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SEATIDE ANALYSIS PROCESS. VOLUME IID. NAVAL ENGAGEMENT MODEL (N--ETC(U)
FEB 75 DAAB09-72-C-0062
UNCLASSIFIED VSD-00.1636-VOL-2D-REV-A NL

1 OF 3
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SEATIDE ANALYSIS PROCESS

VOLUME IID

NAVAL ENGAGEMENT MODEL (NEM)

APPENDIX N

REPORT NO. 00.1636
JANUARY 1974
(CONTRACT DAAB09-72-C-0062)

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NAVAL ENGAGEMENT MODEL (NEM).

APPENDIX N. Revision A.

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FOREWORD

(U) This report was prepared by the Vought Systems Division, LTV Aerospace Corporation, P.O. Box 6267, Dallas, Texas 75222 under U. S. Army Electronics Command Contract DAAB09-72-C-0062. The work was initiated under the direction of Captain R. A. Dowd, USN and completed under Captain W. A. Greene, USN, Chief, Long Range Forecast Division, Directorate of Estimates, Defense Intelligence Agency (DIA-DE-1).

(U) Persons contributing to the development and testing of the procedure reported herein include:

DIA-DE-1

Capt. W. A. Greene, USN
Capt. R. A. Dowd, USN (Retired)
Capt. R. F. Weiss, USAF
Mr. R. E. McQuiston

ARPA

Cmdr. T. W. Hogan, USN

VSD

Mr. J. S. Smith, Jr.	Chief Project Engineer, Special Projects
Dr. L. D. Gregory	Project Engineer, SEATIDE
Mr. J. R. Matthews	Models and Analysis
Mr. F. E. Dye, Jr.	Technologies (CM-CGSM)
Mr. R. K. McDonough	Models and Analysis (CM-CGSM)
Mr. R. E. Dyer	Models and Analysis (NEM)
Mr. G. G. Johnson	Aerodynamics
Dr. J. A. Bottorff	Propulsion
Mr. A. C. Morris	Electronics (Radar, Guidance)
Mr. H. R. Crow	Operations Research
Mr. G. H. Harris	Operations Research
Mr. G. S. McCorkle	Propulsion
Mr. L. D. Cardwell	Propulsion

(U) This report has been prepared in the following volumes:

Volume	Classification	Title
I	S	Summary
IIA	U	Naval Engagement Model (NEM) - Users Manual
IIB	U	NEM - Appendices A - I
IIC	S	NEM - Appendices J - M
IID	U	NEM - Appendix N
IIIA	U	Cruise Missile - Concept Generation and Screening Model (CM-CGSM) - Users Manual
IIIB	U	CM-CGSM Appendices A-B
IIIC	S	CM-CGSM Appendix C
IIID	U	CM-CGSM Appendices D-G
IIIE	U	CM-CGSM Appendix H
IV	S	Relative Worth Model (RWM)
V	U	Relative Cost Model (RCM)

ABSTRACT

(U) The SEATIDE Analysis Process is a semi-automated procedure for the generation of time-phased, high value cruise missile weapon systems concepts, together with the supporting technology and intelligence indicators which would reflect that these technological goals are being achieved. The SEATIDE process can also be used to evaluate the effectiveness of fixed force levels, existing forces in SAL environments, or Naval defenses.

(U) The Defense Intelligence Agency, through its Directorate of Estimates, and The Advanced Research Projects Agency (ARPA) have sponsored the development of this computer based analysis at the weapon system and Naval force structure level. A previous process, RIPTIDE, was developed for DIA for use in analysis of strategic missile systems.

(U) Generic to the SEATIDE Analysis Process are three major computer models: The Naval Engagement Model (NEM), Cruise Missile Concept Generation and Screening Model (CM-CGSM) and Relative Worth Model (RWM). The NEM evaluates force effectiveness, tactics, and task force configurations; the CM-CGSM enables definition and selection of candidate, advanced cruise missile system concepts; and the RWM permits assessment of worth in accordance with a variety of objective and subjective criteria. Each of these models has been checked out by DIA.

(U) In addition to exercising the computer models, there are several other analytical and engineering tasks to be performed, e.g., the identification of areas of current interest and the associated criteria and potential concepts, the creation of a foreign technology data bank in a format needed by the computer models, the engineering of concepts to the required detail, and the use of a verification analysis loop.

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K. Ship Kill Functions
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M. Miscellaneous Systems Data

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Appendix N. Naval Engagement Model (NEM) - Fortran Source Program

TITLE	Appendix N
NAVAL ENGAGEMENT MODEL (NEM) FORTRAN SOURCE PROGRAM	NO.
	DATE January 1974

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Appendix N completely revised.

PREPARED BY R. C. Myers

APPROVED BY L. D. Brayley

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APPENDIX N

NAVAL ENGAGEMENT MODEL (NEM) FORTRAN SOURCE PROGRAM

1. INTRODUCTION

Appendix N gives the source program listing for the Naval Engagement Model (NEM). The NEM was written in Fortran IV EBCDIC for the IBM 360 computer. Approximately 9500 source cards make up the 81 subprograms of the NEM.

The listing in Section 2.0 reflects the status of the NEM as delivered to DIA on 19 Jan 1974. The NEM subprograms are grouped by function (related routines are grouped together) and listed in the approximate order of execution. Section 3.0 provides an index to the listing by function. Section 4.0 provides an alphabetical index.

