FAA TECHNICAL CENTER LETTER REPORT

[redacted]

DATA ENTRY SOFTWARE FOR

MICROWAVE LANDING SYSTEM MATH MODELING PROJECT

by

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ACT-100B.4

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ABSTRACT

This letter report describes a data entry software program written for the Microwave Landing System (MLS) project. It contains a brief background and the purpose for this program. In addition, the report includes a flowchart, listing of the program, and output. The software is designed to be run on the Honeywell 66/60 computer. The author of this report is Melvin Buster, Jr., ACT-100B.4 and can be contacted at extension 3892 until August 6, 1982.

Project Number 076-320-430

Key Words

MLS

Honeywell 66/60

TABLE OF CONTENTS

PURPOSE

The purpose for the data entry software is to create a block data file, allowing the user to input data and write the data on a new file in the Technical Center's Honeywell 66/60 computer. This procedure speeds up file editing and reduces the amount of time normally consumed in the data entry process.

BACKGROUND

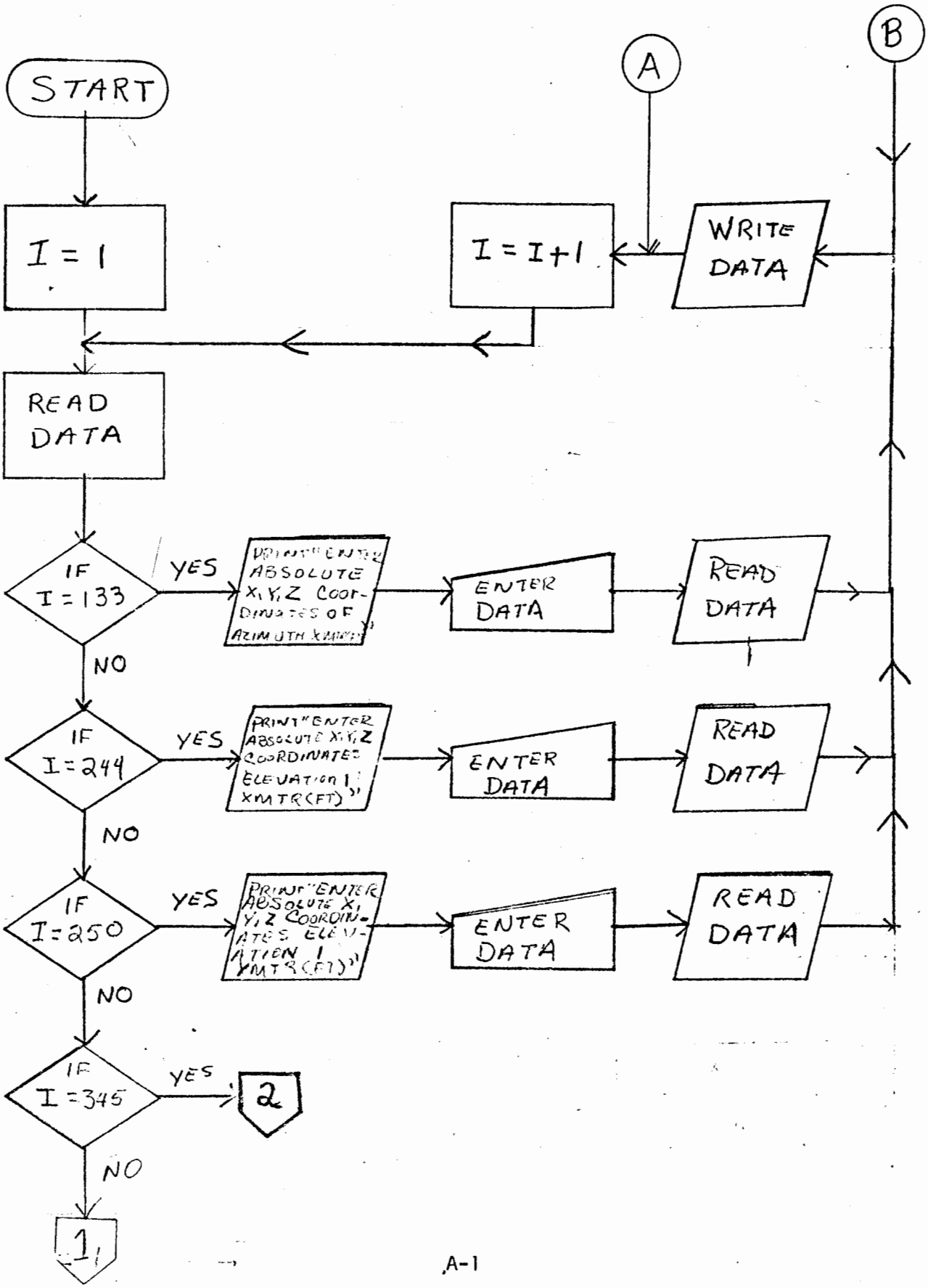
Data entry into the MLS multipath and receiver mathematical models is accomplished by the use of a block data subprogram. The block data is different for each modeling situation since it contains transmitter and building coordinates and other data inputs describing that particular modeling situation. Since a majority of the data remains constant, a considerable amount of time is saved by taking the previous block data and revising the appropriate data to apply to the current situation. To avoid human errors in entering the data in the proper columns, etc., it is desirable to have a program to allow the user to input the appropriate data and create a block data file accordingly.

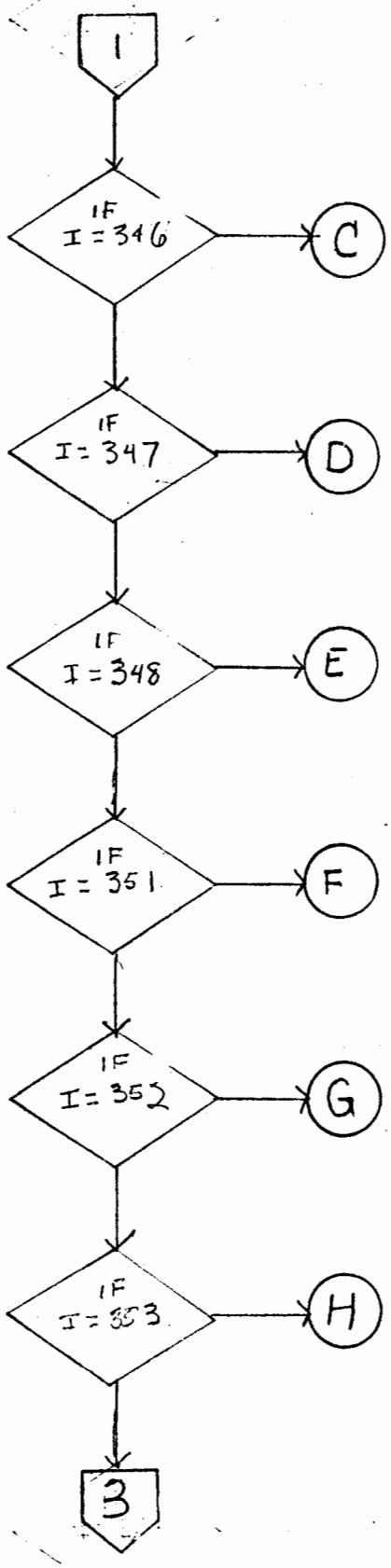
DISCUSSION

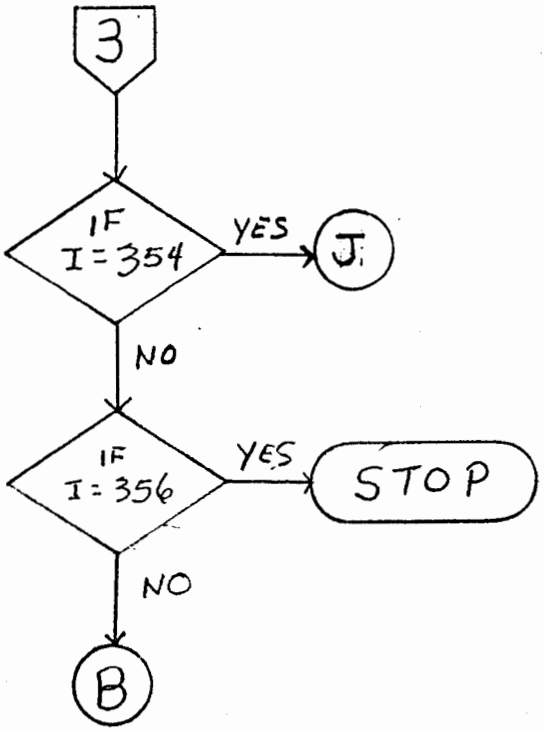
This particular program benefits the MLS math modeling project in that it reads from existing block data files and writes constant or standard data into a new block data file. When the program comes to data that is variable (or site dependent), the program asks the user to enter the characteristic data, such as surface elements or buildings. The site dependent data is then written into the new block data file by the program. This method is more efficient than the former one because it requires much less time to enter the data. Also, this method prevents the user from editing the block data file each time new data is entered. A flow chart of the program, program listing, and sample output are provided in appendices A, B, and C, respectively.

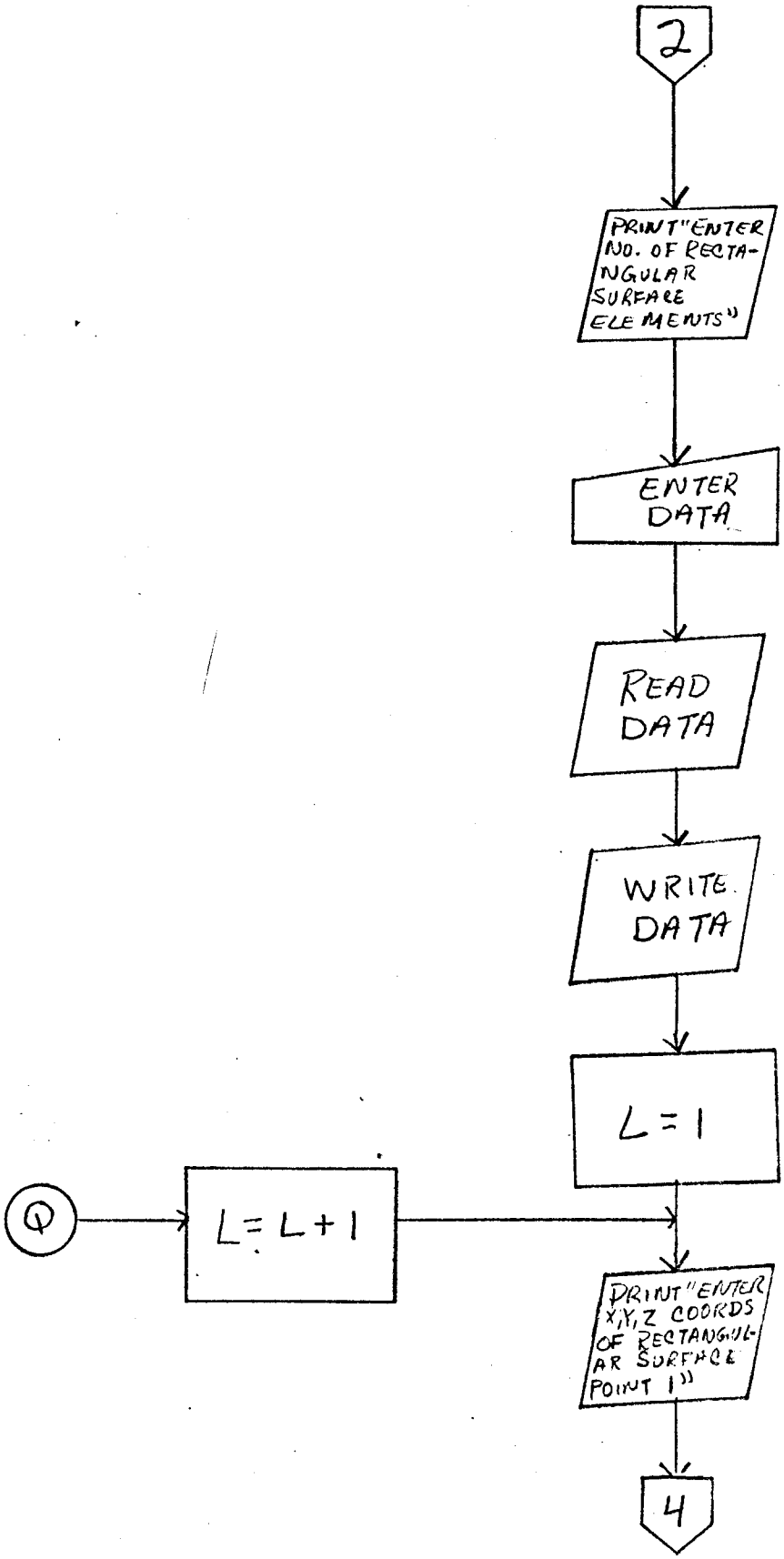
APPENDIX A

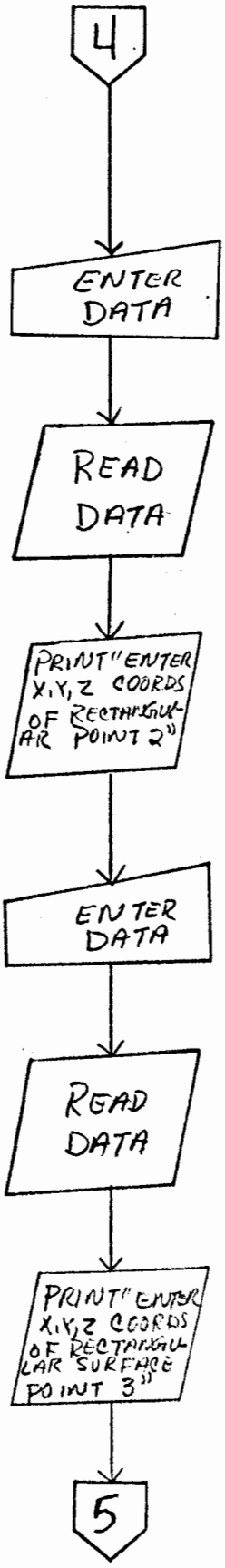
FLOW CHART OF PROGRAM

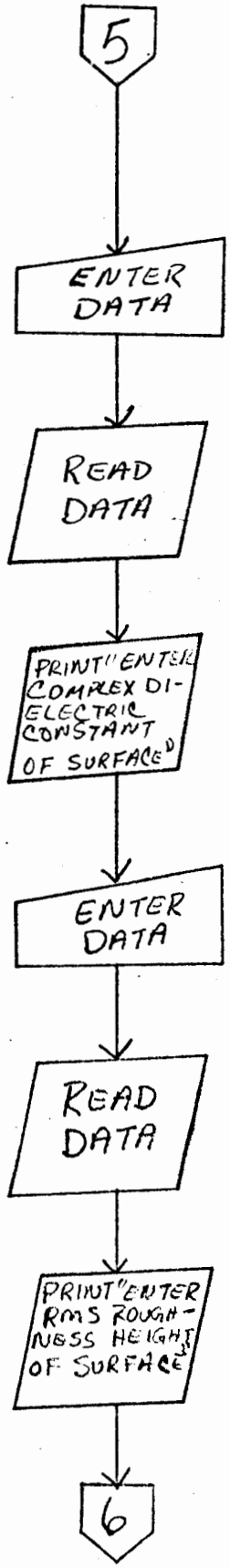

START
I = 1
READ DATA
IF I = 133
YES
PRINT "ENTER ABSOLUTE X,Y,Z COORDINATES OF AZIMUTH XMTR"
ENTER DATA
READ DATA
NO
IF I = 244
YES
PRINT "ENTER ABSOLUTE X,Y,Z COORDINATES ELEVATION 1 XMTR(FT)"
ENTER DATA
READ DATA
NO
IF I = 250
YES
PRINT "ENTER ABSOLUTE X, Y, Z COORDINATES ELEVATION 1 XMTR(FT)"
ENTER DATA
READ DATA
NO
IF I = 345
YES
2
NO
1
I = I + 1
WRITE DATA
A
B

