.

3. Lamar, J. E. and Frink, N. T. : Experimental and Analytic Study of the Longitudinal Aerodynamic Characteristics of Analytically and Empirically Designed Strake-Wing Configurations at Subcritical Speeds. NASA TP-1803, June 1981.

4. Herbert, H.E. and Lamar, J.E. : Production Version of the Extended NASA - Langley Vortex Lattice FORTRAN Computer Program, Vol. II Source Code. NASA TM - 83304, April 1982.

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PROGRAM NO. _____
CODED BY _____
DIVISION _____ SECTION _____

LANGLEY RESEARCH CENTER
FORTRAN - DATA CODING FORM

DATE _____
PAGE 1 OF 2
JOB ORDER _____ TASK NO. _____

STATEMENT NUMBER | CONTINUATION | FORTRAN STATEMENT | IDENTIFICATION AND SEQUENCING

TITLE CARD

GROUP ONE DATA

PLAN	TOTAL	CREF	SREF	XLOCTN	CTILDA	XTILDA	DISTALE
AAN	XS	YS	RTCDHT	STLOIND	REPEAT		
XREG(I)	YREG(I)	DIH(I)	AMCD	FOR EACH	FOR EACH PLANFORM		
XREG(N)	YREG(N)			BREAKPOINT			

WHERE N = AAN + 1

GROUP TWO DATA

SECTION ONE (REQUIRED)

CONFIG	SCW	VIC	MACH	CLDES	SA(1)	SA(2)	SA(3)	SA(4)	ISTA(1)	ISTA(2)	ISTA(3)	ISTA(4)	ISTA5	ISTA6	ICOMP

SECTION TWO (IF ATPCOID = 1.)

YINNER(1)	YOUTER(1)	YINNER(2)	YOUTER(2)	YINNER(3)	YOUTER(3)	YINNER(4)	YOUTER(4)
XL(1)	XT(1)	XL(2)	XT(2)	XL(3)	XT(3)	XL(4)	XT(4)

NASA-Langley Form 67 (MAR 69)

NOTE: WRITE NUMBERS 10, LETTERS I Ø U G = C, SYMBOLS / . , *

a) Title Card, Groups One and Two

Figure 1 Input Data Layout

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PROGRAM NO.
CODED BY
DIVISION SECTION

LANGLEY RESEARCH CENTER
FORTRAN - DATA CODING FORM

DATE
PAGE 2 OF 2
JOB ORDER TASK NO.

STATEMENT NUMBER | CONTINUATION | FORTRAN STATEMENT | IDENTIFICATION AND SEQUENCING

```
GROUP TWO DATA (CONT'D)
SECTION THREE (IF SCW = 0.)
STA
TBLSCW(I) TBLSCW(I+1) ---> AS REQUIRED
THE ABOVE IS REPEATED FOR EACH PLANFORM
SECTION FOUR (IF TWIST (I) ≠ 0.)
ALP ---> AS REQUIRED                    ALP
LEADING EDGE VALUE                      TRAILING EDGE VALUE
REPEAT ABOVE FOR EACH SPANWISE STATION AND FOR EACH PLANFORM HAVING TWIST(I)≠0.
SECTION FIVE (IF ATPCOD = 2. AND CLDES ≠ 11. OR 100.)
TOTFL
XDOWN   SWEP   ZREF   DIHED   } REPEAT TOTFL TIMES
```

NASA-Langley Form 67 (MAR 69)