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2. LISTING

```
C   PGM=NXX(NFM)      MAIN PROGRAM                                                    NXX 0010
C   MODS.MAIN,KILLHF,STATE,RADAR,FFACT,SEAREF.          VER.13  11-25-74            NXX 0020
C   ADD .STRING,SIGOS.                                  VER.13  11-25-74            NXX 0030
C                                                                                   NXX 0040
C       DEFINE FILE 4(1CCC,40,U,JD4)                                                NXX 0050
        DEFINE  FILE 11( 180,555,U,JD11)                                            NXX 0060
       COMMON/DEVICE/ N1,N2,N3,N4,N5,N6,N7,N8,N9,N10,N11,N12                        NXX 0070
        INTEGER  ZIP,ZCODE,Z1,Z2,Z3,Z4,Z5,Z6,Z7,Z8,Z9                               NXX 0080
        COMMON/INOUT/NLINE,NPAGE,PCODE(20),MISC(7),XMISC(7),ZIP,ZCODE(19)           NXX 0090
      1, JRASH(20),TRASH(20),IR(8),IC(8),DUM(8),IDUM(8),NFLAG,NFLAG2                NXX 0100
        EQUIVALENCE  (ZCODE(1),Z1),(ZCODE(2),Z2),(ZCODE(3),Z3)                      NXX 0110
      1             ,(ZCODE(4),Z4),(ZCODE(5),Z5),(ZCODE(6),Z6)                      NXX 0120
      2             ,(ZCODE(7),Z7),(ZCODE(8),Z8),(ZCODE(9),Z9)                      NXX 0130
        COMMON/KLAS/ CLAS(20)                                                       NXX 0140
        COMMON/INOUU/IPR(16),JPAR(16),PAR(16),LABEL                                 NXX 0150
        COMMON/INOU4/JD4                                                            NXX 0160
C       COMMON/INOU9/JD9,ND9,NB9,INDX9(  10,6)                                      NXX 0170
        COMMON/INOU11/ JD11,ND11,NB11,INDX11(180,7)                                 NXX 0180
        NAMELIST/NAM1/MISC,XMISC,IPR,JPAR,PAR,NPAGE,LABEL                           NXX 0190
CFORMATS                                                                            NXX 0200
 1000   FORMAT(1X,19A4,A3)                                                          NXX 0210
 2000   FORMAT(1H1,71X, 4HPAGE,I4/6X,19A4,A3)                                       NXX 0220
 1002   FORMAT(A4,3I2,I10,4I5,10A4)                                                 NXX 0230
 2002   FORMAT(/6X,A4,3I2,I10,4I5,10A4)                                             NXX 0240
 1003   FORMAT (10X,7G10.3)                                                         NXX 0250
 2003   FORMAT (10X,7G13.6)                                                         NXX 0260
 2005   FORMAT(1HO,20HERROR IN MAIN AT EL=,F8.2,3X,A4,3I2,I10,4I5,10A4)             NXX 0270
 2006   FORMAT(//////////44X, 4HNXX //                                              NXX 0280
     1        44X, 4HXXXX//                                                        NXX 0290
     2        35X,'VOUGHT SYSTEMS DIVISION',  //                                   NXX 0300
     3        34X,25HLTV AEROSPACE CORPORATION          //                        NXX 0310
     4        37X,19HDALLAS, TEXAS 75222 )                                        NXX 0320
C***  SAMPLE ZIPS FOR BASIC TABLE HANDLING                                          NXX 0330
CIP  3                          START NEW BASIC TABLE FILE(REPLACE OLD)            NXX 0340
CIP  7 1 1                      READ BASIC TABLE & ADD TO DISK 11                  NXX 0350
CIP  7 1 2                      FIND AND PRINT FOLLOWING BASIC TABLE               NXX 0360
CABLE NO.   ID1.....     ID2      (ONE ID CARD)                                     NXX 0370
CIP  7 1 4                   -1 UPDATE BASIC TABLE.TEMP IF -1 IN COL.30            NXX 0380
CIP  7 1 5                      REPLACE FOLLOWING BASIC TABLE ON DISK 11           NXX 0390
CIP  7 1 6                      PRINT ALL BASIC TABLES NOW ON DISK11               NXX 0400
CIP  7 3                        DELETE ALL TEMPORARY TABLES ON DISK11              NXX 0410
CIP 11 1 P  ID1.....   -N       UPDATE ORIG. TABLE=ID1,EXT=-N,NAMELIST             NXX 0420
CIP 11 2 P  ID1.....   -N       UPDATE BASIC TABLE UPDATE IF ANY                   NXX 0430
C***                                                                                NXX 0440
        DATA  BLANK/'    '/                                                         NXX 0450
        NFLAG = 0                                                                   NXX 0460
        NFLAG2= 0                                                                   NXX 0470
        ND9   = 1                                                                   NXX 0480
        NB9   = 0                                                                   NXX 0490
        LAA1 =  27                                                                  NXX 0500
        MAA1 =  12                                                                  NXX 0510
        KZARL=  96 + LAA1*(5+MAA1)                                                  NXX 0520
        IMAGE = 1                                                                   NXX 0530
        JD11 = 1                                                                    NXX 0540
        READ (N11'JD11,ERR=1)  ND11,NB11,INDX11                                     NXX 0550
```

```
 1      NPAGE = 1                                                        NXX 0560
 101    READ (N5,1000) CLAS, PCODE                                       NXX 0570
        IF (PCODE(1).EQ.BLANK.OR.IMAGE.EQ.0)  IMAGE=0                    NXX 0580
 2      CALL PAGE                                                        NXX 0590
        WRITE(N6,2006)                                                   NXX 0600
 900    CALL PAGE                                                        NXX 0610
        IF (IMAGE.EQ.1)  GO TO 38                                        NXX 0620
 902    F1 = 902.                                                        NXX 0630
        READ(N5,1002,END= 10,ERR=9021) ZCODE                             NXX 0640
        IF (IPR(1).EQ.0)  GO TO 9022                                     NXX 0650
        WRITE(N6,2002) ZCODE                                             NXX 0660
        NLINE = NLINE + 2                                                NXX 0670
C**                                                                      NXX 0680
 9022   GO TO (1,2,3,4,5,6,7,8,9,10,11,12) ,Z2                           NXX 0690
 9021   NFLAG = NFLAG + 1                                                NXX 0700
        WRITE(N6,2005) F1, ZCODE                                         NXX 0710
        GO TO 902                                                        NXX 0720
C**READ INOUT PARAMETERS                                                 NXX 0730
 3      ND11 = 3                                                         NXX 0740
        NB11 = 0                                                         NXX 0750
        GO TO 902                                                        NXX 0760
 38     CALL  CARD(N5,N6,N9, CLAS,PCODE)                                 NXX 0770
        IMAGE = 0                                                        NXX 0780
        N5  = N9                                                         NXX 0790
        GO TO 101                                                        NXX 0800
 4      IF (Z3.GT.1)  GO TO 42                                           NXX 0810
        READ (N5,NAM1)                                                   NXX 0820
        WRITE(N6,NAM1)                                                   NXX 0830
        GO TO 900                                                        NXX 0840
 42     GO TO 902                                                        NXX 0850
 5      GO TO 902                                                        NXX 0860
 6      CALL  LCHEK(ZCODE,N5,N6)                                         NXX 0870
        GO TO 902                                                        NXX 0880
C**  READ  ASIC TABLES AND STORE ON DA DISK 11                           NXX 0890
 7      IX = Z4                                                          NXX 0900
        IF (Z3.GE.2)  GO TO 73                                           NXX 0910
        IPR(1) = 0                                                       NXX 0920
        IF (Z4.NE.1)   IPR(1)=1                                          NXX 0930
        CALL  TBASIC(IX)                                                 NXX 0940
        GO TO 902                                                        NXX 0950
C***  DELETE ALL TEMPORARY TABLES ON DISK11                              NXX 0960
 73     K   = 0                                                          NXX 0970
        DO 7301 I=1,NB11                                                 NXX 0980
        IF (INDX11(I,7).GE.0)  GO TO 7301                                NXX 0990
        K   = K + 1                                                      NXX 1000
        INDX11(I,2) = 0                                                  NXX 1010
 7301   CONTINUE                                                         NXX 1020
        NB11 = NB11 - K                                                  NXX 1030
        IF (K.GT.0)  ND11=INDX11(NB11+1,4)                               NXX 1040
        IF (Z2.EQ.10)  GO TO 1001                                        NXX 1050
        GO TO 902                                                        NXX 1060
 8      IX  = Z4                                                         NXX 1070
        IPR(1) = 1                                                       NXX 1080
        IF (Z3.LE.0)  GO TO 8C                                           NXX 1090
        GO TO (81,82,83,84,85,86), Z3                                    NXX 1100
```

```
C                                                                       NXX 1110
 80     CALL   PAGE                                                     NXX 1120
        CALL   SETUPA(IX)                                               NXX 1130
        CALL   SETUPB(IX)                                               NXX 1140
        CALL   SETUPC(IX)                                               NXX 1150
        CALL   SETUPD(IX)                                               NXX 1160
        CALL SETUPE(IX)                                                 NXX 1170
        CALL   SETUPF(IX)                                               NXX 1180
        CALL   ALLXYZ(-4.,1,N6,IXX)                                     NXX 1190
        CALL  ALLXYZ( 0.,1,N6,IXX)                                      NXX 1200
        GO TO 902                                                       NXX 1210
 81     IF (NLINE.GT.10)  CALL PAGE                                     NXX 1220
        CALL SETUPA(IX)                                                 NXX 1230
       CALL  ALLXYZ(.0,1,N6,IXX)                                        NXX 1240
        CALL   ALLXYZ(-.25,1,N6,IXX)                                    NXX 1250
        GO TO 902                                                       NXX 1260
 82     CALL   SETUPB(IX)                                               NXX 1270
        GO TO 902                                                       NXX 1280
 83     CALL SETUPC(IX)                                                 NXX 1290
        GO TO 902                                                       NXX 1300
 84     CALL   SETUPD(IX)                                               NXX 1310
        GO TO 902                                                       NXX 1320
   85   CALL SETUPF(IX)                                                 NXX 1330
        GO TO 902                                                       NXX 1340
 86     CALL   SETUPE(IX)                                               NXX 1350
        GO TO 902                                                       NXX 1360
 9      CALL   XECUTE                                                   NXX 1370
        GO TO 902                                                       NXX 1380
 10     GO TO 73                                                        NXX 1390
 1001   JD11 = 1                                                        NXX 1400
        WRITE(N11'JD11)  ND11,NB11,INDX11                               NXX 1410
        WRITE(N6,2003)  ND9,NB9,ND11,NB11                               NXX 1420
        STOP                                                            NXX 1430
 11     CALL   UPDA(Z3,Z4,Z5,Z6,IXX)                                    NXX 1440
        IF (IXX.GT.0)  NFLAG=NFLAG+1                                    NXX 1450
        GO TO 902                                                       NXX 1460
 12     IF (Z4.GE.0)  GO TO 1201                                        NXX 1470
        N5  = NN5                                                       NXX 1480
        REWIND  N8                                                      NXX 1490
        GO TO 902                                                       NXX 1500
 1201   NN5 = N5                                                        NXX 1510
        CALL   STRING(Z3,Z4,Z5,Z6,N5,N6,N8,ZCODE)                       NXX 1520
        GO TO 902                                                       NXX 1530
        END                                                             NXX 1540


        SUBROUTINE PAGE                                                 PAGE0010
C** PGM=NXX          L.D.GREGORY. VER.1  11-15-72. FORTRAN IV. . EBCD   PAGE0020
        COMMON/INOUT/NLINE,NPAGE,PCODE(20),IDUM(108)                    PAGE0030
        COMMON/KLAS/ CLAS(20)                                           PAGE0040
 1000   FORMAT(//26X,19A4,A3/1H1,25X,19A4,A3/)                          PAGE0050
 2000   FORMAT(6X,19A4,A3,6X, 4HPAGE,I4/)                               PAGE0060
        WRITE( 6,1000) CLAS, CLAS                                       PAGE0070
        WRITE( 6,2000) PCODE,NPAGE                                      PAGE0080
```

```
      NPAGE = NPAGE + 1                                                 PAGE0090
      NLINE = 8                                                         PAGE0100
      RETURN                                                            PAGE0110
      END                                                               PAGE0120


      SUBROUTINE WCBD11(BZA,LZA,MZA,NCB,KZRL,ID1,ID2,ID3,IX,IXX)        WCBD0010
     COMMON/DEVICE/ N1,N2,N3,N4,N5,N6,N7,N8,N9,N10,N11,N12              WCBD0020
C  PGM=NXX(NEM) MODS.INDX11(180)=300.                    VER.3    1-10-75 WCBD0030
C  PGM=NU5.  SEM.                          VER.2. 04-22-71.FORTRAN IV.FBCD.WCBD0040
C  UTILITY 360 O/S. VER.2. 02-19-71.     L.D.GREGORY,UNIT 3-53300,EXT 510WCBD0050
C  BZA IS BZA(LZA,MZA)                                                  WCBD0060
C  TO WRITE COMMON BLOCKS ON DIRECT ACCESS(DISK) FILE 11                WCBD0070
C  NCB  = COMMON BLK NO., =1 FOR COMMON/CZAZA/, =2 FOR /CZAZB/, ETC.    WCBD0080
C  ID1  = IDENTIFIER NO.1 (PERHAPS AN INDENTURED CODE) OF THIS LOAD     WCBD0090
C  ID2  = IDENTIFIER NO.2 (PERHAPS THE SEQUENCE NO.  ) OF THIS LOAD     WCBD0100
C  ID3  = IDENTIFIER NO.3 (PERHAPS THE DATE OF THE DATA)                WCBD0110
C       =  OR, USE AS FIRST AND LAST NOS. OF TABLES IN THIS LOAD        WCBD0120
C  IX   = ON INPUT(=1 USE ID1,=2 USE ID2,=3 USE BOTH,=4 USE RANGE)      WCBD0130
C  IXX  = ON OUTPUT(=0 LOADED O.K.,=1 TROUBLE)                          WCBD0140
C  KZRL = NO.OF 4-BYTE WORDS IN EACH LOAD                               WCBD0150
C  JD11  = FILE 11 ASSOC.VARIABLE. SEE MAIN AND   //GO.FT11F001  DD     WCBD0160
C* ND11  = VALUE OF FIRST FREE RECORD ON DISK 11                        WCBD0170
C  NB11  = CURRENT(AND FINAL) NO. OF LOADS ON FILE 11                   WCBD0180
C  LZ11  = NO OF 4-BYTE WORDS IN FIXED LENGTH RECORD ON FILE 11         WCBD0190
C  MZ    = NO OF LOGICAL RECORDS EACH OF LENGTH LZ11 IN LOAD'I'.        WCBD0200
C  KEEP  LZA = LZ11                                                     WCBD0210
C  INDX11(I,J) ,     FOR I = LOAD NO.(EACH TIME A COMMON BLK IS EMPTIED WCBD0220
C                          = NB11(CURRENT)              IS ONE LOAD).  WCBD0230
C    FOR  J=1  , =  NCB, COMMON BLK NO.                                 WCBD0240
C         J=2  , =  ID1, IDENTIFIER NO. 1                               WCBD0250
C         J=3  , =  ID2, IDENTIFIER NO. 2                               WCBD0260
C         J=4  , =  ND11  =  START OF TABLE NB11 ON DISK 11             WCBD0270
C         J=5  , =  KZRL  =  SEE ABOVE                                  WCBD0280
C         J=6  , =  BLKSIZE ON DISK 11                                  WCBD0290
C         J=7  , =  ID3, IDENTIFIES NO. 3                               WCBD0300
      COMMON/INOU11/ JD11,ND11,NB11,INDX11(180,7)                       WCBD0310
      DIMENSION  BZA(KZRL)                                              WCBD0320
      DATA  LINDX/ 180/                                                 WCBD0330
 2000 FORMAT(1HO,'BASIC TABLE INDEX=INDX11(   ,7) IS FULL AT NO. OF TABWCBD0340
     1LES=', I4/1X,'ID1, ID2=', 2I12)                                   WCBD0350
C***                                                                    WCBD0360
C***                                                                    WCBD0370
 1    NB11 =  NB11 + 1                                                  WCBD0380
      IF (NB11.GT.LINDX)   GO TO 12                                     WCBD0390
      INDX11(NB11,1) = NCB                                              WCBD0400
      INDX11(NB11,2) = ID1                                              WCBD0410
      INDX11(NB11,3) = ID2                                              WCBD0420
      INDX11(NB11,4) = ND11                                             WCBD0430
      MZ             = (KZRL-1)/LZA   + 1                               WCBD0440
      INDX11(NB11,5) = KZRL                                             WCBD0450
      INDX11(NB11,6) = LZA                                              WCBD0460
      INDX11(NB11,7) = ID3                                              WCBD0470
C***  UNLOAD  BZA                                                       WCBD0480
```

```
 8      JD11 = ND11                                                    WCBD0490
 10     WRITE(N11'JD11) BZA                                            WCBD0500
        ND11 = JD11                                                    WCBD0510
        IXX= 0                                                         WCBD0520
        RETURN                                                         WCBD0530
 12     WRITE(N6,2000)  NB11,ID1,ID2                                   WCBD0540
        STOP                                                           WCBD0550
C***                        ***                          ***           WCBD0560
C***                        ***                          ***           WCBD0570
        ENTRY       RCBD11(BZA,LZA,MZA,NCB,KZRL,ID1,ID2,IX,IXX)        WCBD0580
C                                                                      WCBD0590
C  PGM=NU5.  SEM.                          VER.2. 04-22-71.FORTRAN IV.EBCD.WCBD0600
C  UTILITY 360.VER.2.    02-19-71  L.D.GREGORY    FORTRAN IV     EBCD  WCBD0610
C  TO READ FROM DIRECT ACCESS(DISK)  FILE 11 INTO COMMON BLOCK NCB=1,2  WCBD0620
C  NCB, ID1, ID2, IX - SAME AS ABOVE.      KZRL= DUMMY                  WCBD0630
C  MATCH ID CODES                                                      WCBD0640
        KRW = 0                                                        WCBD0650
 29     ASSIGN  46 TO KS1                                              WCBD0660
        IF (IX.EQ.3)  ASSIGN  32 TO KS1                                WCBD0670
        GO TO (30,40,30), IX                                           WCBD0680
 30     DO 34 J=1,NB11                                                 WCBD0690
        I = NB11 - J + 1                                               WCBD0700
        IF (ID1.NE.INDX11(I,2) )  GO TO 34                             WCBD0710
        GO TO KS1, (32,46)                                             WCBD0720
 32     IF (ID2.NE.INDX11(I,3) )  GO TO 34                             WCBD0730
        GO TO 46                                                       WCBD0740
 34     CONTINUE                                                       WCBD0750
        IF (KRW.EQ.1)   GO TO 1                                        WCBD0760
        GO TO 43                                                       WCBD0770
 40     DO 42 J=1,NB11                                                 WCBD0780
        I = NB11 - J + 1                                               WCBD0790
        IF (ID2.EQ.INDX11(I,3) )  GO TO 46                             WCBD0800
 42     CONTINUE                                                       WCBD0810
        IF(KRW.EQ.1) GO TO 1                                           WCBD0820
 43     IXX= 1                                                         WCBD0830
        RETURN                                                         WCBD0840
C***    ID CODES MATCH                                                 WCBD0850
 46     JB11 = I                                                       WCBD0860
        KZ   = INDX11(JB11,5)                                          WCBD0870
       JD11 = INDX11(JB11,4)                                           WCBD0880
        IF (KRW.NE.0)  GO TO 60                                        WCBD0890
C***    LOAD IN BZA                                                    WCBD0900
 52     READ(N11'JD11) BZA                                             WCBD0910
        IXX= 0                                                         WCBD0920
        RETURN                                                         WCBD0930
C***                        ***                          ***           WCBD0940
C***                        ***                          ***           WCBD0950
        ENTRY       WWBD11(BZA,LZA,MZA,NCB,KZRL,ID1,ID2,ID3,IX,IXX)    WCBD0960
C                                                                      WCBD0970
C  PGM=NU5.  SEM.                          VER.2. 04-22-71.FORTRAN IV.EBCD.WCBD0980
C  UTILITY 360.VER.2.    02-19-71  L.D.GREGORY    FORTRAN IV     EBCD  WCBD0990
C  TO RE-WRITE ONTO DIRECT ACCESS(DISK)  FILE 11 INTO SAME SPACE       WCBD1000
C  MATCH ID CODES                                                      WCBD1010
        KRW = 1                                                        WCBD1020
        GO TO 29                                                       WCBD1030
```

```
C***    LOAD IN BZA                                                    WCBD1040
 60     WRITE(N11'JD11) BZA                                            WCBD1050
        IXX= 0                                                         WCBD1060
        INDX11(JB11,7) = ID3                                           WCBD1070
        RETURN                                                         WCBD1080
        END                                                            WCBD1090


        SUBROUTINE  WMAT3(KIND,IX,X,LA,MA,NA,L,M,N,NLINE,TTL)          WMAT0010
C   PGM=NXX  VER.3.  4-25-73  NEM  L.D.GREGORY  IBM 360   EBCD        WMAT0020
C   UTILITY TRIPLEX. VER.1.  7/19/70.  FORTRAN IV.       EBCD        WMAT0030
C   PURPOSE. WRITE A MATRIX  N  FROM A SERIES OF  NA  SUCH.           WMAT0040
C   KIND = 1, INTEGER                                                 WMAT0050
C        = 2, REAL                                                    WMAT0060
        DIMENSION  IX(LA,MA,NA), X(LA,MA,NA), TTL(15)                  WMAT0070
 2000   FORMAT(1H1,71X, 4HPAGE,I4/6X,19A4,A3)                          WMAT0080
 2002   FORMAT(/6X,12HMATRIX NO.= ,I4/6X,15A4)                         WMAT0090
 2004   FORMAT(6X,4H ROW,10(2X,4HCOL.,I2,4X) )                         WMAT0100
 2007   FORMAT(5X,I5,10G12.5/(10X,10G12.5) )                           WMAT0110
 2008   FORMAT(5X,I3,11C,9I12/(6X,10I12))                              WMAT0120
        ASSIGN 141 TO KS1                                              WMAT0130
        IF (KIND.EQ.2)  ASSIGN 142 TO KS1                              WMAT0140
        INCR = M/10 + 1                                                WMAT0150
        INCM = INCR*L + 6                                              WMAT0160
        IF (NLINE + INCM - 61)  6, 6, 4                                WMAT0170
 4      CALL PAGE                                                      WMAT0180
C                                  DELETED                             WMAT0190
        NLINE = 9                                                      WMAT0200
 6      NLINE = NLINE + 4                                              WMAT0210
        WRITE(6,2002)   N,TTL                                          WMAT0220
        K    = MIN0(10,M) - 1                                          WMAT0230
        WRITE(6,2004) (J,J=1,K)                                        WMAT0240
        I  = 0                                                         WMAT0250
 14     I  = I + 1                                                     WMAT0260
        GO TO KS1, (141,142)                                           WMAT0270
 141    WRITE(6,2008) I,(IX(I,J,N),J=1,M)                              WMAT0280
        GO TO 143                                                      WMAT0290
 142    WRITE(6,2007) I,( X(I,J,N),J=1,M)                              WMAT0300
 143    NLINE = NLINE + INCR                                           WMAT0310
        IF (I-L) 16,18,18                                              WMAT0320
 16     IF (NLINE + INCR - 60) 14,14, 4                                WMAT0330
 18     RETURN                                                         WMAT0340
        END                                                            WMAT0350


        SUBROUTINE  WRITRX(X,LXA,MXA,L,M,VAR,INX,NLINE,NPAGE,PCODE,TITLE)WRRX0010
C  LA0268. VER. 2  08/18/70 SCREENING.  L.D.GREGORY 3-55100 EXT. 510   WRRX0020
C  UTILITY 360/65. SUBR.WRITRX.VER.1. 12/06/69. FORTRAN IV       EBCD  WRRX0030
        DIMENSION  X(LXA,MXA),TITLE(15),PCODE(20)                      WRRX0040
 2000   FORMAT(1H1,71X, 4HPAGE,I4/6X,19A4,A3)                          WRRX0050
 2002   FORMAT(/6X,4HVAR=,F12.5/6X,15A4)                               WRRX0060
 2004   FORMAT(6X,4H ROW,10(2X,4HCOL.,I2,4X) )                         WRRX0070
 2007   FORMAT(5X,I5,10G12.5/(10X,10G12.5) )                           WRRX0080
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```
      I  = 0                                                          WRRX0090
 1    INX = 0                                                         WRRX0100
      INCR = M/10 + 1                                                 WRRX0110
      INCM = INCR*L + 6                                               WRRX0120
      IF (NLINE + INCM - 61)  6, 6, 4                                 WRRX0130
 4    CALL PAGE                                                       WRRX0140
      NLINE = 8                                                       WRRX0150
 6    NLINE = NLINE + 4                                               WRRX0160
      WRITE(6,2002) VAR,TITLE                                         WRRX0170
      K    = MIN0(10,M) - 1                                           WRRX0180
      WRITE(6,2004) (J,J=1,K)                                         WRRX0190
 14   I  = I + 1                                                      WRRX0200
      WRITE(6,2007) I,(X(I,J),J=1,M)                                  WRRX0210
      NLINE = NLINE + INCR                                            WRRX0220
      IF (I-L) 16,18,18                                               WRRX0230
 16   IF (NLINE + INCR - 60) 14,14, 4                                 WRRX0240
 18   RETURN                                                          WRRX0250
      END                                                             WRRX0260


      SUBROUTINE SORT(VALUE,IRANK,ITEM,N)                             SORT0010
C  LA0268. VER. 2  08/18/70 SCREENING.  L.D.GREGORY 3-55100 EXT. 510  SORT0020
C  UTILITY 360/65 OR RAX.  1/05/70  FIXED DIM. FORTRAN BASIC.  EBCD   SORT0030
C      PURPOSE.  TO TAKE N  ITEMS EACH WITH VALUE(I), I=1,N            SORT0040
C                AND RANK IN ORER FROM SMALLEST TO LARGEST             SORT0050
C                AND STORE RANK OF THE  ITH. ITEM IN  IRANK(I)         SORT0060
C                AND STORE NO. OF ITEM WITH  JTH. RANK IN  ITEM(J).    SORT0070
     DIMENSION VALUE(300), IRANK(300), ITEM(300)                      SORT0080
      IF(N-1) 52,52,1                                                 SORT0090
 1    DO 10 I=1,N                                                     SORT0100
 10   IRANK(I) = 1                                                    SORT0110
 14   N1 = N-1                                                        SORT0120
      DO  40  I = 1,N1                                                SORT0130
      J1 = I + 1                                                      SORT0140
      DO  40  J = J1,N                                                SORT0150
 16   IF (VALUE(I)-VALUE(J)) 30,30,20                                 SORT0160
 20   IRANK(I) = IRANK(I) + 1                                         SORT0170
      GO TO 40                                                        SORT0180
 30   IRANK(J) = IRANK(J) + 1                                         SORT0190
 40   CONTINUE                                                        SORT0200
      DO  50  I = 1,N                                                 SORT0210
      J  = IRANK(I)                                                   SORT0220
 50   ITEM(J) = I                                                     SORT0230
      RETURN                                                          SORT0240
 52   ITEM(1) = 1                                                     SORT0250
      IRANK(1)= 1                                                     SORT0260
      RETURN                                                          SORT0270
      END                                                             SORT0280


      SUBROUTINE  KORDER(KA,NA)                                       ORDR0010
C  PGM=NXX.   L.D.GREGORY. VER.1   3-8-73.   FORTRAN IV.    EBCD      ORDR0020
C  TO ORDER FROM SMALLEST TO LARGEST  -  INTEGERS                     ORDR0030
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      DIMENSION  KA(NA)                                                  ORDR0040
 1    IF (NA.LE.1)  RETURN                                              ORDR0050
      NA1 = NA - 1                                                      ORDR0060
      DO 10 I=1,NA1                                                     ORDR0070
      L   = KA(I)                                                       ORDR0080
      JA  = I + 1                                                       ORDR0090
      DO 10 J=JA,NA                                                     ORDR0100
      IF (L .LE.KA(J))  GO TO 10                                        ORDR0110
      KA(I) = KA(J)                                                     ORDR0120
      KA(J) = L                                                         ORDR0130
      L   = KA(I)                                                       ORDR0140
 10   CONTINUE                                                          ORDR0150
      RETURN                                                            ORDR0160
      ENTRY  RORDER(XA,NA)                                              ORDR0170
C  TO ORDER FROM SMALLEST TO LARGEST  -  REALS                          ORDR0180
      DIMENSION  XA(NA)                                                 ORDR0190
 21   IF (NA.LE.1)  RETURN                                              ORDR0200
      NA1 = NA - 1                                                      ORDR0210
      DO 28 I=1,NA1                                                     ORDR0220
      X   = XA(I)                                                       ORDR0230
      JA  = I + 1                                                       ORDR0240
      DO 28 J=JA,NA                                                     ORDR0250
      IF (X .LE.XA(J))  GO TO 28                                        ORDR0260
      XA(I) = XA(J)                                                     ORDR0270
      XA(J) = X                                                         ORDR0280
      X   = XA(I)                                                       ORDR0290
 28   CONTINUE                                                          ORDR0300
      RETURN                                                            ORDR0310
      END                                                               ORDR0320


      SUBROUTINE  TBASIC(IX)                                            TBAS0010
C  PGM=NXX.          L.C.GREGORY    VER.3.  7-20-73  FORTRAN IV. EBCD    TBAS0020
C MODS. INDX11(180)=25C.                              VER.4    1-10-75  TBAS0030
C  TO READ INDENTURED CODED TABLES AND STORE ON DA DISK 11.              TBAS0040
CIP  7 1 1                          READ ONTO DISK 11                   TBAS0050
CIP  7 1 2                                                              TBAS0060
CIP  7 1 3                                                              TBAS0070
CIP  7 1 4                -1        TABLE UPDATE                        TBAS0080
CIP  7 1 5                          REPLACE TABLE                       TBAS0090
CIP  7 1 6                          PRINT ALL TABLES NOW ON DISK 11     TBAS0100
C*******************************                ***************        TBAS0110
C  PGM=NU5(SEM) STRATEGIC ENGAGEMENT MODEL - 1 JUNE 71 FORTRAN IV EBCD  TBAS0120
C  EXECUTIVE SUBPROGRAM FOR THE BASIC TABLE PROCESSING LINK             TBAS0130
      COMMON/BASTAB/ KZARL                                              TBAS0140
C  PGM=NU5. SEM                        VER.2. 04-05-71.FORTRAN IV.EBCD.TBAS0150
C  L.D.GREGORY,UNIT 3-53300,EXT 510.                                    TBAS0160
C  SUBROUTINE PURPOSE, TO READ A SET OF BASIC LABELED TABLES.           TBAS0170
      INTEGER  ZIP,ZCODE,Z1,Z2,Z3,Z4,Z5,Z6,Z7,Z8,Z9                     TBAS0180
     COMMON/DEVICE/ N1,N2,N3,N4,N5,N6,N7,N8,N9,N10,N11,N12              TBAS0190
      COMMON/INOUT/NLINE,NPAGE,PCODE(20),MISC(7),XMISC(7),ZIP,ZCODE(19)TBAS0200
     1, JRASH(20),TRASH(20),IR(8),IC(8),DUM(8),IDUM(8),NFLAG,NFLAG2     TBAS0210
      EQUIVALENCE  (ZCODE(1),Z1),(ZCODE(2),Z2),(ZCODE(3),Z3)            TBAS0220
     1           ,(ZCODE(4),Z4),(ZCODE(5),Z5),(ZCODE(6),Z6)            TBAS0230
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     2              ,(ZCODE(7),Z7),(ZCODE(8),Z8),(ZCODE(9),Z9)          TBAS0240
      COMMON /INOUU/ IPR(16),JPAR(16), PAR(16),LABEL                    TBAS0250
      COMMON/INOU11/ JD11,ND11,NB11,INDX11(180,7)                       TBAS0260
CZAZA                                                                   TBAS0270
      INTEGER  TITLA                                                    TBAS0280
      COMMON/CZAZA/NCBA,IDA1, IDA2, IDA3, JZARL,LZA,MZA,ICA(16),CA(16)  TBAS0290
     1, TITLA(15),HEADA(37),IFMT                                        TBAS0300
     2, LA1,LAA1,MA1,MAA1,KA1(27,5),VA1(27,12)                          TBAS0310
      DIMENSION  BZA( 555)                                              TBAS0320
      EQUIVALENCE  (NCBA,BZA(1))                                        TBAS0330
     DIMENSION LABLA(4,8),LABLB(52)                                     TBAS0340
      EQUIVALENCE(LABLA(1),ICA(1)),(LABLB(1),TITLA(1))                  TBAS0350
      DATA NBLANK/'    '/                                               TBAS0360
C  NOTE. IF BZA(LZA,MZA), THEN LZA=RECORD LENGTH ON FILE 11,            TBAS0370
C  AND MZA=ENOUGH TO COVER UP TO PADZA BUT NOT MORE THAN ALL OF CZAZA.   TBAS0380
C  LA1,LAA1,MA1,MAA1 ARE ACTUAL AND ABSOLUTE DIMENSIONS OF VA1,          TBAS0390
C   AND LA1,LAA1 ARE ACTUAL AND ABSOLUTE LENGTH OF KA1.                 TBAS0400
C  KZARL=NO.OF 4 BYTE WORDS IN CZAZA UP TO PADZA                        TBAS0410
C  IDA1 AND IDA2 ARE INPUT NUMBERS TO UNIQUELY IDENTIFY THE TABLE=LOAD  TBAS0420
C   IN CZAZA AT ANY GIVEN TIME.                                         TBAS0430
C                                                                       TBAS0440
C  PRINT CONTROL,  IPR(2) = 0, NO PRINT UNLESS(Z4.NE.1)                 TBAS0450
C                         = 1, PRINT                                    TBAS0460
C  IF Z4 = 1, READ FROM FILE 5 AND USE IPR(2) PRINT OPTION              TBAS0470
C         2, WRITE ONLY (FILE 6) = PRINT                                TBAS0480
C         3, READ FROM FILE 5 AND PRINT                                 TBAS0490
C  IF Z4 = 4, READ FROM FILE 5 AND UPDATE, TEMP IF Z7.LT.0              TBAS0500
C       = 5, REPLACE ON DISK 11, ADD IF NEW                             TBAS0510
C       = 6, PRINT ALL BASIC TABLES (INPUTS) NOW STORED ON DISK 11      TBAS0520
C  IF IPR(3) = 0, USE STD. COL HEADS IN PRINT (IF PRINTED)              TBAS0530
C            = 1, USE HEADS READ IN                                     TBAS0540
CFORMATS                                                                TBAS0550
 1000  FORMAT(12X,2I8,I2,2I5,10A4)                                      TBAS0560
 1002  FORMAT(5A4,6(2X,2A4))                                            TBAS0570
 1003  FORMAT((20X,6(2X,2A4)) )                                         TBAS0580
 1004  FORMAT(I3,1X,3A4,I4,6F10.0)                                      TBAS0590
 1005  FORMAT((20X,6F10.0))                                             TBAS0600
 1006  FORMAT(4(2A4,A2,I10))                                            TBAS0610
 1007  FORMAT(4(2A4,A2,F10.0))                                          TBAS0620
 2005  FORMAT(1HO,22HERROR IN BASIC  AT E1=F8.2,3X,A4,3I2,I10,4I5,10A4/ TBAS0630
    1       ( 6X,3HE2=1PG12.5) )                                        TBAS0640
C** INITIALIZE. NOTE,IF BZA(LZA,MZA), THEN LENGTH OF DATA IN CZAZA      TBAS0650
C** IS KZARL WHICH IS.LE.(LZA*MZA).  VA1 IS VA1(LAA1,MAA1).             TBAS0660
 1     NCBA = 1                                                         TBAS0670
       LZA  = 555                                                       TBAS0680
       MZA  = 12                                                        TBAS0690
       LAA1 = 27                                                        TBAS0700
       MAA1 = 12                                                        TBAS0710
      KZARL=96+5*LAA1+LAA1*MAA1                                         TBAS0720
       JZARL = KZARL                                                    TBAS0730
       NFLAG2 = 0                                                       TBAS0740
       IF (Z4.EQ.6)  GO TO  150                                         TBAS0750
C** READ TABLES AND STORE                                               TBAS0760
       READ(N5,1000) TITLA                                              TBAS0770
       IDA1 = TITLA(1)                                                  TBAS0780
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      IDA2 = TITLA(2)                                                    TBAS0790
      IDA3 = TITLA(3)                                                    TBAS0800
      IDA4 = TITLA(4)                                                    TBAS0810
      MA1  = TITLA(5)                                                    TBAS0820
      Z9   = MA1                                                         TBAS0830
      GO TO (4,100,4,120,4), Z4                                          TBAS0840
 4    K3 = 2 * Z9 + 5                                                    TBAS0850
      K4 = MIN0(Z9, 6)                                                   TBAS0860
      ASSIGN 14 TO KS1                                                   TBAS0870
      IF (Z9.GT.6)  GO TO 7                                              TBAS0880
      ASSIGN  10 TO KS1                                                  TBAS0890
 7    READ(N5,1002) (HEADA(I),I=1,17)                                    TBAS0900
      IF (Z9.LE.6)  GO TO 9                                              TBAS0910
      READ(N5,1003) (HEADA(I),I=18,K3)                                   TBAS0920
 9    IF (Z4.EQ.4)  GO TO 124                                            TBAS0930
      I = 0                                                              TBAS0940
 10   I = I + 1                                                          TBAS0950
      READ(N5,1004) (KA1(I,J),J=1,5)    , (VA1(I,J),J=1,K4)              TBAS0960
      IF (KA1(I,1).LE.0)  GO TO 16                                       TBAS0970
      GO TO KS1, (14,10)                                                 TBAS0980
 14   READ(N5,1005) (VA1(I,J),J=7,Z9)                                    TBAS0990
      GO TO 10                                                           TBAS1000
C** FILL LABELS IN CZA7A                                                 TBAS1010
 16   LA1 = I - 1                                                        TBAS1020
 18   READ(N5,1006) ICA                                                  TBAS1030
      READ(N5,1007)  CA                                                  TBAS1040
      IF(LABEL.GT.0) GO TO 185                                           TBAS1050
      DO 181 II=1,8                                                      TBAS1060
      DO 181 JJ=1,3                                                      TBAS1070
 181  LABLA(JJ,II)=NBLANK                                                TBAS1080
      DO 182 II=6,52                                                     TBAS1090
 182  LABLB(II)=NBLANK                                                   TBAS1100
      DO 183 II=2,4                                                      TBAS1110
      DO 183 JJ=1,LA1                                                    TBAS1120
 183  KA1(JJ,II)=NBLANK                                                  TBAS1130
 185  IY = 3                                                             TBAS1140
      IF (Z4.EQ.3) GO TO 102                                             TBAS1150
      IF (Z4.EQ.1) GO TO 28                                              TBAS1160
      IF (Z4.EQ.4 .AND. Z7.LT.0) GO TO 28                                TBAS1170
      IF (Z4.EQ.4 .AND. Z7.GE.0) GO TO 26                                TBAS1180
      IF (Z4.EQ.5) GO TO 26                                              TBAS1190
   25 E1=25.                                                             TBAS1200
      GO TO 31                                                           TBAS1210
C** LOAD ON DISK 11                                                      TBAS1220
 26   IY = 3                                                             TBAS1230
      CALL  WWBD11(BZA,LZA,MZA,NCBA,KZARL,IDA1,IDA2,IDA3,IY,IXX)         TBAS1240
      IF(IXX.EQ.0) GO TO 32                                              TBAS1250
      GO TO 30                                                           TBAS1260
   28 CALL  WCBD11(BZA,LZA,MZA,NCBA,KZARL,IDA1,IDA2,IDA3,IY,IXX)         TBAS1270
      IF (IXX.EQ.0)  GO TO 32                                            TBAS1280
 30   E1 = 30.                                                           TBAS1290
 31   WRITE(N6,2005)E1,ZCODE,IDA1,IDA2                                   TBAS1300
      NFLAG = NFLAG  + 1                                                 TBAS1310
      RETURN                                                             TBAS1320
C**  TEST FOR PRINT                                                      TBAS1330
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 32     IF (IPR(2).EQ.0.AND.Z4.LE.1)  RETURN                                  TBAS1340
        CONTINUE                                                              TBAS1350
        IF (IPR(2).LE.1.OR.IPR(2).GE.3)  GO TO 102                            TBAS1360
C**   CALL FROM DISK 11 AND PRINT OUT                                         TBAS1370
 100    IY = 3                                                                TBAS1380
        CALL  RCBD11(BZA,LZA,MZA,NCBA,KZARL,IDA1,IDA2,IY,IXX)                 TBAS1390
        IF (IXX.EQ.0)  GO TO 102                                              TBAS1400
        E1 = 100.03                                                           TBAS1410
        GO TO 31                                                              TBAS1420
 102    IY = IPR(3)                                                           TBAS1430
        CALL  WBASIC(KA1,VA1,LAA1,MAA1,LA1,MA1,IDA1,IDA2,IDA3,ICA,CA,IY       TBAS1440
     1,       TITLA,HEADA )                                                   TBAS1450
        IF (IPR(2).LE.2)  CALL PAGE                                           TBAS1460
        RETURN                                                                TBAS1470
C**   RECALL FROM FILE 11 AND UPDATE                                          TBAS1480
 120    IY = 3                                                                TBAS1490
        CALL  RCBD11(BZA,LZA,MZA,NCBA,KZARL,IDA1,IDA2,IY,IXX)                 TBAS1500
        IF (IXX.EQ.0)  GO TO 122                                              TBAS1510
C                                                                             TBAS1520
        E1 = 120.04                                                           TBAS1530
        GO TO 31                                                              TBAS1540
 122    IDA3 = Z7                                                             TBAS1550
        GO TO 4                                                               TBAS1560
 124    READ(N5,1004) (IR(J),J=1,5) , (TRASH(J),J=1,6)                        TBAS1570
        IF (IR(1).LE.0)  GO TO 18                                             TBAS1580
        IF (Z9.LE.6)  GO TO 125                                               TBAS1590
        READ(N5,1005) (TRASH(J),J=7,Z9)                                       TBAS1600
 125    DO 126 I=1,LA1                                                        TBAS1610
        IF (KA1(I,1).EQ.IR(1))  GO TO 128                                     TBAS1620
 126    CONTINUE                                                              TBAS1630
C**   ADD AT END OF TABLE                                                     TBAS1640
        LA1 = LA1 + 1                                                         TBAS1650
        I   = LA1                                                             TBAS1660
 128    DO 130 J=1,5                                                          TBAS1670
 130    KA1(I,J) = IR(J)                                                      TBAS1680
        DO 132 J=1,Z9                                                         TBAS1690
 132    VA1(I,J) = TRASH(J)                                                   TBAS1700
        GO TO 124                                                             TBAS1710
C**   PRINT ALL NOW ON DISK 11                                                TBAS1720
 150    CALL PAGE                                                             TBAS1730
        DO 152 I=1,NB11                                                       TBAS1740
        IF (INDX11(I,1).NE.NCBA) GO TO 152                                    TBAS1750
        IF (INDX11(I,2).LE.0) GO TO 152                                       TBAS1760
        JD11=INDX11(I,4)                                                      TBAS1770
        READ(N11'JD11)  BZA                                                   TBAS1780
        IY=IPR(3)                                                             TBAS1790
        CALL  WBASIC(KA1,VA1,LAA1,MAA1,LA1,MA1,IDA1,IDA2,IDA3,ICA,CA,IY       TBAS1800
     1,      TITLA,HEADA)                                                     TBAS1810
C       CALL PAGE                                                             TBAS1820
  152   CONTINUE                                                              TBAS1830
        RETURN                                                                TBAS1840
        END                                                                   TBAS1850
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      SUBROUTINE  WBASIC(JX,X,LXA,MXA,L,M,ID1,ID2,ID3,ICA,CA,INX        WBAS0010
     1,  TITLE,HEAD )                                                   WBAS0020
C   TO WRITE INDENTURED CODED TABLES                                    WBAS0030
C   PGM=NXX     (WITH CLASSIFICATION LABELS) VER.4 06-20-73 FORT.IV FBCD WBAS0040
C   L.C.GREGORY,UNIT 2-54240,EXT 510.                                   WBAS0050
C   SUBROUTINE PURPOSE, TO WRITE A SET OF BASIC LABELED TABLES.         WBAS0060
C   TITLE IS 15A4 = 60H         ID1 & ID2 ARE UNIQUE TABLE IDENT CODES. WBAS0070
C   HEAD IS  A4,3A4,A4 = 20H,PLUS 8( 2A4)=64H, PLUS 8( 2A4)=64H.ALL=148H WBAS0080
C   INX = 0 , USE STANDARD HEADINGS                                     WBAS0090
C       = 1 , FURNISH COL HEADS AT CALL TIME                            WBAS0100
C   WRITES ARRAY JX=(ROW LABELS) SIDE BY SIDE WITH ARRAY  X=(DATA).     WBAS0110
C   ICA CONTAINS 4 INTEGER NAMES AND VALUES                             WBAS0120
C    CA CONTAINS 4 REAL    NAMES AND VALUES                             WBAS0130
      COMMON/DEVICE/ N1,N2,N3,N4,N5,N6,N7,N8,N9,N10,N11,N12             WBAS0140
      INTEGER  ZIP,ZCODE,TITLE                                          WBAS0150
      COMMON/INOUT/NLINE,NPAGE,PCODE(20),MISC(7),XMISC(7),ZIP,ZCODE(19)WBAS0160
     1      ,JRASH(20),TRASH(20),IR(8),IC(8),DUM(8),IDUM(8),NFLAG,NFLAG2WBAS0170
      DIMENSION  JX(LXA,5), X(LXA,MXA),ICA(16),CA(16)                   WBAS0180
      DIMENSION  TITLE(15), HEAD(37)                                    WBAS0190
C  FORMATS                                                              WBAS0200
 2000 FORMAT(1H1,71X, 4HPAGE,I4/6X,19A4,A3)                             WBAS0210
 2002 FORMAT(//6X,4HID1=, I8,8H,   ID2=,I8,8H,   ID3=,I4/               WBAS0220
     1          6X,10HTABLE NO. ,2I8,I4,2I5,10A4)                      WBAS0230
 2008 FORMAT(1HO,33HERROR IN SUBROUTINE WBASIC AT E1=,F8.2,              WBAS0240
     1        /6X,10HTABLE NO. ,2I8,I4,2I5,10A4/(6X,3HE2=10G12.5) )     WBAS0250
 2012 FORMAT(7X, 3HROW,7H   ID. , 12HNAME * * * *,5H DATA,6(4X,4HCOL.,  WBAS0260
     1  I3,3X)/(40X,6(4X,4HCOL.,I3,3X)) )                              WBAS0270
 2014 FORMAT(7X, 3HROW,2X,A4,1X,3A4,1X,A4,6(4X,2A4,2X)/                 WBAS0280
     1  (40X,6(4X,2A4,2X)) )                                           WBAS0290
 2016 FORMAT(/5X,2I5,2H. ,3A4,I5,6G14.6)                                WBAS0300
 2017 FORMAT(/5X,2I5,2H. ,3A4,I5,6G14.6/(40X,6G14.6))                   WBAS0310
 2018 FORMAT(/12X,7HINTEGER,3X,4(2X,2A4,A2,G13.6)/                      WBAS0320
     1       (12X,7HREAL   ,3X,4(2X,2A4,A2,G13.6)) )                   WBAS0330
 1    E1 = 1.0                                                          WBAS0340
      IF (L*M.LE.LXA*MXA.AND.L.GE.0.AND.M.GE.0)  GO TO 22               WBAS0350
 2    NFLAG = NFLAG + 1                                                 WBAS0360
      WRITE(N6,2008)E1,TITLE,ID1,ID2,ID3,ID4                            WBAS0370
      RETURN                                                            WBAS0380
 22   ASSIGN 36 TO KS                                                   WBAS0390
      IF (M.GT.6)  ASSIGN 38 TO KS                                      WBAS0400
      I = 0                                                             WBAS0410
      K3 = MIN0(2*M,24) + 5                                             WBAS0420
      K4 = MIN0(  M,12) - 1                                             WBAS0430
      INCR = (M-1)/6 + 2                                                WBAS0440
      INCM = INCR*L + 8                                                 WBAS0450
      IF (NLINE+INCM.LE.63)            GO TO 26                         WBAS0460
C**                                                                     WBAS0470
 24   CALL PAGE                                                         WBAS0480
C                                                                       WBAS0490
C                                                                       WBAS0500
 26   NLINE = NLINE + 6                                                 WBAS0510
      WRITE(N6,2002)ID1,ID2,ID3,TITLE                                   WBAS0520
      IF (INX.GT.0)                    GO TO 30                         WBAS0530
      WRITE(N6,2012)(J,J=1,K4)                                          WBAS0540
      GO TO 32                                                          WBAS0550
```

```
 30     WRITE(N6,2014)(HEAD(K),K=1,K3)                                  WBAS0560
 32     IF (L.LE.0)                        GO TO 42                     WBAS0570
C**                                                                     WBAS0580
 34     I = I + 1                                                       WBAS0590
        GO TO KS,(36,38)                                                WBAS0600
 36     WRITE(N6,2016)I,(JX(I,J),J=1,5), (X(I,K),K=1,M)                 WBAS0610
        GO TO 40                                                        WBAS0620
 38     WRITE(N6,2017)I,(JX(I,J),J=1,5), (X(I,K),K=1,M)                 WBAS0630
 40     NLINE = NLINE + INCR                                            WBAS0640
        IF (I.GE.L)                        GO TO 42                     WBAS0650
        IF (NLINE + INCR.LE.61)            GO TO 34                     WBAS0660
        GO TO 24                                                        WBAS0670
C**                                                                     WBAS0680
 42     WRITE(N6,2018)ICA,CA                                            WBAS0690
        NLINE = NLINE + 3                                               WBAS0700
        RETURN                                                          WBAS0710
        END                                                             WBAS0720


        SUBROUTINE  UPDA(M3,M4,M5,M6,IXX)                               UPDA0010
C  PGM=NEM. L.D.G.        VER.1. 7-29-73.  IBM 370 FORTRAN IV      EBCD  UPDA0020
C MODS. INDX11(180)=70.                                          2      UPDA0030
C  TO READ CHANGES TO BASIC TABLES IN NAMELIST FORMAT                   UPDA0040
        COMMON/DEVICE/N1,N2,N3,N4,N5,N6,N7,N8,N9,N10,N11,N12            UPDA0050
        COMMON/INOUT/NLINE,NPAGE,DUMA(35), NCODE(19)                    UPDA0060
      1,IDUMB(72), NFLAG, NFLAG2                                        UPDA0070
        COMMON/INOU11/ JD11,ND11,NB11,INDX11(180,7)                     UPDA0080
CZAZA                                                                   UPDA0090
        INTEGER TITLA                                                   UPDA0100
        COMMON/CZAZA/NCBA,IDA1,IDA2,IDA3,JZARL,LZA,MZA,ICA(16),CA(16)   UPDA0110
      1, TITLA(15),HEADA(37),IFMT                                       UPDA0120
      2, LA1,LAA1,MA1,MAA1,KA1(27,5),VA1(27,12)                         UPDA0130
        DIMENSION  BZA( 555)                                            UPDA0140
        EQUIVALENCE  (NCBA,BZA(1))                                      UPDA0150
        DATA  NB3,LZ,MZ,LA,MA/ 1,555,12,27,12/                          UPDA0160
        INTEGER  TITLE,ROWNAM                                           UPDA0170
        DIMENSION  TITLE(10),ROWNAM(3),DATA(12)                         UPDA0180
      1,     ICONST(4),CONST(4)                                         UPDA0190
        DATA DFAULT,IFAULT/1.E-66, 12345678/                            UPDA0200
        EQUIVALENCE (TITLA(6),TITLE(1)),(ICONST(1),IC1),(ICONST(2),IC2), UPDA0210
      1   (ICONST(3),IC3),(ICONST(4),IC4),(CONST(1),RC1),(CONST(2),RC2), UPDA0220
      2   (CONST(3),RC3),(CONST(4),RC4)                                 UPDA0230
        NAMELIST/NAMUP/ID1,ID2,ID3,TITLE,ROWSEQ,ROWNAM,CODE,DATA        UPDA0240
      1,         IC1,IC2,IC3,IC4,     RC1,RC2,RC3,RC4,RETURN          UPDA0250
      2,     ICONST,CONST                                               UPDA0260
        DATA  BLANK,LANK/'    ','    '/,JXXX/'XXXX'/                    UPDA0270
C***  SAMPLE INPUT                                                      UPDA0280
CIP 11 1 2  6210       -1                 UPDATE ORIGINAL TABLE.        UPDA0290
C&NAMUP ROWSEQ=10., DATA(2) = 222.,333.,DATA(7)=7.,                &END UPDA0300
C&NAMUP ROWSEQ=14., CODE=6253., DATA(3)= 3.,IC2= 2,    RETURN=1., &END UPDA0310
CIP  8                                 EXECUTE                          UPDA0320
CIP 11 2 2  6210       -1              UPDATE TABLE UPDATE              UPDA0330
C      ETC.                                                             UPDA0340
C***                                                                    UPDA0350
```

```
 2000   FORMAT(1HO,'NO TABLE FOUND TO UPDATE FOR ID= ',2I10)                  UPDA0360
 2002   FORMAT(1HO,'TABLE ALREADY FULL FOR ID=',2I10,',  ROWSEQ=',F4.0)      UPDA0370
 2004   FORMAT(1HO,'EXTRA LINE ADDED TO TABLE FOR ID=',2I10,                  UPDA0380
     1       ',  ROWSEQ=',F4.0)                                             UPDA0390
 2006   FORMAT(5X, I5,2H. ,3A4,I5, 6G14.6/40X,6G14.6)                        UPDA0400
 2008   FORMAT(1HO,'NEW LINE FOR TABLE WITH ID=',2I10)                       UPDA0410
 2043   FORMAT(1HO,'CONSTANTS UPDATED',3X,4(2X,2A4,A2,G13.6)                 UPDA0420
     1      / 21X, 4(2X,2A4,A2,G13.6))                                      UPDA0430
C***                                                                        UPDA0440
 1      KZARL = 96 + LA*(5 + MA)                                            UPDA0450
        IXX = 0                                                             UPDA0460
        RETURN = 0.                                                         UPDA0470
        IPRINT = M4                                                         UPDA0480
        ID1    = M5                                                         UPDA0490
        ID2    = M6                                                         UPDA0500
        ID3    = -1                                                         UPDA0510
 2      NB1 = NB11 + 1                                                      UPDA0520
        DO 10 J=1,NB11                                                      UPDA0530
        I   = NB1 - J                                                       UPDA0540
        IF (INDX11(I,1).NE.1)  GO TO 10                                     UPDA0550
        IF (INDX11(I,2).EQ.ID1.AND.INDX11(I,3).EQ.ID2)  GO TO 4             UPDA0560
        GO TO 10                                                            UPDA0570
 4      IF (M3.GT.1)  GO TO 14                                              UPDA0580
        IF (INDX11(I,7).GE.0)  GO TO 14                                     UPDA0590
 10     CONTINUE                                                            UPDA0600
C***  NO TABLE FOUND                                                        UPDA0610
 12     IXX = IXX + 1                                                       UPDA0620
        WRITE(N6,2000) ID1,ID2                                              UPDA0630
        NLINE = NLINE + 2                                                   UPDA0640
 13     IF (RETURN.GT..01)  RETURN                                          UPDA0650
        READ (N5,NAMUP)                                                     UPDA0660
        GO TO 13                                                            UPDA0670
C***  TABLE FOUND                                                           UPDA0680
 14     JB  = I                                                             UPDA0690
        JD11 = INDX11(JB,4)                                                 UPDA0700
        READ (N11'JD11) BZA                                                 UPDA0710
C***  READY FOR UPDATE                                                      UPDA0720
 20     DO 22 I=1,12                                                        UPDA0730
 22     DATA(I)=DFAULT                                                      UPDA0740
        ROWSEQ=0.                                                           UPDA0750
        CODE=DFAULT                                                         UPDA0760
        DO 23 I=1,4                                                         UPDA0770
        ICONST(I)=IFAULT                                                    UPDA0780
 23     CONST(I)=DFAULT                                                     UPDA0790
        ROWNAM(1) = JXXX                                                    UPDA0800
        ROWNAM(2) = LANK                                                    UPDA0810
        ROWNAM(3) = LANK                                                    UPDA0820
C***  READ NAMELIST                                                         UPDA0830
        READ (N5,NAMUP)                                                     UPDA0840
        KSEQ = ROWSEQ + .01                                                 UPDA0850
        KODE = CODE + .01                                                   UPDA0860
        DO 28 I=1,LA1                                                       UPDA0870
        IF (KA1(I,1).EQ.KSEQ)  GO TO 33                                     UPDA0880
 28     CONTINUE                                                            UPDA0890
        IF (LA1.LT.LA)  GO TO 29                                            UPDA0900
```

```
      IXX = IXX + 1                                                    UPDA0910
      WRITE(N6,2002) ID1, ID2, ROWSEQ                                  UPDA0920
      GO TO 13                                                         UPDA0930
C***  ADD LINE TO UPDATE                                               UPDA0940
 29   LA1 = LA1 + 1                                                    UPDA0950
      KA1(LA1,1) = KSEQ                                                UPDA0960
      DO 30 I=1,3                                                      UPDA0970
 30   KA1(LA1,I+1) = ROWNAM(I)                                         UPDA0980
      KA1(LA1,5)   = KODE                                              UPDA0990
      DO 31 I=1,MA1                                                    UPDA1000
 31   VA1(LA1,I) = DATA(I)                                             UPDA1010
C***  PRINT                                                            UPDA1020
      IF (NLINE.GT.55)  CALL PAGE                                      UPDA1030
      WRITE(N6,2004) ID1, ID2, ROWSEQ                                  UPDA1040
      JROW = LA1                                                       UPDA1050
      GO TO 42                                                         UPDA1060
C***  FOUND ROW.  TEST FOR CODE                                        UPDA1070
 33   JROW = I                                                         UPDA1080
      IF(CODE.NE.DFAULT) KA1(JROW,5)=KODE                              UPDA1090
C***  TEST FOR DATA                                                    UPDA1100
 36   DO 40 I=1,MA1                                                    UPDA1110
      AD=DATA(I)                                                       UPDA1120
      IF(AD.NE.DFAULT) VA1(JROW,I)=AD                                  UPDA1130
 40   CONTINUE                                                         UPDA1140
      IF (NLINE.GT.55)  CALL PAGE                                      UPDA1150
      WRITE(N6,2008) ID1, ID2                                          UPDA1160
 42   WRITE(N6,2006) (KA1(JROW,J),J=1,5),(VA1(JROW,J),J=1,MA1)         UPDA1170
      NLINE = NLINE + 4                                                UPDA1180
      J=0                                                              UPDA1190
      DO 430 I=1,4                                                     UPDA1200
      K=ICONST(I)                                                      UPDA1210
      IF(K.EQ.IFAULT) GO TO 43                                         UPDA1220
      ICA(I*4)=K                                                       UPDA1230
      J=1                                                              UPDA1240
 43   AD=CONST(I)                                                      UPDA1250
      IF(AD.EQ.DFAULT) GO TO 430                                       UPDA1260
      CA(I*4)=AD                                                       UPDA1270
      J=1                                                              UPDA1280
 430  CONTINUE.                                                        UPDA1290
      IF(J.EQ.0) GO TO 44                                              UPDA1300
      WRITE(N6,2043) ICA,CA                                            UPDA1310
      NLINE=NLINE+3                                                    UPDA1320
C***  READ MORE CHANGES                                                UPDA1330
 44   IF (RETURN.LE..01)  GO TO 20                                     UPDA1340
C***  WRITE UPDATE ON DISK 11                                          UPDA1350
      NB1 = NB11 + 1                                                   UPDA1360
      DO 46 J=1,NB11                                                   UPDA1370
      I  = NB1 - J                                                     UPDA1380
      IF (INDX11(I,1).NE.1)  GO TO 46                                  UPDA1390
      IF (INDX11(I,2).EQ.ID1.AND.INDX11(I,3).EQ.ID2)  GO TO 48         UPDA1400
 46   CONTINUE                                                         UPDA1410
      GO TO 12                                                         UPDA1420
 48   JB  = I                                                          UPDA1430
      IF (INDX11(JB,7).GE.0)  GO TO 50                                 UPDA1440
      IDA3 = ID3                                                       UPDA1450
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```
      JD11 = INDX11(JB,4)                                                UPDA1460
      WRITE(N11'JD11) BZA                                                UPDA1470
      GO TO 52                                                           UPDA1480
C***  CREATE TEMPORARY FILE (ID3=-1)                                     UPDA1490
 50   KZARL = LZ                                                         UPDA1500
      IDA3 = ID3                                                         UPDA1510
      CALL WC3D11(BZA,LZA,MZA,NCBA,KZARL,ID1,ID2,ID3,IX,IY)              UPDA1520
C***  PRINT OPTION                                                       UPDA1530
 52   IF (IPRINT.LE.1)  GO TO 60                                         UPDA1540
      IF (IPRINT.LE.2)  GO TO 54                                         UPDA1550
      IY  = 3                                                            UPDA1560
      CALL RCBD11(BZA,LZ,MZ,NCB,KZARL,ID1,ID2,IY,IX)                     UPDA1570
      IF (IX.EQ.0)  GO TO 54                                             UPDA1580
      GO TO 12                                                           UPDA1590
 54   IP  = 1                                                            UPDA1600
      CALL WBASIC(KA1,VA1,LAA1,MAA1,LA1,MA1,IDA1,IDA2,ICA3,ICA,CA,IP,    UPDA1610
     1            TITLA,HEADA)                                           UPDA1620
 60   RETURN                                                             UPDA1630
      END                                                                UPDA1640


      SUBROUTINE  STRING(M3,M4,M5,M6,N5,N6,N8,NCODE)                     STNG0010
C  TO RECORD, RETRIEVE, OR PRINT STRINGS ON TAPE 8)    10-28-74          STNG0020
C  FOR NFM AT DALLAS. NEEDS 1.MODS TO MAIN  2. TAPE 8.                  STNG0030
CALLS                                                                   STNG0040
CXX 12 1 0     74000     1      READ TO XXX,PUT ON TAPE 8,CASE=7400,NW=1.STNG0050
CXX                             END OF STRING)                          STNG0060
CXX 12 2 0     74000            FIND CASE 74000 ON TAPE 8,INSERT HERE.  STNG0070
CXX 12 3 0     74000            PRINT CASE 74000,ALL CASES IF CASE=0    STNG0080
CFORMATS                                                                STNG0090
 1000  FORMAT(20A4)                                                     STNG0100
 1001  FORMAT(  A4)                                                     STNG0110
 2000  FORMAT(1X,I4,1H.,20A4)                                           STNG0120
 1002  FORMAT( A4, 6X, I10,20X,10A4)                                    STNG0130
 2001  FORMAT( 4HCASE,6X,I10,20X,10A4)                                  STNG0140
 2003  FORMAT(54HXXX 12 1-1                                 END OF STRING,STNG0150
     1        26X)                                                       STNG0160
 2004  FORMAT(4HEND ,76X)                                               STNG0170
 2005  FORMAT( 6X, 5HCASE=,I10,16H,   NOW ON TAPE8)                     STNG0180
 2006  FORMAT( 6X, 5HCASE=,I10, 9H,   FOUND ,6X,10A4)                   STNG0190
 2007  FORMAT( 6X, 5HCASE=,I10,13H,   NOT FOUND )                       STNG0200
CNOTES.                                                                 STNG0210
C  1.THE FIRST CARD AFTER A XXX 12 1 0  MUST BE A ZIP CARD.             STNG0220
C  2.THE NEXT  CARD AFTER A XXX  (END OF STRING)  MUST BE A ZIP CARD.   STNG0230
C.  3.Z6=1 USED IN XXX 12 1 0 MEANS WRITE STARTING AT FRONT END OF TAPE8STNG0240
C  4.CAN LOAD A CASE AND USE IN SAME JOB IF LATER USE A XXX 12 2 CARD.  STNG0250
C  5.PRINT OF CASE DETAILS APPEAR ONLY FIRST TIME PUT ON TAPE8, AND     STNG0260
C     THEN ONLY IN INPUT CARD IMAGES(IF TURNED ON).                     STNG0270
C  6.CASE DETAILS PRINTED BY XXX 12 3, ALL CASES IF CASE=0. IF DESIRED, STNG0280
C     BEST TO PRINT BEFORE USING A  XXX 12 2 CARD, SINCE THIS MEANS     STNG0290
C     FIND AND USE IMMEDIATELY.                                         STNG0300
C  7.IF CANNOT FIND A CASE FOR XXX 12 2 , PROGRAM STOPS,XXX 12 3 GOES ONSTNG0310
C  8.IF STRING CONTAINS TABLE UPDATES, TABLES MUST BE AHEAD OF UPDATES, STNG0320
C     EITHER IN THIS STRING OR IN PREVIOUS STRING, OR REGULAR STREAM.   STNG0330
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```
C  S.ON XXX 12 1 CARD USE COLS 42-80 FOR STRING TITLE.                    STNG0340
      DIMENSION CARD(20),NCODE(19),TITLE(10)                             STNG0350
      DATA  CASE, XXX, END/4HCASE,4HXXX ,4HEND /                         STNG0360
 1    IF (M3.GT.1)  GO TO 20                                             STNG0370
      NUTAPE = M6                                                        STNG0380
      IF (NUTAPE.EQ.1)  GO TO 10                                         STNG0390
C  SEARCH FOR END                                                        STNG0400
 6    READ (N8,1001) TEST                                                STNG0410
      IF (TEST.NE.END)  GO TO 6                                          STNG0420
      BACKSPACE  N8                                                      STNG0430
 10   WRITE(N8,2001) M5,(NCODE(I),I=10,19)                               STNG0440
 12   READ (N5,1000) CARD                                                STNG0450
      IF (CARD(1).EQ.XXX)  GO TO 14                                      STNG0460
      WRITE(N8,1000) CARD                                                STNG0470
      GO TO 12                                                           STNG0480
 14   WRITE(N8,2003)                                                     STNG0490
      WRITE(N8,2004)                                                     STNG0500
      END FILE  N8                                                       STNG0510
      REWIND    N8                                                       STNG0520
      WRITE(N6,2005) M5                                                  STNG0530
      RETURN                                                             STNG0540
C  FIND CASE= M5                                                         STNG0550
 20   IF (M3.GT.2)  GO TO 30                                             STNG0560
 21   READ (N8,1002) TEST, NUM, TITLE                                    STNG0570
      IF (TEST.EQ.END)  GO TO 26                                         STNG0580
      IF (NUM.EQ. M5 )  GO TO 24                                         STNG0590
 22   READ (N8,1001) TEST                                                STNG0600
      IF (TEST.EQ.XXX)  GO TO 21                                         STNG0610
      GO TO 22                                                           STNG0620
 24   IF (M3.EQ.3)  GO TO 32                                             STNG0630
      WRITE(N6,2006) M5, TITLE                                           STNG0640
      N5  = N8                                                           STNG0650
      RETURN                                                             STNG0660
 26   WRITE(N6,2007) M5                                                  STNG0670
      IF (M3.EQ.3)  RETURN                                               STNG0680
      STOP                                                               STNG0690
C  PRINT CASE(S) ON TAPE 8, ALL IF CASE NUMBER IS ZERO                   STNG0700
 30   REWIND  N8                                                         STNG0710
      IF (M5.LE. 0)  GO TO 36                                            STNG0720
      GO TO 21                                                           STNG0730
 32   CALL  PAGE                                                         STNG0740
      WRITE(N6,2006) NUM, TITLE                                          STNG0750
      K  = 0                                                             STNG0760
 34   READ (N8,1000) CARD                                                STNG0770
      K  = K + 1                                                         STNG0780
      WRITE(N6,2000) K,CARD                                              STNG0790
      IF (CARD(1).NE.XXX)  GO TO 34                                      STNG0800
      IF (M5.GT.0)  GO TO 38                                             STNG0810
 36   READ (N8,1002) TEST, NUM, TITLE                                    STNG0820
      IF (TEST.NE.END)  GO TO 32                                         STNG0830
 38   REWIND N8                                                          STNG0840
      RETURN                                                             STNG0850
      END                                                                STNG0860
```

```
      SUBROUTINE  CARD(N5,N6,NX, CLAS,PCODE)                          CARD0010
C  PGM=NXX(NEM).  L.D.G.      VER.1  7-23-73      FORTRAN IV     EBCD  CARD0020
C  TO READ CARD IMAGES FROM N5, COPY ONTO NX,  AND PRINT ON N6        CARD0030
 1000  FORMAT(20A4)                                                   CARD0040
 1001  FORMAT(1X,19A4,A3)                                             CARD0050
 2000  FORMAT(1X,I5,'.',20A4)                                         CARD0060
 2001  FORMAT(1X,I5,'.',1X,19A4,A3)                                   CARD0070
 2002  FORMAT(6X,'INPUT CARD IMAGES',/)                               CARD0080
       DIMENSION  KARD(20),CLAS(20),PCODE(20)                         CARD0090
       DATA  KZIP,K10/'ZIP ','1C  '/                                  CARD0100
       K1     = 1                                                     CARD0110
       KCARD = 2                                                      CARD0120
       NLINE = 2                                                      CARD0130
       WRITE(N6,2002)                                                 CARD0140
       WRITE(NX, 1001) CLAS, PCODE                                    CARD0150
       WRITE(N6,2001) K1, CLAS, KCARD, PCODE                          CARD0160
       GO TO 2                                                        CARD0170
 1     NLINE = 0                                                      CARD0180
       WRITE(N6,2002)                                                 CARD0190
 2     NLINE = NLINE + 1                                              CARD0200
       KCARD = KCARD + 1                                              CARD0210
       READ (N5,1000) KARD                                            CARD0220
       WRITE(NX, 1000)KARD                                            CARD0230
       WRITE(N6,2000) KCARD, KARD                                     CARD0240
       IF (KARD(1).EQ.KZIP.AND.KARD(2).EQ.K10)  GO TO 8               CARD0250
       IF (NLINE.LT.50)  GO TO 2                                      CARD0260
       CALL PAGE                                                      CARD0270
       GO TO 1                                                        CARD0280
 8     END FILE NX                                                    CARD0290
       REWIND   NX                                                    CARD0300
       RETURN                                                         CARD0310
       END                                                            CARD0320


      SUBROUTINE UNIQUE(KA,KU,IU)                                     UNIQ0010
C**PGM=NXX. L.D.G.            9-7-73   FORTRAN IV              EBCDIC UNIQ0020
C  FOR ITEMS IN KA(KU)  IN INCREASING OR DECREASING ORDER, OR WITH     UNIQ0030
C  ALL LIKE ITEMS ADJACENT, PUT A UNIQUE LIST IN THE FRONT OF KA AND   UNIQ0040
C  RETURN THE REDUCED NUMBER  IU,(IU.LE.KU).                           UNIQ0050
C**                                                                   UNIQ0060
      DIMENSION KA(KU),RA(KU)                                         UNIQ0070
      IF(1-KU) 8,6,4                                                  UNIQ0080
 4    IU=0                                                            UNIQ0090
      RETURN                                                          UNIQ0100
 6    IU=1                                                            UNIQ0110
      RETURN                                                          UNIQ0120
 8    IU=1                                                            UNIQ0130
      K1=KU-1                                                         UNIQ0140
      I=1                                                             UNIQ0150
 10   K=KA(I)                                                         UNIQ0160
      I1=I+1                                                          UNIQ0170
      DO 12 J=I1,KU                                                   UNIQ0180
      IF(K.EQ.KA(J)) GO TO 12                                         UNIQ0190
      IU=IU+1                                                         UNIQ0200
```

```
      KA(IU)=KA(J)                                                      UNIQ0210
      I=J-1                                                             UNIQ0220
      GO TO 16                                                          UNIQ0230
 12   CONTINUE                                                          UNIQ0240
       RETURN                                                           UNIQ0250
 16   I=I+1                                                             UNIQ0260
      IF(I.LE.K1) GO TO 10                                              UNIQ0270
      RETURN                                                            UNIQ0280
C***                                                                    UNIQ0290
C                                                                       UNIQ0300
       ENTRY        RNIQUE(RA,KU,IU,E)                                  UNIQ0310
C***                                                                    UNIQ0320
       IF(1-KU) 28,26,24                                                UNIQ0330
 24   IU=0                                                              UNIQ0340
      RETURN                                                            UNIQ0350
 26   IU=1                                                              UNIQ0360
      RETURN                                                            UNIQ0370
 28   IU=1                                                              UNIQ0380
      K1=KU-1                                                           UNIQ0390
      I=1                                                               UNIQ0400
 30    R=RA(I)                                                          UNIQ0410
      I1=I+1                                                            UNIQ0420
      DO 32 J=I1,KU                                                     UNIQ0430
       IF (R.LE.(RA(J)+E).AND.R.GE.(RA(J)-E))    GO TO 32               UNIQ0440
      IU=IU+1                                                           UNIQ0450
      RA(IU)=RA(J)                                                      UNIQ0460
      I=J-1                                                             UNIQ0470
      GO TO 36                                                          UNIQ0480
 32    RA(J) = R                                                        UNIQ0490
       RETURN                                                           UNIQ0500
 36   I=I+1                                                             UNIQ0510
      IF(I.LE.K1) GO TO 30                                              UNIQ0520
      RETURN                                                            UNIQ0530
      END                                                               UNIQ0540


       SUBROUTINE  SETUPA(IPRINT)                                       SETA0010
C  PGM=NXX.   L.D.GREGORY. VER.8   9-15-73   FORTRAN IV. EBCD.          SETA0020
C  TO SET UP INITIAL POSITIONS AND PLANNED ROUTES                       SETA0030
CALLED BY  MAIN AND ZIP CARD AS FOLLOWS                                 SETA0040
CIP  8 1 P                              SET UP NAV.INIT.PKG/PRINT P=1,2SETA0050
C  NOTES, IN CSETA, RED & BLU FOLLOW PATTERN AS BELOW,          /BLU     SETA0060
C   1.NRG = NO.OF RED GROUPS                                    /NRG     SETA0070
C   2.KRGN(I) = ITH GROUP NO.,E.G.       2180000  (FROM TABLE 0)/KRGN   SETA0080
C   3.KRGK(I) = ITH GROUP KODE,E.G.         1118  (FROM TABLE 2)/KRGK   SETA0090
C              WHICH RELATES RED GROUP 11 TO 18                 /       SETA0100
C   4.RGC( 8,6,K) = KTH. TABLE OF RED GROUP CENTERS VS TIME     /RGC     SETA0110
C   5.NRU(I) = NO.OF RED UNITS IN ITH GROUP + 100* STARTING LINE/NRU     SETA0120
C   6.KRUK( ,J) = RED UNIT KODE,E.G.     2010100, 83410000, ETC /KRUK   SETA0130
C   7.RA,RB,RC,RD = RED CENTER,VECTOR,START,RENDEZVOUS POINTS.  /RA,RB,  SETA0140
C**                                                                     SETA0150
       COMMON/DEVICE/ N1,N2,N3,N4,N5,N6,N7,N8,N9,N10,N11,N12            SETA0160
       COMMON/INOUT/NLINE,NPAGE,DUMA(35), NCODE(19)                     SETA0170
      1,ICUMB(72), NFLAG, NFLAG2                                        SETA0180
```

```
CZAZA                                                                   SETA0190
      INTEGER TITLA                                                     SETA0200
      COMMON/CZAZA/NCBA,IDA1,IDA2,IDA3,JZARL,LZA,MZA,ICA(16),CA(16)     SETA0210
     1, TITLA(15),HEADA(37),IFMT                                        SETA0220
     2, LA1,LAA1,MA1,MAA1,KA1(27,5),VA1(27,12)                          SETA0230
      DIMENSION  BZA( 555)                                              SETA0240
      EQUIVALENCE  (NCBA,BZA(1))                                        SETA0250
      DATA  NCB,LZ,MZ,LA,MA/ 1,555,12,27,12/                            SETA0260
      COMMON/CWORK/KA2(27),VA2(27,12),KA3(27),VA3(27,12),               SETA0270
     1             LA2,MA2,          LA3,MA3          ,PWORK(794)     SETA0280
      DIMENSION  KWORK(706)                                             SETA0290
      EQUIVALENCE  (KA2(1),KWORK(1))                                    SETA0300
CNAVIG                                                                  SETA0310
      COMMON/CNAVIG/ NGMX,BE,BF,RE,RF,                                  SETA0320
     1     NBG,BA,BB,BC,BD,KBGN(18),KBGK(18),BGC( 8,6,18),NBU(18),     SETA0330
     2     NRG,RA,RB,RC,RD,KRGN(18),KRGK(18),RGC( 8,6,18),NRU(18),     SETA0340
     3          TTIME,NUMX,                                            SETA0350
     4     KBL,KBUK(4,50),BREL(4,50),BXYZ(50,7),NAMBU(50,2),BV(50,8),  SETA0360
     5     KRU,KRUK(4,50),RREL(4,50),RXYZ(50,7),NAMRU(50,2),RV(50,8)   SETA0370
      DATA  RAD/0.0174533/,PI/3.14159/                                  SETA0380
      DIMENSION  VA(12)                                                 SETA0390
      NAMELIST/NAMA1/NBG,KBGN,KBGK                                      SETA0400
      NAMELIST/NAMA2/NRG,KRGN,KRGK                                      SETA0410
      NAMELIST/NAMA3/KBU,NBU                                            SETA0420
      NAMELIST/NAMA4/KRU,NRU                                            SETA0430
      NAMELIST/NAMA5/KBU,BREL                                           SETA0440
      NAMELIST/NAMA6/KRU,RREL                                           SETA0450
 2005 FORMAT(1HO,22HERROR IN SETUPA AT E1=,F8.2,3X,'ID=',2I10)          SETA0460
 2006 FORMAT(1HO,  'CHECK FOR MISSING TABLE, ID=',2I10)                 SETA0470
 2008 FORMAT(/6X,' AFTER INITIAL SETUP',/6X,' UNIT  NAME',10X,'CODE',   SETA0480
     1  6X,'TYPE GRUP STAT   DELTA X   DELTA Y   DELTA Z    VALUE')    SETA0490
 2009 FORMAT(/6X,I4,'.  ',2A4,2I10,2I5, 4F10.3)                         SETA0500
C**  ARITHMETIC FUNCTIONS,                                             SETA0510
      JUPAK(N,KD,KM) = MOD( N/10**KD, 10**KM)                           SETA0520
      HRS(X)   = FLOAT(IFIX(X)) + (X-FLOAT(IFIX(X))) / 0.6              SETA0530
C**                                                                     SETA0540
 1    KZARL = 96 + LA*(5 + MA)                                          SETA0550
      JZARL = KZARL                                                     SETA0560
      NFLAG2= 0                                                         SETA0570
      NGMAX = NGMX                                                      SETA0580
      NUMAX = NUMX                                                      SETA0590
      ID2   = 0                                                         SETA0600
C** FIND TABLE OF TABLES. TABLE NO.= 0 .                                SETA0610
      KTRAN = 1                                                         SETA0620
      ID1   = 00010000                                                  SETA0630
 3    IY  = 1                                                           SETA0640
 4    CALL  RCBD11(BZA,LZ,MZ,NCB,KZARL,ID1,ID2,IY,IXX)                  SETA0650
      IF (IXX.EQ.0)  GO TO (10,22,52), KTRAN                            SETA0660
      E1   = 4.03                                                       SETA0670
 6    WRITE(N6,2006)      ID1, ID2                                      SETA0680
      NFLAG2 = NFLAG2 + 1                                               SETA0690
      GO TO ( 8,50,70), KTRAN                                           SETA0700
 8    STOP                                                              SETA0710
C** STORE TABLE NUMBERS FROM TABLE NO.= 0 .                             SETA0720
 10   NBG = 0                                                           SETA0730
```

```
      NRG = 0                                                                  SETA0740
      DO 14 I=1,LA1                                                            SETA0750
      DO 14 J=1,MA1                                                            SETA0760
      K   = (VA1(I,J) + .001)                                                  SETA0770
      IF (K.LE.0.OR. K.EQ.100.OR. K.EQ.200.OR. K.GE.300)  GO TO 14             SETA0780
      IF (K.GT.200)  GO TO 12                                                  SETA0790
      NBG = NBG + 1                                                            SETA0800
      KBGN(NBG) = K * 10000                                                    SETA0810
      GO TO 14                                                                 SETA0820
 12   NRG = NRG + 1                                                            SETA0830
      KRGN(NRG) = K * 10000                                                    SETA0840
 14   CONTINUE                                                                 SETA0850
C** SORT TABLE NUMBERS                                                        SETA0860
      CALL  KORDER(KBGN,NBG)                                                   SETA0870
      CALL KORDER(KRGN,NRG)                                                    SETA0880
C** START BLU SET UP. GET BLU GROUP CENTERS FROM TABLE NO.=1000000            SETA0890
 20   KTRAN = 2                                                                SETA0900
      ID1 = 1000000                                                            SETA0910
      GO TO 3                                                                  SETA0920
 22   BA  = ICA(4)                                                             SETA0930
      BB  = ICA(8)                                                             SETA0940
      BC  = ICA(12)                                                            SETA0950
      BD  = ICA(16)                                                            SETA0960
      BE  = CA(12)                                                             SETA0970
      BF  = CA(16)                                                             SETA0980
 24   DO 28 I=1,LA1                                                            SETA0990
      KA2(I) = MOD(KA1(I,5),100) * 10000 + ID1                                 SETA1000
      DO 26 J=1,MA1                                                            SETA1010
 26   VA2(I,J) = VA1(I,J)                                                      SETA1020
      VA2(I,2) = VA2(I,2) / 6.080                                              SETA1030
      VA2(I,3) = HRS(VA2(I,3))                                                 SETA1040
      DO 28 J= 4,10,3                                                          SETA1050
      VA2(I,J+2) = VA2(I,J+2) / 6.080                                          SETA1060
 28   VA2(I,J)   = HRS(VA2(I,J) )                                              SETA1070
      LA2 = LA1                                                                SETA1080
      MA2 = MA1                                                                SETA1090
C** CYCLE THRU BLU GROUP CENTERS IN TABLE NO.=1000000                         SETA1100
 32   IXX = 0                                                                  SETA1110
      KK  = 0                                                                  SETA1120
      DO 38 KG=1,NBG                                                           SETA1130
      KGN = KBGN(KG)                                                           SETA1140
      DO 36 KH=1,LA2                                                           SETA1150
      IF (KGN.NE.KA2(KH))  GO TO 36                                            SETA1160
      KK  = KK + 1                                                             SETA1170
      KBGN(KK) = KGN                                                           SETA1180
      KBGK(KK) = KA1(KH,5)                                                     SETA1190
      DO 34 KJ=1,12                                                            SETA1200
 34   VA(KJ) = VA2(KH,KJ)                                                      SETA1210
      CALL  NAVIT(BGC,NGMAX,KK,VA,ICA,CA,IXY,N6)                               SETA1220
      IXX = IXX + IXY                                                          SETA1230
 36   CONTINUE                                                                 SETA1240
 38   CONTINUE                                                                 SETA1250
      NBG = KK                                                                 SETA1260
      IF (IXX.NE.0)  NFLAG2 = NFLAG2 + 1                                       SETA1270
C** START RED SET UP. GET RED GROUP CENTERS FROM TABLE NO.=2000000            SETA1280
```

```
 50     KTRAN = 3                                                        SETA1290
        ID1 = 2000000                                                    SETA1300
        GO TO 3                                                          SETA1310
 52     RA  = ICA(4)                                                     SETA1320
        RB  = ICA(8)                                                     SETA1330
        RC  = ICA(12)                                                    SETA1340
        RD  = ICA(16)                                                    SETA1350
        RE  = CA(12)                                                     SETA1360
        RF  = CA(16)                                                     SETA1370
 54     DO 58 I=1,LA1                                                    SETA1380
        KA3(I) = MOD(KA1(I,5),100) * 10000 + ID1                         SETA1390
        DO 56 J=1,MA1                                                    SETA1400
 56     VA3(I,J) = VA1(I,J)                                              SETA1410
        VA3(I,2) = VA3(I,2) / 6.080                                      SETA1420
        VA3(I,3) = HRS(VA3(I,3))                                         SETA1430
        DO 58 J= 4,10,3                                                  SETA1440
        VA3(I,J+2) = VA3(I,J+2) / 6.080                                  SETA1450
 58     VA3(I,J)   = HRS(VA3(I,J) )                                      SETA1460
        LA3 = LA1                                                        SETA1470
        MA3 = MA1                                                        SETA1480
C** CYCLE THRU RED GROUP CENTERS IN TABLE NO.=2000000                    SETA1490
 62     IXX = 0                                                          SETA1500
        KK  = 0                                                          SETA1510
        DO 68 KG=1,NRG                                                   SETA1520
        KGN = KRGN(KG)                                                   SETA1530
        DO 66 KH=1,LA3                                                   SETA1540
        IF (KGN.NE.KA3(KH))  GO TO 66                                    SETA1550
        KK  = KK + 1                                                     SETA1560
        KRGN(KK) = KGN                                                   SETA1570
        KRGK(KK) = KA1(KH,5)                                             SETA1580
        DO 64 KJ=1,12                                                    SETA1590
 64     VA(KJ) = VA3(KH,KJ)                                              SETA1600
        CALL  NAVIT(RGC,NGMAX,KK,VA,ICA,CA,IXY,N6)                       SETA1610
        IXX = IXX + IXY                                                  SETA1620
 66     CONTINUE                                                         SETA1630
 68     CONTINUE                                                         SETA1640
        NRG = KK                                                         SETA1650
        IF (IXX.NE.0)  NFLAG2 = NFLAG2 + 1                               SETA1660
C** PRINT OPTION                                                         SETA1670
 70     IF (IPRINT.LE.0)  GO TO 78                                       SETA1680
        IF (NBG.LE.0)  GO TO 74                                          SETA1690
        WRITE(N6,NAMA1)                                                  SETA1700
        NLINE = NLINE + 6                                                SETA1710
        IF (IPRINT.LE.1)  GO TO 74                                       SETA1720
        DO 72 I=1,NBG                                                    SETA1730
        CALL  WMAT3(2,ICA,BGC, 8, 6,NGMAX, 8, 6, I,NLINE,                SETA1740
     1 60HBORDERED TABLE. BLU GROUP CENTERS VS TIME                    ) SETA1750
 72     CONTINUE                                                         SETA1760
 74     IF (NRG.LE.0)  GO TO 78                                          SETA1770
        CALL  PAGE                                                       SETA1780
        WRITE(N6,NAMA2)                                                  SETA1790
        NLINE = NLINE + 6                                                SETA1800
        IF (IPRINT.LE.1)  GO TO 78                                       SETA1810
        DO 76 I=1,NRG                                                    SETA1820
        CALL  WMAT3(2,ICA,RGC, 8, 6,NGMAX, 8, 6, I,NLINE,                SETA1830
```