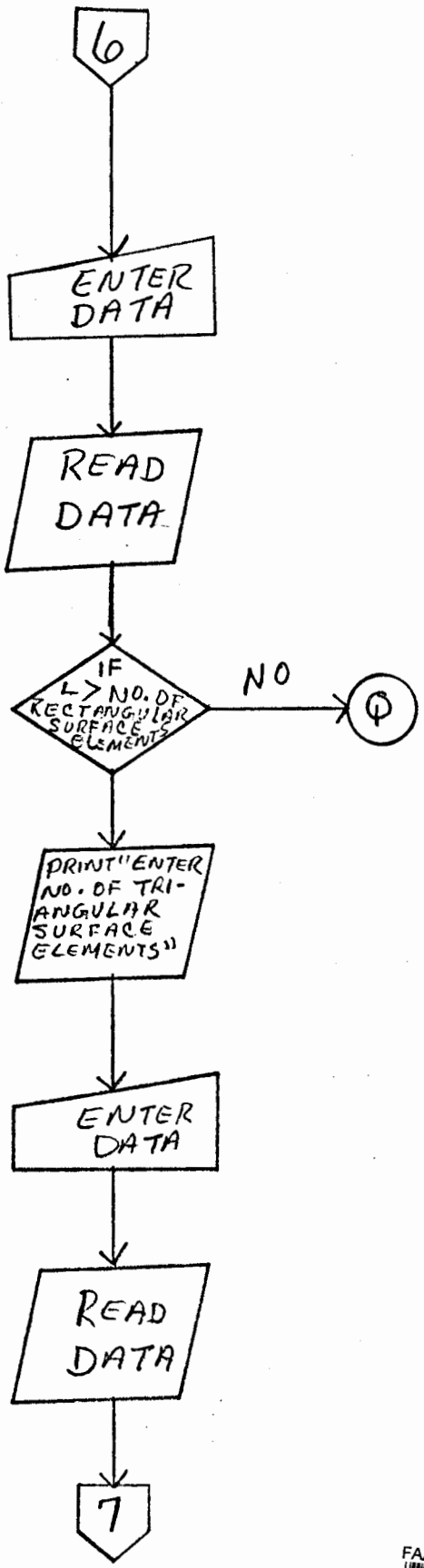

1
IF
I = 346
C
IF
I = 347
D
IF
I = 348
E
IF
I = 351
F
IF
I = 352
G
IF
I = 353
H
3

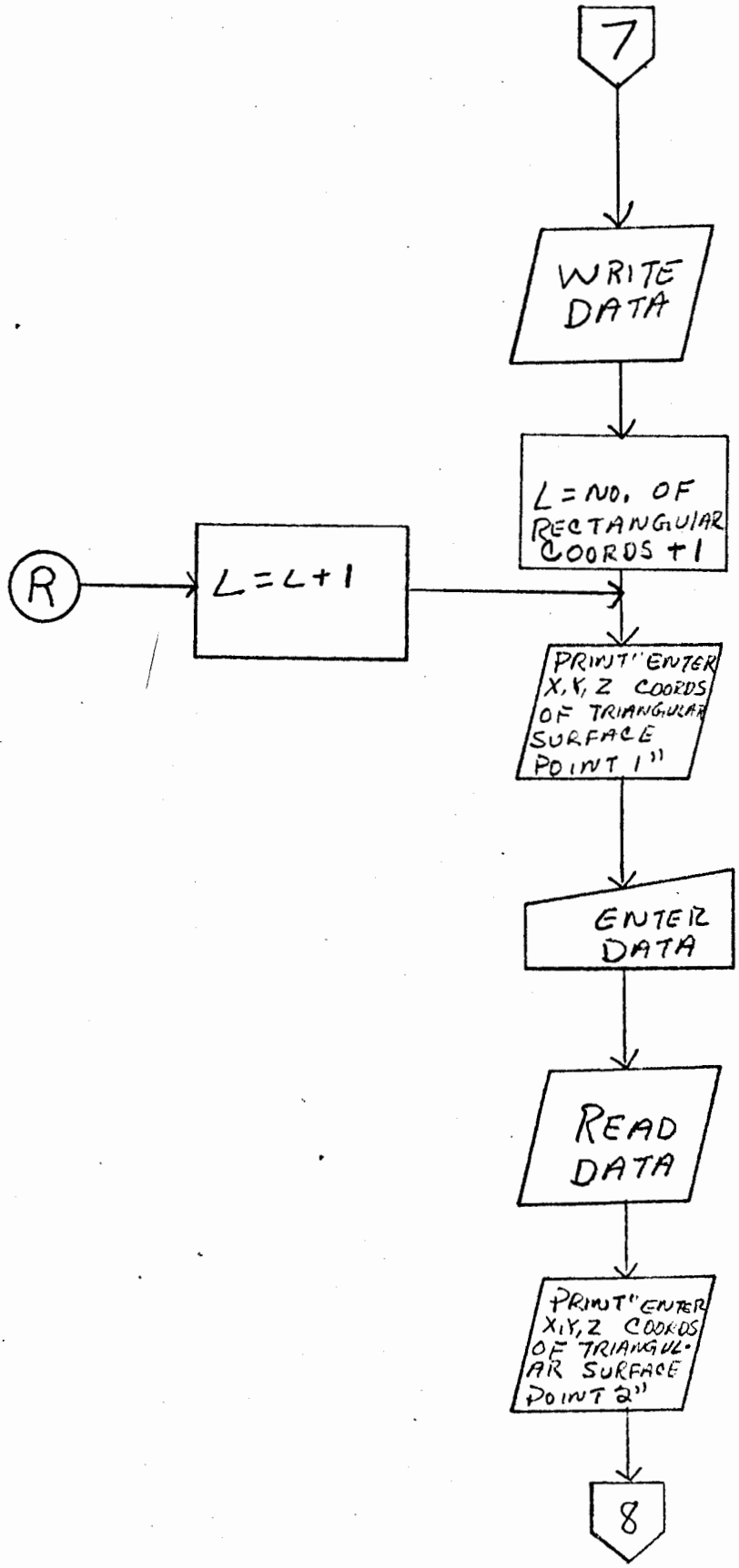

3
IF
I = 354
YES
J
NO
IF
I = 356
YES
STOP
NO
B

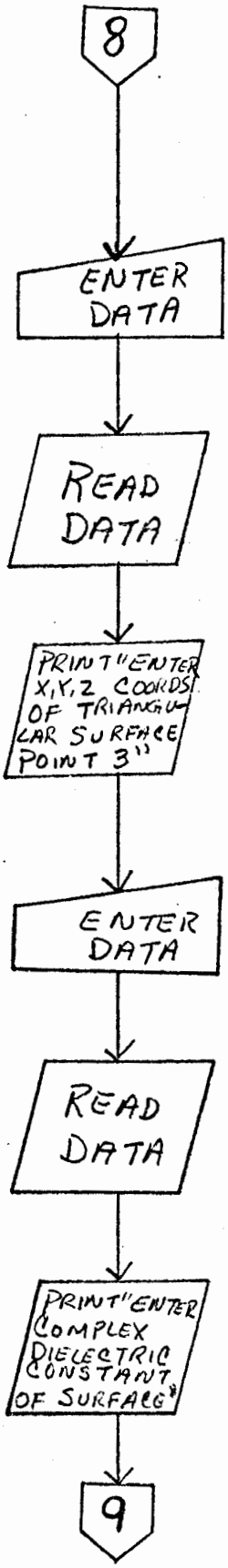

2
PRINT "ENTER NO. OF RECTANGULAR SURFACE ELEMENTS"
ENTER DATA
READ DATA
WRITE DATA
L = 1
Q
L = L + 1
PRINT "ENTER X,Y,Z COORDS OF RECTANGULAR SURFACE POINT 1"
4

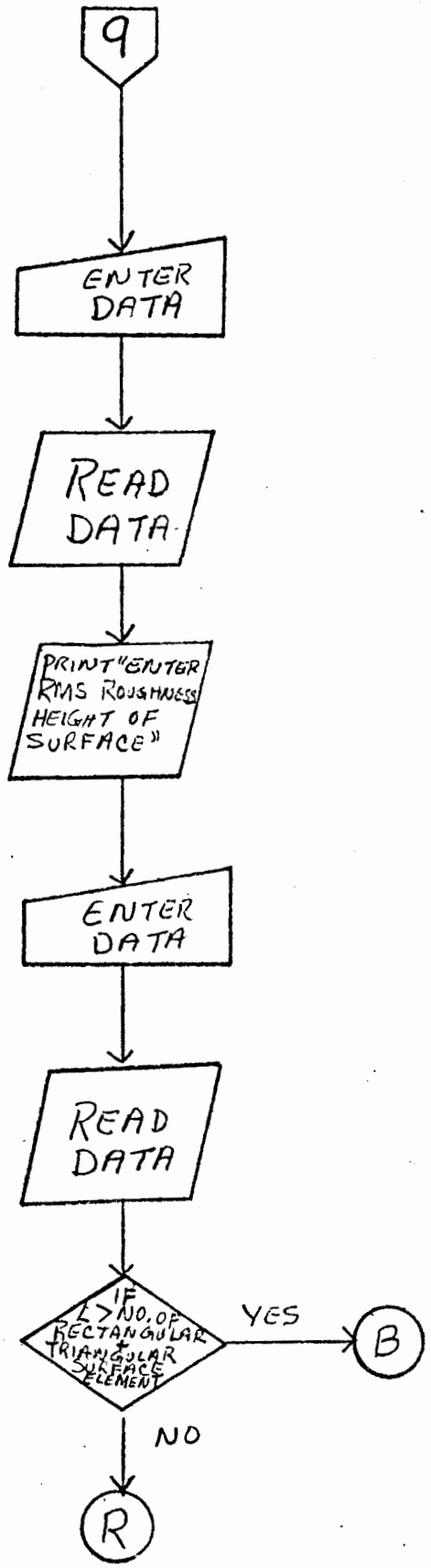

4
ENTER DATA
READ DATA
PRINT "ENTER X,Y,Z COORDS OF RECTANGULAR POINT 2"
ENTER DATA
READ DATA
PRINT "ENTER X,Y,Z COORDS OF RECTANGULAR SURFACE POINT 3"
5

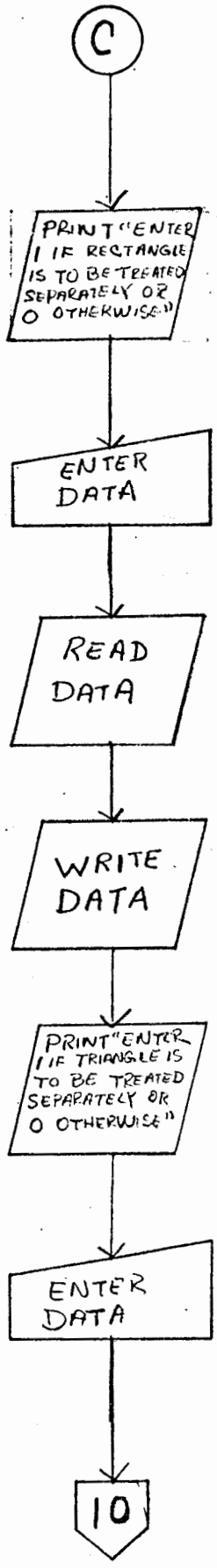

5
ENTER DATA
READ DATA
PRINT "ENTER COMPLEX DIELECTRIC CONSTANT OF SURFACE"
ENTER DATA
READ DATA
PRINT "ENTER RMS ROUGHNESS HEIGHT OF SURFACE"
6

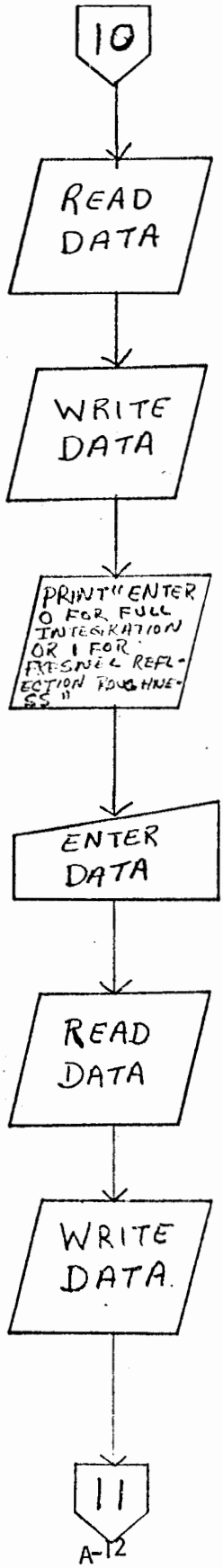


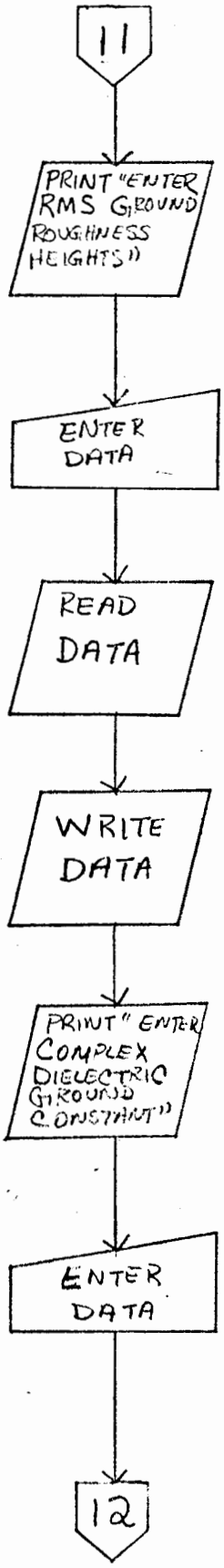

7
WRITE DATA
L = NO. OF RECTANGULAR COORDS + 1
R
L = L + 1
PRINT "ENTER X, Y, Z COORDS OF TRIANGULAR SURFACE POINT 1"
ENTER DATA
READ DATA
PRINT "ENTER X, Y, Z COORDS OF TRIANGULAR SURFACE POINT 2"
8

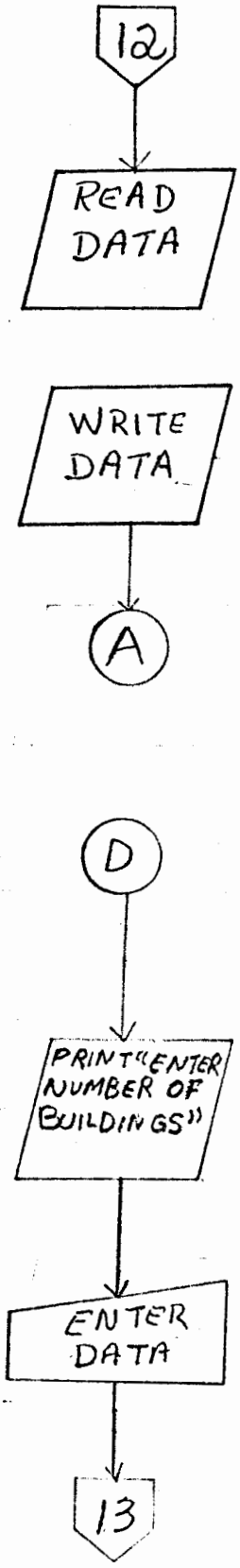

8
ENTER DATA
READ DATA
PRINT "ENTER X,Y,Z COORDS OF TRIANGULAR SURFACE POINT 3"
ENTER DATA
READ DATA
PRINT "ENTER COMPLEX DIELECTRIC CONSTANT OF SURFACE"
9

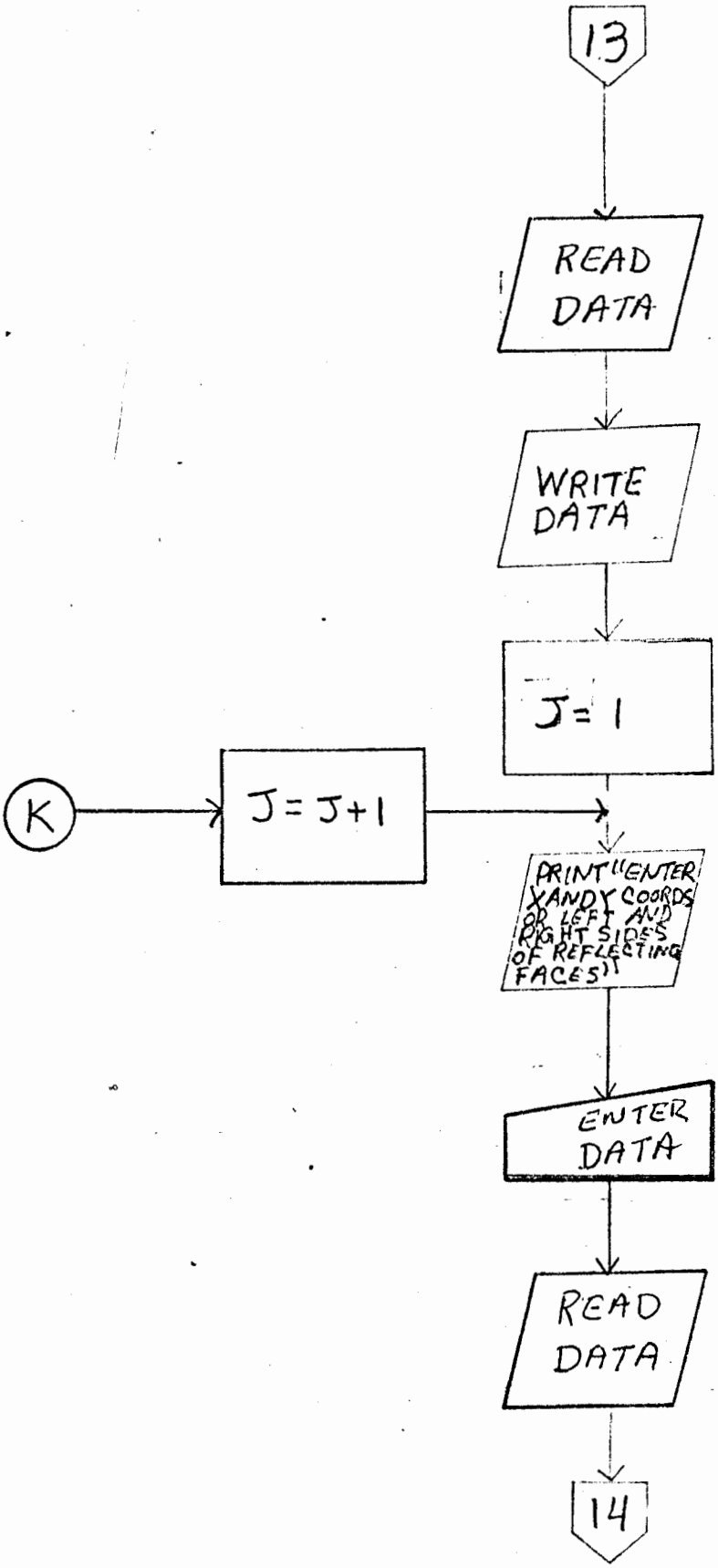

9
ENTER DATA
READ DATA
PRINT "ENTER RMS ROUGHNESS HEIGHT OF SURFACE"
ENTER DATA
READ DATA
IF L > NO. OF RECTANGULAR & TRIANGULAR SURFACE ELEMENT
YES
B
NO
R