NOTE: WRITE NUMBERS 10, LETTERS I Ø U G Z C, SYMBOLS / . , *

b) Group Two Concluded

Figure 1 Concluded

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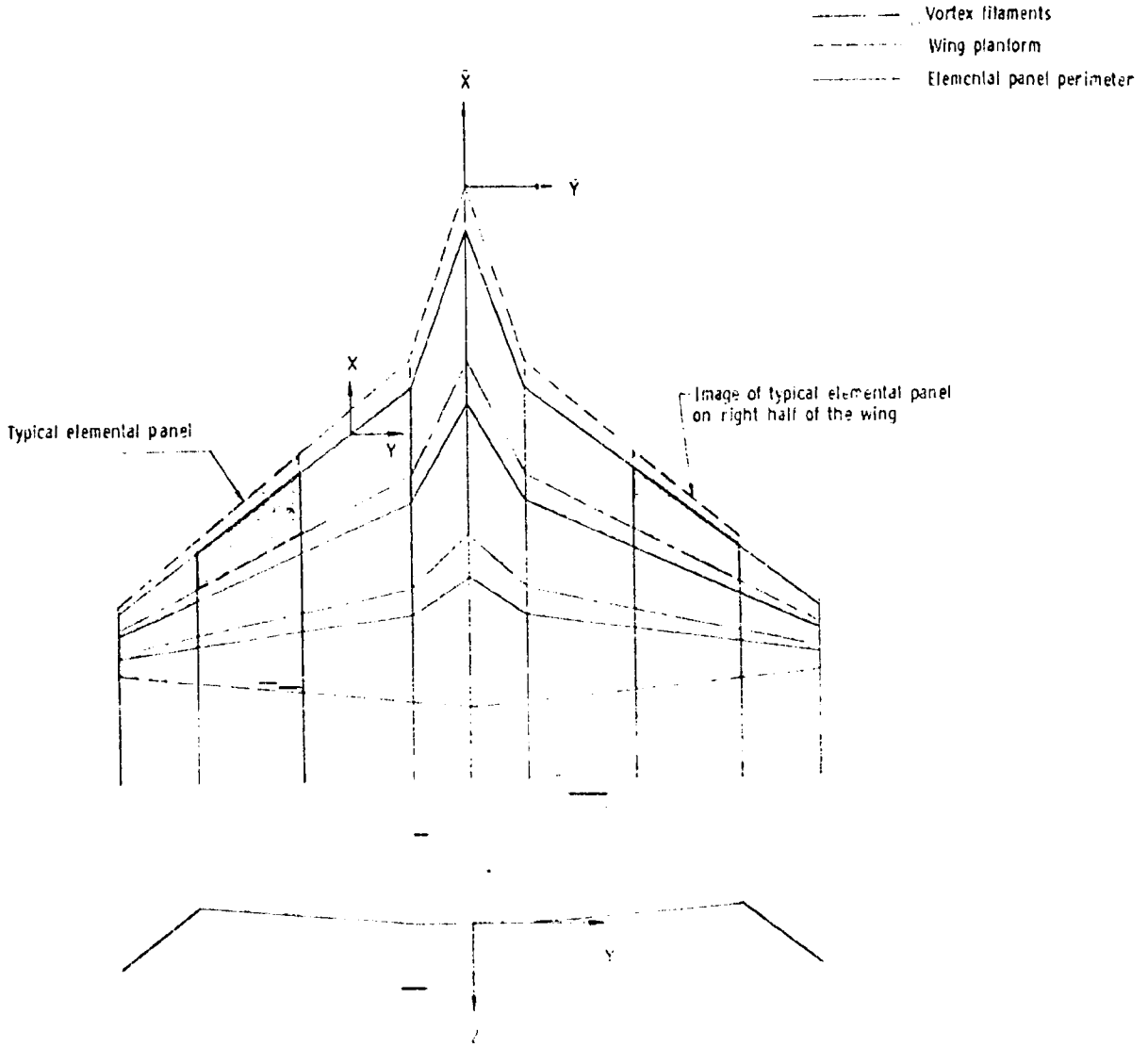

Figure 2- General layout of axis systems, elemental panels, and horseshoe vortices for a typical wing planform.

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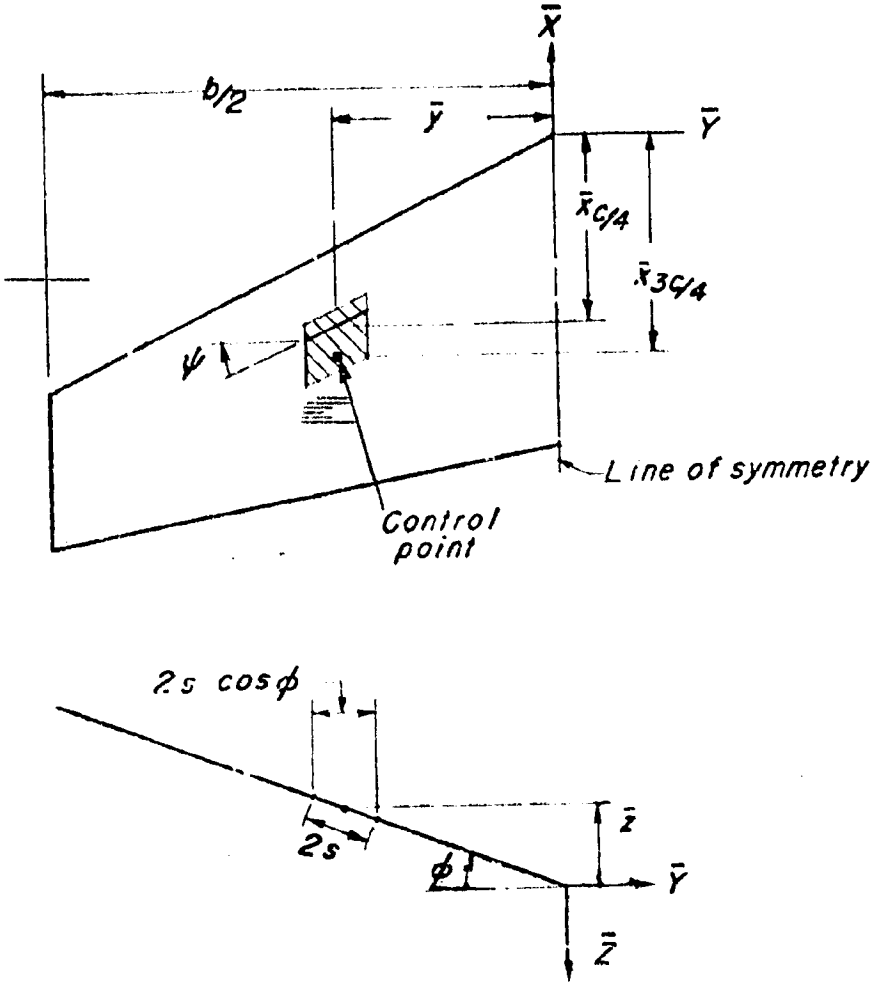

Figure 3- Variables used to describe the geometry of an elemental panel.