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     1 60HBORDERED TABLE. RED GROUP CENTERS VS TIME                    ) SETA1840
 76     CONTINUE                                                        SETA1850
CX* SET UP UNITS IN  KBUK AND KRUK  (BLU & RED)                        SETA1860
C    CODE  NBU(I) =  100*J + K, WHERE K=NO.UNITS IN GROUP I            SETA1870
C                                    J=STARTING LINE IN KBUK           SETA1880
C    KRUK(1,J)  = UNIT KODE,E.G.  1010100  FOR  JTH  UNIT             SETA1890
C    KBUK(2,J)  = UNIT TYPE,E.G. 61130000                              SETA1900
C    KRUK(3,J)  = BACKWARD REF TO GROUP LINE NO. IN KBGN,BGC,KRGN,RGC  SETA1910
C    KBUK(4,J)  = STATUS       ALIVE = 1                               SETA1920
C**    ADD THE FOLLOWING TO GROUP POS TO GET UNIT POS                  SETA1930
C    BREL(1,J)  = DELTA  X  FOR BLU.     RREL(1,J)  = DELTA  X  FOR RED SETA1940
C    BREL(2,J)  =        Y          .    RREL(2,J)  =        Y          SETA1950
C    BREL(3,J)  =        Z          .    RREL(3,J)  =        Z          SETA1960
C    BREL(4,J)  = VALUE             ,    RREL(4,J)  = VALUE             SETA1970
C    BV(J, )    = ALT & VEL         ,    RV(J, )    = ALT & VEL         SETA1980
C    KBU        = TOTAL NO. OF BLU UNITS                               SETA1990
C** CYCLE THRU GROUP TABLES & SET UP UNITS                             SETA2000
 78     IF (NBG.LE.0)  GO TO 100                                        SETA2010
C** BLU UNITS                                                          SETA2020
 80     KBU = 0                                                         SETA2030
        ID2 = 0                                                         SETA2040
        IY  = 1                                                         SETA2050
        DO  99 KG=1,NBG                                                 SETA2060
        ID1 = KBGN(KG)                                                  SETA2070
        CALL  RCBD11(BZA,LZ,MZ,NCB,KZARL,ID1,ID2,IY,IXX)                SETA2080
        IF (IXX.EQ.0)  GO TO 84                                         SETA2090
 81     E1  = 81.00                                                     SETA2100
 82     WRITE(N6,2006)     ID1, ID2                                     SETA2110
        NFLAG2 = NFLAG2 + 1                                             SETA2120
        GO TO 99                                                        SETA2130
C** CYCLE THRU UNITS IN BLU GROUP TABLE                                 SETA2140
 84     CALL  UNISET(KA1,VA1,LA,MA,LA1,MA1,NGMAX,KG,NUMAX,NBU,KBU,NAMBU, SETA2150
     1              KBUK,BREL,BV,ID1,IXX)                               SETA2160
        IF (IXX.EQ.0)  GO TO 99                                         SETA2170
        NFLAG2 = NFLAG2 + 1                                             SETA2180
 99     CONTINUE                                                        SETA2190
C**  RED UNITS                                                         SETA2200
 100    IF (NRG.LE.0)  GO TO 120                                        SETA2210
        KRU = 0                                                         SETA2220
        ID2 = 0                                                         SETA2230
        IY  = 1                                                         SETA2240
        DO 116 KG=1,NRG                                                 SETA2250
        ID1 = KRGN(KG)                                                  SETA2260
        CALL RCBD11(BZA,LZ,MZ,NCB,KZARL,ID1,ID2,IY,IXX)                 SETA2270
        IF (IXX.EQ.0)  GO TO 114                                        SETA2280
 111    E1  = 111.00                                                    SETA2290
 112    WRITE(N6,2006)     ID1, ID2                                     SETA2300
        NFLAG2 = NFLAG2 + 1                                             SETA2310
        GO TO 116                                                       SETA2320
C**  CYCLE THRU UNITS IN RED GROUP TABLE                               SETA2330
 114    CALL UNISET(KA1,VA1,LA,MA,LA1,MA1,NGMAX,KG,NUMAX,NRU,KRU,NAMRU, SETA2340
     1              KRUK,RREL,RV,ID1,IXX)                               SETA2350
        IF (IXX.EQ.0)  GO TO 116                                        SETA2360
        NFLAG2 = NFLAG2 + 1                                             SETA2370
 116    CONTINUE                                                        SETA2380
```

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C**  CHANGE VALUES IN BREL TO DELTA  X, Y, Z, REF HEADING AT T=0          SETA2390
 120    IF (KBU.LE.0)  GO TO 124                                         SETA2400
        DO 122 KU=1,KBU                                                  SETA2410
        KG   = KBUK(3,KU)                                                SETA2420
        HEAD = AINT(BGC(6,5,KG) )                                        SETA2430
        BEAR = (HEAD + BREL(3,KU)) * RAD                                 SETA2440
        RG   = BREL(2,KU)                                                SETA2450
        BREL(1,KU) = RG * SIN(BEAR)                                      SETA2460
        BREL(2,KU) = RG * COS(BEAR)                                      SETA2470
 122    BREL(3,KU) = .0                                                  SETA2480
C**  PRINT OPTION                                                        SETA2490
        IF (IPRINT.LT.2)  GO TO 124                                      SETA2500
        CALL PAGE                                                        SETA2510
        WRITE(N6,NAMA3)                                                  SETA2520
        WRITE(N6,2008)                                                   SETA2530
        DO 1221 J = 1, KBU                                               SETA2540
 1221   WRITE(N6,2009) J,(NAMBU(J,I),I=1,2),(KBUK(I,J),I=1,4),           SETA2550
     1    (BREL(I,J),I=1,4)                                             SETA2560
C**  CHANGE VALUES IN  RREL TO DELTA  X, Y, Z, REF HEADING AT T=0        SETA2570
 124    IF (KRU.LE.0)  GO TO 128                                         SETA2580
        DO 126 KU=1,KRU                                                  SETA2590
        KG   = KRUK(3,KU)                                                SETA2600
        HEAD = AINT(RGC(6,5,KG) )                                        SETA2610
        BEAR = (HEAD + RREL(3,KU)) * RAD                                 SETA2620
        RG   = RREL(2,KU)                                                SETA2630
        RREL(1,KU) = RG * SIN(BEAR)                                      SETA2640
        RREL(2,KU) = RG * COS(BEAR)                                      SETA2650
 126    RREL(3,KU) = .0                                                  SETA2660
C**  PRINT OPTION                                                        SETA2670
        IF (IPRINT.LT.2)  GO TO 128                                      SETA2680
        CALL  PAGE                                                       SETA2690
        WRITE(N6,NAMA4)                                                  SETA2700
        WRITE(N6,2008)                                                   SETA2710
        DO 1261 J = 1, KRU                                               SETA2720
 1261   WRITE(N6,2009) J,(NAMRU(J,I),I=1,2),(KRUK(I,J),I=1,4),           SETA2730
     1    (RREL(I,J),I=1,4)                                             SETA2740
 128    IF (NFLAG2.NE.0)     NFLAG=NFLAG + 1                             SETA2750
        IF (NBC*NRG*KBU*KRU .LE. 0) NFLAG = NFLAG + 1                    SETA2760
        RETURN                                                           SETA2770
        END                                                              SETA2780


      SUBROUTINE  NAVIT(GC,NGA,NG,VA,ICA,CA,IXX,N6)                      NVIT0010
C   PGM=NXX. L.D.G.          VER.3  8-27-73    FORTRAN IV.    EBCD      NVIT0020
C   TO SET UP INITIAL POSITIONS AND PLANNED ROUTES                       NVIT0030
C   CALLED BY,  SETUPA                                                   NVIT0040
        DIMENSION  GC(8,6,NGA), VA(12), ICA(16), CA(16)                  NVIT0050
        DATA     RAD/0.0174533/,PI/3.14159/                              NVIT0060
 2000   FORMAT(1HO,5X,  'ERROR IN NAVIGATION INITIALIZATION PKG'/        NVIT0070
     1       6X,'CHECK TIMES IN TABLE OF GROUP CENTERS'/                 NVIT0080
     2       6X,'POINT=',I3,',  TIMES=',2F7.3,',   GROUP=',I3)          NVIT0090
C**  SETUP BORDERED TABLE  GC(8,6,NGA)                                   NVIT0100
 1      IXX = 0                                                          NVIT0110
        GC(1,1,NG) = 806.C                                               NVIT0120
```

```
      DO   4 I=2,6                                                    NVIT0130
 4    GC(1,I,NG) = I                                                  NVIT0140
      GC(2,1,NG)=-10.                                                 NVIT0150
      GC(3,1,NG) = VA(10)                                             NVIT0160
      GC(4,1,NG) = VA(7)                                              NVIT0170
      GC(5,1,NG) = VA(4)                                              NVIT0180
      GC(6,1,NG) =  VA(3)                                             NVIT0190
      GC(7,1,NG) =    .25 + VA(3)                                     NVIT0200
      GC(8,1,NG)=5.0+VA(3)                                            NVIT0210
C** CENTER                                                            NVIT0220
 6    XC   = ICA(4)                                                   NVIT0230
      YC   = ICA(8)                                                   NVIT0240
      BR   = AINT(VA(1))                                              NVIT0250
      RG   = (VA(1)-BR) * 1000.                                       NVIT0260
C**  POINT A. RELEASE POINT                                           NVIT0270
      X   = RG * SIN(BR*RAD)                                          NVIT0280
      Y    = RG * COS(BR*RAD)                                         NVIT0290
 8    GC(6,2,NG) = XC + X                                             NVIT0300
      GC(6,3,NG) = YC + Y                                             NVIT0310
      GC(6,4,NG) = VA(2)                                              NVIT0320
      GC(6,6,NG) =  0.0                                               NVIT0330
      XA   = XC + X                                                   NVIT0340
      YA   = YC + Y                                                   NVIT0350
      ZA   = VA(2)                                                    NVIT0360
      GC(6,5,NG) = VA(5)                                              NVIT0370
C**  POINT B.                                                         NVIT0380
 10   BR   = AINT(VA(5))                                              NVIT0390
      V    = (VA(5)-BR) * 1000.                                       NVIT0400
      RG   = V * (VA(3)-VA(4))                                        NVIT0410
      X    = RG * SIN(BR*RAD)                                         NVIT0420
      Y    = RG * COS(BR*RAD)                                         NVIT0430
      GC(5,2,NG) = XA - X                                             NVIT0440
      GC(5,3,NG) = YA - Y                                             NVIT0450
      GC(5,4,NG) = VA(6)                                              NVIT0460
      GC(5,5,NG) = VA(5)                                              NVIT0470
      GC(5,6,NG) = (VA(2)-VA(6)) / (VA(3)-VA(4))                      NVIT0480
C**  POINT A1.                                                        NVIT0490
 12   RG   = V * (GC(7,1,NG)-GC(6,1,NG) )                            NVIT0500
      GC(7,2,NG) = XA + RG*SIN(BR*RAD)                                NVIT0510
      GC(7,3,NG) = YA + RG*COS(BR*RAD)                                NVIT0520
      GC(7,4,NG) = ZA                                                 NVIT0530
      XR   = CA(12)                                                   NVIT0540
      YR   = CA(16)                                                   NVIT0550
      ZR   = ZA                                                       NVIT0560
 14   ANG = ATAN2( (XR-GC(7,2,NG)),(YR-GC(7,3,NG)) )                  NVIT0570
      IF (ANG.LT..0)     ANG = ANG + 2.* PI                           NVIT0580
      DANG = AINT(ANG/RAD)                                            NVIT0590
      GC(7,5,NG) = DANG + V/1000.                                     NVIT0600
      GC(7,6,NG) = 0.0                                                NVIT0610
C**  POINT A2.                                                        NVIT0620
 18   RG   = V * (GC(8,1,NG) - GC(7,1,NG) )                          NVIT0630
      GC(8,2,NG) = GC(7,2,NG) + RG*SIN(DANG*RAD)                      NVIT0640
      GC(8,3,NG) = GC(7,3,NG) + RG*COS(DANG*RAD)                      NVIT0650
      GC(8,4,NG) = ZA                                                 NVIT0660
      GC(8,5,NG) = GC(7,5,NG)                                         NVIT0670
```

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      GC(8,6,NG) = 0.C                                                  NVIT0680
C**   POINT C.                                                          NVIT0690
 20     BR   = AINT(VA(8))                                             NVIT0700
        V    = (VA(8)-BR) * 1000.                                      NVIT0710
        RG   = V * (VA(4)-VA(7) )                                      NVIT0720
        GC(4,2,NG) = GC(5,2,NG) - RG * SIN(BR*RAD)                     NVIT0730
        GC(4,3,NG) = GC(5,3,NG) - RG * COS(BR*RAD)                     NVIT0740
        GC(4,4,NG) = VA(9)                                             NVIT0750
        GC(4,5,NG) = VA(8)                                             NVIT0760
        GC(4,6,NG) = (VA(6)-VA(9)) / (VA(4)-VA(7))                     NVIT0770
C**   POINT D.                                                          NVIT0780
 22     BR   = AINT(VA(11))                                            NVIT0790
        V    = (VA(11)-BR) * 1000.                                     NVIT0800
        RG   = V * (VA(7)-VA(10) )                                     NVIT0810
        GC(3,2,NG) = GC(4,2,NG) - RG * SIN(BR*RAD)                     NVIT0820
        GC(3,3,NG) = GC(4,3,NG) - RG * COS(BR*RAD)                     NVIT0830
        GC(3,4,NG) = VA(12)                                            NVIT0840
        GC(3,5,NG) = VA(11)                                            NVIT0850
        GC(3,6,NG) = (VA(9)-VA(12))/(VA(7)-VA(10))                     NVIT0860
C**   POINT E.                                                          NVIT0870
 24     XS   = CA(4)                                                   NVIT0880
        YS   = CA(8)                                                   NVIT0890
        ZS   = GC(3,4,NG)                                              NVIT0900
        ANG = ATAN2( (GC(3,2,NG)-XS),(GC(3,3,NG)-YS) )                 NVIT0910
        IF (ANG.LT..0)    ANG = ANG + 2.* PI                           NVIT0920
        DANG = AINT(ANG/RAD)                                           NVIT0930
 26     RG   = V * (GC(3,1,NG)-GC(2,1,NG) )                            NVIT0940
        XE   = GC(3,2,NG) - RG * SIN(DANG*RAD)                         NVIT0950
        YE   = GC(3,3,NG) - RG * COS(DANG*RAD)                         NVIT0960
        GC(2,2,NG) = XE                                                NVIT0970
        GC(2,3,NG) = YE                                                NVIT0980
        GC(2,4,NG) = GC(3,4,NG)                                        NVIT0990
        GC(2,5,NG) = DANG + V/1000.                                    NVIT1000
        GC(2,6,NG) = 0.0                                               NVIT1010
        IXX = 0                                                        NVIT1020
        DO 28 I=2,7                                                    NVIT1030
        IF (  GC(I+1,1,NG).GT.GC(I,1,NG) )    GO TO 28                NVIT1040
        IXX = IXX + 1                                                  NVIT1050
        WRITE(N6,2000) I, GC(I,1,NG), GC(I+1,1,NG), NG                 NVIT1060
 28     CONTINUE                                                       NVIT1070
        RETURN                                                         NVIT1080
        END                                                            NVIT1090