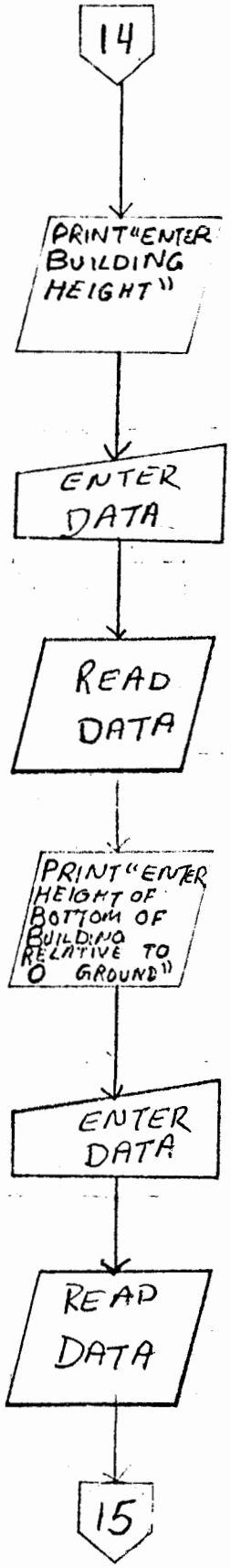

C
PRINT "ENTER 1 IF RECTANGLE IS TO BE TREATED SEPARATELY OR 0 OTHERWISE"
ENTER DATA
READ DATA
WRITE DATA
PRINT "ENTER 1 IF TRIANGLE IS TO BE TREATED SEPARATELY OR 0 OTHERWISE"
ENTER DATA
10

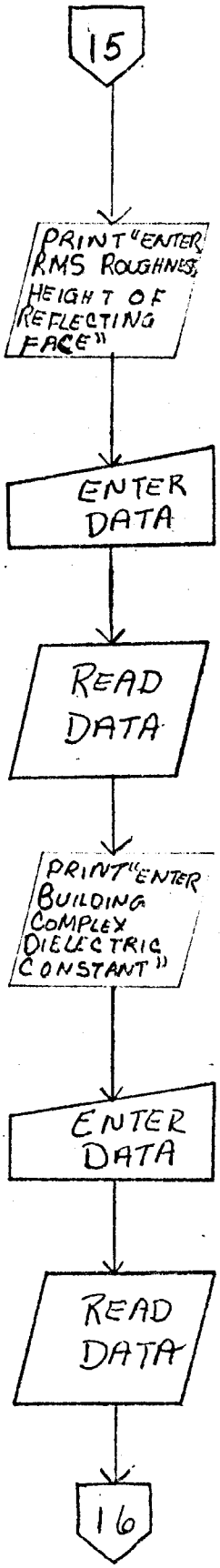

10
READ DATA
WRITE DATA
PRINT "ENTER 0 FOR FULL INTEGRATION OR 1 FOR FRESNEL REFLECTION ROUGHNESS"
ENTER DATA
READ DATA
WRITE DATA.
11

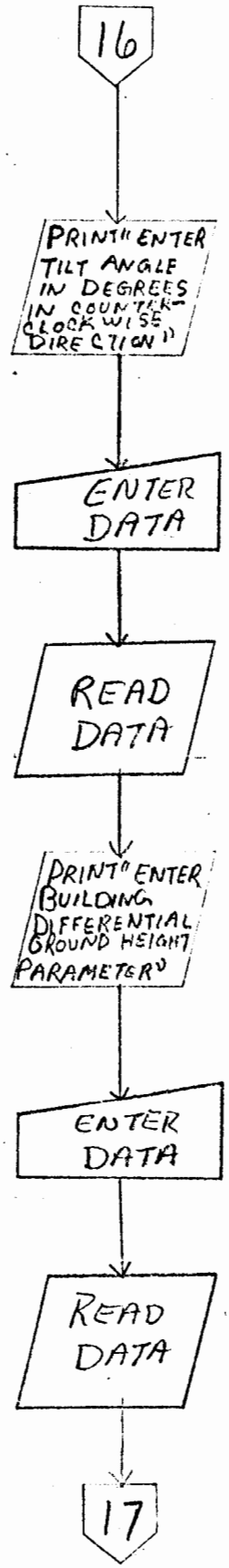

11
PRINT "ENTER RMS GROUND ROUGHNESS HEIGHTS"
ENTER DATA
READ DATA
WRITE DATA
PRINT "ENTER COMPLEX DIELECTRIC GROUND CONSTANT"
ENTER DATA
12

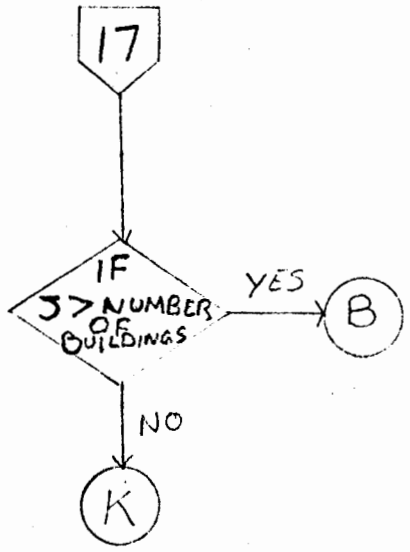

12
READ DATA
WRITE DATA
A
D
PRINT "ENTER NUMBER OF BUILDINGS"
ENTER DATA
13

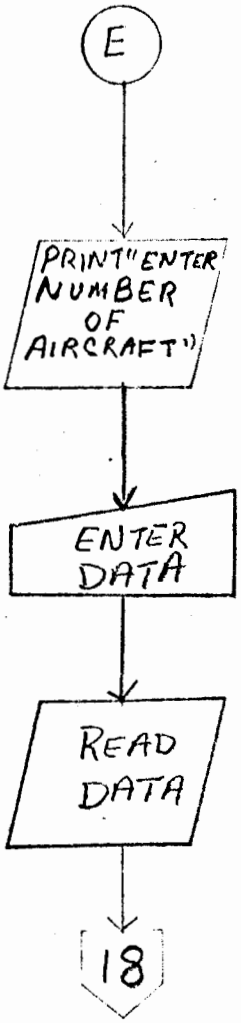

13
READ DATA
WRITE DATA
J = 1
K
J = J+1
PRINT "ENTER XANDY COORDS OR LEFT AND RIGHT SIDES OF REFLECTING FACES"
ENTER DATA
READ DATA
14

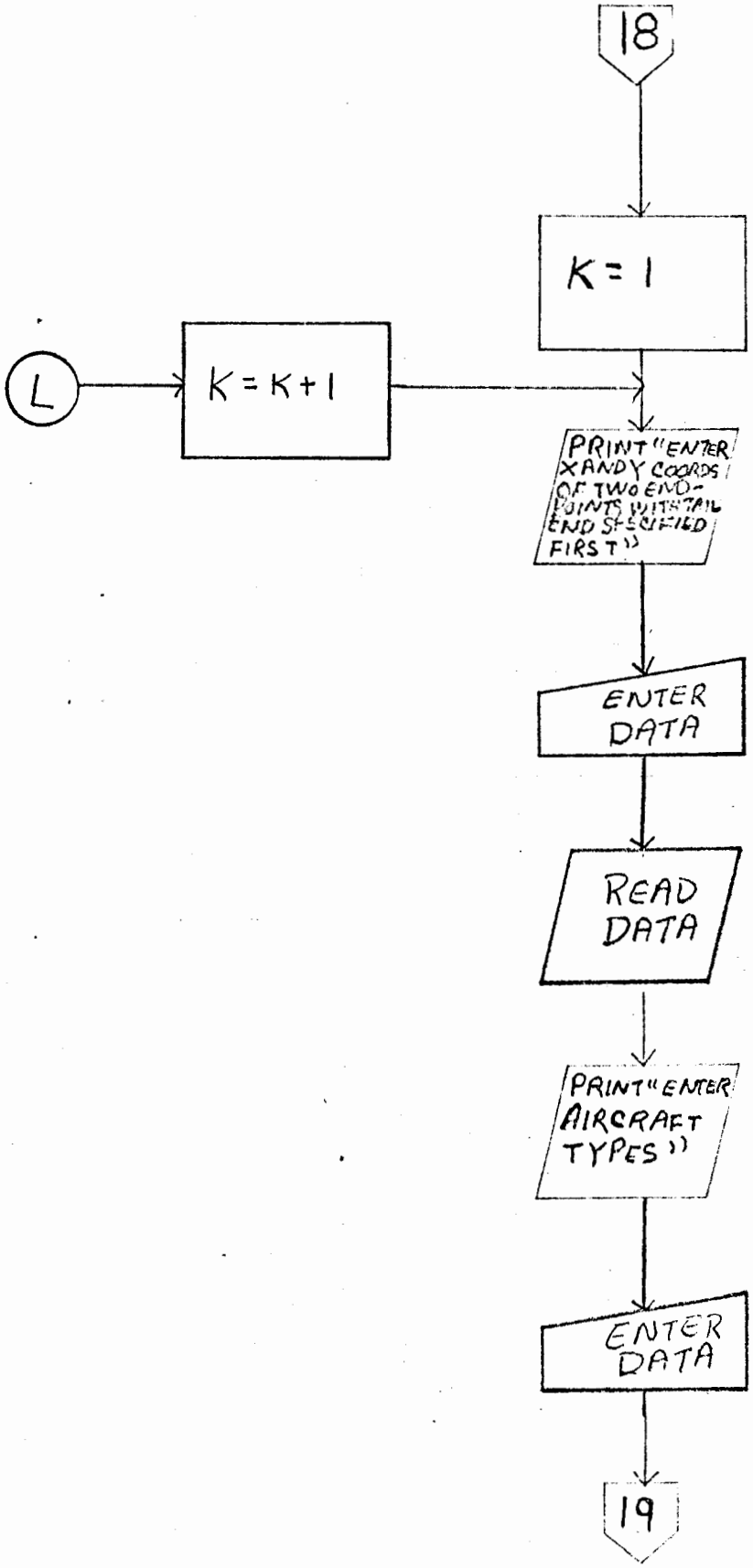

14
PRINT "ENTER BUILDING HEIGHT"
ENTER DATA
READ DATA
PRINT "ENTER HEIGHT OF BOTTOM OF BUILDING RELATIVE TO 0 GROUND"
ENTER DATA
READ DATA
15

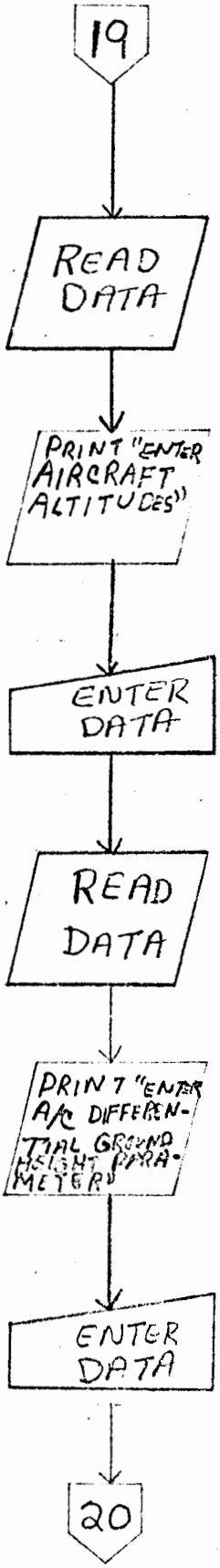

15
PRINT "ENTER RMS ROUGHNESS, HEIGHT OF REFLECTING FACE"
ENTER DATA
READ DATA
PRINT "ENTER BUILDING COMPLEX DIELECTRIC CONSTANT"
ENTER DATA
READ DATA
16

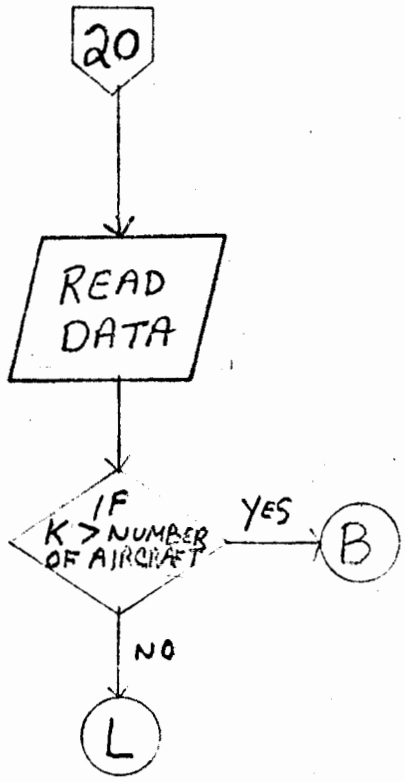

16
PRINT" ENTER TILT ANGLE IN DEGREES IN COUNTER-CLOCK WISE DIRECTION"
ENTER DATA
READ DATA
PRINT" ENTER BUILDING DIFFERENTIAL GROUND HEIGHT PARAMETER"
ENTER DATA
READ DATA
17

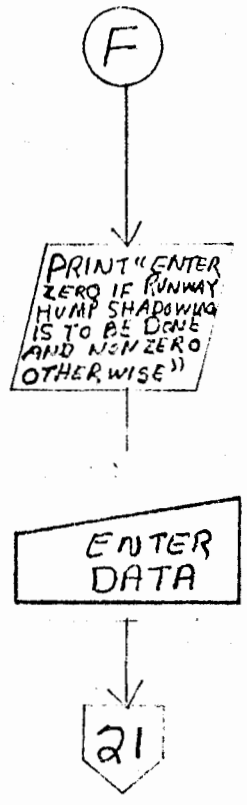

17
IF
J > NUMBER OF BUILDINGS
YES
B
NO
K

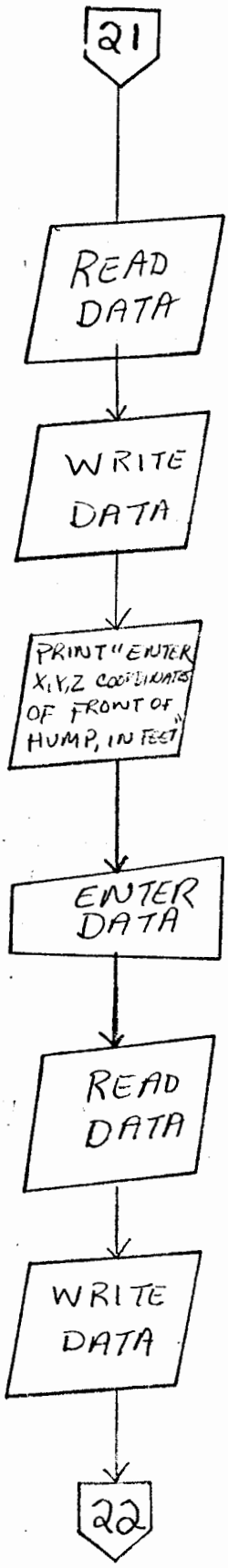

E
PRINT "ENTER NUMBER OF AIRCRAFT"
ENTER DATA
READ DATA
18

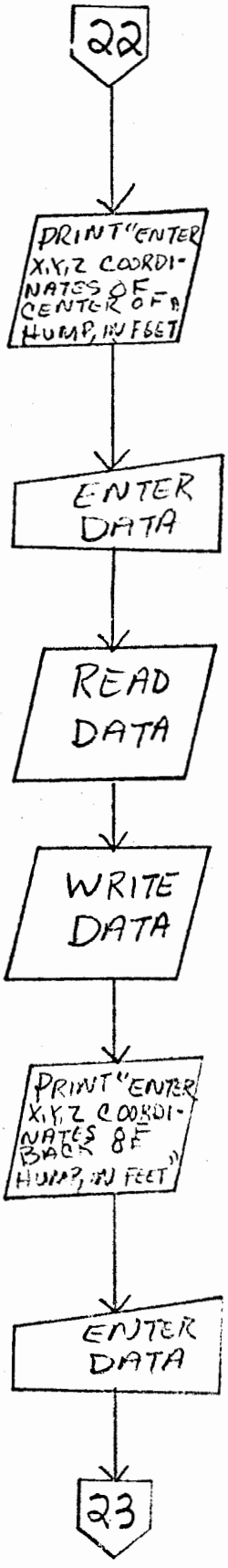

18
K = 1
L
K = K + 1
PRINT "ENTER X AND Y COORDS OF TWO END-POINTS WITH TAIL END SPECIFIED FIRST"
ENTER DATA
READ DATA
PRINT "ENTER AIRCRAFT TYPES"
ENTER DATA
19

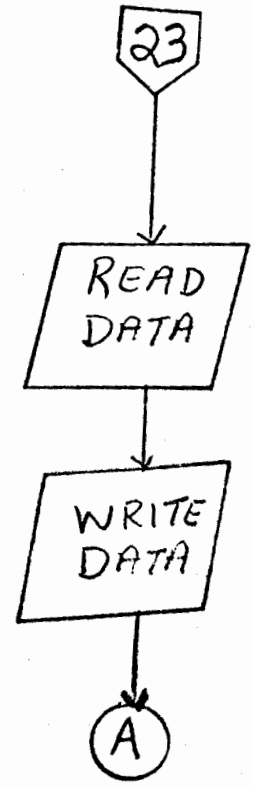

19
READ DATA
PRINT "ENTER AIRCRAFT ALTITUDES"
ENTER DATA
READ DATA
PRINT "ENTER A/C DIFFERENTIAL GROUND HEIGHT PARAMETER"
ENTER DATA
20

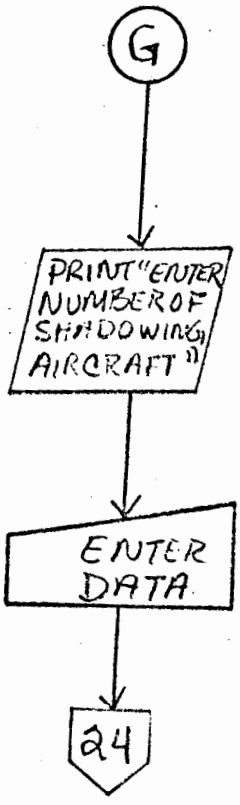

20
READ DATA
IF K > NUMBER OF AIRCRAFT
YES
B
NO
L

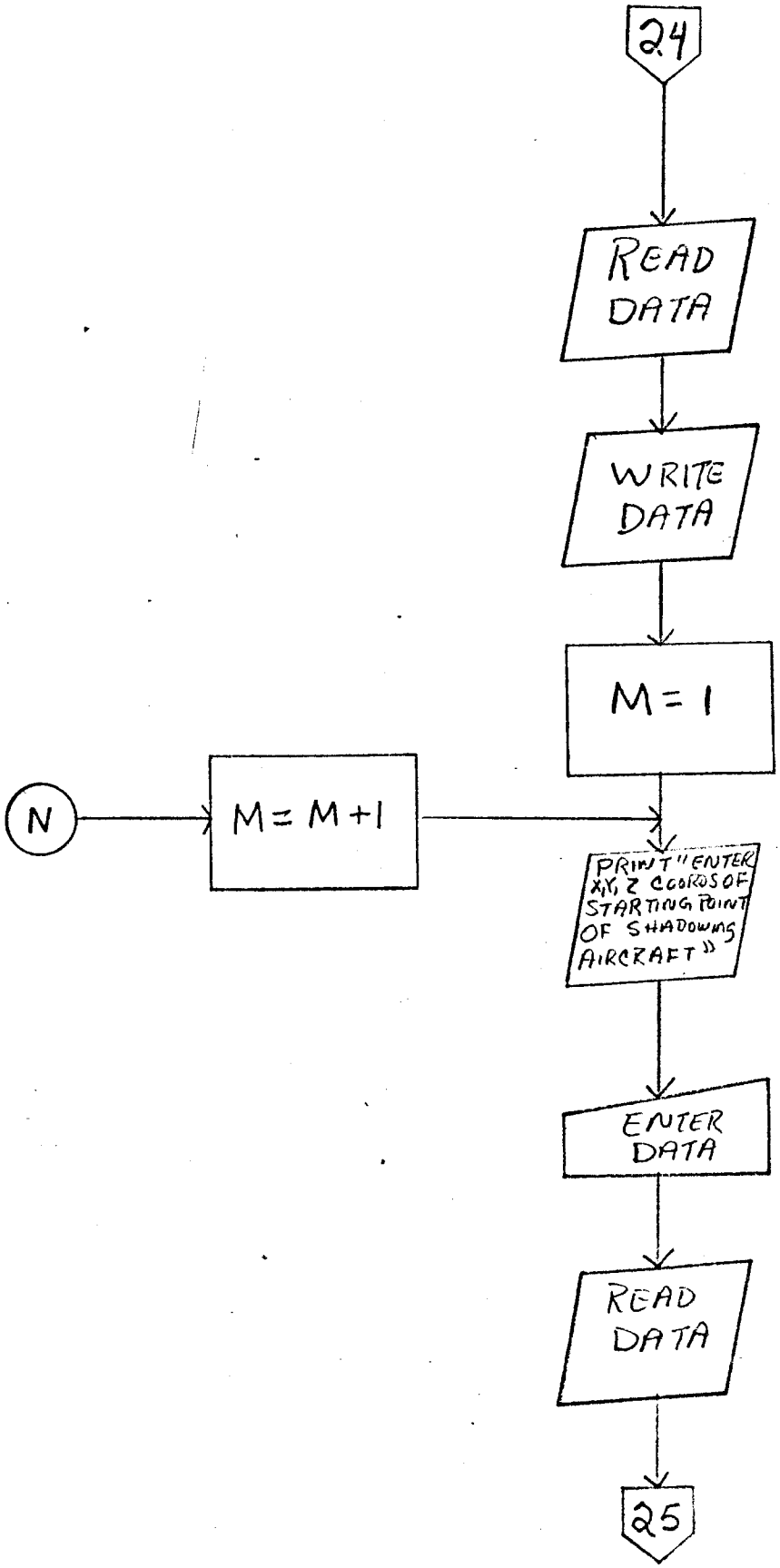

F
PRINT "ENTER ZERO IF RUNWAY HUMP SHADOWING IS TO BE DONE AND NON ZERO OTHERWISE"
ENTER DATA
21

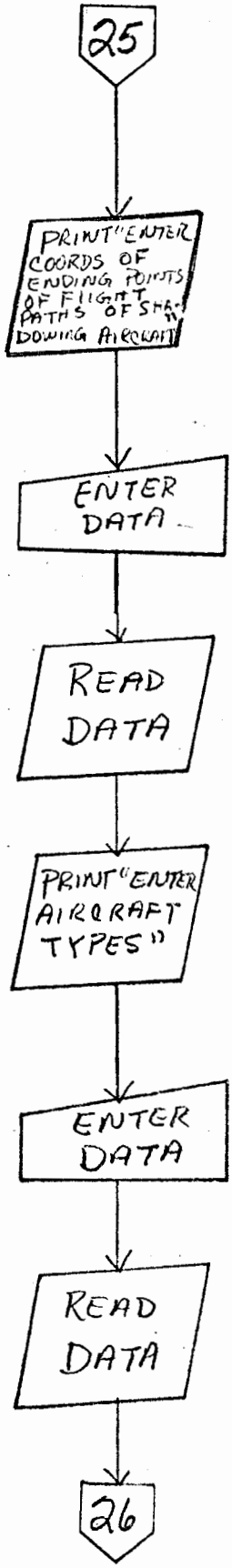

21
READ DATA
WRITE DATA
PRINT "ENTER X,Y,Z COORDINATES OF FRONT OF HUMP, IN FEET"
ENTER DATA
READ DATA
WRITE DATA
22

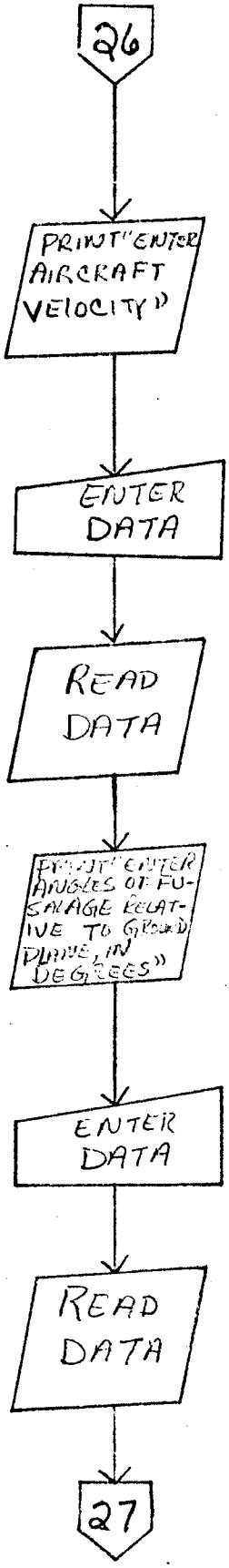

22
PRINT "ENTER X,Y,Z COORDINATES OF CENTER OF A HUMP, IN FEET
ENTER DATA
READ DATA
WRITE DATA
PRINT "ENTER X,Y,Z COORDINATES OF BACK OF HUMP, IN FEET"
ENTER DATA
23

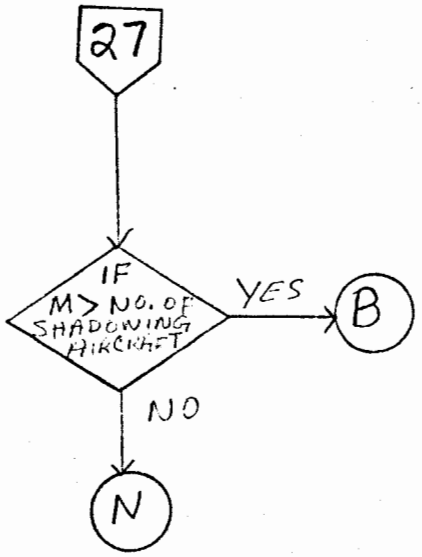

23
READ DATA
WRITE DATA
A

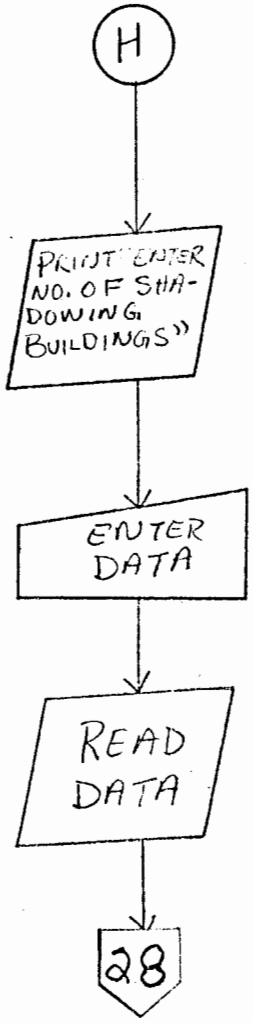

G
PRINT "ENTER NUMBER OF SHADOWING AIRCRAFT"
ENTER DATA
24

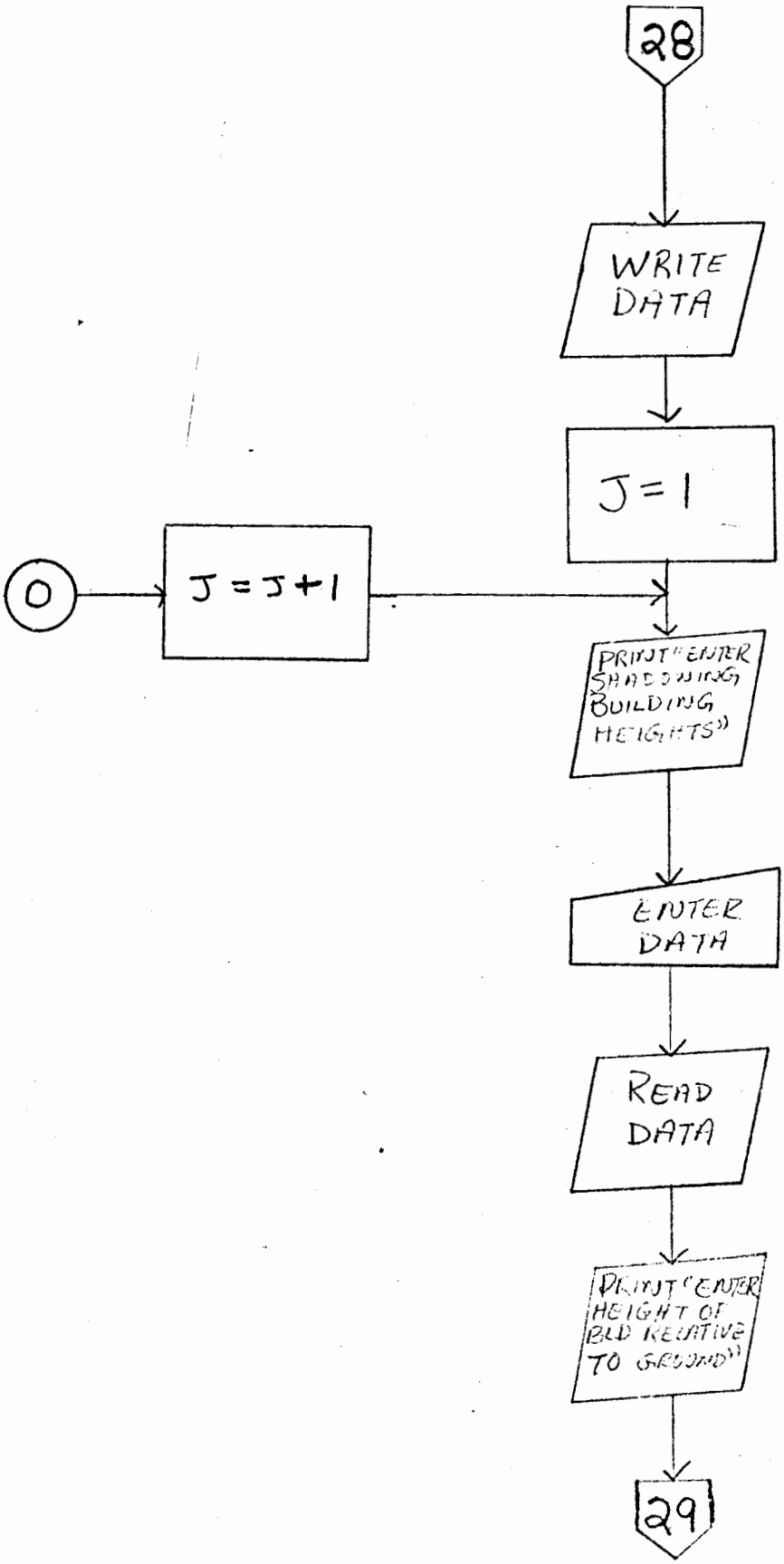

24
READ DATA
WRITE DATA
M = 1
N
M = M + 1
PRINT "ENTER X, Y, Z COORDS OF STARTING POINT OF SHADOWING AIRCRAFT"
ENTER DATA
READ DATA
25

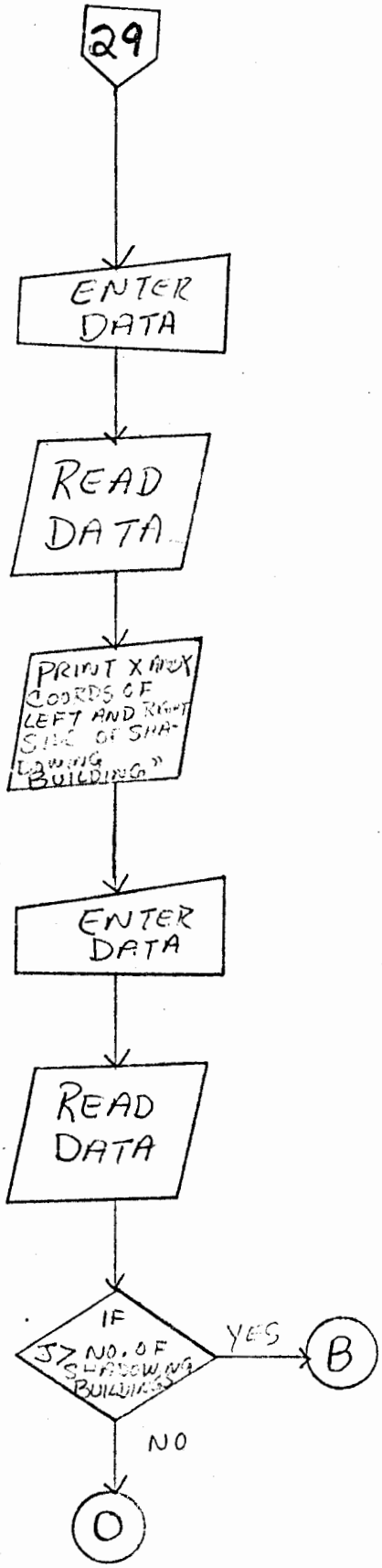

25
PRINT "ENTER COORDS OF ENDING POINTS OF FLIGHT PATHS OF SHOOTING AIRCRAFT"
ENTER DATA
READ DATA
PRINT "ENTER AIRCRAFT TYPES"
ENTER DATA
READ DATA
26