      SUBROUTINE  UNISET(KA1,VA1,LA,MA,LA1,MA1,NGMAX,KG,NUMAX,NBU,KBU, USET0010
     1              NAMBU,KBUK,BREL,BV,ID1,IXX)                        USET0020
C** PGM=NXX. L.D.G.         VER.3.  7-7-73    FORTRAN 1V     EBCD     USET0030
C MODS. N6=121.                                          VER.4   11-25-74 USET0040
C** TO SET UP UNITS FROM GROUP TABLES 1.1,1.2,2.1, ETC.                 USET0050
C   CALLED BY  SETUPA. AT SN = 78.                                     USET0060
      DIMENSION  KA1(LA,MA), VA1(LA,MA), NBU(NGMAX), KBUK(4,NUMAX)     USET0070
      DIMENSION  BREL(4,NUMAX),NAMBU(NUMAX,2),BV(NUMAX,8)              USET0080
 2005 FORMAT(1HO, 'ERROR IN UNISET AT E1=',F8.2,3X,'ID=',2I10)         USET0090
 2006 FORMAT(1HO, 'NUMBER OF UNITS EXCEEDS NUMAX =',I4,', AT ID=',I10) USET0100
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 2007  FORMAT(1HO,'IN GROUP TABLE=',I10,',  EXCLUDED LINE NO.=',I4)      USET0110
 1     ID2 = 0                                                          USET0120
       IXX = 0                                                          USET0130
       N6  = 6                                                          USET0140
       KUG = 0                                                          USET0150
       DO 98 L=1,LA1                                                    USET0160
       KQ  = VA1(L,1) + .001                                            USET0170
       IF (KA1(L,5).GT.0. AND .KQ.GT.0)  GO TO 86                       USET0180
 85    F1  = 85.00                                                      USET0190
       WRITE(N6,2007) ID1, L                                            USET0200
       GO TO 98                                                         USET0210
 86    IF (KBU.LT.NUMAX)  GO TO 88                                      USET0220
 87    IXX = 1                                                          USET0230
       WRITE(N6,2006) NUMAX, ID1                                        USET0240
       RETURN                                                           USET0250
 88    KBU = KBU + 1                                                    USET0260
       KUG = KUG + 1                                                    USET0270
       IF (KUG.EQ.1)   NBU(KG) = 100 * KBU                              USET0280
       KBUK(1,KBU) = ID1 + 100 * KUG                                    USET0290
       KBUK(2,KBU) = 10000 * KA1(L,5)                                   USET0300
       KBUK(3,KBU) = KG                                                 USET0310
       KBUK(4,KBU) = 1                                                  USET0320
       NAMBU(KBU,1) = KA1(L,2)                                          USET0330
       NAMBU(KBU,2) = KA1(L,3)                                          USET0340
       DO 90 LL=1,4                                                     USET0350
 90    BREL(LL,KBU) = VA1(L,LL)                                         USET0360
       DO 91 LL=1,8                                                     USET0370
 91    BV(KBU,LL) = VA1(L,LL+4)                                         USET0380
       BV(KBU,3) = BV(KBU,3) / 6.080                                    USET0390
       BV(KBU,8) = BV(KBU,8) / 6.080                                    USET0400
C**  TAKE CARE OF QUANTITY.GT.1                                         USET0410
 92    IF (KQ.LE.1)  GO TO 98                                           USET0420
       IF (KBU.LT.NUMAX)  GO TO 94                                      USET0430
       GO TO 87                                                         USET0440
 94    KQ  = KQ - 1                                                     USET0450
       K   = KBU                                                        USET0460
       KBU = KBU + 1                                                    USET0470
       KUG = KUG + 1                                                    USET0480
       KBUK(1,KBU) = KBUK(1,K) + 100                                    USET0490
       KBUK(2,KBU) = KBUK(2,K)                                          USET0500
       KBUK(3,KBU) = KG                                                 USET0510
       KBUK(4,KBU) = 1                                                  USET0520
       NAMBU(KBU,1) = NAMBU(K,1)                                        USET0530
       NAMBU(KBU,2) = NAMBU(K,2)                                        USET0540
       DO 96 LL=1,4                                                     USET0550
 96    BREL(LL,KBU) = BREL(LL,K)                                        USET0560
       DO 97 LL=1,8                                                     USET0570
 97    BV(KBU,LL) = BV(K,LL)                                            USET0580
       GO TO 92                                                         USET0590
 98    CONTINUE                                                         USET0600
       NBU(KG) = NBU(KG) + KUG                                          USET0610
       RETURN                                                           USET0620
       END                                                              USET0630
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      SUBROUTINE  SETUPB(IPRINT)                                          SETB0010
C  PGM=NXX.  L.D.GREGORY.  10-1-73      FORTRAN IV                 EBCD   SETB0020
C  TO SET UP PLATFORMS VS SYSTEMS FOR CURRENT PROBLEM                      SETB0030
C  CALLED BY MAIN AND ZIP CARD AS FOLLOWS                                  SETB0040
CIP  8 2 P                              SET UP SYSTEM AND SUBSYSTEMS       SETB0050
C**                                                                       SETB0060
      COMMON/DEVICE/ N1,N2,N3,N4,N5,N6,N7,N8,N9,N10,N11,N12               SETB0070
       COMMON/INOUT/NLINE,NPAGE,DUMA(35), NCODE(19)                       SETB0080
     1,IDUMB(72), NFLAG, NFLAG2                                           SETB0090
CZAZA                                                                     SETB0100
       INTEGER TITLA                                                      SETB0110
       COMMON/CZAZA/NCBA,IDA1,IDA2,IDA3,JZARL,LZA,MZA,ICA(16),CA(16)      SETB0120
     1, TITLA(15),HEADA(37),IFMT                                          SETB0130
     2, LA1,LAA1,MA1,MAA1,KA1(27,5),VA1(27,12)                            SETB0140
       DIMENSION  BZA( 555)                                               SETB0150
       EQUIVALENCE  (NCBA,BZA(1))                                         SETB0160
       DATA  NCB,LZ,MZ,LA,MA/ 1,555,12,27,12/                             SETB0170
CNAVIG                                                                    SETB0180
       COMMON/CNAVIG/ NGMX,BE,BF,RE,RF,                                   SETB0190
     1      NBG,BA,BB,BC,BD,KBGN(18),KBGK(18),BGC( 8,6,18),NBU(18),      SETB0200
     2      NRG,RA,RB,RC,RD,KRGN(18),KRGK(18),RGC( 8,6,18),NRU(18),      SETB0210
     3           TTIME,NUMX,                                              SETB0220
     4      KBU,KBUK(4,50),BREL(4,50),BXYZ(50,7),NAMBU(50,2),BV(50,8),   SETB0230
     5      KRU,KRUK(4,50),RREL(4,50),RXYZ(50,7),NAMRU(50,2),RV(50,8)    SETB0240
       COMMON/CWORK/LA2,MA2,LAA2,MAA2, KA2(3,15),VA2(12,15),              SETB0250
     1              LA3,MA3,LAA3,MAA3, VA3(48,15),          KA5( 547)     SETB0260
CPLAT  VS  SYSTEMS  (SUBSYSTEMS)                                          SETB0270
       COMMON/CPLAT/NBP,NBPMX,NBSS,NBSSMX,NBSPP(15),NBPWS(45),            SETB0280
     1   NAMBP(2,15),KBPT(15),NABSS(2,45),KBST(45),KBPXS(45,15),          SETB0290
     2   BPX1(12,15),                                                     SETB0300
     3              NRP,NRPMX,NRSS,NRSSMX,NRSPP(15),NRPWS(45),            SETB0310
     4   NAMRP(2,15),KRPT(15),NARSS(2,45),KRST(45),KRPXS(45,15),          SETB0320
     5   RPX1(12,15)                                                      SETB0330
C***                                                                      SETB0340
C  NAMBP  = NAME,BLU PLATFORMS          / NAMRP  = NAME,RED PLATFORMS     SETB0350
C  KBPT   = KODES,BLU PLAT TYPE,61130000/ KRPT   = ETC.                   SETB0360
C  NABSS  = NAME,BLU SUB SYSTEMS        / ETC.   =                        SETB0370
C  KBST   = KODES,BLU SS TYPES, 65140000/        =                        SETB0380
C  KBPXS  = KODES,BLU PLAT VS SS + QTY  /        =                        SETB0390
C         = E.G. 65140C02               /        =                        SETB0400
C  NBP    = NO.OF BLU PLAT IN  KBPT     /        =                        SETB0410
C  NBSS   = NO.OF BLU SUBSYS  IN KBST   /        =                        SETB0420
C  NBSPP  = NO.SYS PER PLATFORM                                           SETB0430
C  BPX1   = BLU PLAT EXTENT(-1) DATA    / RPX1   = RED PLAT EXTENT(-1)    SETB0440
       DIMENSION  KBPTT( 7), KRPTT( 3)                                    SETB0450
       DATA  NBPTT,KBPTT/ 7,61100000,61200000,61300000,61500000,          SETB0460
     1    62100003,63100000,63200000/                                     SETB0470
       DATA  NRPTT,KRPTT/ 3,81300000,82100003,83300000/                   SETB0480
       DATA  BLANK,LANK/'    ','    '/                                    SETB0490
 2005  FORMAT(1HO,22HERROR IN SETUPB AT E1=,F8.2,3X,'ID1=',2I10)          SETB0500
 2006  FORMAT(1HO, 'NO. BLU PLATFORMS=',I4,',  EXCEEDS STORAGE=',I4)     SETB0510
 2007  FORMAT(1HO, 'NO TABLE FOUND FOR ID1, ID2=',2I10)                   SETB0520
 2008  FORMAT(1HO, 'NO. BLU SYSTEMS=',I4,',  EXCEEDS STORAGE=',I4)      SETB0530
 2010  FORMAT(6X,'BLU PLATFORM DATA')                                     SETB0540
 2012  FORMAT(6X,'PLATFORM TYPE=',I10/(9X,6G14.6) )                       SETB0550
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 2206  FORMAT(1HO, 'NO. RED PLATFORMS=',I4,',  EXCEEDS STORAGE=',I4)      SETB0560
 2208  FORMAT(1HO, 'NO. RED SYSTEMS=',I4,',  EXCEEDS STORAGE=',I4)       SETB0570
 2210  FORMAT(6X,'RED PLATFORM DATA')                                     SETB0580
       LAA5  = 727                                                        SETB0590
       LAA3  = 48                                                         SETB0600
       MAA3  = 15                                                         SETB0610
       LAA2  = 12                                                         SETB0620
       MAA2  = 15                                                         SETB0630
       NBPMX = 15                                                         SETB0640
       NBSSMX= 45                                                         SETB0650
       NRPMX = 15                                                         SETB0660
       NRSSMX= 45                                                         SETB0670
       KZARL = 96 + LA*(5 + MA)                                           SETB0680
       JZARL = KZARL                                                      SETB0690
       NFLAG2= 0                                                          SETB0700
C***   FIND DISTINCT BLU PLATFORMS (UNIT) CODES                           SETB0710
  1    IF (KBU.LE.0)  GO TO 201                                           SETB0720
       DO 12 I=1,KBU                                                      SETB0730
 12    KA5(I)= KBUK(2,I)                                                  SETB0740
       CALL  KORDER(KA5,KBU)                                              SETB0750
       CALL  UNIQUE(KA5,KBU,NBP)                                          SETB0760
       IF (NBP.LE.NBPMX)  GO TO 14                                        SETB0770
       WRITE(N6,2006) NBP, NBPMX                                          SETB0780
       NFLAG2 = NFLAG2 + 1                                                SETB0790
       NBP    = NBPMX                                                     SETB0800
 14    DO 16 I=1,NBP                                                      SETB0810
 16    KBPT(I) = KA5(I)                                                   SETB0820
C***   ZERO OUT WORKING ARRAYS                                            SETB0830
       DO 22 J=1,NBPMX                                                    SETB0840
       DO 18 I=1,2                                                        SETB0850
       NAMBP(I,J) = LANK                                                  SETB0860
 18    KA2(I,J)  =  LANK                                                  SETB0870
       KA2(3,J)  =  0                                                     SETB0880
       DO 20 I=1,12                                                       SETB0890
       VA2(I,J) = .0                                                      SETB0900
 20    VA3(I,J) = .0                                                      SETB0910
       DO 22 I=13,LAA3                                                    SETB0920
 22    VA3(I,J) = .0                                                      SETB0930
C***   CYCLE THRU CATALOG PLATFORM TABLES                                 SETB0940
       IY  = 3                                                            SETB0950
       DO 44  KC=1,NBPTT                                                  SETB0960
       ID1 =(KBPTT(KC) / 10000) * 10000                                   SETB0970
       DO 42  KX=1,5                                                      SETB0980
       ID2 = -KX                                                          SETB0990
       CALL  RCBD11(BZA,LZ,MZ,NCB,KZARL,ID1,ID2,IY,IXX)                   SETB1000
       IF (IXX.EQ.0)  GO TO 26                                            SETB1010
       KOUTA = MOD(KBPTT(KC),10000)                                       SETB1020
       DO 24 I=1,4                                                        SETB1030
       KOUT = MOD(KOUTA,10)                                               SETB1040
       IF (KX.EQ.KOUT)  GO TO 42                                          SETB1050
 24    KOUTA = KOUTA / 10                                                 SETB1060
       WRITE(N6,2007) ID1,ID2                                             SETB1070
       GO TO 42                                                           SETB1080
C***   CYCLE THRU PLATFORM TYPES IN KBPT (FROM ENGAGEMENT STRUCTURE)      SETB1090
 26    DO 40  KT=1,NBP                                                    SETB1100
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      K    =  KBPT(KT) / 10000                                          SETB1110
      DO 28  J=1,LA1                                                    SETB1120
      IF (K.EQ.KA1( J,5))  GO TO 30                                     SETB1130
 28   CONTINUE                                                          SETB1140
      GO TO 40                                                          SETB1150
C***  FOUND, PLATFORM TYPE IN CATALOG                                   SETB1160
 30   JT   = J                                                          SETB1170
      IF (KX.GE.2)  GO TO 36                                            SETB1180
C***  TRANSFER PLATFORM NAME, TYPE, AND DATA                            SETB1190
 32   KA2(1,KT) = KA1(JT,2)                                             SETB1200
      KA2(2,KT) = KA1(JT,3)                                             SETB1210
      KA2(3,KT) = KBPT(KT)                                              SETB1220
      NAMBP(1,KT) = KA2(1,KT)                                           SETB1230
      NAMBP(2,KT) = KA2(2,KT)                                           SETB1240
      DO 34 J=1,12                                                      SETB1250
 34   VA2(J,KT) = VA1(JT,J)                                             SETB1260
      GO TO 40                                                          SETB1270
 36   KTEST = 10000 * K                                                 SETB1280
      DO 37 J=1,NBP                                                     SETB1290
      IF (KTEST.EQ.KA2(3,J) )  GO TO 371                                SETB1300
 37   CONTINUE                                                          SETB1310
      GO TO 40                                                          SETB1320
 371  JA   = 12*(KX-2)                                                  SETB1330
      DO 38 J=1,12                                                      SETB1340
 38   VA3(JA+J,KT) = VA1(JT,J)                                          SETB1350
 40   CONTINUE                                                          SETB1360
 42   CONTINUE                                                          SETB1370
 44   CONTINUE                                                          SETB1380
C***  BUILD SYSTEM LIST (UNIQUE)                                        SETB1390
 50   LA5 = 0                                                           SETB1400
      DO 52 J=1,NBP                                                     SETB1410
      DO 52 I=1,LAA3                                                    SETB1420
      A    = VA3(I,J)                                                   SETB1430
      IF (A.LE..001)  GO TO 52                                          SETB1440
      IF ( MOD( INT((A+.004)*100.), 100).LT.1)   GO TO 52               SETB1450
      LA5 = LA5 + 1                                                     SETB1460
      KA5(LA5) = (A + .004)                                             SETB1470
 52   CONTINUE                                                          SETB1480
      CALL   KORDER(KA5,LA5)                                            SETB1490
      CALL   UNIQUE(KA5,LA5,K)                                          SETB1500
      NBSS = K                                                          SETB1510
      IF (NBSS.LE.NBSSMX)  GO TO 54                                     SETB1520
      WRITE(N6,2008) NBSS, NBSSMX                                       SETB1530
      NFLAG2 = NFLAG2 + 1                                               SETB1540
      NBSS = NBSSMX                                                     SETB1550
 54   DO 56 I=1,NBSS                                                   SETB1560
 56   KBST(I) = 10000*KA5(I)                                            SETB1570
C***  BUILD SYSTEMS VS PLATFORMS MATRIX  KBPXS                          SETB1580
      DO 60 I=1,NBP                                                     SETB1590
 60   NBSPP(I) = 0                                                      SETB1600
      DO 66 I=1,NBSS                                                    SETB1610
      NABSS(1,I) = LANK                                                 SETB1620
      NABSS(2,I) = LANK                                                 SETB1630
      NBPWS(I) = 0                                                      SETB1640
      KST = KBST(I)                                                     SETB1650
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      DO 66 J=1,NBP                                                    SETB1660
      KBPXS(I,J) = 0                                                   SETB1670
      DO 64 K=1,LAA3                                                   SETB1680
      A   = VA3(K,J)                                                   SETB1690
      IF (A.LE..001)  GO TO 64                                         SETB1700
      L   = INT(A + .004)*10000                                        SETB1710
      IF (L.NE.KST)  GO TO 64                                          SETB1720
      KL  = MOD( INT((A+.004)*100.), 100)                              SETB1730
      IF (K.GT.36)  GO TO 62                                           SETB1740
      KBPXS(I,J) = KST + MIN0(KL,99)                                   SETB1750
      NBPWS(I) = NBPWS(I) + 1                                          SETB1760
      NBSPP(J) = NBSPP(J) + 1                                          SETB1770
      GO TO 64                                                         SETB1780
 62   KBPXS(I,J) = KBPXS(I,J) + 100*MIN0(KL,99)                        SETB1790
 64   CONTINUE                                                         SETB1800
 66   CONTINUE                                                         SETB1810
C***  TRANSFER EXTENT(-1) DATA                                         SETB1820
 74   DO 76 I=1,LAA2                                                   SETB1830
      DO 76 J=1,MAA2                                                   SETB1840
 76    BPX1(I,J) = VA2(I,J)                                            SETB1850
C***  PRINT OPTION                                                     SETB1860
      IF (IPRINT.LT.2)  GO TO 78                                       SETB1870
      CALL PAGE                                                        SETB1880
      WRITE(N6,2010)                                                   SETB1890
      DO 77 I=1,NBP                                                    SETB1900
 77   WRITE(N6,2012)  KBPT(I),(BPX1(J,I),J=1,12)                       SETB1910
 78   CONTINUE                                                         SETB1920
C***  PROCESS RED PLATFORM DATA                                        SETB1930
C***  FIND DISTINCT RED PLATFORMS (UNIT) CODES                         SETB1940
 201  IF (KRU.LE.0)  GO TO 401                                         SETB1950
      DO 212 I=1,KRU                                                   SETB1960
 212  KA5(I)= KRUK(2,I)                                                SETB1970
      CALL  KORDER(KA5,KRU)                                            SETB1980
      CALL  UNIQUE(KA5,KRU,NRP)                                        SETB1990
      IF (NRP.LE.NRPMX)  GO TO 214                                     SETB2000
      WRITE(N6,2206) NRP, NRPMX                                        SETB2010
      NFLAG2 = NFLAG2 + 1                                              SETB2020
      NRP    = NRPMX                                                   SETB2030
 214  DO 216 I=1,NRP                                                   SETB2040
 216  KRPT(I) = KA5(I)                                                 SETB2050
C***  ZERO OUT WORKING ARRAYS                                          SETB2060
      DO 222 J=1,NRPMX                                                 SETB2070
      DO 218 I=1,2                                                     SETB2080
      NAMRP(I,J) = LANK                                                SETB2090
 218  KA2(I,J)  =  LANK                                                SETB2100
      KA2(3,J)  =  0                                                   SETB2110
      DO 220 I=1,12                                                    SETB2120
      VA2(I,J) = .0                                                    SETB2130
 220  VA3(I,J) = .0                                                    SETB2140
      DO 222 I=13,LAA3                                                 SETB2150
 222  VA3(I,J) = .0                                                    SETB2160
C***  CYCLE THRU CATALOG PLATFORM TABLES                               SETB2170
      IY  = 3                                                          SETB2180
      DO 244 KC=1,NRPTT                                                SETB2190
      ID1 =(KRPTT(KC) / 10000) * 10000                                 SETB2200
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      DO 242 KX=1,5                                                    SETB2210
      ID2 = -KX                                                        SETB2220
      CALL  RCBD11(BZA,LZ,MZ,NCB,KZARL,ID1,ID2,IY,IXX)                 SETB2230
      IF (IXX.EQ.0)  GO TO 226                                         SETB2240
      KOUTA = MOD(KRPTT(KC),10000)                                     SETB2250
      DO 224 I=1,4                                                     SETB2260
      KOUT = MOD(KOUTA,10)                                             SETB2270
      IF (KX.EQ.KOUT)  GO TO 242                                       SETB2280
 224  KOUTA = KOUTA / 10                                               SETB2290
      WRITE(N6,2007) ID1,ID2                                           SETB2300
      GO TO 242                                                        SETB2310
C***  CYCLE THRU PLATFORM TYPES IN KRPT (FROM ENGAGEMENT STRUCTURE)    SETB2320
 226  DO 240 KT=1,NRP                                                  SETB2330
      K   =  KRPT(KT) / 10000                                          SETB2340
      DO 228 J=1,LA1                                                   SETB2350
      IF (K.EQ.KA1( J,5))  GO TO 230                                   SETB2360
 228  CONTINUE                                                         SETB2370
      GO TO 240                                                        SETB2380
C***  FOUND, PLATFORM TYPE IN CATALOG                                  SETB2390
 230  JT  = J                                                          SETB2400
      IF (KX.GE.2)  GO TO 236                                          SETB2410
C***  TRANSFER PLATFORM NAME, TYPE, AND DATA                           SETB2420
 232  KA2(1,KT) = KA1(JT,2)                                            SETB2430
      KA2(2,KT) = KA1(JT,3)                                            SETB2440
      KA2(3,KT) = KRPT(KT)                                             SETB2450
      NAMRP(1,KT) = KA2(1,KT)                                          SETB2460
      NAMRP(2,KT) = KA2(2,KT)                                          SETB2470
      DO 234 J=1,12                                                    SETB2480
 234  VA2(J,KT) = VA1(JT,J)                                            SETB2490
      GO TO 240                                                        SETB2500
 236  KTEST = 10000 * K                                                SETB2510
      DO 237 J=1,NRP                                                   SETB2520
      IF (KTEST.EQ.KA2(3,J) )  GO TO 2371                              SETB2530
 237  CONTINUE                                                         SETB2540
      GO TO 240                                                        SETB2550
 2371 JA  = 12*(KX-2)                                                  SETB2560
      DO 238 J=1,12                                                    SETB2570
 238  VA3(JA+J,KT) = VA1(JT,J)                                         SETB2580
 240  CONTINUE.                                                        SETB2590
 242  CONTINUE                                                         SETB2600
 244  CONTINUE                                                         SETB2610
C***  BUILD SYSTEM LIST (UNIQUE)                                       SETB2620
 250  LA5 = 0                                                          SETB2630
      DO 252 J=1,NRP                                                   SETB2640
      DO 252 I=1,LAA3                                                  SETB2650
      A   = VA3(I,J)                                                   SETB2660
      IF (A.LE..001)  GO TO 252                                        SETB2670
      IF ( MOD( INT((A+.004)*100.), 100).LT.1)   GO TO 252             SETB2680
      LA5 = LA5 + 1                                                    SETB2690
      KA5(LA5) = (A + .004)                                            SETB2700
 252  CONTINUE                                                         SETB2710
      CALL  KORDER(KA5,LA5)                                            SETB2720
      CALL  UNIQUE(KA5,LA5,K)                                          SETB2730
      NRSS = K                                                         SETB2740
      IF (NRSS.LE.NRSSMX)  GO TO 254                                   SETB2750
```

```
      WRITE(N6,2208) NRSS, NRSSMX                                       SETB2760
      NFLAG2 = NFLAG2 + 1                                               SETB2770
      NRSS = NRSSMX                                                     SETB2780
  254 DO 256 I=1,NRSS                                                   SETB2790
  256 KRST(I) = 10000*KA5(I)                                            SETB2800
C***  BUILD SYSTEMS VS PLATFORMS MATRIX  KRPXS                          SETB2810
      DO 260 I=1,NRP                                                    SETB2820
  260 NRSPP(I) = 0                                                      SETB2830
      DO 266 I=1,NRSS                                                   SETB2840
      NARSS(1,I) = LANK                                                 SETB2850
      NARSS(2,I) = LANK                                                 SETB2860
      NRPWS(I) = 0                                                      SETB2870
      KST = KPST(I)                                                     SETB2880
      DO 266 J=1,NRP                                                    SETB2890
      KRPXS(I,J) = 0                                                    SETB2900
      DO 264 K=1,LAA3                                                   SETB2910
      A   = VA3(K,J)                                                    SETB2920
      IF (A.LE..001)  GO TO 264                                         SETB2930
      L   = INT(A + .004)*10000                                         SETB2940
      IF (L.NE.KST)  GO TO 264                                          SETB2950
      KL  = MOD( INT((A+.004)*100.), 100)                               SETB2960
      IF (K.GT.36)  GO TO 262                                           SETB2970
      KRPXS(I,J) = KST + MIN0(KL,99)                                    SETB2980
      NRPWS(I) = NRPWS(I) + 1                                           SETB2990
      NRSPP(J) = NRSPP(J) + 1                                           SETB3000
      GO TO 264                                                         SETB3010
  262 KRPXS(I,J) = KRPXS(I,J) + 100*MIN0(KL,99)                         SETB3020
  264 CONTINUE                                                          SETB3030
  266 CONTINUE                                                          SETB3040
C***  TRANSFER EXTENT(-1) DATA                                          SETB3050
  274 DO 276 I=1,LAA2                                                   SETB3060
      DO 276 J=1,MAA2                                                   SETB3070
  276   RPX1(I,J) = VA2(I,J)                                            SETB3080
C***  PRINT OPTION                                                      SETB3090
      IF (IPRINT.LT.2)  GO TO 278                                       SETB3100
      CALL PAGE                                                         SETB3110
      WRITE(N6,2210)                                                    SETB3120
      DO 277 I=1,NRP                                                    SETB3130
  277 WRITE(N6,2012)  KRPT(I),(RPX1(J,I),J=1,12)                        SETB3140
  278 CONTINUE                                                          SETB3150
  401 RETURN                                                            SETB3160
      END                                                               SETB3170


      SUBROUTINE  SETUPC(IPRINT)                                        SETC0010
C  PGM=NXX(NEM). L.D.G.        VER.2    10-22-73   FORTRAN IV     EBCD  SETC0020
C  TO SET UP SYSTEMS DATA FOR CURRENT PROBLEM FOR SYSTEMS IN SETUPB     SETC0030
C  SETS UP,BLU 1.ASMS=7800   2.TRAJ=4110                                SETC0040
C                                                                       SETC0050
C         ,REC 1.ASMS=9800    2.TRAJ=5110    3.SSMS=9600                SETC0060
C  CALLED BY MAIN AND ZIP CARD AS FOLLOWS                               SETC0070
CIP  8 3 P                                SET UP SYSTEM DATA            SETC0080
C***                                                                    SETC0090
      COMMON/DEVICE/ N1,N2,N3,N4,N5,N6,N7,N8,N9,N10,N11,N12             SETC0100
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      COMMON/INOUT/NLINE,NPAGE,DUMA(35), NCODE(19)                          SETC0110
     1,IDUMB(72), NFLAG, NFLAG2                                             SETC0120
CZAZA                                                                       SETC0130
      INTEGER TITLA                                                         SETC0140
      COMMON/CZAZA/NCBA,IDA1,IDA2,IDA3,JZARL,LZA,MZA,ICA(16),CA(16)         SETC0150
     1, TITLA(15),HEADA(37),IFMT                                            SETC0160
     2, LA1,LAA1,MA1,MAA1,KA1(27,5),VA1(27,12)                              SETC0170
      DIMENSION  BZA( 555)                                                  SETC0180
      EQUIVALENCE  (NCBA,BZA(1))                                            SETC0190
      DATA  NCB,LZ,MZ,LA,MA/ 1,555,12,27,12/                                SETC0200
CNAVIG                                                                      SETC0210
      COMMON/CNAVIG/ NGMX,BE,BF,RE,RF,                                      SETC0220
     1     NBG,BA,BB,BC,BD,KBGN(18),KBGK(18),BGC( 8,6,18),NBU(18),          SETC0230
     2     NRG,RA,RB,RC,RD,KRGN(18),KRGK(18),RGC( 8,6,18),NRU(18),          SETC0240
     3          TTIME,NUMX,                                                SETC0250
     4     KBU,KBUK(4,50),BREL(4,50),BXYZ(50,7),NAMBU(50,2),BV(50,8),       SETC0260
     5     KRU,KRUK(4,50),RREL(4,50),RXYZ(50,7),NAMRU(50,2),RV(50,8)        SETC0270
CPLAT  VS  SYSTEMS  (SUBSYSTEMS)                                            SETC0280
      COMMON/CPLAT/NBP,NBPMX,NBSS,NBSSMX,NBSPP(15),NBPWS(45),               SETC0290
     1   NAMBP(2,15),KBPT(15),NABSS(2,45),KBST(45),KBPXS(45,15),           SETC0300
     2   BPX1(12,15),                                                      SETC0310
     3              NRP,NRPMX,NRSS,NRSSMX,NRSPP(15),NRPWS(45),             SETC0320
     4   NAMRP(2,15),KRPT(15),NARSS(2,45),KRST(45),KRPXS(45,15),           SETC0330
     5   RPX1(12,15)                                                       SETC0340
CMSLSYS                          16     2     2     6     6     24     50  SETC0350
      COMMON/CMSLSY/ NMSL,NMSLMX,NBSSM,NBASM,NRSSM,NRASM,LATMSL,LTRAJ,      SETC0360
     1    NAMMSL(2,16),KMSLTY(16),                                          SETC0370
     2    DATMSL(24,16), TTRAJ(50,16)                                       SETC0380
CWORK                                                                       SETC0390
      COMMON/CWORK/                                                         SETC0400
     1    LW1,MW1,LAW1,MAW1,  KW1(27,5),  VW1(27,12),                       SETC0410
     2    LW2,MW2,LAW2,MAW2,  KW2(27,5),  VW2(27,12),                       SETC0420
     3    LW3,MW3,LAW3,MAW3,  KW3(27,5),  VW3(27,12),       PADW(111)       SETC0430
      DATA  BLANK,LANK/ '    ','    '/                                      SETC0440
CFORMATS                                                                    SETC0450
 2006  FORMAT(1HO,'NO.OF SSM+ASM=',I4,',  EXCEEDS STORAGE=',I4)           SETC0460
 2007  FORMAT(1HO,'NO TABLE FOUND FOR ID1, ID2=', 2I10)                      SETC0470
 2008  FORMAT(1HO,'NO LINE FOUND IN TABLE ID1, ID2=',I9,',',I4,             SETC0480
     1 ',  FOR MISSILE TYPE=',I9)                                          SETC0490
 2009  FORMAT(1HO,'NO LINE FOUND IN TABLE ID1, ID2=',I9,',',I4,             SETC0500
     1 ',  FOR MISSILE TYPE=',I9,',  TRAJ TYPE=',I9)                       SETC0510
 2010  FORMAT(1HO,'ERROR IN TABLE ID1, ID2=',I9,',',I4,                     SETC0520
     1 ',  FOR TRAJ=',I9)                                                  SETC0530
 2011  FORMAT(1HO,'AT END OF SETUPC, CUM NO. SETUP ERRORS=NFLAG=',I5)       SETC0540
 3020  FORMAT(6X,'SSMS & ASMS'/                                            SETC0550
     1    8X,'NO.BLU SSM TYPES=',I4,',  NO.BLU ASM TYPES=',I4/            SETC0560
     2    8X,'NO.RED SSM TYPES=',I4,',  NO.RED ASM TYPES=',I4)            SETC0570
 3022  FORMAT(/1X,I6,'.',2A4,I9,'    MISSILE DATA')                        SETC0580
 3023  FORMAT(/1X,I6,'.',2A4,I9,'    TEMP TRAJ DATA')                      SETC0590
 3024  FORMAT( 8X,10G12.5)                                                 SETC0600
CFORMATS                                                                    SETC0610
      KZARL = 96 + LA*(5 + MA)                                              SETC0620
      JZARL = KZARL                                                         SETC0630
      NFLAG2= 0                                                             SETC0640
C***  INITIALIZE                                                            SETC0650
```

```
 200    NMSLMX = 16                                                    SETC0660
        LATMSL = 24                                                    SETC0670
        LTRAJ  = 50                                                    SETC0680
        NMSL   = 0                                                     SETC0690
        NBSSM  = 0                                                     SETC0700
        NBASM  = 0                                                     SETC0710
        NRSSM  = 0                                                     SETC0720
        NRASM  = 0                                                     SETC0730
        DO 203 J=1,NMSLMX                                              SETC0740
        DO 201 I=1,2                                                   SETC0750
 201    NAMMSL(I,J) = LANK                                             SETC0760
        KMSLTY(J) = 0                                                  SETC0770
        DO 202 I=1,LATMSL                                              SETC0780
        DATMSL(I,J) = .0                                               SETC0790
 202    TTRAJ (I,J) = .0                                               SETC0800
        DO 203 I=LATMSL,LTRAJ                                          SETC0810
 203    TTRAJ (I,J) = .0                                               SETC0820
        KEX  = 0                                                       SETC0830
        IF (KBU.LE.0)  GO TO 300                                       SETC0840
C***   SET UP BLU.   KEX = 1                                           SETC0850
 204    KEX = 1                                                        SETC0860
        LW1 = 0                                                        SETC0870
        LW2 = 0                                                        SETC0880
        LW3 = 0                                                        SETC0890
C**CALL RAW TRAJ                                                       SETC0900
        IY  = 3                                                        SETC0910
        KTRAN = 1                                                      SETC0920
        ID1   = 41100000                                               SETC0930
        ID2   = -1                                                     SETC0940
C*** READ FROM DISK 11                                                 SETC0950
 206    CALL  RD3D11(BZA,LZ,MZ,NCB,KZARL,ID1,ID2,IY,IXX)               SETC0960
        IF (IXX.EQ.0)     GO TO (210,218,228,236), KTRAN               SETC0970
        WRITE(N6,2007)  ID1,ID2                                        SETC0980
        NFLAG2 = NFLAG2 + 1                                            SETC0990
        GO TO (216,224,232,300), KTRAN                                 SETC1000
C**TRANSFER RAW TRAJ TO CWORK (1)                                      SETC1010
 210    DO 213 I=1,LA1                                                 SETC1020
        DO 212 J=1,MA1                                                 SETC1030
 212    VW1(I,J) = VA1(I,J)                                            SETC1040
 213    KW1(I,5) = KA1(I,5)                                            SETC1050
        LW1 = LA1                                                      SETC1060
        MW1 = MA1                                                      SETC1070
C**CALL BLU MSL (-2)                                                   SETC1080
 216    KTRAN = 2                                                      SETC1090
        ID1   = 78100000                                               SETC1100
        ID2   = -2                                                     SETC1110
        GO TO 206                                                      SETC1120
C**TRANSFER MSL (-2) TO CWORK (2)                                      SETC1130
 218    DO 222 I=1,LA1                                                 SETC1140
        DO 220 J=1,MA1                                                 SETC1150
 220    VW2(I,J) = VA1(I,J)                                            SETC1160
 222    KW2(I,5) = KA1(I,5)                                            SETC1170
        LW2 = LA1                                                      SETC1180
        MW2 = MA1                                                      SETC1190
C**CALL BLU MSL (-3)                                                   SETC1200
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 224    KTRAN = 3                                                              SETC1210
        ID1   = 78100000                                                       SETC1220
        ID2   = -3                                                             SETC1230
C**     GO TO 206          USE THIS INSTEAD OF 232 IF EXTENT -3 IS ADDED       SETC1240
        GO TO 232                                                              SETC1250
C**TRANSFER MSL (-2) TO CWORK (3)                                              SETC1260
 228    DO 230 I=1,LA1                                                         SETC1270
        KW3(I,5) = KA1(I,5)                                                    SETC1280
        DO 230 J=1,MA1                                                         SETC1290
 230    VW3(I,J) = VA1(I,J)                                                    SETC1300
        LW3 = LA1                                                              SETC1310
        MW3 = MA1                                                              SETC1320
C**CALL BLU MSL (-1)                                                           SETC1330
 232    KTRAN = 4                                                              SETC1340
        ID1   = 78100000                                                       SETC1350
        ID2   = -1                                                             SETC1360
        GO TO 206                                                              SETC1370
C*** PROCESS BLU MSL NOW IN CZAZA AND CWORK                                    SETC1380
C**TEST IF ALL NEEDED TABLES WERE FOUND. INCLUDE LW3 IF ADDED                  SETC1390
 236    IF (LW1*LW2    .EQ.0)  GO TO 300                                       SETC1400
C**CYCLE THRU SYSTEMS IN KBST                                                  SETC1410
        DO 280 KT=1,NBSS                                                       SETC1420
        KTYPE = KBST(KT)                                                       SETC1430
        NFLAG3 = 0                                                             SETC1440
C**CYCLE THRU 7810 (-1) IN CZAZA                                               SETC1450
        KTEST = KTYPE / 10000                                                  SETC1460
        DO 240 I=1,LA1                                                         SETC1470
        IF (KTEST.EQ.KA1(I,5) )   GO TO 242                                    SETC1480
 240    CONTINUE                                                               SETC1490
        GO TO 280                                                              SETC1500
C**TEST IF STORAGE.EXCEEDED                                                    SETC1510
 242    KL  = I                                                                SETC1520
        NMSL = NMSL + 1                                                        SETC1530
        IF (NMSL.LE.NMSLMX)  GO TO 243                                         SETC1540
        WRITE(N6,2006)  NMSL, NMSLMX                                           SETC1550
        NFLAG2 = NFLAG2 + 1                                                    SETC1560
        GO TO 400                                                              SETC1570
C**SET COUNTERS & NAME                                                         SETC1580
 243    KTEST = KTYPE / 1000000                                                SETC1590
        IF (KTEST.EQ.76)  NBSSM = NBSSM + 1                                    SETC1600
        IF (KTEST.EQ.78)  NBASM = NBASM + 1                                    SETC1610
        DO 244 I=1,2                                                           SETC1620
        NABSS(I,KT) = KA1(KL,I+1)                                              SETC1630
 244    NAMMSL(I,NMSL) = NABSS(I,KT)                                           SETC1640
C**STORE TYPE & DATA FROM EXTENT (-1)                                          SETC1650
        KMSLTY(NMSL) = KTYPE                                                   SETC1660
        DO 246 I=1,6                                                           SETC1670
 246    DATMSL(I+15,NMSL) = VA1(KL,I)                                          SETC1680
C**STORE DATA FROM EXTENT (-2) IN CWORK (2)                                    SETC1690
 250    KTEST = KTYPE / 10000                                                  SETC1700
        DO 252 I=1,LW2                                                         SETC1710
        IF (KTEST.EQ.KW2(I,5) )  GO TO 254                                     SETC1720
 252    CONTINUE                                                               SETC1730
        NFLAG3 = NFLAG3 + 1                                                    SETC1740
        ID1 = 78100000                                                         SETC1750
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      ID2 = -2                                                          SETC1760
      WRITE(N6,2008)  ID1, ID2, KTYPE                                   SETC1770
      GO TO 260                                                         SETC1780
 254  KL   = I                                                          SETC1790
      DO 256 I=1,MW2                                                    SETC1800
 256  DATMSL(I,NMSL) = VW2(KL,I)                                        SETC1810
C**STORE DATA FROM EXTENT (-3) IN CWORK (3)       (IF ANY)            SETC1820
 260  IF (LW3.EQ.0.OR.LATMSL.LT.36)  GO TO 270                          SETC1830
      KTEST = KTYPE / 10000                                             SETC1840
      DO 262 I=1,LW3                                                    SETC1850
      IF (KTEST.EQ.KW3(I,5) )  GO TO 264                                SETC1860
 262  CONTINUE                                                          SETC1870
      NFLAG3 = NFLAG3 + 1                                               SETC1880
      ID1 = 78100000                                                    SETC1890
      ID2 = -3                                                          SETC1900
      WRITE(N6,2008)  ID1, ID2, KTYPE                                   SETC1910
      GO TO 270                                                         SETC1920
 264  KL   = I                                                          SETC1930
      DO 266 I=1,MW3                                                    SETC1940
 266  DATMSL(I+24,NMSL) = VW3(KL,I)                                     SETC1950
C***  PROCESS TEMP TRAJ & STORE IN  TTRAJ                               SETC1960
 270  ID1 = 41100000                                                    SETC1970
      ID2 = -1                                                          SETC1980
      KTRTY = MOD(IFIX(DATMSL(2,NMSL)*100.+.4),100)                     SETC1990
      DO 276 K=1,2                                                      SETC2000
      KTEST = KTRTY*100 + K                                             SETC2010
      DO 272 I=1,LW1                                                    SETC2020
      IF (KTEST.EQ.KW1(I,5) )  GO TO 274                                SETC2030
 272  CONTINUE                                                          SETC2040
      IF (K.EQ.2)  GO TO 278                                            SETC2050
      NFLAG3 = NFLAG3 + 1                                               SETC2060
      ID1 = 41100000                                                    SETC2070
      ID2 = -1                                                          SETC2080
      WRITE(N6,2009) ID1,ID2,KTYPE, KTEST                               SETC2090
      GO TO 278                                                         SETC2100
 274  KL   = I                                                          SETC2110
      CALL  STTRAJ(K,KTEST,KL,VW1,LA,MA,IXX,TTRAJ(1,NMSL),LTRAJ)        SETC2120
      IF (IXX.EQ.0)  GO TO 276                                          SETC2130
      NFLAG3 = NFLAG3 + 1                                               SETC2140
      WRITE(N6,2010) ID1,ID2, KTEST                                     SETC2150
 276  CONTINUE                                                          SETC2160
C*** TEST FOR ERROR FREE SETUP.  PUT POINTER IN SYSTEM LIST.           SETC2170
 278  IF (NFLAG3.LE.0)   KBST(KT) = KBST(KT) + NMSL                     SETC2180
 280  CONTINUE                                                          SETC2190
C***                                                                   SETC2200
C***     ***        ***        ***                                     SETC2210
C***SET UP RED                                                         SETC2220
 300  IF (KRU.LE.0)  GO TO 381                                          SETC2230
 304  KFX = 2                                                           SETC2240
      LW1 = 0                                                           SETC2250
      LW2 = 0                                                           SETC2260
      LW3 = 0                                                           SETC2270
      IY  = 3                                                           SETC2280
      KTRAN = 1                                                         SETC2290
      ID1   = 51100000                                                  SETC2300
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      ID2    = -1                                                          SETC2310
 306  CALL   RCBD11(BZA,LZ,MZ,NCB,KZARL,ID1,ID2,IY,IXX)                   SETC2320
      IF (IXX.EQ.0)      GO TO (310,318,328,336), KTRAN                    SETC2330
      WRITE(N6,2007)  ID1,ID2                                              SETC2340
      NFLAG2 = NFLAG2 + 1                                                  SETC2350
      GO TO (316,324,332,400), KTRAN                                       SETC2360
 310  DO 313 I=1,LA1                                                       SETC2370
      DO 312 J=1,MA1                                                       SETC2380
 312  VW1(I,J) = VA1(I,J)                                                  SETC2390
 313  KW1(I,5) = KA1(I,5)                                                  SETC2400
      LW1 = LA1                                                            SETC2410
      MW1 = MA1                                                            SETC2420
 316  KTRAN = 2                                                            SETC2430
      ID1    = 98100000                                                    SETC2440
      ID2    = -2                                                          SETC2450
      GO TO 306                                                            SETC2460
C**TRANSFER MSL (-2) TO CWORK (2)                                          SETC2470
 318  DO 322 I=1,LA1                                                       SETC2480
      DO 320 J=1,MA1                                                       SETC2490
 320  VW2(I,J) = VA1(I,J)                                                  SETC2500
 322  KW2(I,5) = KA1(I,5)                                                  SETC2510
      LW2 = LA1                                                            SETC2520
      MW2 = MA1                                                            SETC2530
C**CALL RED MSL (-3)                                                       SETC2540
 324  KTRAN = 3                                                            SETC2550
      ID1    = 98100000                                                    SETC2560
      ID2    = -3                                                          SETC2570
C**    GO TO 306          USE THIS INSTEAD OF 332 IF EXTENT -3 IS ADDED   SETC2580
      GO TO 332                                                            SETC2590
C**TRANSFER MSL (-3) TO CWORK (3)                                          SETC2600
 328  DO 330 I=1,LA1                                                       SETC2610
      KW3(I,5) = KA1(I,5)                                                  SETC2620
      DO 330 J=1,MA1                                                       SETC2630
 330  VW3(I,J) = VA1(I,J)                                                  SETC2640
      LW3 = LA1                                                            SETC2650
      MW3 = MA1                                                            SETC2660
C**CALL RED MSL (-1)                                                       SETC2670
 332  KTRAN = 4                                                            SETC2680
      ID1    = 98100000                                                    SETC2690
      ID2    = -1                                                          SETC2700
      GO TO 306                                                            SETC2710
C*** PROCESS RED MSL NOW IN CZAZA AND CWORK                                SETC2720
C**TEST IF ALL NEEDED TABLES WERE FOUND. INCLUDE LW3 IF ADDED              SETC2730
 336  IF (LW1*LW2    .EQ.0)  GO TO 400                                     SETC2740
C**CYCLE THRU SYSTEMS IN KRST                                              SETC2750
      DO 380 KT=1,NRSS                                                     SETC2760
      KTYPE = KRST(KT)                                                     SETC2770
      NFLAG3 = 0                                                           SETC2780
C**CYCLE THRU 9810 (-1) IN CZAZA                                           SETC2790
      KTEST = KTYPE / 10000                                                SETC2800
      DO 340 I=1,LA1                                                       SETC2810
      IF (KTEST.EQ.KA1(I,5) )   GO TO 342                                  SETC2820
 340  CONTINUE                                                             SETC2830
      GO TO 380                                                            SETC2840
C**TEST IF STORAGE EXCEEDED                                                SETC2850
```