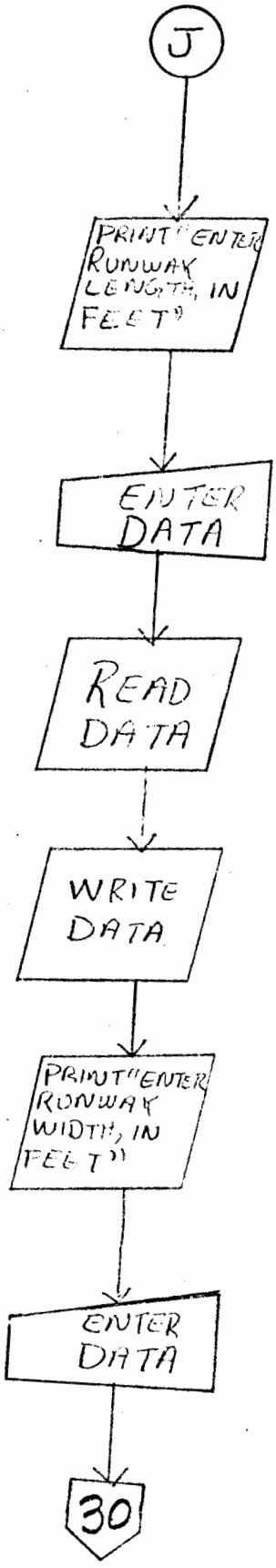

26
PRINT "ENTER AIRCRAFT VELOCITY"
ENTER DATA
READ DATA
PRINT "ENTER ANGLES OF FUSELAGE RELATIVE TO GROUND PLANE, IN DEGREES"
ENTER DATA
READ DATA
27

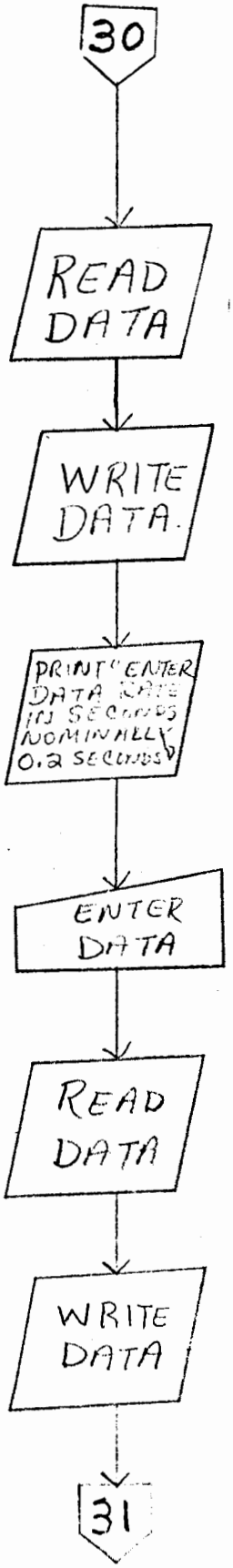

27
IF
M > NO. OF
SHADOWING
AIRCRAFT
YES
B
NO
N

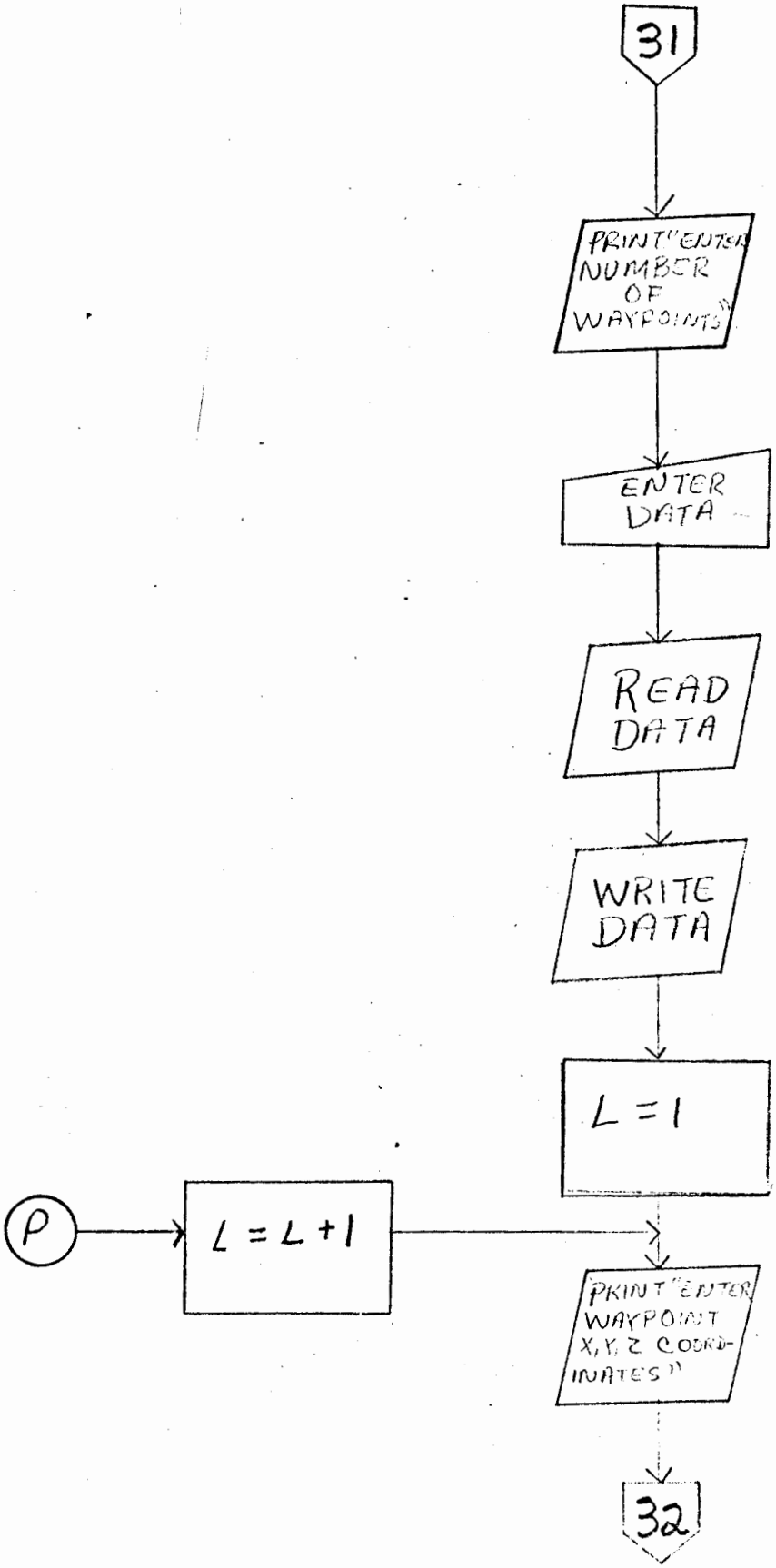

H
PRINT "ENTER
NO. OF SHA-
DOWING
BUILDINGS"
ENTER
DATA
READ
DATA
28

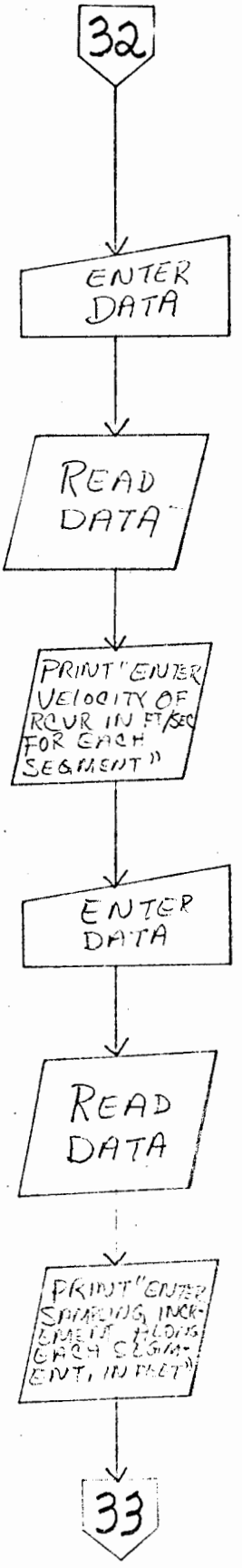

28
WRITE DATA
J = 1
J = J + 1
PRINT "ENTER SHADOWING BUILDING HEIGHTS"
ENTER DATA
READ DATA
PRINT "ENTER HEIGHT OF BLD RELATIVE TO GROUND"
29

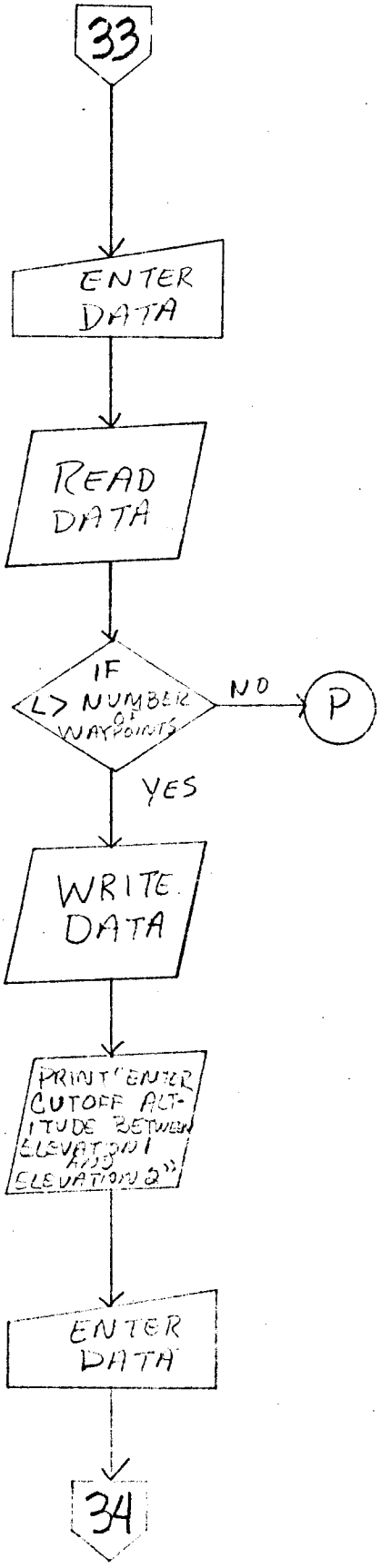

29
ENTER DATA
READ DATA
PRINT X AND X COORDS OF LEFT AND RIGHT SIDE OF SHADOWING BUILDING"
ENTER DATA
READ DATA
IF J7 NO. OF SHADOWING BUILDINGS
YES
B
NO
O

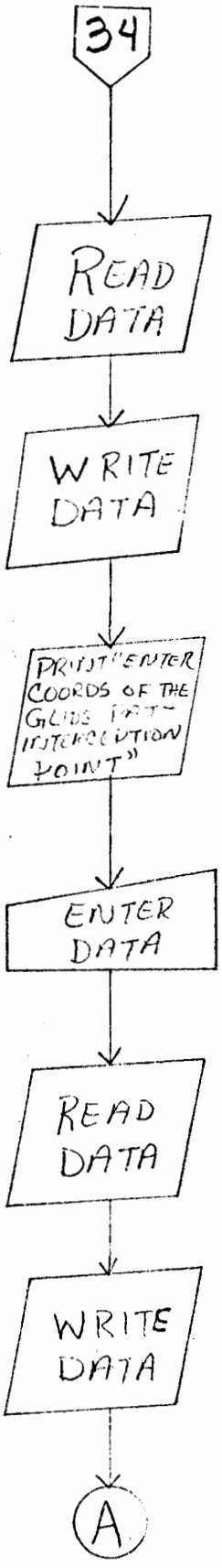

J
PRINT "ENTER RUNWAY LENGTH, IN FEET"
ENTER DATA
READ DATA
WRITE DATA
PRINT "ENTER RUNWAY WIDTH, IN FEET"
ENTER DATA
30


30
READ DATA
WRITE DATA.
PRINT "ENTER DATA RATE IN SECONDS NOMINALLY 0.2 SECONDS"
ENTER DATA
READ DATA
WRITE DATA
31


31
PRINT "ENTER NUMBER OF WAYPOINTS"
ENTER DATA
READ DATA
WRITE DATA
L = 1
P
L = L + 1
PRINT "ENTER WAYPOINT X, Y, Z COORDINATES"
32


32
ENTER DATA
READ DATA
PRINT "ENTER VELOCITY OF ROUR IN FT/SEC FOR EACH SEGMENT"
ENTER DATA
READ DATA
PRINT "ENTER SPACING, INCREMENTS HOLDING EACH SEGMENT, IN FEET"
33


33
ENTER DATA
READ DATA
IF L> NUMBER OF WAYPOINTS
NO
P
YES
WRITE DATA
PRINT "ENTER CUTOFF ALTITUDE BETWEEN ELEVATION 1 AND ELEVATION 2"
ENTER DATA
34


34
READ DATA
WRITE DATA
PRINT "ENTER COORDS OF THE GLIDS INT-INTERSECTION POINT"
ENTER DATA
READ DATA
WRITE DATA
A

APPENDIX B

LISTING OF PROGRAM

```
10*#RUN# /BUSTER/WRIDAT"08":/BUSTER/MYFILE"10"
20C *******PROGRAM "WRIDAT"******
30      DIMENSION SURFS(9,20),ERS(20),SH2S(20),GRNDBD(10),AC(4,10),HUMPF(3),HUMP(3)
40      DIMENSION BLD(10,4),HB(10),HBOT(10),SH2B(10),DICSTB(10)
50      DIMENSION SHPOS1(3,10),SHPOS2(3,10)
60      DIMENSION SHACTP(10),SHVEL(10),SHANG(10),HBS(10),HBI(10),SHBLD(4,10)
70      DIMENSION XPOS(36),YPOS(36),ZPOS(36),VEL(36),DINC(36),GPIP(3)
80      DIMENSION HUMPB(3),TILT(10),NACTYP(10),ALT(10),GRNDAC(10)
90      DATA XPOS,YPOS,ZPOS,VEL,DINC/180*0./
100      DATA AC/40*0./,HUMPF,HUMP,HUMPB/9*0./
110      DATA ERS,SH2S/40*0./,SURFS/180*0./
120     CHARACTER*80 C
130     NDAT=355
140C
150     DO 10 I=1,NDAT
160      READ(08,99)C
170   99 FORMAT(A80)
180     IF(I.EQ.133)GO TO 25
190     IF(I.EQ.244)GO TO 26
200     IF(I.EQ.250)GO TO 27
210     IF(I.EQ.345)GO TO 101
220     IF(I.EQ.346)GO TO 106
230     IF(I.EQ.347)GO TO 111
240     IF(I.EQ.348)GO TO 804
250     IF(I.EQ.351)GO TO 809
260     IF(I.EQ.352)GO TO 813
270     IF(I.EQ.353)GO TO 819
280     IF(I.EQ.354)GO TO 823
290      WRITE(10,23)C
300   23 FORMAT(A80)
310     GO TO 10
320C
330C      AZIMUTH ANTENNA CHARACTERISTICS
340C
350 25 WRITE(6,31)
360 31 FORMAT(1X,"ENTER ABSOLUTE X,Y,Z LOCATIONS OF AZIMUTH XMTR(FT)")
370     READ ,X,Y,Z
380      LN=62235
390      WRITE(6,125)LN,X,Y,Z
400      WRITE(10,125)LN,X,Y,Z
410 125 FORMAT(I5,6X,"DATA XMTRAZ/",2(F8.2,",",),F8.2,"/")
420     GO TO 10
430C
440C      ELEVATION ANTENNA CHARACTERISTICS
450C
460 26 WRITE(6,32)
470 32 FORMAT(1X,"ENTER ABSOLUTE X,Y,Z LOCATIONS OF ELEVATION 1
480& XMTR(FT)")
490     READ ,X,Y,Z
500      LN=64761
510      WRITE(6,126)LN,X,Y,Z
520      WRITE(10,126)LN,X,Y,Z
530 126 FORMAT(I5,6X,"DATA XMTR1/",2(F8.2,",",),F8.2,"/")
540     GO TO 10
550C
560 27 WRITE(6,33)
570 33 FORMAT(1X,"ENTER ABSOLUTE X,Y,Z LOCATIONS OF ELEVATION 2
580& XMTR(FT)")
590     READ ,X,Y,Z
600      LN=65005
```

```
      WRITE(6,127)LN,X,Y,Z
      WRITE(10,127)LN,X,Y,Z
127 FORMAT(I5,6X,"DATA XMIRE2/",2(F8.2,","),F8.2,"/")
    GO TO 10
C
C     SURFACE ELEMENTS
C
101 WRITE(6,150)
150 FORMAT(1X,"ENTER NO. OF RECTANGULAR SURFACE ELEMENTS")
      READ ,NR
      LN=68361
      WRITE(6,128)LN,NR
      WRITE(10,128)LN,NR
128 FORMAT(I5,6X,"DATA NR/",I3,"/")
C
103 DO 12 L=1,NR
    WRITE(6,152)L
152 FORMAT(1X,"ENTER X,Y,Z COORDS OF RECTANGULAR SURFACE",1X,I2,1X,"
&" POINT1")
      READ ,(SURFS(J,L),J=1,3)
130 FORMAT(I5,6X,"DATA SURFS/")
      WRITE(6,636)L
636 FORMAT(1X,"ENTER X,Y,Z COORDS OF RECTANGULAR SURFACE",1X,I2,1X,"
&" POINT 2")
      READ ,(SURFS(J,L),J=4,6)
      WRITE(6,637)L
637 FORMAT(1X,"ENTER X,Y,Z COORDS OF RECTANGULAR SURFACE",1X,I2,1X,"
&" POINT 3")
      READ ,(SURFS(J,L),J=7,9)
C
      WRITE(6,153)L
153 FORMAT(1X,"ENTER COMPLEX DIELECTRIC CONSTANTS OF SURFACE",I2)
    READ ,ERS(L)
131 FORMAT(I5,6X,"DATA ERS/"5(F8.2,","),/,I5,5X,"&",5(F8.2,","),/
&,I5,5X,"&",5(F8.2,","),/,I5,5X,"&",5(F8.2,","),"/")
C
      WRITE(6,154)L
154 FORMAT(1X,"ENTER RMS ROUGHNESS HEIGHT OF SURFACES",I2)
      READ ,SH2S(L)
132 FORMAT(I5,6X,"DATA SH2S/"5(F8.2,","),/,I5,5X,"&",5(F8.2,","),/,
&I5,5X,"&",5(F8.2,","),/,I5,5X,"&",5(F8.2,","),"/")
 12 CONTINUE
      WRITE(6,643)
643 FORMAT(1X"ENTER NO. OF TRIANGULAR ELEMENTS")
      READ ,NT
      WRITE(6,644)LN+1,NT
      WRITE(10,644)LN+1,NT
644 FORMAT(I5,6X,"DATA NT/",I3,"/")
      DO 13 L=NR+1,NR+NT
      WRITE(6,638)L-NR
638 FORMAT(1X,"ENTER X,Y,Z COORDS OF TRIANGULAR SURFACE",1X,I2,1X,"
&" POINT 1")
      READ ,(SURFS(J,L),J=1,3)
      WRITE(6,639)L-NR
639 FORMAT(1X,"ENTER X,Y,Z COORDS OF TRIANGULAR SURFACE",1X,I2,1X,"
&" POINT 2")
      READ ,(SURFS(J,L),J=4,6)
      WRITE(6,640)L-NR
640 FORMAT(1X,"ENTER X,Y,Z COORDS OF TRIANGULAR SURFACE",1X,I2,1X,"
&" POINT 3")
```

```
      READ *,(SURFS(J,L),J=7,9)
      WRITE(6,645)L-NR
  645 FORMAT(1X,"ENTER COMPLEX DIELECTRIC CONSTANTS OF SURFACE",I2)
      READ *,ERS(L)
      WRITE(6,646)L-NR
  646 FORMAT(1X,"ENTER RMS ROUGHNESS HEIGHT OF SURFACE",I2)
      READ *,SH2S(L)
   13 CONTINUE
      LN=68365
      WRITE(6,130)LN
      WRITE(10,130)LN
      NUM=180-(NR+NT)*9
      DO 14 M=1,NR+NT
      WRITE(6,641)LN+M,(SURFS(J,M),J=1,9)
      WRITE(10,641)LN+M,(SURFS(J,M),J=1,9)
  641 FORMAT(I5,5X,"&",9(F8.2,","))
   14 CONTINUE
      LN=LN+M+1
      WRITE(6,642)LN,NUM
  642 FORMAT(I5,5X,"&",I3,"*0,/")
      WRITE(10,642)M,NUM
      WRITE(6,131)LN+10,(ERS(L),L=1,5),LN+11,(ERS(L),L=6,10),
     & LN+12,(ERS(L),L=11,15),LN+13,(ERS(L),L=16,20)
      WRITE(10,131)LN+10,(ERS(L),L=1,5),LN+11,(ERS(L),L=6,10),
     & LN+12,(ERS(L),L=11,15),LN+13,(ERS(L),L=16,20)
      WRITE(6,132)LN+14,(SH2S(L),L=1,5),LN+15,(SH2S(L),L=6,10),
     & LN+16,(SH2S(L),L=11,15),LN+17,(SH2S(L),L=16,20)
      WRITE(10,132)LN+14,(SH2S(L),L=1,5),LN+15,(SH2S(L),L=6,10),
     & LN+16,(SH2S(L),L=11,15),LN+17,(SH2S(L),L=16,20)
      GO TO 10
C
  106 WRITE(6,155)
  155 FORMAT(1X,"ENTER 1 IF RECTANGLE IS TO BE TREATED SEPERATELY
     &  OR 0 OTHERWISE")
      READ *,NRSPEC
      LN=68550
      WRITE(6,133)LN,NRSPEC
      WRITE(10,133)LN,NRSPEC
  133 FORMAT(I5,6X,"DATA NRSPEC/",I1,"/")
  107 WRITE(6,156)
  156 FORMAT(1X,"ENTER 1 IF TRIANGLE IS TO BE TREATED SEPERATELY
     &  OR 0 OTHERWISE")
      READ *,NTSPEC
      WRITE(6,134)LN+1,NTSPEC
      WRITE(10,134)LN+1,NTSPEC
  134 FORMAT(I5,6X,"DATA NTSPEC/",I1,"/")
C
    WRITE(6,157)
  157 FORMAT(1X,"ENTER 0 FOR FULL INTEGRATION OR 1 FOR FRESNEL
     &  REFLECTION ROUGHNESS")
      READ *,ISPGRD
      WRITE(6,135)LN+2,ISPGRD
      WRITE(10,135)LN+2,ISPGRD
  135 FORMAT(I5,6X,"DATA ISPGRD/",I1,"/")
C
  109 WRITE(6,158)
  158 FORMAT(1X,"ENTER RMS GROUND ROUGHNESS HEIGHT",
      READ *,SH2G
      WRITE(6,136)LN+3,SH2G
      WRITE(10,136)LN+3,SH2G
```

```
1810 136  FORMAT(I5,6X,"DATA SH2G/",F8.2,"/")
1820C
1830 110 WRITE(6,159)
1840 159 FORMAT(1X,"ENTER COMPLEX DIELECTRIC GROUND CONSTANT")
1850      READ ,ERG
1860      WRITE(6,137)LN+4,ERG
1870      WRITE(10,137)LN+4,ERG
1880 137 FORMAT(I5,6X,"DATA ERG/",F8.2,"/")
1890      GO TO 10
1900C
1910C      BUILDING CHARACTERISTICS
1920C
1930 111 WRITE(6,160)
1940 160 FORMAT(1X,"ENTER NUMBER OF BIULDINGS")
1950      READ ,NBLD
1960      LN=68641
1970      WRITE(6,138)LN,NBLD
1980      WRITE(10,138)LN,NBLD
1990 138 FORMAT(I5,6X,"DATA NBLD/",I3,"/")
2000C
2010      N=68651
2020      NUM=40-NBLD*4
2030      LNUM=N+NBLD
2040 112 DO 45 J=1,NBLD
2050    WRITE(6,161)J
2060 161 FORMAT(1X,"ENTER X & Y COORDS OR LEFT & RIGHT SIDES OF REFLECTING
2070&     FACES",I2)
2080      READ ,(BLD(J,K),K=1,4)
2090 139 FORMAT(I5,6X,"DATA BLD/")
2100C
2110    WRITE(6,162)J
2120 162 FORMAT(1X,"ENTER BUILDING HEIGHT",I2)
2130      READ ,HB(J)
2140 140 FORMAT(I5,6X,"DATA HB/"9(F6.2,","),F6.2,"/")
2150C
2160    WRITE(6,163)J
2170 163 FORMAT(1X,"ENTER HEIGHT OF BOTTOM OF BUILDING",I2,1X,"RELATIVE TO
2180&   0 GROUND")
2190      READ ,HBOT(J)
2200 600 FORMAT(I5,6X,"DATA HBOT/"9(F8.2,","),F8.2,"/")
2210C
2220    WRITE(6,164)J
2230 164 FORMAT(1X,"ENTER RMS ROUGHNESS HEIGHT OF REFLECTING FACE",I2)
2240      READ ,SH2B(J)
2250 601 FORMAT(I5,6X,"DATA SH2B/"9(F8.2,","),F8.2,"/")
2260C
2270    WRITE(6,165)J
2280 165 FORMAT(1X,"ENTER BUILDING",I3,1X,"COMPLEX DIELECTRIC CONSTANT",I2)
2290      READ ,DICSTB(J)
2300 602 FORMAT(I5,6X,"DATA DICSTB/"9(F6.2,","),F6.2,"/")
2310C
2320    WRITE(6,166)J
2330 166 FORMAT(1X,"ENTER TILT ANGLE IN DEGREES TO COUNTERCLOCKWISE DIRECTION",I2)
2340      READ ,TILT(J)
2350 603 FORMAT(I5,6X,"DATA TILT/"9(F6.2,","),F6.2,"/")
2360C
2370    WRITE(6,167)J
2380 167 FORMAT(1X,"ENTER BUILDING DIFFERENTIAL GROUND HEIGHT PARAMETER",I2)
2390      READ ,GRNDB(J)
2400 604 FORMAT(I5,6X,"DATA GRNDB/"9(F8.2,","),F8.2," ")
```

```
  45 CONTINUE
     WRITE(6,139)N
     DO 63 L=1,NBLD
     WRITE(6,98)NHL,(BLD(L,K),K=1,4)
     WRITE(10,98)NHL,(BLD(L,K),K=1,4)
  98 FORMAT(I5,5X,"&",4(F8.2,","))
  63 CONTINUE
     WRITE(6,95)LNUM+1,NUM
  95 FORMAT(I5,5X,"&",I2,"*0./")
     WRITE(6,140)LNUM+2,(HB(J),J=1,10)
     WRITE(10,140)LNUM+2,(HB(J),J=1,10)
     WRITE(6,600)LNUM+3,(HBOT(J),J=1,10)
     WRITE(10,600)LNUM+3,(HBOT(J),J=1,10)
     WRITE(6,601)LNUM+4,(SH2B(J),J=1,10)
     WRITE(10,601)LNUM+4,(SH2B(J),J=1,10)
     WRITE(6,602)LNUM+5,(DICSTB(J),J=1,10)
     WRITE(10,602)LNUM+5,(DICSTB(J),J=1,10)
     WRITE(6,603)LNUM+6,(TILT(J),J=1,10)
     WRITE(10,603)LNUM+6,(TILT(J),J=1,10)
     WRITE(6,604)LNUM+7,(GRNDRD(J),J=1,10)
     WRITE(10,604)LNUM+7,(GRNDRD(J),J=1,10)
     GO TO 10
C
C     AIRCRAFT CHARACTERISTICS
C
 804 WRITE(6,168)
 168 FORMAT(1X,"ENTER NUMBER OF AIRCRAFT")
    READ *,NAC
     LN=68881
     WRITE(6,605)LN,NAC
     WRITE(10,605)LN,NAC
 605 FORMAT(I5,6X,"DATA NAC/",I3,"/")
C
 805 DO 46 K=1,NAC
     WRITE(6,169)K
 169 FORMAT(1X,"ENTER X & Y COORDS OF TWO ENDPOINTS OF AIRCRAFT",I2,1X,"
&   WITH TAIL END SPECIFIED FIRST")
     READ *,(AC(K,J),J=1,4)
 606 FORMAT(I5,6X,"DATA AC/"9(F8.2,",",)F8.2,"/")
C
     WRITE(6,170)K
 170 FORMAT(1X,"ENTER AIRCRAFT TYPES",I2)
     READ *,NACTYP(K)
 607 FORMAT(I5,6X,"DATA NACTYP/"9(F8.2,",",)F8.2-"/")