```
 342    KL   = I                                                        SETC2860
        NMSL = NMSL + 1                                                SETC2870
        IF (NMSL.LE.NMSLMX)  GO TO 343                                 SETC2880
        WRITE(N6,2006)  NMSL, NMSLMX                                   SETC2890
        NFLAG2 = NFLAG2 + 1                                            SETC2900
        GO TO 400                                                      SETC2910
C**SET COUNTERS & NAME                                                 SETC2920
 343    KTEST = KTYPE / 1CC0000                                        SETC2930
        IF (KTEST.EQ.96)  NRSSM = NRSSM + 1                            SETC2940
        IF (KTEST.EQ.98)  NRASM = NRASM + 1                            SETC2950
        DO 344 I=1,2                                                   SETC2960
        NARSS(I,KT) = KA1(KL,I+1)                                      SETC2970
 344    NAMMSL(I,NMSL) = NARSS(I,KT)                                   SETC2980
C**STORE TYPE & DATA FROM EXTENT (-1)                                  SETC2990
        KMSLTY(NMSL) = KTYPE                                           SETC3000
        DO 346 I=1,6                                                   SETC3010
 346    DATMSL(I+15,NMSL) = VA1(KL,I)                                  SETC3020
C**STORE DATA FROM EXTENT (-2) IN CWORK (2)                            SETC3030
 350    KTEST = KTYPE / 10000                                          SETC3040
        DO 352 I=1,LW2                                                 SETC3050
        IF (KTEST.EQ.KW2(I,5) )  GO TO 354                             SETC3060
 352    CONTINUE                                                       SETC3070
        NFLAG3 = NFLAG3 + 1                                            SETC3080
        ID1 = 98100000                                                 SETC3090
        ID2 = -2                                                       SETC3100
        WRITE(N6,2008)  ID1, ID2, KTYPE                                SETC3110
        GO TO 360                                                      SETC3120
 354    KL   = I                                                       SETC3130
        DO 356 I=1,MW2                                                 SETC3140
 356    DATMSL(I,NMSL) = VW2(KL,I)                                     SETC3150
C**STORE DATA FROM EXTENT (-3) IN CWORK (3)       (IF ANY)             SETC3160
 360    IF (LW3.EQ.0.OR.LATMSL.LT.36)  GO TO 370                       SETC3170
        KTEST = KTYPE / 10000                                          SETC3180
        DO 362 I=1,LW3                                                 SETC3190
        IF (KTEST.EQ.KW3(I,5) )  GO TO 364                             SETC3200
 362    CONTINUE                                                       SETC3210
        NFLAG3 = NFLAG3 + 1                                            SETC3220
        ID1 = 98100000                                                 SETC3230
        ID2 = -3                                                       SETC3240
        WRITE(N6,2008)  ID1, ID2, KTYPE                                SETC3250
        GO TO 370                                                      SETC3260
 364    KL   = I                                                       SETC3270
        DO 366 I=1,MW3                                                 SETC3280
 366    DATMSL(I+24,NMSL) = VW3(KL,I)                                  SETC3290
C***  PROCESS TEMP TRAJ & STORE IN TTRAJ                               SETC3300
 370    ID1 = 5110C0C0                                                 SETC3310
        ID2 = -1                                                       SETC3320
        KTRTY = MOD(IFIX(DATMSL(2,NMSL)*100.+.4),100)                  SETC3330
        DO 376 K=1,2                                                   SETC3340
        KTEST = KTRTY*100 + K                                          SETC3350
        DO 372 I=1,LW1                                                 SETC3360
        IF (KTEST.EQ.KW1(I,5) )  GO TO 374                             SETC3370
 372    CONTINUE                                                       SETC3380
        IF (K.EQ.2)  GO TO 378                                         SETC3390
        NFLAG3 = NFLAG3 + 1                                            SETC3400
```

```
      WRITE(N6,2009) ID1,ID2,KTYPE,KTEST                                SETC3410
      GO TO 378                                                         SETC3420
  374 KL   = I                                                          SETC3430
      CALL  STTRAJ(K,KTEST,KL,VW1,LA,MA,IXX,TTRAJ(1,NMSL),LTRAJ)        SETC3440
      IF (IXX.EQ.0)  GO TO 376                                          SETC3450
      NFLAG3 = NFLAG3 + 1                                               SETC3460
      WRITE(N6,2010) ID1,ID2, KTEST                                     SETC3470
  376 CONTINUE                                                          SETC3480
C*** TEST FOR ERROR FREE SETUP.  PUT POINTER IN SYSTEM LIST.            SETC3490
  378 IF (NFLAG3.LE.0)   KRST(KT) = KRST(KT) + NMSL                     SETC3500
  380 CONTINUE                                                          SETC3510
  381 IF (NMSL .LE. 0) GO TO 400                                        SETC3520
C     UNPACK DATMSL                                                     SETC3530
      DO 382 I = 1, NMSL                                                SETC3540
      K = DATMSL(2,I) * 100. + .4                                       SETC3550
      DATMSL(2,I) = K / 100                                             SETC3560
      DATMSL(13,I) = MOD(K,100)                                         SETC3570
      K = DATMSL(3,I) * 10. + .4                                        SETC3580
      DATMSL(3,I) = K / 10                                              SETC3590
      DATMSL(14,I) = MOD(K,10)                                          SETC3600
      K = DATMSL(7,I) * 100. + .4                                       SETC3610
      DATMSL(7,I) = K / 100                                             SETC3620
      DATMSL(15,I) = MOD(K,100)                                         SETC3630
      DATMSL(15,I) = DATMSL(15,I) / 100.                                SETC3640
  382 DATMSL(6,I) = DATMSL(6,I) / 60.                                   SETC3650
C***  ADJUST FOR SALVO SIZE                                            SETC3660
      DO 386 KT = 1, NRSS                                               SETC3670
      K = KRST(KT) / 1000000                                            SETC3680
      IF (K .NE. 76 .AND. K .NE. 78) GO TO 386                          SETC3690
      K = MOD(KRST(KT),100)                                             SETC3700
      DO 384 KE = 1, NRP                                                SETC3710
      IF (KRPXS(KT,KE) .EQ. 0) GO TO 384                                SETC3720
      LW1 = (KRPXS(KT,KE) / 10000) * 10000                              SETC3730
      MW1 = KRPXS(KT,KE) - LW1                                          SETC3740
      LW2 = MW1 / 100                                                   SETC3750
      MW2 = MW1 - LW2 * 100                                             SETC3760
      LW3 = LW2 * MW2                                                   SETC3770
      IF (LW2 .EQ. 99 .OR. LW3 .EQ. 0) GO TO 384                        SETC3780
      MW3 = DATMSL(5,K) + .4                                            SETC3790
      LW3 = LW3 / MW3                                                   SETC3800
      KRPXS(KT,KE) = LW1 + LW3 * 100 + MW2                              SETC3810
  384 CONTINUE                                                          SETC3820
  386 CONTINUE                                                          SETC3830
      DO 390 KT = 1, NRSS                                               SETC3840
      K = KRST(KT) / 1000000                                            SETC3850
      IF (K .NE. 96 .AND. K .NE. 98) GO TO 390                          SETC3860
      K = MOD(KRST(KT),100)                                             SETC3870
      DO 388 KE = 1, NRP                                                SETC3880
      IF (KRPXS(KT,KE) .EQ. 0) GO TO 388                                SETC3890
      LW1 = (KRPXS(KT,KE) / 10000) * 10000                              SETC3900
      MW1 = KRPXS(KT,KE) - LW1                                          SETC3910
      LW2 = MW1 / 100                                                   SETC3920
      MW2 = MW1 - LW2 * 100                                             SETC3930
      LW3 = LW2 * MW2                                                   SETC3940
      IF (LW2 .EQ. 99 .OR. LW3 .EQ. 0) GO TO 388                        SETC3950
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      MW3 = DATMSL(5,K) + .4                                          SETC3960
      LW3 = LW3 / MW3                                                 SETC3970
      KRPXS(KT,KE) = LW1 + LW3 * 100 + MW2                            SETC3980
  388 CONTINUE                                                        SETC3990
  390 CONTINUE                                                        SETC4000
C*** WRAP UP                                                          SETC4010
  400 IF (NFLAG2.GT.0)  NFLAG=NFLAG + 1                               SETC4020
      IF (IPRINT.GT.0)  GO TO 430                                     SETC4030
  402 WRITE(N6,2011) NFLAG                                            SETC4040
      RETURN                                                          SETC4050
C***  PRINT OPTIONS            ***                    ***             SETC4060
C                                                                     SETC4070
      ENTRY       PRSETC(IPRINT)                                      SETC4080
C                                                                     SETC4090
C***  SSMS & ASMS                                                     SETC4100
  430 CALL  PAGE                                                      SETC4110
      WRITE(N6,3020)  NBSSM, NBASM, NRSSM, NRASM                      SETC4120
      IF (NMSL.LE.0)  GO TO 436                                       SETC4130
      IF (IPRINT.LT.2)  GO TO 436                                     SETC4140
      DO 432 KT=1,NMSL                                                SETC4150
      WRITE(N6,3022) KT, (NAMMSL(I,KT),I=1,2),KMSLTY(KT)              SETC4160
  432 WRITE(N6,3024) (DATMSL(I,KT),I=1,LATMSL)                        SETC4170
      CALL  PAGE                                                      SETC4180
      DO 434 KT=1,NMSL                                                SETC4190
      WRITE(N6,3023) KT, (NAMMSL(I,KT),I=1,2),KMSLTY(KT)              SETC4200
  434 WRITE(N6,3024) (TTRAJ(I,KT),I=1,LTRAJ)                          SETC4210
  436 WRITE(N6,2011) NFLAG                                            SETC4220
      RETURN                                                          SETC4230
      END                                                             SETC4240


      SUBROUTINE STTRAJ(KT,KTEST,KL,VW1,LA,MA,IXX,TTRAJ,LTRAJ)        STTR0010
C  PGM=NXX(NEM). L.D.G.                  9-15-73    FORTRAN IV    EBCD  STTR0020
C  TO SETUP TEMPORARY TRAJECTORIES FOR MSLS & A/C.                    STTR0030
C                                                                     STTR0040
C***  KT    =  1,   PRIMARY TRAJ                                      STTR0050
C            =  2    SHORT RANGE TRAJ                               STTR0060
C     KTEST =  TRAJ CODE IN TABLE 4110 OR 5110, E.G. 401=PRIMARY TRAJ=4 STTR0070
C     KL    =  LINE NO.IN VW1 FOR TRAJ TO BE SET UP.                  STTR0080
C     VW1(KL,J) = JTH ITEM IN LINE=KL                                 STTR0090
C     LA, MA=  ABSOLUTE DIMENSIONS OF VW1                             STTR0100
C     IXX   =  ERROR INDEX.  =0 IF OK   = 1 IF KO.                    STTR0110
C     TTRAJ =  ARRAY OF TRAJ ELEMENTS                                 STTR0120
C     LTRAJ =  LENGTH OF TTRAJ                                        STTR0130
C***                                                                  STTR0140
      DIMENSION  VW1(LA,MA), TTRAJ(LTRAJ)                             STTR0150
    1 IXX = 0                                                         STTR0160
      J   = 0                                                         STTR0170
      IF (KT.EQ.2)  J=25                                              STTR0180
      TTRAJ(J+1) = KTEST                                              STTR0190
      TTRAJ(J+2) = VW1(KL,1)                                          STTR0200
      KD  = VW1(KL,2)*1000. + .4                                      STTR0210
      TTRAJ(J+3) =  KD / 1000                                         STTR0220
      TTRAJ(J+4) =  MOD(KD,1000)                                      STTR0230
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      K    = 1                                                          STTR0240
      RCUM= .0                                                          STTR0250
      DO 18 L=1,5                                                       STTR0260
      K    = K + 2                                                      STTR0270
      M    = J + 4*L                                                    STTR0280
      H1   = VW1(KL,K+1) / 6.080                                        STTR0290
      H2   = .0                                                         STTR0300
      IF (L.LE.4)   H2=VW1(KL,K+3) / 6.080                              STTR0310
      KD   = ABS(VW1(KL,K)*10000.) + .4                                 STTR0320
      R1   = KD / 10000                                                 STTR0330
      V1   = MOD(KD,10000)                                              STTR0340
      D    = SQRT((H2-H1)**2 + R1**2)                                   STTR0350
      IF (D.LT..001)   GO TO 10                                         STTR0360
      SINA = (H2-H1) / D                                                STTR0370
      COSA = R1 / D                                                     STTR0380
      VH1  = V1*COSA                                                    STTR0390
      VV1  = V1*SINA                                                    STTR0400
      GO TO 12                                                          STTR0410
C*** ZERO LENGTH LEG                                                    STTR0420
 10   VH1 = .001                                                        STTR0430
      VV1 = .0                                                          STTR0440
      R1  = .0001                                                       STTR0450
 12   RCUM= RCUM + R1                                                   STTR0460
C*** TAKE CARE OF AIRPLANE FLAG                                         STTR0470
      IF (VW1(KL,K).GT.(-.0001))  GO TO 14                              STTR0480
      VH1 = -V1                                                         STTR0490
      VV1 = .0                                                          STTR0500
      H2  = H1                                                          STTR0510
 14   TTRAJ(M+1) = H1                                                   STTR0520
      TTRAJ(M+2) = RCUM                                                 STTR0530
      TTRAJ(M+3) = VH1                                                  STTR0540
      TTRAJ(M+4) = VV1                                                  STTR0550
 18   CONTINUE                                                          STTR0560
C*** FILL EXTRA POINT                                                   STTR0570
      TTRAJ(J+25) = .0                                                  STTR0580
C                                                                       STTR0590
C*** REVERSE CUM RANGE                                                  STTR0600
      DO 22 L=2,5                                                       STTR0610
      M  = J - 4*L + 28                                                 STTR0620
 22   TTRAJ(M+2) = RCUM - TTRAJ(M-2)                                    STTR0630
      TTRAJ(J+6) = RCUM                                                 STTR0640
      IF (TTRAJ(J+2).LT.100..OR.TTRAJ(J+3).LT..001)  IXX=1              STTR0650
      RETURN                                                            STTR0660
      END                                                               STTR0670


      SUBROUTINE  SETUPD(IPRINT)                                        SETD0010
C  PGM=NXX(NEM). E.C.     VER.1   10-18-73          FORTRAN IV      EBCD  SETD0020
C  MODS.RED AAM 9900=420-451.                          VER.2   12-19-74 SETD0030
C  TO SET UP SYSTEMS DATA FOR CURRENT PROBLEM FOR SYSTEMS IN SETUPB      SETD0040
C  CALLED BY MAIN AND ZIP CARD AS FOLLOWS                               SETD0050
CIP  8 4 P                                SETUPD. MISC. WEAPONS         SETD0060
C***                                                                    SETD0070
      COMMON/DEVICE/ N1,N2,N3,N4,N5,N6,N7,N8,N9,N10,N11,N12             SETD0080
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      COMMON/INOUT/NLINE,NPAGE,DUMA(35), NCODE(19)                          SETD0090
     1,IDUMB(72), NFLAG, NFLAG2                                             SETD0100
CZAZA                                                                       SETD0110
      INTEGER TITLA                                                         SETD0120
      COMMON/CZAZA/NCBA,IDA1,IDA2,IDA3,JZARL,LZA,MZA,ICA(16),CA(16)         SETD0130
     1, TITLA(15),HEADA(37),IFMT                                            SETD0140
     2, LA1,LAA1,MA1,MAA1,KA1(27,5),VA1(27,12)                              SETD0150
      DIMENSION  BZA( 555)                                                  SETD0160
      EQUIVALENCE  (NCBA,BZA(1))                                            SETD0170
CNAVIG                                                                      SETD0180
      COMMON/CNAVIG/ NGMX,BE,BF,RE,RF,                                      SETD0190
     1     NBC,BA,BB,BC,BD,KBGN(18),KBGK(18),BGC( 8,6,18),NBU(18),         SETD0200
     2     NRG,RA,RB,RC,RD,KRGN(18),KRGK(18),RGC( 8,6,18),NRU(18),         SETD0210
     3          TTIME,NUMX,                                                SETD0220
     4     KBU,KBUK(4,40),BREL(4,40),BXYZ(40,7),NAMBU(40,2),BV(40,8),      SETD0230
     5     KRU,KRUK(4,40),RREL(4,40),RXYZ(40,7),NAMRU(40,2),RV(40,8)       SETD0240
CPLAT  VS  SYSTEMS  (SUBSYSTEMS)                                            SETD0250
      COMMON/CPLAT/NBP,NBPMX,NBSS,NBSSMX,NBSPP(15),NBPWS(45),               SETD0260
     1   NAMBP(2,15),KBPT(15),NABSS(2,45),KBST(45),KBPXS(45,15),          SETD0270
     2   BPX1(12,15),                                                      SETD0280
     3              NRP,NRPMX,NRSS,NRSSMX,NRSPP(15),NRPWS(45),             SETD0290
     4   NAMRP(2,15),KRPT(15),NARSS(2,45),KRST(45),KRPXS(45,15),          SETD0300
     5   RPX1(12,15)                                                       SETD0310
      COMMON/CWORK/ LA2,MA2,LA3,LA4,MA4,KA2(43),A,VA2(179),K,               SETD0320
     1 KA5(1170)                                                            SETD0330
CZZSYS                          25     11     12   15                      SETD0340
      COMMON/CZZSYS/NZZSYS,NZZSMX,NBZSYS,NRZSYS,LAZZ,NAMSYS(2,25),          SETD0350
     1    KZZTYP(25),ZZSYS(15,25)                                           SETD0360
CSAMLT                 8,12,15,                                             SETD0370
      COMMON/CSAMLT/L,M,N,RMN(15),RMX(15),EMN(15),EMX(15),ZMX(15),          SETD0380
     1 XMX(15),  RT(8,12,15)                                                SETD0390
CSASYS                            15     4      4       2     4    20       SETD0400
      COMMON/CSASYS/ NSASYS,NSASMX,NBGUN,NBSAM,NRGUN,NRSAM, LASA,           SETD0410
     1    NAMSA(2,15),KSATYP(15),SASYS(20,15)                               SETD0420
      DIMENSION KBZZT(5), KRZZT(5), KBSAST(2), KRSAST(2)                    SETD0430
      DATA  NCB,LZ,MZ,LA,MA/ 1,555,12,27,12/                                SETD0440
      DATA NBZZT, NRZZT, KBZZT, KRZZT/5, 5, 71000000, 72000000,             SETD0450
     1 73000000,74000000,79000000,91000000,92000000,93000000,94000000,     SETD0460
     2 99000000/                                                            SETD0470
      DATA NBSAST, NRSAST, KBSAST, KRSAST/2, 2, 75100000, 77100000,         SETD0480
     1 95100000,97100000/                                                   SETD0490
      DATA NLTMX, NMTMX, NNTMX/8, 12, 15/                                   SETD0500
 5000  FORMAT(1HO,'NO TABLE FOUND FOR ID1, ID2=', 2I10)                      SETD0510
 5010  FORMAT(1HO,'NO. OF MISC. WEAPON SYSTEMS=',I4,', EXCEEDS STORAGE='SETD0520
     1,I4)                                                                  SETD0530
 5020  FORMAT(1HO,'NO. OF SURFACE-TO-AIR SYSTEMS=',I4,', EXCEEDS STORAGESETD0540
     1=',I4)                                                                SETD0550
 5030  FORMAT(1HC,'NO. TIME LINE TABLES=',I4,', EXCEEDS STORAGE=',I4)       SETD0560
 5040  FORMAT(6X,'AAGUNS & SAMS'/                                            SETD0570
     1    8X,'NO.BLU GUN TYPES=',I4,',  NO.BLU SAM TYPES=',I4/             SETD0580
     2    8X,'NO.RED GUN TYPES=',I4,',  NO.RED SAM TYPES=',I4)             SETD0590
 5050  FORMAT(/8X,'SYSTEM',13X,'MIN RANGE   MAX RANGE   MIN ELEV     MAX SETD0600
     1ELEV    MAX ALT     MAX HORIZ.'/ 8X,'NAME AND TYPE', 8X,'NM',       SETD0610
     2 10X,'NM', 10X,'DEG', 9X,'DEG', 9X,'KFT', 9X,'NM')                    SETD0620
 5060  FORMAT(1X, I6,'.', 2A4, I9, 8G12.5)                                   SETD0630
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 5070  FORMAT(1H0,'AT END OF SETUPD,CUM NO. SETUP ERRORS=NFLAG=',I5)     SETD0640
 5080  FORMAT(6X,'MISC. WEAPON DATA')                                    SETD0650
 5090  FORMAT(/I7,'.',2A4,I9,'    WEAPON DATA')                          SETD0660
 5100  FORMAT(8X,10G12.5)                                                SETD0670
 5110  FORMAT(6X,'AAGUNS & SAMS')                                        SETD0680
 5120  FORMAT(6X,'MISC. WEAPON DATA'/                                    SETD0690
     1    8X,'SYSTEM',13X,'MAX RANGE   VELOCITY    WHD WT'/             SETD0700
     2    8X,'NAME AND TYPE',8X,'NM', 10X,'KTS', 9X'LBS')               SETD0710
 5130  FORMAT(I7,'.',2A4,I9,8G12.5)                                      SETD0720
       KZARL = 96 + LA*(5 + MA)                                          SETD0730
       JZARL = KZARL                                                     SETD0740
       NFLAG2 = 0                                                        SETD0750
       NZZSMX = 25                                                       SETD0760
       LAZZ = 15                                                         SETD0770
       NSASMX = 15                                                       SETD0780
       LASA = 20                                                         SETD0790
       NZZSYS = 0                                                        SETD0800
       NBZSYS = 0                                                        SETD0810
       NRZSYS = 0                                                        SETD0820
       L = NLTMX                                                         SETD0830
       M = NMTMX                                                         SETD0840
       N = NNTMX                                                         SETD0850
       NSASYS = 0                                                        SETD0860
       NBGUN = 0                                                         SETD0870
       NBSAM = 0                                                         SETD0880
       NRGUN = 0                                                         SETD0890
       NRSAM = 0                                                         SETD0900
       IY = 3                                                            SETD0910
       ID2 = -1                                                          SETD0920
C***   SETUP BLU MISCELLANEOUS WEAPON SYSTEMS                            SETD0930
       IF (KBU .LE. 0) GO TO 400                                         SETD0940
C***   CYCLE THRU BLU SYSTEMS                                            SETD0950
       DO  70 KC = 1, NBZZT                                              SETD0960
       ID1 = KBZZT(KC)                                                   SETD0970
       CALL  RCBD11(BZA,LZ,MZ,NCB,KZARL,ID1,ID2,IY,IXX)                  SETD0980
       IF (IXX .EQ. 0) GO TO  10                                         SETD0990
       WRITE(N6,5000) ID1,ID2                                            SETD1000
       GO TO  70                                                         SETD1010
   10  DO  60 KT = 1, NBSS                                               SETD1020
       K = KBST(KT) / 10000                                              SETD1030
       IF (ID1/1000000 .NE. K/100) GO TO  60                             SETD1040
       DO  20 J = 1, LA1                                                 SETD1050
       IF (K .EQ. KA1(J,5)) GO TO  30                                    SETD1060
   20  CONTINUE                                                          SETD1070
       GO TO  60                                                         SETD1080
C***   FOUND SYSTEM IN CATALOG                                           SETD1090
   30  JT = J                                                            SETD1100
       NBZSYS = NBZSYS + 1                                               SETD1110
       IF (NBZSYS .LE. NZZSMX) GO TO  40                                 SETD1120
       WRITE(N6,5010) NBZSYS, NZZSMX                                     SETD1130
       NFLAG2 = NFLAG2 + 1                                               SETD1140
       NBZSYS = NZZSMX                                                   SETD1150
       GO TO 100                                                         SETD1160
C***   TRANSFER SYSTEM NAME AND DATA.  PUT POINTER IN KBST.              SETD1170
   40  NABSS(1,KT) = KA1(JT,2)                                           SETD1180
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      NAMSYS(1,NBZSYS) = KA1(JT,2)                                      SETD1190
      NABSS(2,KT) = KA1(JT,3)                                           SETD1200
      NAMSYS(2,NBZSYS) = KA1(JT,3)                                      SETD1210
      KZZTYP(NBZSYS) = K * 10000                                        SETD1220
      KBST(KT) = K * 10000 + NBZSYS                                     SETD1230
      DO  50 KD = 1, 12                                                 SETD1240
   50 ZZSYS(KD,NBZSYS) = VA1(JT,KD)                                     SETD1250
      A = IFIX(VA1(JT,2) + .004)                                        SETD1260
      ZZSYS( 2,NBZSYS) = A                                              SETD1270
      ZZSYS(13,NBZSYS) = IFIX((VA1(JT,2)-A) * 100. + .4)                SETD1280
      A = IFIX(VA1(JT,3) + .004)                                        SETD1290
      ZZSYS( 3,NBZSYS) = A                                              SETD1300
      ZZSYS(14,NBZSYS) = IFIX((VA1(JT,3)-A) * 10. + .4)                 SETD1310
      A = IFIX(VA1(JT,7) + .004)                                        SETD1320
      ZZSYS( 7,NBZSYS) = A                                              SETD1330
      ZZSYS(15,NBZSYS) = VA1(JT,7) - A                                  SETD1340
      ZZSYS(6,NBZSYS) = ZZSYS(6,NBZSYS) / 60.                           SETD1350
C***  ADJUST FOR SALVO SIZE                                             SETD1360
      MA4 = VA1(JT,5) + .00001                                          SETD1370
      DO  55 KE = 1, NBP                                                SETD1380
      IF (KBPXS(KT,KE) .EQ. 0) GO TO  55                                SETD1390
      LA2 = (KBPXS(KT,KE) / 10000) * 10000                              SETD1400
      MA2 = KBPXS(KT,KE) - LA2                                          SETD1410
      LA3 = MA2 / 100                                                   SETD1420
      MA3 = MA2 - LA3 * 100                                             SETD1430
      LA4 = LA3 * MA3                                                   SETD1440
      IF (LA3 .EQ. 99 .OR. LA4 .EQ. 0) GO TO  55                        SETD1450
      LA4 = LA4 / MA4                                                   SETD1460
      KBPXS(KT,KE) = LA2 + LA4*100 + MA3                                SETD1470
   55 CONTINUE                                                          SETD1480
   60 CONTINUE                                                          SETD1490
   70 CONTINUE                                                          SETD1500
  100 NZZSYS = NBZSYS                                                   SETD1510
C***  SETUP BLU SURFACE-TO-AIR SYSTEMS                                  SETD1520
      DO 170 KC = 1, NBSAST                                             SETD1530
      ID1 = KBSAST(KC)                                                  SETD1540
      CALL  RCBD11(BZA,LZ,MZ,NCB,KZARL,ID1,ID2,IY,IXX)                  SETD1550
      IF (IXX .EQ. 0) GO TO 110                                         SETD1560
      WRITE(N6,5000) ID1,ID2                                            SETD1570
      GO TO 170                                                         SETD1580
  110 DO 160 KT = 1, NBSS                                               SETD1590
      K = KBST(KT) / 10000                                              SETD1600
      IF (ID1/100000 .NE. K/100) GO TO 160                              SETD1610
      DO 120 J = 1, LA1                                                 SETD1620
      IF (K .EQ. KA1(J,5)) GO TO 130                                    SETD1630
  120 CONTINUE                                                          SETD1640
      GO TO 160                                                         SETD1650
C***  FOUND SYSTEM IN CATALOG                                           SETD1660
  130 JT = J                                                            SETD1670
      GO TO (131, 132), KC                                              SETD1680
  131 NBGUN = NBGUN + 1                                                 SETD1690
      GO TO 133                                                         SETD1700
  132 NBSAM = NBSAM + 1                                                 SETD1710
  133 NSASYS = NSASYS + 1                                               SETD1720
      IF (NSASYS .LE. NSASMX) GO TO 140                                 SETD1730
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      WRITE(N6,5020) NSASYS, NSASMX                                    SETD1740
      NFLAG2 = NFLAG2 + 1                                              SETD1750
      NSASYS = NSASMX                                                  SETD1760
      GO TO (134, 135), KC                                             SETD1770
  134 NBGUN = NBGUN - 1                                                SETD1780
      GO TO 400                                                        SETD1790
  135 NBSAM = NBSAM - 1                                                SETD1800
      GO TO 400                                                        SETD1810
C***  TRANSFER SYSTEM NAME AND DATA.  PUT POINTER IN KBST.             SETD1820
  140 NABSS(1,KT) = KA1(JT,2)                                          SETD1830
      NAMSA(1,NSASYS) = KA1(JT,2)                                      SETD1840
      NABSS(2,KT) = KA1(JT,3)                                          SETD1850
      NAMSA(2,NSASYS) = KA1(JT,3)                                      SETD1860
      KSATYP(NSASYS) = K * 10000                                       SETD1870
      KBST(KT) = K * 10000 + NSASYS                                    SETD1880
      DO 150 KD = 1, 12                                                SETD1890
  150 SASYS(KD,NSASYS) = VA1(JT,KD)                                    SETD1900
      A = IFIX(VA1(JT,2) + .004)                                       SETD1910
      SASYS( 2,NSASYS) = A                                             SETD1920
      SASYS(13,NSASYS) = IFIX((VA1(JT,2)-A) * 100. + .4)               SETD1930
      A = IFIX(VA1(JT,3) + .004)                                       SETD1940
      SASYS( 3,NSASYS) = A                                             SETD1950
      SASYS(14,NSASYS) = IFIX((VA1(JT,3)-A) * 10. + .4)                SETD1960
      A = IFIX(VA1(JT,7) + .004)                                       SETD1970
      SASYS( 7,NSASYS) = A                                             SETD1980
      SASYS(15,NSASYS) = VA1(JT,7) - A                                 SETD1990
      SASYS(6,NSASYS) = SASYS(6,NSASYS) / 60.                          SETD2000
C***  ADJUST FOR SALVO SIZE                                            SETD2010
      MA4 = VA1(JT,5) + .00001                                         SETD2020
      DO 155 KE = 1, NBP                                               SETD2030
      IF (KBPXS(KT,KE) .EQ. 0) GO TO 155                               SETD2040
      LA2 = (KBPXS(KT,KE) / 10000) * 10000                             SETD2050
      MA2 = KBPXS(KT,KE) - LA2                                         SETD2060
      LA3 = MA2 / 100                                                  SETD2070
      MA3 = MA2 - LA3 * 100                                            SETD2080
      LA4 = LA3 * MA3                                                  SETD2090
      IF (LA3 .EQ. 99 .OR. LA4 .EQ. 0) GO TO 155                       SETD2100
      LA4 = LA4 / MA4                                                  SETD2110
      KBPXS(KT,KE) = LA2 + LA4*100 + MA3                               SETD2120
  155 CONTINUE                                                         SETD2130
  160 CONTINUE                                                         SETD2140
  170 CONTINUE                                                         SETD2150
C***  SETUP RED MISCELLANEOUS WEAPON SYSTEMS                           SETD2160
  400 IF (KRU .LE. 0) GO TO 600                                        SETD2170
C***  CYCLE THRU RED SYSTEMS                                           SETD2180
      DO 470 KC = 1, NRZZT                                             SETD2190
      ID1 = KRZZT(KC)                                                  SETD2200
      CALL  RCBD11(BZA,LZ,MZ,NCB,KZARL,ID1,ID2,IY,IXX)                 SETD2210
      IF (IXX .EQ. 0) GO TO 410                                        SETD2220
      WRITE(N6,5000) ID1,ID2                                           SETD2230
      GO TO 470                                                        SETD2240
  410 DO 460 KT = 1, NRSS                                              SETD2250
      K = KRST(KT) / 10000                                             SETD2260
      IF (ID1/1000000 .NE. K/100) GO TO 460                            SETD2270
      DO 420 J = 1, LA1                                                SETD2280
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      IF (K .EQ. KA1(J,5)) GO TO 430                                    SETD2290
  420 CONTINUE                                                          SETD2300
      GO TO 460                                                         SETD2310
C***  FOUND SYSTEM IN CATALOG                                           SETD2320
  430 JT = J                                                            SETD2330
      NZZSYS = NZZSYS + 1                                               SETD2340
      IF (NZZSYS .LE. NZZSMX) GO TO 440                                 SETD2350
      WRITE(N6,5010) NZZSYS, NZZSMX                                     SETD2360
      NFLAG2 = NFLAG2 + 1                                               SETD2370
      NZZSYS = NZZSMX                                                   SETD2380
      GO TO 500                                                         SETD2390
C***  TRANSFER SYSTEM NAME AND DATA.  PUT POINTER IN KRST.              SETD2400
  440 NARSS(1,KT) = KA1(JT,2)                                           SETD2410
      NAMSYS(1,NZZSYS) = KA1(JT,2)                                      SETD2420
      NARSS(2,KT) = KA1(JT,3)                                           SETD2430
      NAMSYS(2,NZZSYS) = KA1(JT,3)                                      SETD2440
      KZZTYP(NZZSYS) = K * 10000                                        SETD2450
      KRST(KT) = K * 10000 + NZZSYS                                     SETD2460
      DO 450 KD = 1, 12                                                 SETD2470
  450 ZZSYS(KD,NZZSYS) = VA1(JT,KD)                                     SETD2480
      A = IFIX(VA1(JT,2) + .004)                                        SETD2490
      ZZSYS( 2,NZZSYS) = A                                              SETD2500
      ZZSYS(13,NZZSYS) = IFIX((VA1(JT,2)-A) * 100. + .4)                SETD2510
      A = IFIX(VA1(JT,3) + .004)                                        SETD2520
      ZZSYS( 3,NZZSYS) = A                                              SETD2530
      ZZSYS(14,NZZSYS) = IFIX((VA1(JT,3)-A) * 10. + .4)                 SETD2540
      A = IFIX(VA1(JT,7) + .004)                                        SETD2550
      ZZSYS( 7,NZZSYS) = A                                              SETD2560
      ZZSYS(15,NZZSYS) = VA1(JT,7) - A                                  SETD2570
      ZZSYS(6,NZZSYS) = ZZSYS(6,NZZSYS) / 60.                           SETD2580
C***  ADJUST FOR SALVO SIZE                                             SETD2590
      MA4 = VA1(JT,5) + .00001                                          SETD2600
      DO 455 KE = 1, NRP                                                SETD2610
      IF (KRPXS(KT,KE) .EQ. 0) GO TO 455                                SETD2620
      LA2 = (KRPXS(KT,KE) / 10000) * 10000                              SETD2630
      MA2 = KRPXS(KT,KE) - LA2                                          SETD2640
      LA3 = MA2 / 100                                                   SETD2650
      MA3 = MA2 - LA3 * 100                                             SETD2660
      LA4 = LA3 * MA3                                                   SETD2670
      IF (LA3 .EQ. 99 .OR. LA4 .EQ. 0) GO TO 455                        SETD2680
      LA4 = LA4 / MA4                                                   SETD2690
      KRPXS(KT,KE) = LA2 + LA4*100 + MA3                                SETD2700
  455 CONTINUE                                                          SETD2710
  460 CONTINUE                                                          SETD2720
  470 CONTINUE                                                          SETD2730
  500 NRZSYS = NZZSYS - NBZSYS                                          SETD2740
C***  SETUP RED SURFACE-TO-AIR SYSTEMS                                  SETD2750
      DO 570 KC = 1, NRSAST                                             SETD2760
      ID1 = KRSAST(KC)                                                  SETD2770
      CALL  RCBD11(B7A,LZ,MZ,NCB,KZARL,ID1,ID2,IY,IXX)                  SETD2780
      IF (IXX .EQ. 0) GO TO 510                                         SETD2790
      WRITE(N6,5000) ID1,ID2                                            SETD2800
      GO TO 570                                                         SETD2810
  510 DO 560 KT = 1, NRSS                                               SETD2820
      K = KRST(KT) / 10000                                              SETD2830
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      IF (ID1/100000C .NE. K/100) GO TO 560                          SETD2840
      DO 520 J = 1, LA1                                              SETD2850
      IF (K .EQ. KA1(J,5)) GO TO 530                                 SETD2860
  520 CONTINUE                                                       SETD2870
      GO TO 560                                                      SETD2880
C***  FOUND SYSTEM IN CATALOG                                        SETD2890
  530 JT = J                                                         SETD2900
      GO TO (531, 532), KC                                           SETD2910
  531 NRGUN = NRGUN + 1                                              SETD2920
      GO TO 533                                                      SETD2930
  532 NRSAM = NRSAM + 1                                              SETD2940
  533 NSASYS = NSASYS + 1                                            SETD2950
      IF (NSASYS .LE. NSASMX) GO TO 540                              SETD2960
      WRITE(N6,5020) NSASYS, NSASMX                                  SETD2970
      NFLAG2 = NFLAG2 + 1                                            SETD2980
      NSASYS = NSASMX                                                SETD2990
      GO TO (534, 535), KC                                           SETD3000
  534 NRGUN = NRGUN - 1                                              SETD3010
      GO TO 600                                                      SETD3020
  535 NRSAM = NRSAM - 1                                              SETD3030
      GO TO 600                                                      SETD3040
C***  TRANSFER SYSTEM NAME AND DATA.  PUT POINTER IN KRST.           SETD3050
  540 NARSS(1,KT) = KA1(JT,2)                                        SETD3060
      NAMSA(1,NSASYS) = KA1(JT,2)                                    SETD3070
      NARSS(2,KT) = KA1(JT,3)                                        SETD3080
      NAMSA(2,NSASYS) = KA1(JT,3)                                    SETD3090
      KSATYP(NSASYS) = K * 10000                                     SETD3100
      KRST(KT) = K * 10000 + NSASYS                                  SETD3110
      DO 550 KD = 1, 12                                              SETD3120
  550 SASYS(KD,NSASYS) = VA1(JT,KD)                                  SETD3130
      A = IFIX(VA1(JT,2) + .004)                                     SETD3140
      SASYS( 2,NSASYS) = A                                           SETD3150
      SASYS(13,NSASYS) = IFIX((VA1(JT,2)-A) * 100. + .4)             SETD3160
      A = IFIX(VA1(JT,3) + .004)                                     SETD3170
      SASYS( 3,NSASYS) = A                                           SETD3180
      SASYS(14,NSASYS) = IFIX((VA1(JT,3)-A) * 10. + .4)              SETD3190
      A = IFIX(VA1(JT,7) + .004)                                     SETD3200
      SASYS( 7,NSASYS) = A                                           SETD3210
      SASYS(15,NSASYS) = VA1(JT,7) - A                               SETD3220
      SASYS(6,NSASYS) = SASYS(6,NSASYS) / 60.                        SETD3230
C***  ADJUST FOR SALVO SIZE                                          SETD3240
      MA4 = VA1(JT,5) + .00001                                       SETD3250
      DO 555 KE = 1, NRP                                             SETD3260
      IF (KRPXS(KT,KE) .EQ. 0) GO TO 555                             SETD3270
      LA2 = (KRPXS(KT,KE) / 10000) * 10000                           SETD3280
      MA2 = KRPXS(KT,KE) - LA2                                       SETD3290
      LA3 = MA2 / 100                                                SETD3300
      MA3 = MA2 - LA3 * 100                                          SETD3310
      LA4 = LA3 * MA3                                                SETD3320
      IF (LA3 .EQ. 99 .OR. LA4 .EQ. 0) GO TO 555                     SETD3330
      LA4 = LA4 / MA4                                                SETD3340
      KRPXS(KT,KE) = LA2 + LA4*100 + MA3                             SETD3350
  555 CONTINUE                                                       SETD3360
  560 CONTINUE                                                       SETD3370
  570 CONTINUE                                                       SETD3380
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C***  SETUP TIME LINES 75XX, 77XX, 95XX, 97XX                                SETD3390
  600  IF (NSASYS .LE. 0) GO TO 700                                          SETD3400
       DO 670 KC = 1, NSASYS                                                 SETD3410
       ID1 = KSATYP(KC)                                                      SETD3420
       CALL  RCBD11(BZA,LZ,MZ,NCB,KZARL,ID1,ID2,IY,IXX)                      SETD3430
       IF (IXX .EQ. 0) GO TO 610                                             SETD3440
       WRITE(N6,5000) ID1,ID2                                                SETD3450
       GO TO 670                                                             SETD3460
  610  DO 620 I = 1, LA1                                                     SETD3470
       DO 620 J = 1, MA1                                                     SETD3480
  620  RT(I,J,KC) = VA1(I,J)                                                 SETD3490
       RMN(KC) = CA(4)                                                       SETD3500
       RMX(KC) = CA(8)                                                       SETD3510
       EMN(KC) = ICA(4)                                                      SETD3520
       EMX(KC) = ICA(8)                                                      SETD3530
       ZMX(KC) = ICA(16)                                                     SETD3540
       XMX(KC) = CA(16)                                                      SETD3550
       SASYS(16,KC) = RMN(KC)                                                SETD3560
       SASYS( 1,KC) = RMX(KC)                                                SETD3570
  670  CONTINUE                                                              SETD3580
  700  IF (NFLAG2 .GT. 0) NFLAG = NFLAG + 1                                  SETD3590
       IF (IPRINT .GT. 0) GO TO 800                                          SETD3600
       GO TO 900                                                             SETD3610
C***  PRINT OPTIONS                          * * *                          SETD3620
C***                                         * * *                          SETD3630
       ENTRY        PRSETD(IPRINT)                                           SETD3640
C***                                         * * *                          SETD3650
  800  IF (NZZSYS .LE. 0) GO TO 808                                          SETD3660
       CALL PAGE                                                             SETD3670
       WRITE(N6,5120)                                                        SETD3680
       DO 804 I = 1, NZZSYS                                                  SETD3690
  804  WRITE(N6,5130) I, (NAMSYS(J,I),J=1,2), KZZTYP(I),                     SETD3700
     1       (ZZSYS(J,I),J=1,3)                                              SETD3710
       IF (IPRINT .LT. 2) GO TO 808                                          SETD3720
       CALL PAGE                                                             SETD3730
       WRITE(N6,5080)                                                        SETD3740
       DO 806 I = 1, NZZSYS                                                  SETD3750
       WRITE(N6,5090) I, (NAMSYS(J,I),J=1,2), KZZTYP(I)                      SETD3760
  806  WRITE(N6,5100) (ZZSYS(J,I),J=1,LAZZ)                                  SETD3770
  808  IF (NSASYS .LE. 0) GO TO  900                                         SETD3780
       CALL PAGE                                                             SETD3790
       WRITE(N6,5040) NBGUN, NBSAM, NRGUN, NRSAM                             SETD3800
       WRITE(N6,5050)                                                        SETD3810
       DO 810 I = 1, NSASYS                                                  SETD3820
  810  WRITE(N6,5060) I, (NAMSA(J,I),J=1,2), KSATYP(I), RMN(I), RMX(I),      SETD3830
     1 EMN(I), EMX(I), ZMX(I), XMX(I)                                        SETD3840
       IF (IPRINT .LT. 2) GO TO 900                                          SETD3850
       CALL PAGE                                                             SETD3860
C***  PRINT TIME LINES                                                      SETD3870
       DO 820 I = 1, NSASYS                                                  SETD3880
       LA2 = RT(1,1,I) + .1                                                  SETD3890
       MA2 = MOD(LA2,100)                                                    SETD3900
       LA2 = LA2 / 100                                                       SETD3910
  820  CALL WMAT3(2,K,RT,L,M,N,LA2,MA2,I,NLINE,60HBORDERED TABLE, AAGUN      SETD3920
     1CR SAM TIME OF FLIGHT (SEC VS DEG)     )                              SETD3930
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  850  CALL PAGE                                                          SETD3940
       WRITE(N6,5110)                                                     SETD3950
       DO 860 I = 1, NSASYS                                               SETD3960
       WRITE(N6,5090) I, (NAMSA(J,I),J=1,2), KSATYP(I)                    SETD3970
  860  WRITE(N6,5100) (SASYS(J,I),J=1,LASA)                               SETD3980
  900 WRITE(N6,5070) NFLAG                                                SETD3990
       RETURN                                                             SETD4000
       END                                                                SETD4010