C
     WRITE(6,171)K
 171 FORMAT(1X,"ENTER AIRCRAFT",I2,1X,"ALTITUDES")
     READ *,ALT(K)
 608 FORMAT(I5,6X,"DATA ALT/"9(F8.2,",",)F8.2,"/")
C
     WRITE(6,172)K
 172 FORMAT(1X,"ENTER A/C DIFFERENTIAL GROUND HEIGHT PARAMETER",I2)
     READ *,GRNDAC(K)
 609 FORMAT(I5,6X,"DATA GRNDAC/"9(F8.2,",",)F8.2,"/")
  46 CONTINUE
     NUM=40-NAC*4
     WRITE(6,606)LN
     WRITE(10,606)LN
     DO 299 M=1,NAC
     WRITE(6,700)LN+M,(AC(M,J),J=1,4)

*
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```
      WRITE(10,700)LN+M,(AC(K,J),J=1,4)
  700 FORMAT(I5,5X,"&",4(F8.2,","))
  299 CONTINUE
      WRITE(6,701)LN+M+1,NUM
      WRITE(10,701)LN+M+1,NUM
  701 FORMAT(I5,5X,"&",I2,"*0./")
      WRITE(6,607)LN+10,(NACTYP(K),K=1,10)
      WRITE(10,607)LN+10,(NACTYP(K),K=1,10)
      WRITE(6,608)LN+11,(ALT(K),K=1,10)
      WRITE(10,608)LN+11,(ALT(K),K=1,10)
      WRITE(6,609)LN+12,(GRNDAC(K),K=1,10)
      WRITE(10,609)LN+12,(GRNDAC(K),K=1,10)
      LN=0
      GO TO 10
C
C     RUNWAY HUMP PARAMETERS
C
  809 WRITE(6,173)
  173 FORMAT(1X,"ENTER ZERO IF RUNWAY HUMP SHADOWING IS TO BE DONE
&AND NONZERO OTHERWISE")
      READ ,IHUMP
      LN=69301
      IF(IHUMP.NE.0)GO TO 399
      WRITE(6,610)LN,IHUMP
      WRITE(10,610)LN,IHUMP
  610 FORMAT(I5,6X,"DATA IHUMP/",I2,"/")
C
  810 WRITE(6,174)
  174 FORMAT(1X,"ENTER X,Y,Z COORDINATES OF FRONT OF HUMP,IN FEET")
      READ ,HUMPF
      WRITE(6,611)LN+1,HUMPF
      WRITE(10,611)LN+1,HUMPF
  611 FORMAT(I5,6X,"DATA HUMPF/",2(F8.2,","),F8.2,"/")
C
  811 WRITE(6,175)
  175 FORMAT(1X,"ENTER X,Y,Z COORDINATES OF CENTER OF HUMP,IN FEET")
      READ ,HUMP
      WRITE(6,612)LN+2,HUMP
      WRITE(10,612)LN+2,HUMP
  612 FORMAT(I5,6X,"DATA HUMP/",2(F8.2,","),F8.2,"/")
C
  812 WRITE(6,176)
  176 FORMAT(1X,"ENTER X,Y,Z COORDINATES OF BACK OF HUMP,IN FEET")
      READ ,HUMPB
      WRITE(6,613)LN+3,HUMPB
      WRITE(10,613)LN+3,HUMPB
  613 FORMAT(I5,6X,"DATA HUMPB/",2(F8.2,","),F8.2,"/")
      LN=0
      GO TO 10
  399 WRITE(6,611)LN+1,HUMPF
      WRITE(10,611)LN+1,HUMPF
      WRITE(6,612)LN+2,HUMP
      WRITE(10,612)LN+2,HUMP
      WRITE(6,613)LN+3,HUMPB
      WRITE(10,613)LN+3,HUMPB
      GO TO 10
C
C     SHADOWING AIRCRAFT CHARACTERISTICS
C
  813 WRITE(6,179)
```

```
178 FORMAT(1X,'ENTER NUMBER OF SHADOWING AIRCRAFT')
    READ ,NSHAC
    LN=69481
    WRITE(6,614)LN,NSHAC
    WRITE(10,614)LN,NSHAC
614 FORMAT(I5,6X,'DATA NSHAC/',I3,'/')
C
814 DO 15 M=1,NSHAC
    WRITE(6,179)M
179 FORMAT(1X,'ENTER X,Y,Z COORDS OF STARTING POINTS OF FLIGHT PATHS
&  OF SHADOWING AIRCRAFT',I2)
    READ ,(SHPOS1(J,M),J=1,3)
615 FORMAT(I5,6X,'DATA SHPOS1/'9(F8.2,',',),F8.2,'/')
C
    WRITE(6,180)M
180 FORMAT(1X,'ENTER COORDS OF ENDING POINTS OF FLIGHT PATHS
&  OF SHADOWING AIRCRAFT',I2)
    READ ,(SHPOS2(J,M),J=1,3)
616 FORMAT(I5,6X,'DATA SHPOS2/'9(F8.2,',',),F8.2,'/')
C
    WRITE(6,181)M
181 FORMAT(1X,'ENTER AIRCRAFT ',I3,1X,'TYPE')
    READ ,SHACTP(M)
617 FORMAT(I5,6X,'DATA SHACTP/'9(F8.2,',',),F8.2,'/')
C
    WRITE(6,182)M
182 FORMAT(1X,'ENTER AIRCRAFT VELOCITY',I2)
    READ ,SHVEL(M)
618 FORMAT(I5,6X,'DATA SHVEL/'9(F8.2,',',),F8.2,'/')
C
    WRITE(6,183)M
183 FORMAT(1X,'ENTER ANGLES OF FUSELAGE',I2,1X,'RELATIVE TO GROUND
&  PLANE,IN DEGREES')
    READ ,SHANG(M)
619 FORMAT(I5,6X,'DATA SHANG/'9(F8.2,',',),F8.2,'/')
 15 CONTINUE
    NUM=30-NSHAC*3
    LN=69480
    WRITE(6,615)LN
    WRITE(10,615)LN
    DO 89 L=1,NSHAC
    WRITE(6,702)LN+L,(SHPOS1(J,M),J=1,3)
    WRITE(10,702)LN+L,(SHPOS1(J,M),J=1,3)
702 FORMAT(I5,5X,'&',3(F8.2,','))
 89 CONTINUE
    L=L+1
    WRITE(6,703)LN+L,NUM
    WRITE(10,703)LN+L,NUM
703 FORMAT(I5,5X,'&',I2,'*0./')
    LN=69510
    WRITE(6,616)LN
    WRITE(10,616)LN
    DO 90 K=1,NSHAC
    WRITE(6,704)LN+K,(SHPOS2(J,M),J=1,3)
    WRITE(10,704)LN+K,(SHPOS2(J,M),J=1,3)
704 FORMAT(I5,5X,'&',3(F8.2,','))
 90 CONTINUE
    K=K+1
    WRITE(6,705)LN+K,NUM
    WRITE(10,705)LN+K,NUM
```

```
4210 705 FORMAT(I5,5X,"&",I2,"*0./")
4220      WRITE(6,617)LN+11,(SHACTP(M),M=1,10)
4230      WRITE(10,617)LN+11,(SHACTP(M),M=1,10)
4240      WRITE(6,618)LN+12,(SHVEL(M),M=1,10)
4250      WRITE(10,618)LN+12,(SHVEL(M),M=1,10)
4260      WRITE(6,619)LN+13,(SHANG(M),M=1,10)
4270      WRITE(10,619)LN+13,(SHANG(M),M=1,10)
4280      LN=0
4290      GO TO 10
4300C
4310C      SHADOWING AIRCRAFT CHARACTERISTICS
4320C
4330 819 WRITE(6,184)
4340 184 FORMAT(1X,"ENTER NO. OF SHADOWING BUILDINGS")
4350      READ ,NSHBLD
4360      LN=69651
4370      WRITE(6,620)LN,NSHBLD
4380      WRITE(10,620)LN,NSHBLD
4390 620 FORMAT(I5,6X,"DATA NSHBLD/",I3,"/")
4400C
4410    DO 16 J=1,NSHBLD
4420      WRITE(6,185) J
4430 185 FORMAT(1X,"ENTER SHADOWING BUILDING HEIGHTS",I2)
4440      READ ,HBS(J)
4450 621 FORMAT(I5,6X,"DATA HBS/"9(F8.2,","),F8.2,"/")
4460C
4470      WRITE(6,186)J
4480 186 FORMAT(1X,"ENTER HEIGHT OF BLD",I2,1X,"RELATIVE TO GROUND")
4490      READ ,HBT(J)
4500 622 FORMAT(I5,6X,"DATA HBT/"9(F8.2,","),F8.2,"/")
4510C
4520      WRITE(6,187)J
4530 187 FORMAT(1X,"ENTER X & Y COORDS  OF LEFT & RIGHT SIDE FOR SHADOWING
4540& BUILDINGS",I2)
4550      READ ,(SHBLD(J,K),K=1,4)
4560 623 FORMAT(I5,6X,"DATA SHBLD/"9(F8.2,","),F8.2,"/")
4570  16 CONTINUE
4580      WRITE(6,621)LN+1,(HBS(J),J=1,10)
4590      WRITE(10,621)LN+1,(HBS(J),J=1,10)
4600      WRITE(6,622)LN+2,(HBT(J),J=1,10)
4610      WRITE(10,622)LN+2,(HBT(J),J=1,10)
4620      LN=69654
4630      NUM=40-NSHBLD*4
4640      WRITE(6,623)LN
4650      WRITE(10,623)LN
4660      DO 91 K=1,NSHBLD
4670      WRITE(6,706)LN+K,(SHBLD(K,L),L=1,4)
4680      WRITE(10,706)LN+K,(SHBLD(K,L),L=1,4)
4690 706 FORMAT(I5,5X,"&",4(F8.2,","))
4700  91 CONTINUE
4710      K=K+1
4720      WRITE(6,707)LN+K,NUM
4730      WRITE(10,707)LN+K,NUM
4740 707 FORMAT(I5,5X,"&",I2,"*0./")
4750      GO TO 10
4760C
4770C      AIRPORT AND FLIGHT CHARACTERISTICS
4780C
4790 823 WRITE(6,188)
4800 188 FORMAT(1X,"ENTER RUNWAY LENGTH IN FEET")
```

```
      READ ,RUNLEN
      LN=69971
      WRITE(6,624)LN,RUNLEN
      WRITE(10,624)LN,RUNLEN
 624 FORMAT(I5,6X,'DATA RUNLEN/',F8.2,'/')
C
    WRITE(6,189)
 189 FORMAT(1X,'ENTER RUNWAY WIDTH,IN FEET')
      READ ,RUNWID
      WRITE(6,625)LN+1,RUNWID
      WRITE(10,625)LN+1,RUNWID
 625 FORMAT(I5,6X,'DATA RUNWID/',F8.2,'/')
C
    WRITE(6,190)
 190 FORMAT(1X,'ENTER DATA RATE IN SECONDS,NOMINALLY 0.2 SECONDS')
      READ ,DRATE
      WRITE(6,626)LN+2,DRATE
      WRITE(10,626)LN+2,DRATE
 626 FORMAT(I5,6X,'DATA DRATE/',F4.2,'/')
C
      WRITE(6,196)
 196 FORMAT(1X,'ENTER NUMBER OF WAYPOINTS')
      READ ,NWAYPT
      WRITE(6,632)LN+3,NWAYPT
      WRITE(10,632)LN+3,NWAYPT
 632 FORMAT(I5,6X,'DATA NWAYPT/',I3,'/')
      LN=0
      LN=69900
    DO 17 L=1,NWAYPT
      WRITE(6,191)L
 191 FORMAT(1X,'ENTER WAYPOINT',I2,1X,'X,Y,Z COORDINATES')
      READ ,XPOS(L),YPOS(L),ZPOS(L)
 627 FORMAT(I5,6X,'DATA XPOS/')
 628 FORMAT(I5,6X,'DATA YPOS/')
 629 FORMAT(I5,6X,'DATA ZPOS/')
C
      WRITE(6,194)L
 194 FORMAT(1X,'ENTER VELOCITY OF RCVR IN FT/SEC FOR EACH SEGMENT',I2)
      READ ,VEL(L)
 630 FORMAT(I5,6X,'DATA VEL/')
C
      WRITE(6,195)L
 195 FORMAT(1X,'ENTER SAMPLING INCREMENT ALONG EACH SEGMENT',I2,1X,'IN FEET')
      READ ,DINC(L)
 631 FORMAT(I5,6X,'DATA DINC/')
  17 CONTINUE
 650 FORMAT(I5,5X,'&',9(F8.2,','),/,I5,5X,'&',9(F8.2,','),/,
&I5,5X,'&',9(F8.2,','),/,I5,5X,'&',9(F8.2,','),'/')
      WRITE(6,627)LN
      WRITE(10,627)LN
      WRITE(6,650)LN+1,(XPOS(N),N=1,9),LN+2,(XPOS(N),N=10,18),LN+3,
&(XPOS(N),N=19,27),LN+4,(XPOS(N),N=28,36)
      WRITE(10,650)LN+1,(XPOS(N),N=1,9),LN+2,(XPOS(N),N=10,18),
&LN+3,(XPOS(N),N=19,27),LN+4,(XPOS(N),N=28,36)
      WRITE(6,628)LN+5
      WRITE(10,628)LN+5
      WRITE(6,650)LN+6,(YPOS(N),N=1,9),LN+7,(YPOS(N),N=10,18),LN+8,
&(YPOS(N),N=19,27),LN+9,(YPOS(N),N=28,36)
      WRITE(10,650)LN+6,(YPOS(N),N=1,9),LN+7,(YPOS(N),N=10,18),
&LN+8,(YPOS(N),N=19,27),LN+9,(YPOS(N),N=28,36)
```

```
      WRITE(6,629)LN+10
      WRITE(10,629)LN+10
      WRITE(6,650)LN+11,(ZPOS(M),M=1,9),LN+12,(ZPOS(M),M=10,18),LN+13,
     & (ZPOS(M),M=19,27),LN+14,(ZPOS(M),M=28,36)
      WRITE(10,650)LN+11,(ZPOS(M),M=1,9),LN+12,(ZPOS(M),M=10,18),
     & LN+13,(ZPOS(M),M=19,27),LN+14,(ZPOS(M),M=28,36)
      WRITE(6,630)LN+15
      WRITE(10,630)LN+15
      WRITE(6,650)LN+16,(VEL(M),M=1,9),LN+17,(VEL(M),M=10,18),LN+18,
     & (VEL(M),M=19,27),LN+19,(VEL(M),M=28,36)
      WRITE(10,650)LN+16,(VEL(M),M=1,9),LN+17,(VEL(M),M=10,18),
     & LN+18,(VEL(M),M=19,27),LN+19,(VEL(M),M=28,36)
      WRITE(6,631)LN+20
      WRITE(10,631)LN+20
      WRITE(6,650)LN+21,(DINC(M),M=1,9),LN+22,(DINC(M),M=10,18),LN+23,
     & (DINC(M),M=19,27),LN+24,(DINC(M),M=28,36)
      WRITE(10,650)LN+21,(DINC(M),M=1,9),LN+22,(DINC(M),M=10,18),
     & LN+23,(DINC(M),M=19,27),LN+24,(DINC(M),M=28,36)
C
   WRITE(6,197)
197 FORMAT(1X,'ENTER CUTOFF ALTITUDE BETWEEN ELEVATION 1 AND 2')
      READ ,ZCUT
      LN=69980
      WRITE(6,633)LN,ZCUT
      WRITE(10,633)LN,ZCUT
633 FORMAT(I5,6X,'DATA ZCUT/',F8.2,'/')
C
   WRITE(6,198)
198 FORMAT(1X,'ENTER X,Y,Z COORDINATES OF THE GLIDE PATH INTERCEPTION
     & POINT')
      READ ,GPIP
      WRITE(6,634)LN+40,GPIP
      WRITE(10,634)LN+40,GPIP
634 FORMAT(I5,6X,'DATA GPIP/',2(F8.2,','),F8.2,'/')
 10 CONTINUE
      STOP
      END
```