       SUBROUTINE SETUPE(IPRINT)                                          SETE0010
C   PGM=NXX(NFM). L.D.G.        VER.5.  9-7-73      FORTRAN IV      EBCD  SETE0020
C   TO SET UP SYSTEMS DATA FOR CURRENT PROBLEM FOR SYSTEMS IN SETUPB       SETE0030
C   CALLED BY MAIN AND ZIP CARD AS FOLLOWS                                 SETE0040
CIP   8 5 P                                  SETUPE. RADARS AND JAMMERS    SETE0050
C***                                                                       SETE0060
      COMMON/DEVICE/ N1,N2,N3,N4,N5,N6,N7,N8,N9,N10,N11,N12                SETE0070
       COMMON/INOUT/NLINE,NPAGE,DUMA(35), NCODE(19)                        SETE0080
     1,IDUMB(72), NFLAG, NFLAG2                                            SETE0090
CZAZA                                                                      SETE0100
       INTEGER TITLA                                                       SETE0110
       COMMON/CZAZA/NCBA,IDA1,IDA2,IDA3,JZARL,LZA,MZA,ICA(16),CA(16)       SETE0120
     &, TITLA(15),HEADA(37),IFMT                                           SETE0130
     2, LA1,LAA1,MA1,MAA1,KA1(27,5),VA1(27,12)                             SETE0140
       DIMENSION  BZA( 555)                                                SETE0150
       EQUIVALENCE  (NCBA,BZA(1))                                          SETE0160
       DATA  NCB,LZ,MZ,LA,MA/ 1,555,12,27,12/                              SETE0170
CNAVIG                                                                     SETE0180
       COMMON/CNAVIG/ NGMX,BF,BF,RE,RF,                                    SETE0190
     1      NBG,BA,BB,BC,BD,KBGN(18),KBGK(18),BGC( 8,6,18),NBU(18),       SETE0200
     2      NRG,RA,RB,RC,RD,KRGN(18),KRGK(18),RGC( 8,6,18),NRU(18),       SETE0210
     3           TTIME,NUMX,                                               SETE0220
     4      KBU,KBUK(4,50),BREL(4,50),BXYZ(50,7),NAMBU(50,2),BV(50,8),    SETE0230
     5      KRU,KRUK(4,50),RREL(4,50),RXYZ(50,7),NAMRU(50,2),RV(50,8)     SETE0240
       COMMON/CWORK/LA2,MA2,LAA2,MAA2, KA2(3,15),VA2(12,15),               SETE0250
     1              LA3,MA3,LAA3,MAA3, VA3(36,15),          KA5( 727)     SETE0260
CPLAT  VS  SYSTEMS  (SUBSYSTEMS)                                           SETE0270
       COMMON/CPLAT/NBP,NBPMX,NBSS,NBSSMX,NBSPP(15),NBPWS(45),             SETE0280
     1   NAMBP(2,15),KBPT(15),NABSS(2,45),KBST(45),KBPXS(45,15),           SETE0290
     2   BPX1(12,15),                                                      SETE0300
     3              NRP,NRPMX,NRSS,NRSSMX,NRSPP(15),NRPWS(45),             SETE0310
     4   NAMRP(2,15),KRPT(15),NARSS(2,45),KRST(45),KRPXS(45,15),           SETE0320
     5   RPX1(12,15)                                                       SETE0330
CRADAR                                                                     SETE0340
       COMMON/CRADAR/NBSR,NBTR,NBRMX,NBJ,NBJMX,                            SETE0350
     1   BRAD(36,17),BENV(6,2),BETC(4,2),BTAR(6,3),BJAM(6,3,2),            SETE0360
     2              NRSR,NRTR,NRRMX,NRJ,NRJMX,                             SETE0370
     3   RRAD(36,15),RENV(6,2),RETC(4,2),RTAR(6,3),RJAM(6,3,2)             SETE0380
C***                                                                       SETE0390
C   NBSR    = NO.BLU SEARCH RADARS        / NRSR    = NO.RED SEARCH RADARS SETE0400
C   NBTR    = NO.BLU TRACK RADARS         / NRTR    = NO.RED TRACK RADARS  SETE0410
C   NBRMX   = MAX NO.BLU RADARS           / NRRMX   = MAX NO.RED RADARS    SETE0420
C   BRAD(I,J)= BLU, ITH DATA ON JTH RADAR/ RRAD(I,J)=  ETC.                SETE0430
C   BENV(I,K)= BLU RADAR ENVIRONMENT K    / RENV(I,K)=                     SETE0440
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C   EETC(I,L)= BLU MISC RADAR DATA  L     /   ETC.                                  SETE0450
C   RTAR(I,M)= BLU RADAR TARGET DATA  M   /                                         SETE0460
C   BJAM(I,J,N)=BLU JAMMER DATA N         /                                         SETE0470
C   NOTE. THE POINTER TO THE JTH RADAR IS/                                          SETE0480
C     IN KBST( )=KBST( )+J,(J.LE.99).     /                                       SETE0490
C     & NTH JAMMER IN KBST( )=KBST( )+N   /                                       SETE0500
C***                                                                              SETE0510
C                                                                                 SETE0520
       DIMENSION  KBRTT( 2), KRRTT( 2)                                           SETE0530
      DIMENSION RCOL(2),RRTPE(2,2)                                               SETE0540
       DATA  NBRTT,KBRTT/ 2,65100000,67100000/                                   SETE0550
       DATA  NRRTT,KRRTT/ 2,85100000,87100000/                                   SETE0560
      DATA RCOL/' BLU',' RED'/                                                   SETE0570
      DATA RRTPE/' SEA','RCH ',' TRA','CK  '/                                    SETE0580
CSONAR                          15     5     8    12                            SETE0590
       COMMON/CSONAR/NSON,NSONMX,NBSON,NRSON,LASON,NAMSON( 2,15),                SETE0600
     1    KSONTY(15), SONSYS(12,15)                                              SETE0610
 2005  FORMAT(1HO,22HERROR IN SETUPE AT E1=,F8.2,3X,'ID1=',2I10,2G13.6)           SETE0620
 2006  FORMAT(1HO,'NO. OF RADARS=',I4,',  EXCEEDS STORAGE=',I4)                  SETE0630
 2007  FORMAT(1HO,'NO TABLE FOUND FOR ID1, ID2=', 2I10)                          SETE0640
 2008  FORMAT(1HO,'NO. OF JAMMERS=',I4,',  EXCEEDS STORAGE=',I4)                 SETE0650
 2009  FORMAT(1HO,'NO. OF SONARS=',I4,',  EXCEEDS STORAGE=',I4)                  SETE0660
 2011  FORMAT(1HO,'AT END OF SETUPE, CUM NO. SETUP ERRORS=NFLAG=',I5)            SETE0670
 3000  FORMAT(7X,'BLU PLATFORMS VS. SYSTEMS')                                    SETE0680
 3001  FORMAT(7X,'RED PLATFORMS VS. SYSTEMS')                                    SETE0690
 3002  FORMAT(9X,'SYSTEM',13X, 8(I3,'.',2A4) )                                   SETE0700
 3003  FORMAT(9X,'NAME AND TYPE',6X, 8I12)                                       SETE0710
 3004  FORMAT(5X,I3,'.',2A4,I9,2X, 8I12)                                         SETE0720
 3006  FORMAT(6X,'SONAR DATA'/                                                   SETE0730
     1    8X,'NO.BLU SONAR TYPES=',I4,',  NO.RED SONAR TYPES=',I4)             SETE0740
 3008  FORMAT(/1X,I6,'.',2A4,I9,'    SONAR DATA')                                SETE0750
 3010  FORMAT(8X,10G12.5)                                                        SETE0760
 6700 FORMAT(/6X,3A4,'RADAR ARRAY DATA'/6X,10('  COL.=',I3,2X))                  SETE0770
 6701 FORMAT(1X,I4,1X,10G12.5)                                                  SETE0780
 6702 FORMAT(/6X,A4,' JAMMER ARRAY DATA'/)                                      SETE0790
 6703 FORMAT(1X,I4,1X,3G12.5,5X,3G12.5)                                         SETE0800
       KZARL = 96 + LA*(5 + MA)                                                 SETE0810
       JZARL = KZARL                                                            SETE0820
       NFLAG2= 0                                                                SETE0830
       NSONMX = 15                                                              SETE0840
       LASON  = 12                                                              SETE0850
       NSON   = 0                                                               SETE0860
       NBSON  = 0                                                               SETE0870
       NRSON  = 0                                                               SETE0880
C***  SETUP BLU RADARS                                                          SETE0890
 1     IF (KBU.LE.0)  GO TO 201                                                 SETE0900
C***  CYCLE THRU BLU CATALOG RADAR TABLES                                       SETE0910
       IY  = 3                                                                  SETE0920
       NBTR = 0                                                                 SETE0930
       NBSR = 0                                                                 SETE0940
       DO 46 KC=1,NBRTT                                                         SETE0950
       ID1 = KBRTT(KC)                                                          SETE0960
      IDTPE=ID1/100000                                                          SETE0970
       DO 44 KX=1,3                                                             SETE0980
       ID2 = -KX                                                                SETE0990
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      CALL  RCBD11(BZA,LZ,MZ,NCB,KZARL,ID1,ID2,IY,IXX)                  SETE1000
      IF (IXX.EQ.0)  GO TO 26                                           SETE1010
      WRITE(N6,2007) ID1,ID2                                            SETE1020
      GO TO 44                                                          SETE1030
C***  CYCLE THRU SYSTEM TYPES IN  KBST (FROM ENGAGEMENT STRUCTURE)      SETE1040
   26 DO 42 KT=1,NBSS                                                   SETE1050
      K   = KBST(KT) / 10000                                            SETE1060
      IF(K/100 .NE. IDTPE) GO TO 42                                     SETE1070
      DO 28 J=1,LA1                                                     SETE1080
      IF (K.EQ.KA1( J,5))  GO TO 30                                     SETE1090
   28 CONTINUE                                                          SETE1100
      GO TO 42                                                          SETE1110
C***  FOUND, SYSTEM TYPE IN CATALOG                                     SETE1120
   30 JT  = J                                                           SETE1130
      IF (KX.GE.2)  GO TO 37                                            SETE1140
C***  TRANSFER RADAR  NAME AND DATA. PUT POINTER IN  KBST.              SETE1150
      IF (IDTPE.NE.65)  GO TO 32                                        SETE1160
      NBSR = NBSR + 1                                                   SETE1170
      JR   = NBSR                                                       SETE1180
      GO TO 34                                                          SETE1190
   32 NBTR = NBTR + 1                                                   SETE1200
      JR   = NBTR + NBSR                                                SETE1210
   34 IF (JR.LE.NBRMX)  GO TO 36                                        SETE1220
      WRITE(N6,2006) JR, NBRMX                                          SETE1230
      NFLAG2 = NFLAG2 + 1                                               SETE1240
      GO TO 48                                                          SETE1250
   36 NABSS(1,KT) = KA1(JT,2)                                           SETE1260
      NABSS(2,KT) = KA1(JT,3)                                           SETE1270
      KBST(KT) =  KBST(KT) + JR                                         SETE1280
      GO TO 38                                                          SETE1290
   37 JR  = MOD(KBST(KT),100)                                           SETE1300
      IF (JR.GT.0)  GO TO 38                                            SETE1310
      E1  = 37.01                                                       SETE1320
      WRITE(N6,2005) E1, ID1, ID2, NBSR, NBTR                           SETE1330
      NFLAG2 = NFLAG2 + 1                                               SETE1340
      GO TO 42                                                          SETE1350
   38 JA  = 12*(KX-1)                                                   SETE1360
      DO 40 J=1,12                                                      SETE1370
   40 BRAD(JA+J,JR) = VA1(JT,J)                                         SETE1380
   42 CONTINUE                                                          SETE1390
   44 CONTINUE                                                          SETE1400
   46 CONTINUE                                                          SETE1410
C***  SET UP BLU JAMMERS                                                SETE1420
   48 IY  = 3                                                           SETE1430
      ID1 = 68100000                                                    SETE1440
      ID2 = -1                                                          SETE1450
      CALL  RCBD11(BZA,LZ,MZ,NCB,KZARL,ID1,ID2,IY,IXX)                  SETE1460
      IF (IXX.EQ.0)  GO TO 50                                           SETE1470
      WRITE(N6,2007) ID1,ID2                                            SETE1480
      GO TO 59                                                          SETE1490
C***  CYCLE THRU SYSTEM TYPES IN KBST                                   SETE1500
   50 NBJ = 0                                                           SETE1510
      DO 58 KT=1,NBSS                                                   SETE1520
      K   = KBST(KT) / 10000                                            SETE1530
      DO 52 J= 1,LA1                                                    SETE1540
```

```
      IF (K.EQ.KA1( J,5))  GO TO 54                                    SETE1550
 52   CONTINUE                                                         SETE1560
      GO TO 58                                                         SETE1570
C***  FOUND JAMMER IN CATALOG                                          SETE1580
 54   JT  = J                                                          SETE1590
      NBJ = NBJ + 1                                                    SETE1600
      IF (NBJ.LE.NBJMX)  GO TO 56                                      SETE1610
      WRITE(N6,2008) NBJ, NBJMX                                        SETE1620
      NFLAG2 = NFLAG2 + 1                                              SETE1630
      NBJ = NBJMX                                                      SETE1640
      GO TO 59                                                         SETE1650
C***  TRANSFER JAMMER NAME AND DATA. PUT POINTER IN KBST.              SETE1660
C***  NOTE. FREQ. = 30000 / XLAMDA (IN CM.)  (FREQ.IN MHZ)             SETE1670
 56   NABSS(1,KT) = KA1(JT,2)                                          SETE1680
      NABSS(2,KT) = KA1(JT,3)                                          SETE1690
      KBST(KT) =  KBST(KT) + NBJ                                       SETE1700
      DO 57 J=1,3                                                      SETE1710
      I   = 4*(J - 1)                                                  SETE1720
      BJAM(1,J,NBJ) = VA1(JT,I+3)                                      SETE1730
      BJAM(2,J,NBJ) = VA1(JT,I+4)                                      SETE1740
      BJAM(3,J,NBJ) = 1.E6*(VA1(JT,I+2)-VA1(JT,I+1) )                  SETE1750
      BJAM(4,J,NBJ) = 1.0                                              SETE1760
      BJAM(5,J,NBJ) = VA1(JT,I+1)                                      SETE1770
 57   BJAM(6,J,NBJ) = VA1(JT,I+2)                                      SETE1780
 58   CONTINUE                                                         SETE1790
C***  SETUP BLU SONARS                                                 SETE1800
 59   IY  = 3                                                          SETE1810
      ID1 = 65300000                                                   SETE1820
      ID2 = -1                                                         SETE1830
      CALL  RCBD11(BZA,LZ,MZ,NCB,KZARL,ID1,ID2,IY,IXX)                 SETE1840
      IF (IXX.EQ.0)  GO TO  60                                         SETE1850
      WRITE(N6,2007)  ID1,ID2                                          SETE1860
      GO TO  68                                                        SETE1870
C***  CYCLE THRU SYSTEM TYPES IN KBST                                  SETE1880
 60   DO  66 KT=1,NBSS                                                 SETE1890
      K   = KBST(KT) / 10000                                           SETE1900
      IF ( K / 100.NE. 65)  GO TO  66                                  SETE1910
      DO  61 J= 1,LA1                                                  SETE1920
      IF (K.EQ.KA1( J,5))  GO TO  62                                   SETE1930
 61   CONTINUE                                                         SETE1940
      GO TO  66                                                        SETE1950
C***  FOUND SONAR IN CATALOG                                           SETE1960
 62   JT  = J                                                          SETE1970
      NSON = NSON + 1                                                  SETE1980
      IF (NSON.LE.NSONMX)  GO TO  63                                   SETE1990
      WRITE(N6,2009) NSON, NSONMX                                      SETE2000
      NFLAG2 = NFLAG2 + 1                                              SETE2010
      NSON = NSONMX                                                    SETE2020
      GO TO  68                                                        SETE2030
C***  TRANSFER SONAR NAME AND DATA.  PUT POINTER.                      SETE2040
 63   DO  64 I=1,2                                                     SETE2050
      KNAME = KA1(JT,I+1)                                              SETE2060
      NABSS(I,KT) = KNAME                                              SETE2070
 64   NAMSON(I,NSON) = KNAME                                           SETE2080
      KSONTY(NSON) = K*10000                                           SETE2090
```