*

APPENDIX C

SAMPLE OUTPUT

```
60060       BLOCK DATA
60100       LOGICAL FIRSTR
60110       INTEGER NSCNTR,ITRTRK,ITCCST,ITCCTS,ITCCAS,ITACST,ITRGDS,ITRGDV
60120       INTEGER SCNFMT
60130       LOGICAL FRAMST,FRAMND
60140       INTEGER ITRFRM,NENVTR,NFENTR,ICONCT,ITRPRC,ITRTH1,ITRTH2,MCTTRS
60150       INTEGER ITRSLW,ITSLCT
60160       REAL TZTRS,WCTRS,TDTRS,THTDTR,TRSCNW,TRBMWD,TMLTA,TMLTT
60170       REAL TRDWSM,TROOB,TRGRP,TRDGMN,TRGDMX,THFTR,TRDLY,TRSLWR
60180       REAL TRSLWA,TRSLWB
60190       REAL TRUNUS
60200       REAL ALPHA1(4),STDIFF(4),DTMAX(4)
60210       INTEGER SPCTMX(4)
60240       INTEGER IBEAM,IPHS
60250       REAL TBMWID,FBMWID,FOLDBM
60300       LOGICAL TIMPRT,CNTPRT,IFCORR
60310       INTEGER PRNTR
60330       COMMON/CMTRS/FIRSTR(4),NSCNTR(4),TZTRS(4),WCTRS(4),TDTRS(4),
60340      &  THTDTR(4),TRSCNW(4),TRBMWD(4),
60350      & ITRTRK(4),ITCCST(4),ITCCTS(4),ITCCAS(4),ITACST(4),TMLTA(4),
60360      &  TMLTT(4),
60370      & ITRGDS(4),TRDWSM(4),TROOB(4),TRGRP(4),
60380      & ITRGDV(4),TRDGMN(4),TRDGMX(4),
60390      & ITRFRM(4),NENVTR(4),NFENTR(4),ICONCT(4),ITRPRC(4),
60400      &  THFTR(4),TRDLY(4),ITRTH1(4),ITRTH2(4),MCTTRS(4),
60410      & ITRSLW(4),TRSLWR(4),TRSLWA(4),TRSLWB(4),ITSLCT(4),
60420      & TRUNUS(40)
60430        EQUIVALENCE (TRUNUS(1),ALPHA1(1)),(TRUNUS(5),SPCTMX(1))
60440       EQUIVALENCE (TRUNUS(9),STDIFF(1)),(TRUNUS(13),DTMAX(1))
60460       COMMON/CMTRS4/IBEAM(4),TBMWID,FBMWID,FOLDBM(4,13),IPHS(4)
60490       COMMON/CMTRS8/TIMPRT,CNTPRT,PRNTR,ANGHI(4),ANGLO(4),IFCORR
60510       COMMON/COVLM2/AZWID,AZHI
60540       COMMON/RTSPEC/NRSPEC(10),NTSPEC(10),ISPGRD,DUMRT(21)
60560        CHARACTER*4 TITLE1
60570       COMMON /TITLE/TITLE1(18)
60580       EQUIVALENCE(TITLE1(1),IDRUN)
60610       LOGICAL PLZD,PLZAZ,PLZE1,PLZE2
60620       COMMON/AZSYS/XMTRAZ(3),AZVEL(3),WLAZ,PLZAZ,DIMAZ,KWNAZ,KWNSAZ,
60630      &ITYPAZ,DUMERA(4),
60640      &AKOOAH,TCAZH,TSAZH,WRAZH,WOFAZH,NSCNAH,THAZH,DUMAZH(13),
60650      &AKOOAI,TCAZI,TSAZI,WRAZI,WOFAZI,NSCNAI,THAZI,DUMAZI(13),
60660      &DM1AZT,TSAZI,NPKAZT,FNAZT,WCAZT,NSNAZT,IOPAZT,IO2AZT,THFAZT,
60670      &TDTAZT,TDAZI,TZAZT,DM2AZT(8),
60680      & CSTAB,TSAB,NPKAB,TGAB,WCAB,NSCNAB,ILGAB,IERAB,DM1AB,
60690      & THDTAB,TDAB,TZAB,DM2AB(8)
60710       COMMON/DME/XMTRD(3),DUMVEL(3),WLD,PLZD,DIMDME,KWND,KWNSD,ITYPD,
60720      &DUMERD(4),
60730      &TMINCH,TRISEH,PRPH,WRDMEH,DMWOFH,NSCNDH,THDMIH,THDMUH,PLSWDH,
60740      &DUMDMH(11),
60750      &DMD1II(3),WRDMEI,DMWOFI,NSCNDI,DMTHDI,GAMDMI,TDELDI,TRISEI,PLSWDI,
60760      &TMINCI,PRPI,DMD2II(7),
60770      &WCDI,TPRPDT,TMUDT,TPWDDT,TMU2DT,TUPWDT,THFDDT,THFUDT,TURDI,
60780      &DUM1DT(7),NSCNDI,DUM3DT(3),
60790      &DMD1BE(2),WRDMEB,DMD2BE(4),THFDB,DM04BE(2),TDELDB,TMINCB,PRPB,
60800      &GAMDMB,TRISEB,PLSWDB,NSCNDB,TAURDB,DMD3BE(2)
60810       COMMON/EL1/XMTRE1(3),E1VEL(3),WLE1,PLZE1,DIMEL1,KWNE1,KWNSE1,
60820      &ITYPE1,DUMER1(4),
60830      &AKOO1H,TCE1H,TSE1H,WRE1H,WOFE1H,NSCN1H,THE1H,DUME1H(13),
60840      &AKOO1I,TCE1I,TSE1I,WRE1I,WOFE1I,NSCN1I,THE1I,DUME1I(13),
60850      &DM1E1T,TSE1I,NPKE1T,FNE1I,WCE1I,NSNE1I,IOPE1I,IO2E1I,THE1I,
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60860      &TDTE1T,TDE1T,TZE1T,DM2E1T(8),
60870      & CST1B,TS1B,NPK1B,TG1B,WC1B,NSCN1B,ILG1B,IER1B,DM11B,
60880      & THDT1B,TD1B,TZ1B,DM21B(8)
60900       COMMON/EL2/XMTRE2(3),E2VEL(3),WLE2,PLZE2,DIMEL2,KWNE2,KWNSE2,
60910      &ITYPE2,DUMER2(4),
60920      &AKOD2H,TCE2H,TSE2H,WRE2H,WOFE2H,NSCN2H,THE2H,DUME2H(13),
60930      &AKOD2I,TCE2I,TSE2I,WRE2I,WOFE2I,NSCN2I,THE2I,DUME2I(13),
60940      &MCTS2T,TSE2T,NPKE2T,FNE2T,WCE2T,NSNE2T,IOPE2T,IO2E2T,THFE2T,
60950      &TDTE2T,TDE2T,TZE2T,THST2T,DM2E2T(7),
60960      & CST2B,TS2B,NPK2B,TG2B,WC2B,NSCN2B,ILG2B,IER2B,DM12B,
60970      & THDT2B,TD2B,TZ2B,DM22B(8)
60990       COMPLEX ERG,ERS,ERO,DICSTB
61020       COMMON/BDICST/DICSTB(10)
61040       REAL NFZ
61050       COMMON /SURFAC/NR,NT,SURFS(9,20),ERS(20),SH2S(20),
61060      &    ERO,SH2O,NFZ,NA,NB,DUM4(101)
61070       COMMON /BUILD/NBLD,SH2G,ERG,BLD(4,10),HB(10),HBOT(10),SH2B(10),
61080      &    DUM5(90)
61090       COMMON /ACS/NAC,AC(4,10),NACTYP(10),ALT(10),DUMM6(140)
61100       COMMON /DIFSIG/SIGHAZ,SIGHDM,SIGHE1,SIGHE2,SIGLAZ,SIGLDM,SIGLE1,
61110      &SIGLE2
61120       COMMON /HMFR/HUMFF(3),HUMP(3),HUMFB(3), IHUMP
61140       COMMON /AIRPRT/RUNLEN,RUNWID,DRATE,XPOS(36),YPOS(36),ZPOS(36),
61150      & VEL(36),DINC(36),NWAYPT,DUMA11(2)
61160       COMMON/TRSJTR/TJTR(60,4),IPOINT(4,13),NSER(4)
61170       DIMENSION AZJIT(60),DMEJIT(60),EL1JIT(60),EL2JIT(60)
61180       EQUIVALENCE(TJTR(1,1),AZJIT(1)),(TJTR(1,2),DMEJIT(1)),
61190      & (TJTR(1,3), EL1JIT(1)),  (TJTR(1,4), EL2JIT(1))
61200       COMMON/EL2CUT/ZCUT
61210       COMMON/CMACPT/ACBNAZ,ACTTAZ,ACBNEL,ACTTEL
61240       COMMON/CMGPIP/GPIP(3)
61260       LOGICAL FIRST
61270       COMMON/FIRSTS/FIRST(4,4)
61290       COMMON/CNSTNT/PI,TWOPI,PI2,PIPI,RADIAN,DEGREE,SOL
61310       COMMON/COVLIM/E1AZLO,E1AZHI,E1ELHI,E2AZLO,E2AZHI,E2ELHI
61330       INTEGER SHACTP
61340       COMMON /SHDAC/NSHAC,SHPOS1(3,10),SHPOS2(3,10),SHACTP(10),
61350      &SHVEL(10),SHANG(10),DUMSHA(150)
61370       COMMON /SHDBLD/NSHBLD,SHBLD(4,10),HBS(10),HBT(10),DUMSHB(60)
61390       COMMON/BTILT/TILT(10),DMTILT(20)
61410       COMMON/CMDGU/WRGU(2,4),PRPGU(2,4),BETGU(2,4),TRGU(2,4),NSGU(2,4),
61420      & DUMGU1(32)
61440       COMMON/CMDFU/ITDFU(2,4),NDFU(2,4),ADFU(2,4)
61460       LOGICAL LDMFST
61470       COMMON/DME3/IDMTYP(2,4),IDMPLS(2,4),LDMFST(4)
61490       COMMON/DMETTL/TLINK(2,2),TSYST(3,4)
61510       COMMON/CMDDCU/DDUDEL(2,4),DBUGN(2,4),IDDUNS(2,4)
61530       COMMON/CMDTU/WRDTU(2,4),PRPDTU(2,4),WDDTU(2,4),TRDTU(2,4),
61540      & NSDTU(2,4),DMDTU(32)
61560       COMMON/CMDCU/WRDCU(2,4),PRPDCU(2,4),WDDCU(2,4),FNUDCU(2,4),
61570      & NSDCU(2,4),DMDCU1(48)
61590       COMMON/CMDCSU/WRDCSU(2,4),PRPCSU(2,4),WIDCSU(2,4),NSCSU(2,4),
61600      & DUMCSU(32)
61620       COMMON/BDGRND/GRNDBD(10)
61640       COMMON/ACGRND/GRNDAC(10)
61660       COMMON/CMEDIT/THROW(3),AZOUT,ELOUT,DELAY
61680       COMMON/AZRES/ DUMAZR(64),IAMB
61710       DATA IDRUN/9999/
61750       DATA FIRST/16*.TRUE./
61850       DATA PI/3.14159/
61900       DATA TWOPI/6.28318/
61910       DATA PI2/1.57079/
```

```
      DATA PIPI/9.86960/
      DATA RADIAN/0.0174532925/
      DATA DEGREE/57.2957/
      DATA SOL/9.834813E8/
      DATA ILINK/'UPLI', 'NK  ',
     & 'DOWN', 'LINK'/
      DATA ISYST/'DME ', 'MLS ', '    ',
     & 'DOPP', 'LER ', '    ',
     & 'TRSB', '    ', '    ',
     & 'DABS', '    ', '    '/
      DATA XMTRAZ/   12.00,   34.00,   67.00/
      DATA WLAZ/0.197/
      DATA PLZAZ/.TRUE./
      DATA DIMAZ/12.1/
      DATA ITYPAZ/1/
      DATA XMTRD/0.0,275.,15.0/
      DATA WLD/0.917/
      DATA PLZD/.TRUE./
      DATA DIMDME/4./
      DATA ITYPD/2/
      DATA DUMVEL/3*0./
      DATA IDMTYP/0, 0,  0, 0,  2, 2,  0, 0/
      DATA IDMPLS/0 ,0,  0, 0,  5, 5,  0, 0/
      DATA LDMFST/4*.TRUE./
      DATA ITDFU/0, 0,
     & 0, 0,
     & 1, 1,
     & 0,0/
      DATA NDFU/0, 0,
     & 0, 0,
     & 8, 8,
     & 0, 0/
      DATA ADFU/0., 0.,
     & 0., 0.,
     & -20., -20.,
     & 0., 0./
      DATA DDUDEL/
     & 0., 0.,
     & 0., 0.,
     & 100E-9, 100E-9,
     & 0., 0./
      DATA DDUGN/
     & 0., 0.,
     & 0., 0.,
     & -20., -20.,
     & 0., 0./
      DATA IDDUNS/
     & 0, 0,
     & 0, 0,
     & 8, 8,
     & 0, 0/
      DATA WRGU/
     & 0., 0.,
     & 0., 0.,
     & 1.041E9, 1.104E9,
     & 0., 0./
      DATA PRPGU/
     & 0., 0.,
     & 0., 0.,
     & 25E-3, 25E-3,
     & 0., 0./
      DATA RETGU/
```

```
63560      & 0., 0.,
63570      & 0., 0.
63580      & 1.423, 1.423,
63590      & 0., 0./
63600       DATA TRGU/
63610      & 0., 0.,
63620      & 0., 0.,
63630      & 2.5E-6, 2.5E-6,
63640      & 0., 0./
63650       DATA NSGU/
63660      & 0, 0,
63670      & 0, 0,
63680      & 25, 25,
63690      & 0, 0/
63810       DATA WRDTU/
63820      & 0., 0.,
63830      & 0., 0.,
63840      & 1.041E9, 1.104E9,
63850      & 0., 0./
63860       DATA PRPDTU/
63870      & 0., 0.,
63880      & 0., 0.,
63890      & 25E-3, 25E-3,
63900      & 0., 0./
63910       DATA WDDTU/
63920      & 0., 0.,
63930      & 0., 0.,
63940      & 3.5E-6, 3.5E-6,
63950      & 0., 0./
63960       DATA TRDTU/
63970      & 0., 0.,
63980      & 0., 0.,
63990      & 1E-6, 1E-6,
64000      & 0., 0./
64010       DATA NSDTU/
64020      & 0, 0,
64030      & 0, 0,
64040      & 25, 25,
64050      & 0, 0/
64370       DATA WRDCSU/
64380      & 0., 0.,
64390      & 0., 0.,
64400      & 1.041E9, 1.104E9,
64410      & 0., 0./
64420       DATA PRPCSU/
64430      & 0., 0.,
64440      & 0., 0.,
64450      & 25E-3, 25E-3,
64460      & 0., 0./
64470       DATA WTDCSU/
64480      & 0., 0.,
64490      & 0., 0.,
64500      & 3.5E-6, 3.5E-6,
64510      & 0., 0./
64520       DATA NSCSU/
64530      & 0, 0,
64540      & 0, 0,
64550      & 25, 25,
64560      & 0, 0/
64761       DATA XMITRE1/   45.00,   56.00,    9.90/
64770       DATA EIVEL/0., 0., 8300./
```

```
      DATA WLE1/0.197/
      DATA PLZE1/.TRUE./
      DATA DIMEL1/11.82/
      DATA ITYPE1/3/
      DATA XMTRE2/   67.00,     0.90,     0.70/
      DATA WLE2/0.197/
      DATA PLZE2/.TRUE./
      DATA DIMEL2/24./
      DATA ITYPE2/4/
      DATA FIRSTR/4*.TRUE./
      DATA NSCNTR/3, 0, 8, 8/
      DATA TZTRS/6.8E-3, 0., 3.333E-3, 3.067E-3/
      DATA WCTRS/5.06E9, 0., 5.06E9, 5.06E9/
      DATA TDTRS/75E-3, 0., 25E-3, 25E-3/
      DATA THTDTR/-2E4, 0.,-2E4, -1E4/
      DATA TRBMWD/3., 0., 2., 2./
      DATA ITRTRN/1, 0, 1, 1/
      DATA ITCCST/300, 0, 800, 800/
      DATA ITCCTS/8,0,20,20/
      DATA ITACST/8, 0, 20, 20/
      DATA ITRGDS/1, 0, 1, 1/
      DATA ITRDGV/1, 0, 1, 1/
      DATA TRDGMN/12.E-6, 0., 12.E-6, 12.E-6/
      DATA TRDGMX/350.E-6, 0., 350.E-6, 350.E-6/
      DATA NENVTR/25, 0, 25, 25/
      DATA NFENTR/10, 0, 10, 10/
      DATA THETR/-3., 0., -3., -3./
      DATA ITRTH1/1, 0, 1, 1/
      DATA ITRTH2/1, 0, 1, 1/
      DATA ITRSLW/9,9,9,9/
      DATA TRSLWR/0.07, 0., 0.025, 0.025/
      DATA TRSLWA/0.25, 0., 0.125, 0.125/
      DATA TRSLWB/0.03125, 0., 7.813E-3, 7.813E-3/
      DATA ITSLCT/1, 0, 1, 0/
      DATA IBEAM/1, 0, 1, 1/
      DATA ITRPRC/0, 0, 0, 0/
      DATA TRULY/0., 0., .5625, 0.5625/
      DATA ALPHA1/0.99875, 0., 0.99875, 0.99875/
      DATA SPCTMX/450, 0, 1200,1200/
      DATA STDIFF/0.,0.,16.E-6,16.E-6/
      DATA DTMAX/4*2.E-6/
      DATA NSEB/8, 0, 24, 24/
      DATA AZJIT/
     & 0E-3, 65E-3, 143E-3, 227E-3, 293E-3,
     &      377E-3, 447E-3, 511E-3, 592E-3, 657E-3,
     &      735E-3, 819E-3, 885E-3, 969E-3, 1039E-3,
     &     1103E-3, 1184E-3, 1249E-3, 1327E-3, 1411E-3, 40*0./
      DATA DMEJIT/60*0./
      DATA ELIJIT/
     & 0E-3, 31E-3, 53.8E-3, 65E-3, 96E-3,
     &     118.8E-3, 143E-3, 174E-3, 196.8E-3, 227E-3,
     &      259E-3, 280.8E-3, 293E-3, 324E-3, 346.8E-3,
     &      377E-3, 408E-3, 430.8E-3, 447E-3, 478E-3,
     &      500.8E-3, 511E-3, 542E-3, 564.8E-3, 592E-3,
     &      623E-3, 645.8E-3, 657E-3, 688E-3, 710.8E-3,
     &      735E-3, 766E-3, 788.8E-3, 819E-3, 850E-3,
     &      872.8E-3, 885E-3, 916E-3, 938.8E-3, 969E-3,
     &      1000E-3, 1022.8E-3, 1039E-3, 1070E-3, 1092.8E-3,
     &      1103E-3, 1134E-3, 1156.8E-3, 1184E-3, 1215E-3,
     &     1237.8E-3, 1249E-3, 1280E-3, 1302.8E-3, 1327E-3,
     &      1358E-3, 1380.8E-3,  340./
```

```
66840      DATA EL2JIT/
66850     & 0E-3, 20.8E-3, 53.8E-3, 65E-3, 85.8E-3,
66860     &      118.8E-3, 143E-3, 163.8E-3, 196.8E-3,227E-3,
66870     &      247.8E-3, 280.8E-3, 293E-3, 313.8E-3, 346.8E-3,
66880     &      377E-3, 397.8E-3, 430.8E-3, 447E-3, 467.8E-3,
66890     &      509.8E-3, 511E-3, 531.8E-3, 564.8E-3, 592E-3,
66900     &      612.8E-3, 645.8E-3, 657E-3, 677.8E-3, 710.8E-3,
66910     &     735E-3, 755.8E-3, 788.8E-3, 819E-3, 839.8E-3,
66920     &      872.8E-3, 885E-3, 905.8E-3, 938.8E-3, 969E-3,
66930     &      989.8E-3, 1022.8E-3, 1039E-3, 1059.8E-3, 1092.8E-3,
66940     &      1103E-3, 1123.8E-3, 1156.8E-3, 1184E-3, 1204.8E-3,  10*0./
66960      DATA IPOINT/52*1/
67050      DATA ANGHI/62.,0.,32.66,16./
67060      DATA ANGLO/-62.,0.,0.,-2./
67070      DATA TIMPRT/.FALSE./
67080      DATA OUTPRT/.TRUE./
67090      DATA PRNTR/13/
67100      DATA IFCORR/.TRUE./
67250      DATA THROW/1E-5, 1E-2, 3E-2/
67260      DATA AZOUT/3./
67270      DATA ELOUT/3./
67280      DATA DELAY/5E-6/
67430      DATA E1AZLO/-0.803/
67440      DATA E1AZHI/0.803/
67450      DATA E1ELHI/0.349/
67460      DATA E2AZLO/-0.524/
67470      DATA E2AZHI/0.524/
67480      DATA E2ELHI/0.175/
67540      DATA AZWIU/1.047/
67550      DATA AZHI/0.349/
67660      DATA ACBMAZ/1E5/
67670      DATA ACTTAZ/0./
67680      DATA ACBMEL/1E5/
67690      DATA ACTTEL/0./
68320      DATA ER0/(15.,0.)/
68330      DATA NFZ/2.8/
68340      DATA SH20/0.06562/
68350      DATA NA,NB/25,11/
68361      DATA NR/  1/
68362      DATA NT/  1/
68364      DATA SURFS/
68363     &   56.00,    7.00,    0.90,   77.00,    7.90,    9.00,   79.00,   34.00,    3.40,
68364     &   67.00,   78.00,   99.00,   67.00,   99.00,    0.60,   45.00,    4.50,   77.00,
        3  &162*0./
68372      DATA ERS/    7.00,   89.00,    0.  ,    0.  ,    0.  ,
68373     &    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
68374     &    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
68375     &    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,/
68376      DATA SH2S/   88.00,    8.90,    0.  ,    0.  ,    0.  ,
68377     &    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
68378     &    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
68379     &    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,/
68550      DATA NRSPEC/0/
68551      DATA NTSPEC/0/
68552      DATA ISPGRD/1/
68553      DATA SH2O/   56.00/
68554      DATA ERO/   78.00/
68641      DATA NBLD/  1/
68652     &    7.00,   89.00,    9.90,   80.00,
68654      DATA HB/ 34.00,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  /
68655      DATA HBOT/   78.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  /
68656      DATA SH2B/    9.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  /
68657      DATA RESIB/ 23.00,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  /
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      DATA DICSTB/ 23.00,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  /
      DATA TILT/ 90.00,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  ,  0.  /
      DATA GRNDBD/   12.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  /
      DATA NAC/  1/
      DATA AC/
     %    0.12,    0.50,   56.00,   67.00,
     %36*0./
      DATA NACTYP/    0.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  /
      DATA ALT/   78.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  /
      DATA GRNDAC/  99.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  /
      DATA SIGHAZ,SIGHDM,SIGHE1,SIGHE2/4*.5/
      DATA SIGLAZ,SIGLDM,SIGLE1,SIGLE2/4*1.0/
      DATA HUMPF/    0.  ,    0.  ,    0.  /
      DATA HUMP/    0.  ,    0.  ,    0.  /
      DATA HUMPB/    0.  ,    0.  ,    0.  /
      DATA NSHAC/  1/
      DATA SHPOS1/
     %   78.00,   88.00,   99.00,
     %27*0./
      DATA SHPOS2/
     %   78.00,   99.00,   67.00,
     %27*0./
      DATA SHACTP/   45.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  /
      DATA SHVEL/   78.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  /
      DATA SHANG/   89.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  /
      DATA NSHBLD/  1/
      DATA HBS/   45.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  /
      DATA HBT/   89.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  /
      DATA SHBLD/
     %   89.00,   78.00,   99.00,   56.00,
     %36*0./
      DATA RUNLEN/   78.00/
      DATA RUNWID/   78.00/
      DATA DRATE/9.80/
      DATA NWAYPT/  1/
      DATA XPOS/
     %   45.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
     %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
     %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
     %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  */
      DATA YPOS/
     %   67.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
     %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
     %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
     %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  */
      DATA ZPOS/
     %   99.00,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
     %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
     %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
     %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  */
      DATA VEL/
     %   67.90,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
     %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
     %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
     %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  -/
      DATA DINC/
     %   89.70,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
     %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
     %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,
     %    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  ,    0.  -/
      DATA ZCUT/   67.89/
      DATA GRID/   77.00,   89.00,   13.00,
      END
```