```
      KBST(KT) = KBST(KT) + NSON                                        SETE2100
      DO  65 I=1,12                                                     SETE2110
   65 SONSYS(I, NSON) = VAL(JT,I)                                       SETE2120
   66 CONTINUE                                                          SETE2130
   68 NBSON = NSON                                                      SETE2140
C***  PRINT OPTION                                                      SETE2150
      IF (IPRINT.LT.1)  GO TO 73                                        SETE2160
      KC  = 1                                                           SETE2170
 70   KD  = KC + 7                                                      SETE2180
      KD  = MIN0(KD,NBP)                                                SETE2190
      CALL  PAGE                                                        SETE2200
      WRITE(N6,3000)                                                    SETE2210
      WRITE(N6,3002) ((J,  NAMBP(1,J),NAMBP(2,J)),J=KC,KD)             SETE2220
      WRITE(N6,3003) ( KBPT(J),J=KC,KD)                                 SETE2230
      DO 72 I=1,NBSS                                                    SETE2240
      WRITE(N6,3004) (I,NABSS(1,I),NABSS(2,I),KBST(I),                  SETE2250
     1   (KBPXS(I,J),J=KC,KD) )                                         SETE2260
 72   CONTINUE                                                          SETE2270
      KC  = KC + 8                                                      SETE2280
      IF (KC.LE.NBP)  GO TO 70                                          SETE2290
 73   IF (IPRINT.LT.2)  GO TO 201                                       SETE2300
      IF(NBSR.LE.0) GO TO 78                                            SETE2310
      NA=1                                                              SETE2320
      NB=NBSR                                                           SETE2330
      IC=1                                                              SETE2340
      IT=1                                                              SETE2350
   75 CALL PAGE                                                         SETE2360
      WRITE(N6,6700) PCOL(IC),(PRTPE(I,IT),I=1,2),(J,J=NA,NB)           SETE2370
      DO  76 I=1,36                                                     SETE2380
 76   WRITE(N6,6701) I,(BRAD(I,J),J=NA,NB)                             SETE2390
      IF(IT.EQ.2) GO TO 80                                              SETE2400
 78   IF(NBTR.LE.0) GO TO 80                                            SETE2410
      IT=2                                                              SETE2420
      NA=NBSR+1                                                         SETE2430
      NB=NBSR+NBTR                                                      SETE2440
      GO TO 75                                                          SETE2450
 80   CALL PAGE                                                         SETE2460
      WRITE(N6,6702) PCOL(1)                                            SETE2470
      DO  82 I=1,6                                                      SETE2480
 82   WRITE(N6,6703) I, ((BJAM(I,J,K),J=1,3),K=1,2)                     SETE2490
C***  SETUP RED RADARS                                                  SETE2500
 201  IF (KRU.LE.0)  GO TO 590                                          SETE2510
C***  CYCLE THRU RED CATALOG RADAR TABLES                               SETE2520
      IY  = 3                                                           SETE2530
      NRTR = 0                                                          SETE2540
      NRSR = 0                                                          SETE2550
      DO 246 KC=1,NRRTT                                                 SETE2560
      ID1 = KRRTT(KC)                                                   SETE2570
      IDTPE=ID1/1000000                                                 SETE2580
      DO 244 KX=1,3                                                     SETE2590
      ID2 = -KX                                                         SETE2600
      CALL  RCBD11(BZA,LZ,MZ,NCB,KZARL,ID1,ID2,IY,IXX)                  SETE2610
      IF (IXX.EQ.0)  GO TO 226                                          SETE2620
      WRITE(N6,2007) ID1,ID2                                            SETE2630
      GO TO 244                                                         SETE2640
```

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C***  CYCLE THRU SYSTEM TYPES IN  KRST (FROM ENGAGEMENT STRUCTURE)      SETE2650
  226  DO 242 KT=1,NRSS                                                SETE2660
       K    = KRST(KT) / 10000                                         SETE2670
      IF(K/100 .NE. IDTPE) GO TO 242                                   SETE2680
       DO 228 J=1,LA1                                                  SETE2690
       IF (K.EQ.KA1( J,5))  GO TO 230                                  SETE2700
  228  CONTINUE                                                        SETE2710
       GO TO 242                                                       SETE2720
C***  FOUND, SYSTEM TYPE IN CATALOG                                    SETE2730
  230  JT   = J                                                        SETE2740
       IF (KX.GE.2)  GO TO 237                                         SETE2750
C***  TRANSFER RADAR  NAME AND DATA. PUT POINTER IN  KRST.             SETE2760
       IF (IDTPE.NE.85)  GO TO 232                                     SETE2770
       NRSR = NRSR + 1                                                 SETE2780
       JR   = NRSR                                                     SETE2790
       GO TO 234                                                       SETE2800
  232  NRTR = NRTR + 1                                                 SETE2810
       JR   = NRTR + NRSR                                              SETE2820
  234  IF (JR.LE.NRRMX)  GO TO 236                                     SETE2830
       WRITE(N6,2006) JR, NRRMX                                        SETE2840
       NFLAG2 = NFLAG2 + 1                                             SETE2850
       GO TO 248                                                       SETE2860
  236  NARSS(1,KT) = KA1(JT,2)                                         SETE2870
       NARSS(2,KT) = KA1(JT,3)                                         SETE2880
       KRST(KT) =  KRST(KT) + JR                                       SETE2890
       GO TO 238                                                       SETE2900
  237  JR   = MOD(KRST(KT),100)                                        SETE2910
       IF (JR.GT.0)  GO TO 238                                         SETE2920
       E1   = 237.01                                                   SETE2930
       WRITE(N6,2005) E1, ID1, ID2, NRSR, NRTR                         SETE2940
       NFLAG2 = NFLAG2 + 1                                             SETE2950
       GO TO 242                                                       SETE2960
  238  JA   = 12*(KX-1)                                                SETE2970
       DO 240 J=1,12                                                   SETE2980
  240  RRAD(JA+J,JR) = VA1(JT,J)                                       SETE2990
  242  CONTINUE                                                        SETE3000
  244  CONTINUE                                                        SETE3010
  246  CONTINUE                                                        SETE3020
C***  SET UP RED JAMMERS                                               SETE3030
  248  IY   = 3                                                        SETE3040
       ID1 = 81000000                                                  SETE3050
       ID2 = -1                                                        SETE3060
       CALL  RCBD11(BZA,LZ,MZ,NCB,KZARL,ID1,ID2,IY,IXX)                SETE3070
       IF (IXX.EQ.0)  GO TO 250                                        SETE3080
       WRITE(N6,2007) ID1,ID2                                          SETE3090
       GO TO 259                                                       SETE3100
C***  CYCLE THRU SYSTEM TYPES IN KRST                                  SETE3110
  250  NRJ = 0                                                         SETE3120
       DO 258 KT=1,NRSS                                                SETE3130
       K    = KRST(KT) / 10000                                         SETE3140
       DO 252 J= 1,LA1                                                 SETE3150
       IF (K.EQ.KA1( J,5))  GO TO 254                                  SETE3160
  252  CONTINUE                                                        SETE3170
       GO TO 258                                                       SETE3180
C***  FOUND JAMMER IN CATALOG                                          SETE3190
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 254    JT   = J                                                        SETE3200
        NRJ = NRJ + 1                                                  SETE3210
        IF (NRJ.LE.NRJMX)  GO TO 256                                   SETE3220
        WRITE(N6,2008) NRJ, NRJMX                                      SETE3230
        NFLAG2 = NFLAG2 + 1                                            SETE3240
        NRJ = NRJMX                                                    SETE3250
        GO TO 259                                                      SETE3260
C***   TRANSFER JAMMER NAME AND DATA. PUT POINTER IN KRST.             SETE3270
C***   NOTE. FREQ. = 30000 / XLAMDA (IN CM.)  (FREQ.IN MHZ)           SETE3280
 256    NARSS(1,KT) = KA1(JT,2)                                        SETE3290
        NARSS(2,KT) = KA1(JT,3)                                        SETE3300
        KRST(KT) =  KRST(KT) + NRJ                                     SETE3310
        DO 257 J=1,3                                                   SETE3320
        I    = 4*(J - 1)                                               SETE3330
        RJAM(1,J,NRJ) = VA1(JT,I+3)                                    SETE3340
        RJAM(2,J,NRJ) = VA1(JT,I+4)                                    SETE3350
        RJAM(3,J,NRJ) = 1.E6*(VA1(JT,I+2)-VA1(JT,I+1) )                SETE3360
        RJAM(4,J,NRJ) = 1.0                                            SETE3370
        RJAM(5,J,NRJ) = VA1(JT,I+1)                                    SETE3380
 257    RJAM(6,J,NRJ) = VA1(JT,I+2)                                    SETE3390
 258    CONTINUE                                                       SETE3400
C***  SETUP REC SONARS                                                 SETE3410
 259    IY   = 3                                                       SETE3420
        ID1 = 85300000                                                 SETE3430
        ID2 = -1                                                       SETE3440
        CALL  RCBD11(BZA,LZ,MZ,NCB,KZARL,ID1,ID2,IY,IXX)               SETE3450
        IF (IXX.EQ.0)  GO TO 260                                       SETE3460
        WRITE(N6,2007)  ID1,ID2                                        SETE3470
        GO TO 268                                                      SETE3480
C***  CYCLE THRU SYSTEM TYPES IN KRST                                  SETE3490
 260    DO 266 KT=1,NRSS                                               SETE3500
        K    = KRST(KT) / 10000                                        SETE3510
        IF ( K / 100.NE. 85)  GO TO 266                                SETE3520
        DO 261 J= 1,LA1                                                SETE3530
        IF (K.EQ.KA1( J,5))  GO TO 262                                 SETE3540
 261    CONTINUE                                                       SETE3550
        GO TO 266                                                      SETE3560
C***  FOUND SONAR IN CATALOG                                           SETE3570
 262    JT   = J                                                       SETE3580
        NSON = NSON + 1                                                SETE3590
        IF (NSON.LE.NSONMX)  GO TO 263                                 SETE3600
        WRITE(N6,2009) NSON, NSONMX                                    SETE3610
        NFLAG2 = NFLAG2 + 1                                            SETE3620
        NSON = NSONMX                                                  SETE3630
        GO TO 268                                                      SETE3640
C***  TRANSFER SONAR NAME AND DATA.  PUT POINTER.                      SETE3650
 263    DO 264 I=1,2                                                   SETE3660
        KNAME = KA1(JT,I+1)                                            SETE3670
        NARSS( I,KT) = KNAME                                           SETE3680
 264    NAMSON(I,NSON) = KNAME                                         SETE3690
        KSONTY(NSON) = K*10000                                         SETE3700
        KRST(KT) = KRST(KT) + NSON                                     SETE3710
        DO 265 I=1,12                                                  SETE3720
 265    SONSYS(I, NSON) = VA1(JT,I)                                    SETE3730
 266    CONTINUE                                                       SETE3740
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      NRSON = NSON - NBSON                                              SETE3750
C***  PRINT OPTION                                                      SETE3760
      IF (IPRINT.LT.1)  GO TO 273                                       SETE3770
      KC  = 1                                                           SETE3780
270   KD  = KC + 7                                                      SETE3790
      KD  = MIN0(KD,NRP)                                                SETE3800
      CALL  PAGE                                                        SETE3810
      WRITE(N6,3001)                                                    SETE3820
      WRITE(N6,3002) ((J,  NAMRP(1,J),NAMRP(2,J)),J=KC,KD)              SETE3830
      WRITE(N6,3003) ( KRPT(J),J=KC,KD)                                 SETE3840
      DO 272 I=1,NRSS                                                   SETE3850
      WRITE(N6,3004) (I,NARSS(1,I),NARSS(2,I),KRST(I),                  SETE3860
     1   (KRPXS(I,J),J=KC,KD) )                                         SETE3870
272   CONTINUE                                                          SETE3880
      KC  = KC + 8                                                      SETE3890
      IF (KC.LE.NRP)  GO TO 270                                         SETE3900
273   IF (IPRINT.LT.2)  GO TO 590                                       SETE3910
      IF(NRSR.LE.0) GO TO 278                                           SETE3920
      NA=1                                                              SETE3930
      NB=NRSR                                                           SETE3940
      IC=2                                                              SETE3950
      IT=1                                                              SETE3960
275   CALL PAGE                                                         SETE3970
      WRITE(N6,6700) PCOL(IC),(PRTPE(I,IT),I=1,2),(J,J=NA,NB)           SETE3980
      DO 276 I=1,36                                                     SETE3990
276   WRITE(N6,6701) I,(RRAD(I,J),J=NA,NB)                              SETE4000
      IF(IT.EQ.2) GO TO 280                                             SETE4010
278   IF(NRTR.LE.0) GO TO 280                                           SETE4020
      IT=2                                                              SETE4030
      NA=NRSR+1                                                         SETE4040
      NB=NRSR+NRTR                                                      SETE4050
      GO TO 275                                                         SETE4060
280   CALL PAGE                                                         SETE4070
      WRITE(N6,6702) PCOL(2)                                            SETE4080
      DO 282 I=1,6                                                      SETE4090
282   WRITE(N6,6703) I, ((RJAM(I,J,K),J=1,3),K=1,2)                     SETE4100
C***  PRINT SONAR DATA                                                  SETE4110
301   CALL PAGE                                                         SETE4120
      WRITE(N6,3006)  NBSON, NRSON                                      SETE4130
      DO 302 I=1,NSON                                                   SETE4140
      WRITE(N6,3008) I, (NAMSON(J,I),J=1,2), KSCNTY(I)                  SETE4150
302   WRITE(N6,3010) (SONSYS(J,I),J=1,LASON)                            SETE4160
590   IF (NFLAG2.NE.0)  NFLAG = NFLAG + 1                               SETE4170
      WRITE(N6,2011) NFLAG                                              SETE4180
      RETURN                                                            SETE4190
      END                                                               SETE4200


      SUBROUTINE  SETUPF(IPRINT)                                        SETF0010
C  PGM=NXX(NEM). L.D.G.       VER.2    11-28-73   FORTRAN IV     ERCD  SETF0020
C     TO SET UP GENERAL DATA AND CONTROL                                SETF0030
C       1.TABLE 3110 SHIP VULN.                                         SETF0040
C                                                                       SETF0050
C  CALLED BY MAIN AND ZIP CARD AS FOLLOWS                               SETF0060
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CIP  8 6 P                                  SET UP MISCELLANEOUS DATA      SETF0070
C***                                                                       SETF0080
      COMMON/DEVICE/ N1,N2,N3,N4,N5,N6,N7,N8,N9,N10,N11,N12                SETF0090
      COMMON/INOUT/NLINE,NPAGE,DUMA(35), NCODE(19)                         SETF0100
     1,IDUMB(72), NFLAG, NFLAG2                                            SETF0110
CZAZA                                                                      SETF0120
      INTEGER TITLA                                                        SETF0130
      COMMON/CZAZA/NCBA,IDA1,IDA2,IDA3,JZARL,LZA,MZA,ICA(16),CA(16)        SETF0140
     1, TITLA(15),HEADA(37),IFMT                                           SETF0150
     2, LA1,LAA1,MA1,MAA1,KA1(27,5),VA1(27,12)                             SETF0160
      DIMENSION  BZA( 555)                                                 SETF0170
      EQUIVALENCE  (NCBA,BZA(1))                                           SETF0180
      DATA  NCB,LZ,MZ,LA,MA/ 1,555,12,27,12/                               SETF0190
CNAVIG                                                                     SETF0200
      COMMON/CNAVIG/ NGMX,BE,BF,RE,RF,                                     SETF0210
     1     NBG,BA,BB,BC,BD,KBGN(18),KBGK(18),BGC( 8,6,18),NBU(18),        SETF0220
     2     NRG,RA,RB,RC,RD,KRGN(18),KRGK(18),RGC( 8,6,18),NRU(18),        SETF0230
     3          TTIME,NUMX,                                               SETF0240
     4     KBU,KBUK(4,50),BREL(4,50),BXYZ(50,7),NAMBU(50,2),BV(50,8),     SETF0250
     5     KRU,KRUK(4,50),RREL(4,50),RXYZ(50,7),NAMRU(50,2),RV(50,8)      SETF0260
CPLAT  VS  SYSTEMS  (SUBSYSTEMS)                                           SETF0270
      COMMON/CPLAT/NBP,NBPMX,NBSS,NBSSMX,NBSPP(15),NBPWS(45),              SETF0280
     1   NAMBP(2,15),KBPT(15),NABSS(2,45),KBST(45),KBPXS(45,15),           SETF0290
     2   BPX1(12,15),                                                      SETF0300
     3              NRP,NRPMX,NRSS,NRSSMX,NRSPP(15),NRPWS(45),             SETF0310
     4   NAMRP(2,15),KRPT(15),NARSS(2,45),KRST(45),KRPXS(45,15),           SETF0320
     5   RPX1(12,15)                                                       SETF0330
CMSLSYS                          16     2     2     6     6     24     50  SETF0340
      COMMON/CMSLSY/ NMSL,NMSLMX,NBSSM,NBASM,NRSSM,NRASM,LATMSL,LTRAJ,     SETF0350
     1    NAMMSL(2,16),KMSLTY(16),                                         SETF0360
     2    DATMSL(24,16), TTRAJ(50,16)                                      SETF0370
CWORK                                                                      SETF0380
      COMMON/CWORK/                                                        SETF0390
     1    LW1,MW1,LAW1,MAW1,  KW1(27,5),  VW1(27,12),                      SETF0400
     2    LW2,MW2,LAW2,MAW2,  KW2(27,5),  VW2(27,12),                      SETF0410
     3    LW3,MW3,LAW3,MAW3,  KW3(27,5),  VW3(27,12),       PADW(111)      SETF0420
CZZSYS                            25     11     12   15                   SETF0430
      COMMON/CZZSYS/NZZSYS,NZZSMX,NBZSYS,NRZSYS,LAZZ,NAMSYS(2,25),         SETF0440
     1    KZZTYP(25),ZZSYS(15,25)                                          SETF0450
CSAMLT                 8,12,15,                                            SETF0460
      COMMON/CSAMLT/L,M,N,RMN(15),RMX(15),EMN(15),EMX(15),ZMX(15),         SETF0470
     1 XMX(15),  RT(8,12,15)                                               SETF0480
CSASYS                              15     4     4      2     4     20     SETF0490
      COMMON/CSASYS/ NSASYS,NSASMX,NBGUN,NBSAM,NRGUN,NRSAM, LASA,          SETF0500
     1    NAMSA(2,15),KSATYP(15),SASYS(20,15)                              SETF0510
CRADAR                                                                     SETF0520
      COMMON/CRADAR/NBSR,NBTR,NBRMX,NBJ,NBJMX,                             SETF0530
     1   BRAD(36,17),BENV(6,2),BETC(4,2),BTAR(6,3),BJAM(6,3,2),            SETF0540
     2              NRSR,NRTR,NRRMX,NRJ,NRJMX,                             SETF0550
     3   RRAD(36,15),RENV(6,2),RETC(4,2),RTAR(6,3),RJAM(6,3,2)             SETF0560
      COMMON/INOUU/ IPR(16),JPAR(16), PAR(16),LABEL                        SETF0570
CKILLF                                                                     SETF0580
      COMMON/CKILLF/LVSHP,MVSHP,NVSHP,VULSHP(5,12,1),NUN,NUNMX,            SETF0590
     1 KSTATE(100),PKLAST(100),PPROD(100),CUMWT(100),VULCST(100),          SETF0600
     2 VUKILL(100),VWKILL(100),VULFS,VULFA,VULFM                           SETF0610
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      CHOMER                                                                    SETF0620
            COMMON /CHOMER/ NHOM,NHOMMX,NAMHCM(2,10),KHOMTY(10),DATHOM(36,10)   SETF0630
      CFORMATS                                                                  SETF0640
       2006   FORMAT(1HO,'NO.HOMING RADARS=',I4,', EXCEEDS STORAGE=',I4/)       SETF0650
       2007   FORMAT(1HO,'NO TABLE FOUND FOR ID1, ID2=', 2I10)                  SETF0660
       2008   FORMAT(1HO,'DATA MISSING FOR HOMING RADAR TYPE=',I9/)             SETF0670
       2011   FORMAT(1HO,'AT END OF SETUPF, CUM NO. SETUP ERRORS=NFLAG=',I5)    SETF0680
       2012   FORMAT(6X,'NO.OF CRUISE MISSILE HOMING RADAR TYPES=',I4)          SETF0690
       2013   FORMAT(/1X,I6,'.',2A4,I9,4X,'HOMING RADAR DATA')                  SETF0700
       2014   FORMAT(8X,10G12.5)                                                SETF0710
            KZARL = 96 + LA*(5 + MA)                                            SETF0720
            JZARL = KZARL                                                       SETF0730
            NFLAG2 = 0                                                          SETF0740
            LVSHP = 5                                                           SETF0750
            MVSHP = 12                                                          SETF0760
            NVSHP = 1                                                           SETF0770
       100  IY = 3                                                            SETF0780
            KTRAN = 1                                                           SETF0790
            ID1 = 31100000                                                      SETF0800
            ID2 = -1                                                            SETF0810
      C*** READ FROM DISK 11                                                    SETF0820
       102  CALL  RDBD11(BZA,LZ,MZ,NCB,KZARL,ID1,ID2,IY,IXX)                   SETF0830
            IF (IXX .EQ. 0)   GO TO (104,104,104), KTRAN                        SETF0840
            WRITE(N6,2007) ID1,ID2                                              SETF0850
            NFLAG2 = NFLAG2 + 1                                                 SETF0860
            GO TO (110,900,900), KTRAN                                          SETF0870
       104  DO 106 I=1,LVSHP                                                  SETF0880
            DO 106 J=1,MVSHP                                                    SETF0890
       106  VULSHP(I,J,1) = VA1(I,J)                                           SETF0900
            IF (IPRINT .LT. 2)  GO TO 108                                       SETF0910
            CALL PAGE                                                           SETF0920
            CALL  WMAT3(2,ICA,VULSHP,LVSHP,MVSHP,NVSHP,LVSHP,MVSHP, 1,NLINE,   SETF0930
           1 60HVULNERABILITY DATA, NONNUC, SHIPS                          )    SETF0940
       108  CONTINUE                                                          SETF0950
      C***  SETUP CRUISE MISSILE HOMING RADARS                                  SETF0960
       110  NHOMMX = 10                                                       SETF0970
            NHOM   =  0                                                         SETF0980
            IF (NMSL .LE. 0)   GO TO 900                                        SETF0990
            KH = 0                                                              SETF1000
            DO 112 MT=1,NMSL                                                    SETF1010
            KHT = DATMSL(11,MT) + .1                                            SETF1020
            IF (KHT/10.NE.874)  GO TO 112                                       SETF1030
            KH = KH + 1                                                         SETF1040
            KHOMTY(KH) = KHT * 10000                                            SETF1050
       112  CONTINUE                                                          SETF1060
            NHOM = KH                                                           SETF1070
            IF (KH.GT.0)   GO TO 114                                            SETF1080
            NHOM = 0                                                            SETF1090
            GO TO 142                                                           SETF1100
       114  CALL  KORDER(KHOMTY,NHOM)                                         SETF1110
            CALL  UNIQUE(KHOMTY,NHOM,K)                                         SETF1120
            NHOM = K                                                            SETF1130
            IF (NHOM.LE.NHOMMX)   GO TO 116                                     SETF1140
            WRITE(N6,2006) NHOM, NHOMMX                                         SETF1150
            NHOM = NHOMMX                                                       SETF1160
```

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      NFLAG2 = NFLAG2 + 1                                                SETF1170
  116 DO 118 I=1,36                                                      SETF1180
      DO 118 J=1,NHOMMX                                                  SETF1190
  118 DATHOM(I,J) = .0                                                   SETF1200
      IY  = 3                                                            SETF1210
      ID1 = 87100000                                                     SETF1220
      DO 132 KX=1,3                                                      SETF1230
      ID2 = - KX                                                         SETF1240
      CALL  RCBD11(BZA,LZ,MZ,NCB,KZARL,ID1,ID2,IY,IXX)                   SETF1250
      IF (IXX.EQ.0)   GO TO 120                                          SETF1260
      WRITE(N6,2007) ID1,ID2                                             SETF1270
      NFLAG2 = NFLAG2 + 1                                                SETF1280
      NHOM = 0                                                           SETF1290
      GO TO 142                                                          SETF1300
C***  MATCH & TRANSFER                                                   SETF1310
  120 DO 130 KH=1,NHOM                                                   SETF1320
      KHT = KHOMTY(KH) / 10000                                           SETF1330
      DO 122 KR=1,LA1                                                    SETF1340
      KRT = KA1(KR,5)                                                    SETF1350
      IF (KHT .EQ. KRT)   GO TO 124                                      SETF1360
  122 CONTINUE                                                           SETF1370
      WRITE(N6,2008) KHT                                                 SETF1380
      KHOMTY(KH) = -1                                                    SETF1390
      NFLAG2 = NFLAG2 + 1                                                SETF1400
      GO TO 130                                                          SETF1410
  124 KL  = KR                                                           SETF1420
      IF (KX .GT. 1)   GO TO 126                                         SETF1430
      NAMHOM(1,KH) = KA1(KL,2)                                           SETF1440
      NAMHOM(2,KH) = KA1(KL,3)                                           SETF1450
  126 JA  = 12*(KX - 1)                                                  SETF1460
      DO 128 J=1,12                                                      SETF1470
  128 DATHOM(JA+J,KH) = VA1(KL,J)                                        SETF1480
  130 CONTINUE                                                           SETF1490
  132 CONTINUE                                                           SETF1500
C***  BACKFILL POINTERS IN CRUISE MISSILE = KRST(  )                     SETF1510
      DO 140 KS=1,NRSS                                                   SETF1520
      KST = KRST(KS)                                                     SETF1530
      KTEST = KST / 1000000                                              SETF1540
      IF (KTEST.NE.96 .AND. KTEST.NE.98)   GO TO 140                     SETF1550
      MP  = MOD(KST,100)                                                 SETF1560
      KHTR = DATMSL(11,MP) + .1                                          SETF1570
      DO 136 KH=1,NHOM                                                   SETF1580
      KHT  = KHOMTY(KH) / 10000                                          SETF1590
      IF (KHT .EQ. KHTR)   GO TO 138                                     SETF1600
  136 CONTINUE                                                           SETF1610
      GO TO 140                                                          SETF1620
  138 KRST(KS) = KRST(KS) + KH*100                                       SETF1630
  140 CONTINUE                                                           SETF1640
C***  PRINT OPTIONS                                                      SETF1650
  142 IF (IPRINT.LT.1)   GO TO 150                                       SETF1660
      CALL  PAGE                                                         SETF1670
      WRITE(N6,2012) NHOM                                                SETF1680
      IF (NHOM.LE.0)     GO TO 150                                       SETF1690
      DO 144 I=1,NHOM                                                    SETF1700
      WRITE(N6,2013) I, (NAMHOM(K,I),K=1,2), KHOMTY(I)                   SETF1710
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      IF (IPRINT.LT.2)   GO TO 144                                      SETF1720
      WRITE(N6,2014) (DATHOM(K,I),K=1,36)                               SETF1730
  144 CONTINUE                                                          SETF1740
  150 CONTINUE                                                          SETF1750
C***                                                                    SETF1760
  900 IF (NFLAG2.NE.0)  NFLAG=NFLAG+1                                   SETF1770
      WRITE(N6,2011) NFLAG                                              SETF1780
      RETURN                                                            SETF1790
      END                                                               SETF1800


      SUBROUTINE  UCHEK(KODE,N5,N6)                                     UCHK0010
C  NEM UTILITY CHECKER.          5 NOV 73                               UCHK0020
C  KODE IS ZIP CODE, USED TO CALL UCHEK AS FOLLOWS                      UCHK0030
CIP   6 A B                                    CALL UCHEK              UCHK0040
C       A  = 1, NAVIG CHEK      B = 1, NO READ NUCHEK.  = 2, READ.     UCHK0050
C       A  = 2, RADAR CHEK      B = 1, ONE RADAR. SINGLE TARGET        UCHK0060
C                               B = 2, RUN ENGAGEMENT LIST. SINGLE TARGET UCHK0070
C***                                                                    UCHK0080
      DIMENSION  KODE(19),TIMES(10)                                     UCHK0090
      DATA  NTIMES,TIMES/  2, -2., -1., 8*0./                          UCHK0100
      NAMELIST/NUCHEK/NTIMES,TIMES                                      UCHK0110
     K2=KODE(2)                                                         UCHK0120
      K3=KODE(3)                                                        UCHK0130
      K4=KODE(4)                                                        UCHK0140
  1   GO TO (  2,  52,  52), K3                                         UCHK0150
C***  NAVIG CHEK                                                        UCHK0160
  2   IF (KODE(4).LE.1)  GO TO 6                                        UCHK0170
      READ (N5,NUCHEK)                                                  UCHK0180
  6   WRITE(N6,NUCHEK)                                                  UCHK0190
      IPRINT = 1                                                        UCHK0200
      DO 10 I=1,NTIMES                                                  UCHK0210
      TIME = TIMES(I)                                                   UCHK0220
     *CALL  ALLXYZ(TIME,IPRINT,N6,IXX)                                  UCHK0230
  10  CONTINUE                                                          UCHK0240
      RETURN                                                            UCHK0250
C***  RADAR CHEK                                                        UCHK0260
  52  CALL  RADCK(K4,N5,N6)                                             UCHK0270
      RETURN                                                            UCHK0280
      END                                                               UCHK0290


      SUBROUTINE RADCK(K4,N5,N6)                                        RADK0010
C  NEM RADAR CHECKER            5 NOV 73                               RADK0020
C    K4 = 1, SINGLE RADAR                                             RADK0030
C    K4 = 2, RUN ENGAG.LIST.  SINGLE TARGET                           RADK0040
C    K4 = 3,                                                          RADK0050
CPLAT  VS  SYSTEMS  (SUBSYSTEMS)                                        RADK0060
      COMMON/CPLAT/NBP,NBPMX,NBSS,NBSSMX,NBSPP(15),NBPWS(45),           RADK0070
     1   NAMBP(2,15),KBPT(15),NABSS(2,45),KBST(45),KBPXS(45,15),       RADK0080
     2   BPX1(12,15),                                                  RADK0090
     3              NRP,NRPMX,NRSS,NRSSMX,NRSPP(15),NRPWS(45),         RADK0100
     4   NAMRP(2,15),KRPT(15),NARSS(2,45),KRST(45),KRPXS(45,15),       RADK0110
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     5   RPX1(12,15)                                                    RADK0120
CRADAR                                                                  RADK0130
      COMMON/CRADAR/NBSP,NBTR,NBRMX,NBJ,NBJMX,                          RADK0140
     1   BRAD(36,17),BENV(6,2),BETC(4,2),BTAR(6,3),BJAM(6,6),           RADK0150
     2              NRSR,NRTR,NRRMX,NRJ,NRJMX,                          RADK0160
     3   RRAD(36,15),RENV(6,2),RETC(4,2),RTAR(6,3),RJAM(6,6)            RADK0170
      DIMENSION RANGE(10),TRAD(10),PD(10),ANG(10),DYN(10)               RADK0180
      NAMELIST /NAM1/ IBR,KTYP,IRNG,TRAD,RANGE,BENV,RENV,BETC,RETC,     RADK0190
     1 RTAR,RTAR,RJAM,RJAM, IPRINT,ISTOP                                RADK0200
      NAMELIST/NAM2/ IBR,KTYP,IRNG,IPRINT,ISTOP                         RADK0210
      NAMELIST/NAM3/ KTYP,IRNG                                          RADK0220
      ISTOP = 0                                                         RADK0230
      TRAD(1) = 0.                                                      RADK0240
 1    ITST    = 0                                                       RADK0250
      CALL PAGE                                                         RADK0260
      READ (N5,NAM1)                                                    RADK0270
      WRITE(N6,NAM2)                                                    RADK0280
C     GO TO (  4,   ,   ), K4                                           RADK0290
 4    IPRINT = 2                                                        RADK0300
      GO TO ( 10, 20), IBR                                              RADK0310
C** SINGLE RADAR                                                        RADK0320
 10   RHOR = 1.2289*(SQRT(BETC(1,1)) + SQRT(RTAR(3,1)) )                RADK0330
      IF (RANGE(1).GT.RHOR)  RANGE(1)=RHOR                              RADK0340
      DO  12 I=1,NBSS                                                   RADK0350
      K = KBST(I) / 10000                                               RADK0360
      IF (KTYP .EQ. K)  GO TO 16                                        RADK0370
 12   CONTINUE                                                          RADK0380
 14   IF (ISTOP.GE.1)  RETURN                                           RADK0390
      GO TO 1                                                           RADK0400
 16   K = MOD(KBST(I),100)                                              RADK0410
      WRITE(N6,NAM3)                                                    RADK0420
      NMODE = BRAD(36,K) + .1                                           RADK0430
      BETC(4,1) = NMODE                                                 RADK0440
      DELR = RTAR(4,1) / BRAD(21,K)                                     RADK0450
      IF (NMODE.EQ.2)  DELR= RTAR(4,1) / 60.                            RADK0460
 17   CALL RADAR(BRAD(1,K),BENV(1,1),BETC(1,1),RTAR(1,1),RJAM(1,1),     RADK0470
     1 TRAD,RANGE,PD,ANG,DYN,ITST,IRNG,IPRINT)                          RADK0480
      IF (RANGE(1).LE.DELR + 2.)  GO TO 14                              RADK0490
      RANGE(1) = RANGE(1) - DELR                                        RADK0500
      IPRINT = 1                                                        RADK0510
      TRAD(1) = TRAD(10) + TRAD(2) - TRAD(1)                            RADK0520
      GO TO 17                                                          RADK0530
 20   RHOR = 1.2289*(SQRT(RETC(1,1)) + SQRT(BTAR(3,1)) )                RADK0540
      IF (RANGE(1).GT.RHOR)  RANGE(1)=RHOR                              RADK0550
      DO  22 I=1,NRSS                                                   RADK0560
      K = KRST(I) / 10000                                               RADK0570
      IF (KTYP .EQ. K)  GO TO 26                                        RADK0580
 22   CONTINUE                                                          RADK0590
      GO TO 14                                                          RADK0600
 26   K = MOD(KRST(I),100)                                              RADK0610
      WRITE(N6,NAM3)                                                    RADK0620
      NMODE = RRAD(36,K) + .1                                           RADK0630
      RETC(4,1) = NMODE                                                 RADK0640
      DELR = BTAR(4,1) / RRAD(21,K)                                     RADK0650
      IF (NMODE.EQ.2)  DELR= BTAR(4,1) / 60.                            RADK0660
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 27     CALL RADAR(RRAD(1,K),RENV(1,1),RETC(1,1),BTAR(1,1),BJAM(1,1),     RADK0670
     1 TRAD,RANGE,PD,ANG,DYN,ITST,IRNG,IPRINT)                            RADK0680
       IF (RANGE(1).LE.DELR + 2.)  GO TO 14                               RADK0690
       RANGE(1) = RANGE(1) - DELR                                         RADK0700
       IPRINT = 1                                                         RADK0710
       TRAD(1) = TRAD(10) + TRAD(2) - TRAD(1)                             RADK0720
       GO TO 27                                                           RADK0730
       END                                                                RADK0740



       SUBROUTINE XECUTE                                                  XECU0010
CNAVIG                                                                    XECU0020
       COMMON/CNAVIG/ NOMX,BE,BF,RE,RF,                                   XECU0030
      1      NBG,BA,BB,BC,BD,KBGN(18),KBGK(18),BGC( 8,6,18),NBU(18),     XECU0040
      2      NRG,RA,RB,RC,RD,KRGN(18),KRGK(18),RGC( 8,6,18),NRU(18),     XECU0050
      3           TTIME,NUMX,                                            XECU0060
      4      KBU,KBUK(4,50),BREL(4,50),BXYZ(50,7),NAMBU(50,2),BV(50,8),  XECU0070
      5      KRU,KRUK(4,50),RREL(4,50),RXYZ(50,7),NAMRU(50,2),RV(50,8)   XECU0080
       COMMON/DEVICE/ N1,N2,N3,N4,N5,N6,N7,N8,N9,N10,N11,N12              XECU0090
       COMMON/STRCON/  JPK,IPK                                            XECU0100
       COMMON/INFO/  LENINFO,LENSEG,MAXSEG,NEXSEG,LSTSEG,LZCSEG          XECU0110
       COMMON/EXSTOR/ LENSYS,MAXRTU,MAXBTU,LEFTOS,NRTU,NBTU,IBRS,NPHASE  XECU0120
C                                                                         XECU0130
C-----THE FOLLOWING TWO STATEMENTS ADJUST THE AMOUNT OF STORAGE           XECU0140
C      AVAILABLE TO THE PROGRAM FOR DYNAMIC ALLOCATION.                   XECU0150
C                                                                         XECU0160
       DIMENSION STORE1(15000),ISTOR1(15000)                              XECU0170
       DATA LDIMEN/15000/                                                 XECU0180
       EQUIVALENCE (STORE1(1),ISTOR1(1))                                  XECU0190
C                                                                         XECU0200
C-----THE MINIMUM DIMENSION=LDIMEN, FOR ARRAYS STORE1 AND ISTOR1          XECU0210
C      IS GIVEN BY---                                                     XECU0220
C                                                                         XECU0230
C         LDIMEN=(KBU+KRU)*(NSYSPU+8*NSEGPU + 5)+13*(MAXBTU+MAXRTU)+128   XECU0240
C                                                                         XECU0250
       DIMENSION NAME(2)                                                  XECU0260
       DATA NAME/'STOR','E1  '/                                           XECU0270
       DATA KBUSEG,KRUSEG,ITPSEG,ITBSEG,INFORM/5*0/                       XECU0280
       DATA LBRSYS,LBSYST,LRSYST/3*0/                                     XECU0290
       DATA IRTU,IBTU,IRUXYZ,IBUXYZ,INVRTU,INVBTU,IBSTAT,IRSTAT/8*0/      XECU0300
       NAMELIST /DIMENS/ LENSEG,NSEGPU,NSYSPU,MAXRTU,MAXBTU,              XECU0310
      1      LDIMEN,KSAVE,NPHASE                                         XECU0320
       KSAVE=0                                                            XECU0330
       NPHASE=0                                                           XECU0340
       IPK=10000                                                          XECU0350
       JPK=1000*IPK                                                       XECU0360
       DO 100 I=1,LDIMEN                                                  XECU0370
  100  ISTOR1(I)=0                                                        XECU0380
       ISTOR1(1)=NAME(1)                                                  XECU0390
       ISTOR1(2)=NAME(2)                                                  XECU0400
       ISTOR1(3)=LDIMEN                                                   XECU0410
       ISTOR1(4)=10                                                       XECU0420
       ISTOR1(5)=LDIMEN                                                   XECU0430
       ISTOR1(6)=0                                                        XECU0440
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      ISTOR1( 7)=10*IPK+5                                                    XECU0450
      MAXBTU=KBU                                                             XECU0460
      MAXRTU=KRU                                                             XECU0470
      LENSEG=8                                                               XECU0480
      NSYSPU=10                                                              XECU0490
C---- INPUT STORAGE ALLOCATION PARAMETERS                                    XECU0500
      CALL PAGE                                                              XECU0510
      READ(N5,DIMENS)                                                        XECU0520
C                                                                            XECU0530
      JRU=KRU+MAXRTU                                                         XECU0540
      JRU=KBU+MAXBTU                                                         XECU0550
      IPU=2*KBU+11                                                           XECU0560
      IRU=2*KRU+11                                                           XECU0570
      MAXRT2=2*MAXBTU                                                        XECU0580
      MAXRT2=2*MAXRTU                                                        XECU0590
      LENSYS=(KRU+KBU)*NSYSPU                                                XECU0600
      LENIFO=LDIMEN-13*(MAXBTU+MAXRTU)-(NSYSPU+5)*(KBU+KRU)-128              XECU0610
      IF(LENIFO.GT.9999) LENIFO=9999                                         XECU0620
      IF(LENIFO.LT.1) LENIFO=1                                               XECU0630
      NSEGPU=LENIFO/(LENSEG*(KRU+KBU))                                       XECU0640
      WRITE(N6,DIMENS)                                                       XECU0650
      MAXSEG=LENIFO-LENSEG+1                                                 XECU0660
      NEXSEG=0                                                               XECU0670
      LSTSEG=1-LENSEG                                                        XECU0680
      IF(KBUSEG.LE.0) CALL SETDS(KBUSEG,ISTOR1,'KBUSEG  ',0,KRU,  0,0)       XECU0690
      IF(KRUSEG.LE.0) CALL SETDS(KRUSEG,ISTOR1,'KRUSEG  ',0,KRU,  0,0)       XECU0700
      IF(ITRSEG.LE.0) CALL SETDS(ITRSEG,ISTOR1,'ITRSEG  ',0,JRU,0,0)         XECU0710
      IF(ITBSEG.LE.0) CALL SETDS(ITBSEG,ISTOR1,'ITBSEG  ',0,JBU,0,0)         XECU0720
      IF(LBSYST.LE.0) CALL SETDS(LBSYST,ISTOR1,'LBSYST  ',0,IBU,0,0)         XECU0730
      IF(LRSYST.LE.0) CALL SETDS(LRSYST,ISTOR1,'LRSYST  ',0,IRU,0,0)         XECU0740
      IF(IRTU.LE.0) CALL SETDS(IRTU,ISTOR1,'IRTU    ',0,MAXRT2,0,0)          XECU0750
      IF(IBTU.LE.0) CALL SETDS(IBTU,ISTOR1,'IBTU    ',0,MAXBT2,0,0)          XECU0760
      IF(IRUXYZ.LE.0) CALL SETDS(IRUXYZ,ISTOR1,'RTUXYZ  ',1,8,MAXRTU,0)      XECU0770
      IF(IBUXYZ.LE.0) CALL SETDS(IBUXYZ,ISTOR1,'BTUXYZ  ',1,8,MAXBTU,0)      XECU0780
      IF(INVRTU.LE.0) CALL SETDS(INVRTU,ISTOR1,'INVRTU  ',0,MAXRTU,0,0)      XECU0790
      IF(INVBTU.LE.0) CALL SETDS(INVBTU,ISTOR1,'INVBTU  ',0,MAXBTU,0,0)      XECU0800
      IF(IRSTAT.LE.0) CALL SETDS(IRSTAT,ISTOR1,'IRSTAT  ',0,JRU,0,0)         XECU0810
      IF(IBSTAT.LE.0) CALL SETDS(IBSTAT,ISTOR1,'IBSTAT  ',0,JBU,0,0)         XECU0820
      IF(LBRSYS.LE.0) CALL SETDS(LBRSYS,ISTOR1,'LBRSYS  ',0,LENSYS,0,0)      XECU0830
      IF(INFORM.LE.0) CALL SETDS(INFORM,ISTOR1,'INFORM  ',0,LENIFO,0,0)      XECU0840
      KBUSG=ISTOR1(KBUSEG)+1                                                 XECU0850
      KRUSG=ISTOR1(KRUSEG)+1                                                 XECU0860
      ITBSG=ISTOR1(ITBSEG)+1                                                 XECU0870
      ITRSG=ISTOR1(ITRSEG)+1                                                 XECU0880
      INFOR=ISTOR1(INFORM)+1                                                 XECU0890
      KBRSYS=ISTOR1(LBRSYS)+1                                                XECU0900
      LBSYS=ISTOR1(LBSYST)+1                                                 XECU0910
      LRSYS=ISTOR1(LRSYST)+1                                                 XECU0920
      IRT1=ISTOR1(IRTU)+1                                                    XECU0930
      IBT1=ISTOR1(IBTU)+1                                                    XECU0940
      IRUXY1=MOD(ISTOR1(IRUXYZ),10000)+1                                     XECU0950
      IBUXY1=MOD(ISTOR1(IBUXYZ),10000)+1                                     XECU0960
      INVRT1=ISTOR1(INVRTU)+1                                                XECU0970
      INVBT1=ISTOR1(INVBTU)+1                                                XECU0980
      IRSTA1=ISTOR1(IRSTAT)+1                                                XECU0990
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      IBSTA1=ISTOR1(IBSTAT)+1                                          XECU1000
      CALL  ENCAGE(ISTOR1(KRUSG),ISTOR1(KRUSG),ISTOR1(ITBSG),          XECU1010
     1      ISTOR1(ITBSG),ISTOR1(INFOR),ISTOR1(KBRSYS),ISTOR1(LBSYS),  XECU1020
     2      ISTOR1(LBSYS),ISTOR1(IRT1),ISTOR1(IBT1),STORE1(IRUXY1),    XECU1030
     3      STORE1(IRUXY1),ISTOR1(INVRT1),ISTOR1(INVBT1),              XECU1040
     4      ISTOR1(IBSTA1),ISTOR1(IBSTA1))                             XECU1050
      LEFTOS=ISTOR1(5)-ISTOR1(4)                                       XECU1060
      LESS=LEFTOS                                                      XECU1070
      ITU=KRU+KBU                                                      XECU1080
      LSYSPU=(LENSYS-IBBS)/ITU                                         XECU1090
      NSYSPU=NSYSPU-LSYSPU                                             XECU1100
      LESS=LESS+LSYSPU*ITU                                             XECU1110
      LSEGPU=(MAXSEG-LSTSEG)/LENSEG/ITU                                XECU1120
      NSEGPU=NSEGPU-LSEGPU                                             XECU1130
      LESS=LESS+LSEGPU*ITU*LENSEG                                      XECU1140
      IF(NBTU.EQ.0) NBTU=1                                             XECU1150
      IF(NRTU.EQ.0) NRTU=1                                             XECU1160
      LESS=LESS+13*(MAXBTU-NBTU+MAXRTU-NRTU)                           XECU1170
      MAXBTU=NBTU                                                      XECU1180
      MAXRTU=NRTU                                                      XECU1190
      LDIMEN=LDIMEN-LESS                                               XECU1200
      KSAVE=LESS*4/1000                                                XECU1210
      CALL PAGE                                                        XECU1220
      WRITE(N6,DIMENS)                                                 XECU1230
      RETURN                                                           XECU1240
       END                                                             XECU1250


      SUBROUTINE  SETDS(LPOINT,ISTORE,NAME,ITYPE,IDIM,JDIM,KDIM)       SETD0010
      COMMON /STRCON/ JPK,IPK                                          SETD0020
      DIMENSION ISTORE(1),NAME(2)                                      SETD0030
      DIMENSION LINE(10), XLINE(10)                                    SETD0040
      EQUIVALENCE (LINE(1),XLINE(1))                                   SETD0050
      DATA N6/6/                                                       SETD0060
      IF(KDIM.GT.210) GO TO 9                                          SETD0070
      IF(IDIM.GT.9999) GO TO 9                                         SETD0080
      IF(JDIM.GT.999) GO TO 9                                          SETD0090
      IF(ITYPE.NE.1 .AND. ITYPE.NE.0) GO TO 9                          SETD0100
      ISTOP=0                                                          SETD0110
      LDIMEN=ISTORE(3)                                                 SETD0120
      LASTA=ISTORE(4)                                                  SETD0130
      LAST=ISTORE(5)                                                   SETD0140
      NPOINT=ISTORE(6)                                                 SETD0150
      LHEAD=MOD(ISTORE(7),IPK)                                         SETD0160
    3 LZERO=LASTA+LHEAD                                                SETD0170
      IF(KDIM.LE.0) GO TO 30                                           SETD0180
      IF(IDIM.GT.999 .OR. JDIM.GT.210) GO TO 9                         SETD0190
      LENGTH=KDIM*JDIM*IDIM                                            SETD0200
      IPOINT=LZERO+IDIM*IPK+JDIM*JPK                                   SETD0210
      GO TO 4                                                          SETD0220
   30 IF(JDIM.LE.0) GO TO 33                                           SETD0230
      LENGTH=JDIM*IDIM                                                 SETD0240
      IPOINT=LZERO+IDIM*IPK                                            SETD0250
      GO TO 4                                                          SETD0260
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 33 LENGTH=IDIM                                                    SETD0270
    IPOINT=LZERO                                                   SETD0280
  4 NEED=LZERO+LENGTH                                              SETD0290
    IF(NEED.GE.LAST) GO TO 2                                       SETD0300
    K=LDIMEN+1                                                     SETD0310
    IF(NPOINT.LE.0) GO TO 401                                      SETD0320
    DO 400 L=1,NPOINT                                              SETD0330
    LPOINT=K-L                                                     SETD0340
    IF(ISTORE(LPOINT).EQ.0) GO TO 410                              SETD0350
400 CONTINUE                                                       SETD0360
401 NPOINT=NPOINT+1                                                SETD0370
    LPOINT=LAST                                                    SETD0380
    LAST=LAST-1                                                    SETD0390
410 ISTORE(LPOINT)=IPOINT                                          SETD0400
    ISTORE(LZERO-4)=ITYPE+LPOINT*IPK                               SETD0410
    ISTORE(LZERO-3)=NAME(1)                                        SETD0420
    ISTORE(LZERO-2)=NAME(2)                                        SETD0430
    ISTORE(LZERO-1)=0                                              SETD0440
    ISTORE(LZERO)=IDIM+JDIM*IPK+KDIM*JPK                           SETD0450
    ISTORE(4)=NEED                                                 SETD0460
    ISTORE(5)=LAST                                                 SETD0470
    ISTORE(6)=NPOINT                                               SETD0480
    RETURN                                                         SETD0490
  2 LABEL=ISTORE(7)/IPK                                            SETD0500
    MOVE=0                                                         SETD0510
    LASTI=LABEL                                                    SETD0520
    LASTJ=LABEL                                                    SETD0530
 20 JZERO=LASTJ+LHEAD                                              SETD0540
    IF(LASTJ.GE.LASTA) GO TO 200                                   SETD0550
    IZERO=LASTI+LHEAD                                              SETD0560
    ID=ISTORE(JZERO)                                               SETD0570
    IF(ID.LE.0) GO TO 200                                          SETD0580
    IDI =MOD(ID,IPK)                                               SETD0590
    JDI =MOD(ID,JPK)/IPK                                           SETD0600
    IF(JDI .LE.0) JDI =1                                           SETD0610
    KDI =ID/JPK                                                    SETD0620
    IF(KDI .LE.0) KDI =1                                           SETD0630
    LENG=IDI*JDI*KDI                                               SETD0640
    LOAD=LENG  +LHEAD                                              SETD0650
    MARK=ISTORE(JZERO-4)/IPK                                       SETD0660
    IF(MARK.GT.0) GO TO 230                                        SETD0670
    MOVE=MOVE+1                                                    SETD0680
    LASTJ=LASTJ+LOAD                                               SETD0690
    GO TO 20                                                       SETD0700
230 IF(MOVE.GT.0) GO TO 240                                        SETD0710
    LASTJ=LASTJ+LOAD                                               SETD0720
    LASTI=LASTI+LOAD                                               SETD0730
    GO TO 20                                                       SETD0740
240 DO 250 L=1,LOAD                                                SETD0750
    LASTJ=LASTJ+1                                                  SETD0760
    LASTI=LASTI+1                                                  SETD0770
250 ISTORE(LASTI)=ISTORE(LASTJ)                                    SETD0780
    ID=ISTORE(MARK)/IPK                                            SETD0790
    ISTORE(MARK)=ID*IPK+IZERO                                      SETD0800
    GO TO 20                                                       SETD0810
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  200 LASTJ=LASTI+1                                                    SETD0820
      IF(LASTJ.GT.LASTA) GO TO 220                                     SETD0830
      DO 210 L=LASTJ,LASTA                                             SETD0840
  210 ISTORE(L)=0                                                      SETD0850
  220 ISTORE(4)=LASTI                                                  SETD0860
      LASTA=LASTI                                                      SETD0870
      LEFT=LAST-LASTA                                                  SETD0880
      LREQD=LENGTH+LHEAD+1                                             SETD0890
      IF(LEFT.GE.LREQD) GO TO 3                                        SETD0900
      ISTOP=1                                                          SETD0910
      WRITE(N6,6010) ISTORE(1),ISTORE(2),LEFT,LREQD,NAME               SETD0920
      ENTRY       DUMPDS(ISTORE)                                       SETD0930
      NPOINT=ISTORE(6)                                                 SETD0940
      IF(NPOINT.LE.0) GO TO 112                                        SETD0950
      IF (NPOINT.GT.500) GO TO 112                                     SETD0960
      LABEL=ISTORE(7)/IPK                                              SETD0970
      WRITE(N6,6100) (ISTORE(L),L=1,LABEL)                             SETD0980
      M=ISTORE(3)+1                                                    SETD0990
      N=1                                                              SETD1000
   10 LP=M-N                                                           SETD1010
      IPOINT=ISTORE(LP)                                                SETD1020
      IF(IPOINT) 11,11,111                                             SETD1030
      ENTRY       WRITDS(LPOINT,ISTORE)                                SETD1040
      NPOINT=1                                                         SETD1050
      N=1                                                              SETD1060
      IF(LPOINT.LE.0) GO TO 11                                         SETD1070
      IPOINT=ISTORE(LPOINT)                                            SETD1080
  111 IZO=MOD(IPOINT,IPK)                                              SETD1090
      IF(IZO.LE.0) GO TO 11                                            SETD1100
      N1      =ISTORE(IZO-3)                                           SETD1110
      N2      =ISTORE(IZO-2)                                           SETD1120
      LDIM=ISTORE(IZO)                                                 SETD1130
      IDI =MOD(LDIM,IPK)                                               SETD1140
      JDI =MOD(LDIM,JPK)/IPK                                           SETD1150
      ITYPE=MOD(ISTORE(IZO-4),10)                                      SETD1160
      IFILL=ISTORE(IZO-1)                                              SETD1170
      IF(IFILL.EQ.0) IFILL=LDIM                                        SETD1180
      KPR=IFILL/JPK                                                    SETD1190
      IF(KPR.EQ.0) KPR=1                                               SETD1200
      JPR=MOD(IFILL,JPK)/IPK                                           SETD1210
      IF(JPR.EQ.0) JPR=1                                               SETD1220
      IPR=MOD(IFILL,IPK)                                               SETD1230
      IF(IPR.EQ.0) GO TO 11                                            SETD1240
      ASSIGN 121 TO LN                                                 SETD1250
      L=0                                                              SETD1260
      WRITE(N6,6600)N1,N2,IPOINT,LPOINT,ISTORE(1),ISTORE(2)            SETD1270
      DO 100 K=1,KPR                                                   SETD1280
      KADD=(K-1)*JDI*IDI+IZO                                           SETD1290
      DO 110 J=1,JPR                                                   SETD1300
      JKADD=(J-1)*IDI+KADD                                             SETD1310
      DO 120 I=1,IPR                                                   SETD1320
      LOC=JKADD+I                                                      SETD1330
      GO TO LN,(121,125)                                               SETD1340
  121 KP=K                                                             SETD1350
      JP=J                                                             SETD1360
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      IP=I                                                              SETD1370
      ASSIGN 125 TO LN                                                  SETD1380
  125 L=L+1                                                             SETD1390
      LINE(L)=ISTORE(LOC)                                               SETD1400
      IF(L.LT.10) GO TO 120                                             SETD1410
      IF(ITYPE) 1000,1000,1111                                          SETD1420
 1000 WRITE(N6,6111) IP,JP,KP,LINE                                      SETD1430
      GO TO 130                                                         SETD1440
 1111 WRITE(N6,6111) IP,JP,KP,XLINE                                     SETD1450
  130 L=0                                                               SETD1460
      ASSIGN 121 TO LN                                                  SETD1470
  120 CONTINUE                                                          SETD1480
  110 CONTINUE                                                          SETD1490
  100 CONTINUE                                                          SETD1500
      IF(L.EQ.0) GO TO 150                                              SETD1510
      IF(ITYPE) 1001,1001,1110                                          SETD1520
 1001 WRITE(N6,6111) IP,JP,KP,(LINE(I),I=1,L)                           SETD1530
      GO TO 150                                                         SETD1540
 1110 WRITE(N6,6111) IP,JP,KP,(XLINE(I),I=1,L)                          SETD1550
  150 WRITE(N6,6601) IPR,JPR,KPR                                        SETD1560
   11 N=N+1                                                             SETD1570
      IF(N.LE.NPOINT) GO TO 10                                          SETD1580
  112 IF(ISTOP.GT.0) STOP                                               SETD1590
      RETURN                                                            SETD1600
    9 WRITE(N6,6000) ITYPE,IDIM,JDIM,KDIM,NAME,ISTORE(1),ISTORE(2)      SETD1610
      STOP                                                              SETD1620
      ENTRY       FREEDS(LPOINT,ISTORE)                                 SETD1630
      IF(LPOINT.LE.0) RETURN                                            SETD1640
      LZERO=MOD(ISTORE(LPOINT),IPK)                                     SETD1650
      K=ISTORE(LZERO-4)                                                 SETD1660
      IF(K.GT.0) K=-K                                                   SETD1670
      ISTORE(LZERO-4)=K                                                 SETD1680
      ISTORE(LPOINT)=0                                                  SETD1690
      LPOINT=0                                                          SETD1700
      RETURN                                                            SETD1710
 6000 FORMAT(1H1//' STORAGE ARRAY CREATION VARIABLES INCOMPATIBLE'/     SETD1720
     1      '  ITYPE = ',I5/'  IDIM = ',I5/'  JDIM = ',I5/'  KDIM = ',  SETD1730
     2      '  CREATED ARRAY NAME = ',2A4/'  STORAGE ARRAY = ',2A4  )    SETD1740
 6010 FORMAT(1H1//' STORAGE ARRAY = ',2A4, ' HAS ',I5,' WORDS LEFT',    SETD1750
     1      ' AND IS EXCEEDED BY THE ',I5,' WORDS REQUIRED ',           SETD1760
     2      'BY THE CREATED ARRAY = ',2A4)                              SETD1770
 6100 FORMAT(1H1/' DUMP OF STORAGE ARRAY = ',2A4/' LABEL=',(12I10))     SETD1780
 6111 FORMAT(1X,I4,2I3,')',1CG12.5)                                     SETD1790
 6600 FORMAT(//'  I   J  K )  VALUES FOR ARRAY = ',2A4,5X,'MAP POINT',  SETD1800
     1      'ER = ',I10,'  AT LOC',I5,' IN STORAGE ARRAY = ',2A4)       SETD1810
 6601 FORMAT( '  PRINT DIMENSIONS = ', 3I5)                             SETD1820
      END                                                               SETD1830



      SUBROUTINE ENGAGE(KBUSEG,KRUSEG,ITBSEG,ITRSEG,INFORM,LBRSYS,     ENGA0010
     1      LBSYST,LRSYST,IRTU,IBTU,RTUXYZ,BTUXYZ,INVRTU,INVBTU,        ENGA0020
     2      IRSTAT,IBSTAT)                                              ENGA0030
      DIMENSION KBUSEG(1),KRUSEG(1),ITBSEG(1),ITRSEG(1),INFORM(1),     ENGA0040
     1      LBRSYS(1),LBSYST(1),LRSYST(1)                               ENGA0050
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      DIMENSION IRTU(1),IBTU(1),RTUXYZ(8,1),BTUXYZ(8,1),INVRTU(1),        ENGA0060
     1      INVBTU(1),IRSTAT(1),IBSTAT(1)                                 ENGA0070
      COMMON/BATTRY/ NBATT,MISRAD(2,10)                                   ENGA0080
CKILLF                                                                    ENGA0090
      COMMON/CKILLF/LVSHP,MVSHP,NVSHP,VULSHP(5,12,1),NUM,NUMMX,           ENGA0100
     1 KSTATE(100),PKLAST(100),PPROD(100),CUMWT(100),VULCST(100),         ENGA0110
     2 VUKILL(100),VWKILL(100),VULFS,VULFA,VULFM                          ENGA0120
CNAVIG                                                                    ENGA0130
      COMMON/CNAVIG/ NGMX,RE,BF,RE,RF,                                    ENGA0140
     1      NBG,BA,BB,BC,BD,KBGN(18),KBGK(18),BGC( 8,6,18),NBU(18),       ENGA0150
     2      NRG,RA,RB,RC,RD,KRGN(18),KRGK(18),RGC( 8,6,18),NRU(18),       ENGA0160
     3          TTIME,NUMX,                                               ENGA0170
     4      KBU,KBUK(4,50),BREL(4,50),BXYZ(50,7),NAMBU(50,2),BV(50,8),    ENGA0180
     5      KRU,KRUK(4,50),RREL(4,50),RXYZ(50,7),NAMRU(50,2),RV(50,8)     ENGA0190
CPLAT  VS  SYSTEMS  (SUBSYSTEMS)                                          ENGA0200
      COMMON/CPLAT/NBP,NBPMX,NBSS,NBSSMX,NBSPP(15),NBPWS(45),             ENGA0210
     1   NAMBP(2,15),KBPT(15),NABSS(2,45),KBST(45),KBPXS(45,15),          ENGA0220
     2   BPX1(12,15),                                                     ENGA0230
     3              NRP,NRPMX,NRSS,NRSSMX,NRSPP(15),NRPWS(45),            ENGA0240
     4   NAMRP(2,15),KRPT(15),NARSS(2,45),KRST(45),KRPXS(45,15),          ENGA0250
     5   RPX1(12,15)                                                      ENGA0260
CMSLSYS                          16      2      2      6      6      24     50  ENGA0270
      COMMON/CMSLSY/ NMSL,NMSLMX,NBSSM,NBASM,NRSSM,NRASM,LATMSL,LTRAJ,    ENGA0280
     1    NAMMSL(2,16),KMSLTY(16),                                        ENGA0290
     2    DATMSL(24,16), TTRAJ(50,16)                                     ENGA0300
CZZSYS                            25      11      12   15                 ENGA0310
      COMMON/CZZSYS/NZZSYS,NZZSMX,NBZSYS,NRZSYS,LAZZ,NAMSYS(2,25),        ENGA0320
     1    KZZTYP(25),ZZSYS(15,25)                                         ENGA0330
CSAMLT                   8,12,15,                                         ENGA0340
      COMMON/CSAMLT/LX,MX,NX,RMN(15),RMX(15),EMN(15),EMX(15),ZMX(15),     ENGA0350
     1 XMX(15),  RT(8,12,15)                                              ENGA0360
CSASYS                              15      4      4       2      4     20  ENGA0370
      COMMON/CSASYS/ NSASYS,NSASMX,NBGUN,NBSAM,NRGUN,NRSAM, LASA,         ENGA0380
     1    NAMSA(2,15),KSATYP(15),SASYS(20,15)                             ENGA0390
CRADAR                                                                    ENGA0400
      COMMON/CRADAR/NBSR,NBTR,NBRMX,NBJ,NBJMX,                            ENGA0410
     1   BRAD(36,17),BENV(6,2),BETC(4,2),BTAR(6,3),BJAM(6,3,2),           ENGA0420
     2               NRSR,NRTR,NRRMX,NRJ,NRJMX,                           ENGA0430
     3   RRAD(36,15),RENV(6,2),RETC(4,2),RTAR(6,3),RJAM(6,3,2)            ENGA0440
      COMMON/CHOMER/ NHOM,NHOMMX,NAMHOM(2,10),KHOMTY(10),DATHOM(36,10)    ENGA0450
CSONAR                           15      5      8     12                  ENGA0460
      COMMON/CSONAR/NSON,NSONMX,NBSON,NRSON,LASON,NAMSON( 2,15),          ENGA0470
     1    KSONTY(15), SONSYS(12,15)                                       ENGA0480
      COMMON /SONCRV/ IBA,IBB,IDA,IDB,IBOTTM,IACTIV,SRANGE(17),           ENGA0490
     1     SMERIT(17)                                                     ENGA0500
      COMMON/STRCON/  JPK,IPK                                             ENGA0510
      COMMON/INFO/  LENIFO,LENSEG,MAXSEG,NEXSEG,LSTSEG,LZCSEG             ENGA0520
      COMMON/GNAV/ BGCV(8,5,18),RGCV(8,5,18), INTVLB(38),INTVLR(38)       ENGA0530
      COMMON/DEVICE/ N1,N2,N3,N4,N5,N6,N7,N8,N9,N10,N11,N12               ENGA0540
      COMMON /ETIME/ TIME,TIMEA,TIMEB,TBEGIN,TIMEND,TIMAX,TSTEP           ENGA0550
      COMMON/ECONST/ NSHIP,NAIR,NSUB,NVSEA,NVALT,PDTMIN,PDMIN,            ENGA0560
     1     AIRCPT,EPNM,HMIN,PI,TWOPI,IENV,ISCAN,IPRAD,IMISC(35)           ENGA0570
      COMMON/EXSTOR/ LENSYS,MAXRTU,MAXBTU,LEFTDS,NRTU,NBTU,IBRS,NPHASE    ENGA0580
      COMMON/CTLOOP/ TDU1,IPRINT,JPRINT,IVEC,LTIMES,IBVEC,IRVEC,          ENGA0590
     1     IPTVEC,IRTVEC,LEFTB,LEFTR,NEXBTU,NEXRTU,PRSTEP,PSTART,         ENGA0600
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     2     PSTOP,SSTEP,TPRINT,TLAST,TIMES(100)                              ENGA0610
C                                                                           ENGA0620
      DIMENSION JWP(4),WEP(5),JTG(5),TGT(5)                                 ENGA0630
      EQUIVALENCE (IMISC(3),NLPR), (IMISC(4),ISIDE), (IMISC(5),KILLPR)      ENGA0640
     1,    (IMISC(7),ISNAPR), (IMISC(11),IVECB), (IMISC(12),IVECR)          ENGA0650
     2,    (IMISC(13),IRNDVB), (IMISC(14),IRNDVR), (IMISC(29),IRSAM)        ENGA0660
     3,    (IMISC(31),NXSHIP), (IMISC(32),NXAC), (IMISC(33),NXSUB)          ENGA0670
     4,    (IMISC(34),NXCM)                                                 ENGA0680
      DATA JWP,JTG,WEP,TGT/9*0,      10*0./                                 ENGA0690
C                                                                           ENGA0700
      NAMELIST /NGAGE/ NCARLO,TBEGIN,TIMEND,TSTEP,NRANDM,NPHASE,            ENGA0710
     1    IPRINT,ISNAPR,PRSTEP,PSTART,PSTOP,NLPR,KILLPR,                   ENGA0720
     2    PDCLAS,HVTB,HVTR,HVTIME,IVECB,IVECR,IRNDVB,IRNDVR,IRSAM,         ENGA0730
     3    NXSHIP,NXAC,NXSUB,NXCM,                                          ENGA0740
     4    IPRAD,IENV,JAM,ISCAN,PDTIME,PDMIN,PDTMIN,PDCMIN,IACTIV,          ENGA0750
     5    IBOTTM,AIRCPT,IMISC,NBATT,MISRAD,NTIMES,TIMES                    ENGA0760
C                                                                           ENGA0770
 6401 FORMAT(//23X,' CRUISE     HITS ON     MISSILES',                     ENGA0780
     1      /23X,' MISSILES  TARGETS     KILLED',                         ENGA0790
     2      /23X,' LAUNCHED  EVALUATED  ENROUTE' /)                       ENGA0800
 6402 FORMAT(/6X,2A4,I9,I6,I10,I10)                                         ENGA0810
C                                                                           ENGA0820
      DO 10 I=1,100                                                         ENGA0830
   10 TIMES(I)=0.                                                           ENGA0840
      ICU1=50                                                               ENGA0850
      TSTEP=.001                                                            ENGA0860
      PDTIME=.0201                                                          ENGA0870
      PRSTEP=.1                                                             ENGA0880
      JAM=0                                                                 ENGA0890
      NPHASE=6                                                              ENGA0900
      PDCMIN=.5                                                             ENGA0910
      NRANDM=1                                                              ENGA0920
      NCARLO=1                                                              ENGA0930
      IMISC(31)=5                                                           ENGA0940
      IMISC(32)=2                                                           ENGA0950
      IMISC(33)=2                                                           ENGA0960
      IMISC(34)=1                                                           ENGA0970
      HVTB=0.                                                               ENGA0980
      HVTR=0.                                                               ENGA0990
      PDCLAS=0.                                                             ENGA1000
      HVTIME=0.                                                             ENGA1010
      IPRINT=1                                                              ENGA1020
      TBEGIN=100.                                                           ENGA1030
      TIMEND=100.                                                           ENGA1040
      PSTART=-100.                                                          ENGA1050
      PSTOP=100.                                                            ENGA1060
      CALL PAGE                                                             ENGA1070
C                                                                           ENGA1080
C----   INPUT ENGAGEMENT CONTROL PARAMETERS                                 ENGA1090
C                                                                           ENGA1100
      READ(N5,NGAGE)                                                        ENGA1110
      IMISC(1)=PDTIME*1000.+.01                                             ENGA1120
      IMISC(2)=JAM                                                          ENGA1130
      IMISC(6)=PDCMIN*100.+.01                                              ENGA1140
      IMISC(9)=HVTB+.01                                                     ENGA1150
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      IMISC(10)=HVTR+.01                                                ENGA1160
      IMISC(21)=PDCLAS*100.+.01                                         ENGA1170
      IMISC(28)=HVTIME*1000.+.01                                        ENGA1180
C                                                                       ENGA1190
C                                                                       ENGA1200
      CALL SONARM                                                       ENGA1210
      X=IENV                                                            ENGA1220
      BFNV(1,1)=X+.01                                                   ENGA1230
      RFNV(1,1)=X+.01                                                   ENGA1240
      SSTEP=TSTEP                                                       ENGA1250
      DO 100 I=1,NRANDM                                                 ENGA1260
  100 XRN=URN(IDUM)                                                     ENGA1270
      DO 500 ICARLO=1,NCARLO                                            ENGA1280
      INIT=1                                                            ENGA1290
      DO 110 I=1,16                                                     ENGA1300
      DO 110 J=21,24                                                    ENGA1310
  110 DATMSL(J,I)=0.                                                    ENGA1320
      CALL KILLEX(INIT,ISIDE,JWP,WEP,JTG,TGT,IPR,IPR)                   ENGA1330
      CALL GCDATA(BGC,BGCV,NBG,INTVLB,BE,BF)                            ENGA1340
      CALL GCDATA(RGC,RGCV,NRG,INTVLR,RE,RF)                            ENGA1350
      NEXSEG=0                                                          ENGA1360
      LSTSEG=1-LENSEG                                                   ENGA1370
      IBRS=0                                                            ENGA1380
      CALL  SYSTEM(KBPXS,KBPT,KBST,NBP,62,NBSS,BRAD,LBRSYS,             ENGA1390
     1      IBRS,LENSYS,KBU,KBUK,LBSYST,KBGK,NBU,NBG,IBSTAT,            ENGA1400
     2      BPX1,SASYS,ZZSYS,DATMSL,AIRCPT,NVALT,IACTIV,SCNSYS,TTRAJ)   ENGA1410
      CALL  SYSTEM(KRPXS,KRPT,KRST,NRP,82,NRSS,RRAD,LBRSYS,             ENGA1420
     1      IBRS,LENSYS,KRU,KRUK,LRSYST,KRGK,NRU,NRG,IRSTAT,            ENGA1430
     2      RPX1,SASYS,ZZSYS,DATMSL,AIRCPT,NVALT,IACTIV,SCNSYS,TTRAJ)   ENGA1440
      NBTU=0                                                            ENGA1450
      NBTU=0                                                            ENGA1460
      NEXBTU=0                                                          ENGA1470
      NEXRTU=0                                                          ENGA1480
      IF(ICARLO.GT.1) GO TO 30                                          ENGA1490
      MAXTIM=100                                                        ENGA1500
      TCLOSE=.001                                                       ENGA1510
      NTG=NBG+NRG                                                       ENGA1520
      NTIMES=1                                                          ENGA1530
      NOW=1                                                             ENGA1540
      TIMES(NTIMES)=BGC(2,1,1)                                          ENGA1550
      DO 840 NT=2,8                                                     ENGA1560
      DO 850 N=1,NTG                                                    ENGA1570
      I=N-NBG                                                           ENGA1580
      IF(I) 81,81,810                                                   ENGA1590
   81 TRIAL=BGC(NT,1,N)                                                 ENGA1600
      GO TO 811                                                         ENGA1610
  810 TRIAL=RGC(NT,1,I)                                                 ENGA1620
  811 LAST=0                                                            ENGA1630
  815 TNOW=TIMES(NOW)                                                   ENGA1640
      DIFF=TRIAL-TNOW                                                   ENGA1650
      IF(DIFF) 80,850,82                                                ENGA1660
   80 IF(ABS(DIFF).LT.TCLOSE) GO TO 850                                 ENGA1670
      IF(LAST) 802,801,83                                               ENGA1680
  801 LAST=-1                                                           ENGA1690
  802 IF(NOW.EQ.1) GO TO 83                                             ENGA1700
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      NOW=NOW-1                                                          ENGA1710
      GO TO 815                                                          ENGA1720
   82 IF(ABS(DIFF).LT.TCLOSE) GO TO 850                                  ENGA1730
      NOW=NOW+1                                                          ENGA1740
      IF(LAST) 83,821,822                                                ENGA1750
  821 LAST=1                                                             ENGA1760
  822 IF(NOW-NTIMES) 815,815,831                                         ENGA1770
   83 K=NTIMES+1                                                         ENGA1780
      DO 830 I=NOW,NTIMES                                                ENGA1790
      TIMES(K)=TIMES(K-1)                                                ENGA1800
  830 K=K-1                                                              ENGA1810
  831 NTIMES=NTIMES+1                                                    ENGA1820
      TIMES(NOW)=TRIAL                                                   ENGA1830
      IF(NTIMES.LE.MAXTIM) GO TO 850                                     ENGA1840
      CALL PAGE                                                          ENGA1850
      WRITE(N6,6801) MAXTIM,TIMES                                        ENGA1860
 6801 FORMAT(//6X,'NUMBER OF TIMES EXCEEDS',I5/(6X,10G12.5))             ENGA1870
      STOP                                                               ENGA1880
  850 CONTINUE                                                           ENGA1890
  840 CONTINUE                                                           ENGA1900
      IF(TBEGIN.EQ.100.) TBEGIN=TIMES(1)                                 ENGA1910
      TIMAX=TBEGIN+21.000                                                ENGA1920
      IF(TIMEND.EQ.100.) TIMEND=TIMES(NTIMES)                            ENGA1930
      IF(TIMEND.GT.TIMAX) TIMEND=TIMAX                                   ENGA1940
      LTIMES=NTIMES-1                                                    ENGA1950
      WRITE(N6,NGAGE)                                                    ENGA1960
   30 TLAST=TIMES(1)-SSTEP                                               ENGA1970
      TPRINT=TBEGIN                                                      ENGA1980
C                                                                        ENGA1990
      CALL TILOOP(KBUSEG,KRUSEG,ITBSEG,ITRSEG,INFORM,LBRSYS,             ENGA2000
     1      LBSYST,LRSYST,IRTU,IBTU,RTUXYZ,BTUXYZ,INVRTU,INVBTU,         ENGA2010
     2      IRSTAT,IBSTAT)                                               ENGA2020
C                                                                        ENGA2030
  400 CONTINUE                                                           ENGA2040
      IF(NPHASE.LT.2) RETURN                                             ENGA2050
      IVEC=54321                                                         ENGA2060
      CALL ALLXYZ(TIME,      1,N6,IVEC)                                  ENGA2070
      CALL SUMOUT(ICARLO)                                                ENGA2080
      CALL PAGE                                                          ENGA2090
      WRITE(N6,6401)                                                     ENGA2100
      DO 401 I=1,16                                                      ENGA2110
      L=DATMSL(22,I)+.5                                                  ENGA2120
      IF (L.EQ.0) GO TO 401                                              ENGA2130
      J=DATMSL(23,I)+.5                                                  ENGA2140
      K=DATMSL(24,I)+.5                                                  ENGA2150
      WRITE(N6,6402) NAMMSL(1,I),NAMMSL(2,I),KMSLTY(I),L,J,K             ENGA2160
  401 CONTINUE                                                           ENGA2170
      DO 402 I=1,KBU                                                     ENGA2180
      KBUK(4,I)=1                                                        ENGA2190
  402 KBUSEG(I)=0                                                        ENGA2200
      DO 403 I=1,KRU                                                     ENGA2210
      KRUK(4,I)=1                                                        ENGA2220
  403 KRUSEG(I)=0                                                        ENGA2230
      K=KBU+MAXBTU                                                       ENGA2240
      DO 404 I=1,K                                                       ENGA2250
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  4C4 ITBSEG(I)=0                                                    ENGA2260
      K=KRU+MAXRTU                                                   ENGA2270
      DO 405 I=1,K                                                   ENGA2280
  4C5 ITRSEG(I)=0                                                    ENGA2290
      K=2*KBU+11                                                     ENGA2300
      DO 406 I=1,K                                                   ENGA2310
  4C6 LBSYST(I)=0                                                    ENGA2320
      K=2*KRU+11                                                     ENGA2330
      DO 407 I=1,K                                                   ENGA2340
  4C7 LRSYST(I)=0                                                    ENGA2350
  500 CONTINUE                                                       ENGA2360
      RETURN                                                         ENGA2370
      END                                                            ENGA2380


      SUBROUTINE TILOOP(KBUSEG,KRUSEG,ITBSEG,ITRSEG,INFORM,LBRSYS,   TILO0010
     1      LBSYST,LRSYST,IRTU,IBTU,RTUXYZ,BTUXYZ,INVRTU,INVBTU,     TILO0020
     2      IRSTAT,IBSTAT)                                           TILO0030
      DIMENSION KBUSEG(1),KRUSEG(1),ITBSEG(1),ITRSEG(1),INFORM(1),   TILO0040
     1      LBRSYS(1),LBSYST(1),LRSYST(1)                            TILO0050
      DIMENSION IRTU(1),IBTU(1),RTUXYZ(8,1),BTUXYZ(8,1),INVRTU(1),   TILO0060
     1      INVBTU(1),IRSTAT(1),IBSTAT(1)                            TILO0070
      COMMON/BATTRY/ NBATT,MISRAD(2,10)                              TILO0080
CKILLF                                                               TILO0090
      COMMON/CKILLF/LVSHP,MVSHP,NVSHP,VULSHP(5,12,1),NUN,NUNMX,      TILO0100
     1 KSTATE(100),PKLAST(100),PPROD(100),CUMWT(100),VULCST(100),    TILO0110
     2 VUKILL(100),VWKILL(100),VULFS,VULFA,VULFM                     TILO0120
CNAVIG                                                               TILO0130
      COMMON/CNAVIG/ NGMX,BF,BF,RE,RF,                               TILO0140
     1      NBG,BA,BB,BC,BD,KBGN(18),KBGK(18),BGC( 8,6,18),NBU(18),  TILO0150
     2      NPG,RA,RB,RC,RD,KRGN(18),KRGK(18),RGC( 8,6,18),NRU(18),  TILO0160
     3           TTIME,NUMX,                                         TILO0170
     4      KBU,KBUK(4,50),BREL(4,50),BXYZ(50,7),NAMBU(50,2),BV(50,8),TILO0180
     5      KRU,KRUK(4,50),RREL(4,50),RXYZ(50,7),NAMRU(50,2),RV(50,8)TILO0190
CPLAT  VS  SYSTEMS  (SUBSYSTEMS)                                     TILO0200
      COMMON/CPLAT/NBP,NBPMX,NBSS,NBSSMX,NBSPP(15),NBPWS(45),        TILO0210
     1   NAMBP(2,15),KBPT(15),NABSS(2,45),KBST(45),KBPXS(45,15),     TILO0220
     2   BPX1(12,15),                                                TILO0230
     3            NRP,NRPMX,NRSS,NRSSMX,NRSPP(15),NRPWS(45),         TILO0240
     4   NAMRP(2,15),KRPT(15),NARSS(2,45),KRST(45),KRPXS(45,15),     TILO0250
     5   RPX1(12,15)                                                 TILO0260
CMSLSYS                          16     2     2     6     6     24    50 TILO0270
      COMMON/CMSLSY/ NMSL,NMSLMX,NBSSM,NBASM,NRSSM,NRASM,LATMSL,LTRAJ,TILO0280
     1    NAMMSL(2,16),KMSLTY(16),                                   TILO0290
     2    DATMSL(24,16), TTRAJ(50,16)                                TILO0300
CZZSYS                            25     11     12   15               TILO0310
      COMMON/CZZSYS/NZZSYS,NZZSMX,NBZSYS,NRZSYS,LAZZ,NAMSYS(2,25),   TILO0320
     1    KZZTYP(25),ZZSYS(15,25)                                    TILO0330
CSAMLT                 8,12,15,                                      TILO0340
      COMMON/CSAMLT/LX,MX,NX,RMN(15),RMX(15),EMN(15),EMX(15),ZMX(15),TILO0350
     1 XMX(15),  RT(8,12,15)                                         TILO0360
CSASYS                           15     4     4     2     4     20   TILO0370
      COMMON/CSASYS/ NSASYS,NSASMX,NBGUN,NBSAM,NRGUN,NRSAM, LASA,    TILO0380
     1    NAMSA(2,15),KSATYP(15),SASYS(20,15)                        TILO0390
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CRADAR                                                                  TIL00400
      COMMON/CRADAR/NBSR,NBTR,NBRMX,NBJ,NBJMX,                          TIL00410
     1   BRAD(36,17),BENV(6,2),BETC(4,2),BTAR(6,3),BJAM(6,3,2),         TIL00420
     2               NRSR,NRTR,NRRMX,NRJ,NRJMX,                         TIL00430
     3   RRAD(36,15),RENV(6,2),RETC(4,2),RTAR(6,3),RJAM(6,3,2)          TIL00440
      COMMON/CHOMER/ NHOM,NHOMMX,NAMHOM(2,10),KHOMTY(10),DATHOM(36,10)  TIL00450
CSONAR                          15     5     8    12                  TIL00460
      COMMON/CSONAR/NSON,NSONMX,NBSON,NRSON,LASON,NAMSON( 2,15),        TIL00470
     1    KSONTY(15), SONSYS(12,15)                                     TIL00480
      COMMON /SONCRV/ IPA,IBB,IDA,IDB,IBOTTM,IACTIV,SRANGE(17),         TIL00490
     1     SMERIT(17)                                                   TIL00500
      COMMON/STRCON/  JPK,IPK                                           TIL00510
      COMMON/INFO/  LENINFO,LENSEG,MAXSEG,NEXSEG,LSTSEG,LZOSEG         TIL00520
      COMMON/GNAV/ BGCV(8,5,18),RGCV(8,5,18), INTVLB(38),INTVLR(38)     TIL00530
      COMMON/DEVICE/ N1,N2,N3,N4,N5,N6,N7,N8,N9,N10,N11,N12             TIL00540
      COMMON /ETIME/ TIME,TIMEA,TIMEB,TBEGIN,TIMEND,TIMAX,TSTEP         TIL00550
      COMMON/ECONST/ NSHIP,NAIR,NSUB,NVSEA,NVALT,PDTMIN, PDMIN,         TIL00560
     1     AIRCPT,FPNM,HMIN,PI,TWOPI,IENV,ISCAN,IPRAD,IMISC(35)         TIL00570
      COMMON/EXSTOR/ LENSYS,MAXRTU,MAXBTU,LEFTOS,NRTU,NBTU,IBRS,NPHASE  TIL00580
      COMMON/CTLOOP/ IDU1,IPRINT,JPRINT,IVEC,LTIMES,IBVEC,IRVEC,        TIL00590
     1     IBTVEC,IRTVEC,LEFTB,LEFTR,NEXBTU,NEXRTU,PRSTEP,PSTART,       TIL00600
     2     PSTOP,SSTEP,TPRINT,TLAST,TIMES(100)                          TIL00610
      DIMENSION KRHVT(50),KBHVT(50)                                     TIL00620
C                                                                       TIL00630
      EQUIVALENCE (ISIDE,IMISC(4)),(ISNAPR,IMISC(7)),                   TIL00640
     1     (NLPR,IMISC(3)),(KILLPR,IMISC(5))                            TIL00650
C                                                                       TIL00660
      NAMELIST /INTLEG/  INTVLB,INTVLR,KBHVT,KRHVT                      TIL00670
C                                                                       TIL00680
      IBNV=1                                                            TIL00690
      IRNV=1                                                            TIL00700
      IF(IMISC(28).EQ.0) IMISC(28)=22000                                TIL00710
      DO 110 I=1,50                                                     TIL00720
      KRHVT(I)=0                                                        TIL00730
  110 KBHVT(I)=0                                                        TIL00740
      DO 395 KTIME=1,LTIMES                                             TIL00750
      TIMEA=TIMES(KTIME)                                                TIL00760
      TIMEB=TIMES(KTIME+1)                                              TIL00770
      TIME=TIMEA                                                        TIL00780
      IBVTIM=(TIME-TBEGIN)*1000.                                        TIL00790
      JPRINT=IPRINT                                                     TIL00800
    3 IF(TIME.LT.TBEGIN) GO TO 390                                      TIL00810
      IF(TIME.GT.TIMEND) RETURN                                         TIL00820
      IF(TIME.GE.TPRINT) JPRINT=IPRINT                                  TIL00830
      ITIME=(TIME-TBEGIN)*1000.                                         TIL00840
      TSTEP=TIME-TLAST                                                  TIL00850
      IVEC=54321                                                        TIL00860
      CALL ALLXYZ(TIME,JPRINT,N6,IVEC)                                  TIL00870
      IF(JPRINT.EQ.0) GO TO 300                                         TIL00880
      IF(IMISC(3).GT.0) WRITE(N6,INTLEG)                                TIL00890
  300 IBVEC=IVEC/10                                                     TIL00900
      ISIDE=1                                                           TIL00910
      IRVEC=MOD(IVEC,10)                                                TIL00920
      IBTVEC=0                                                          TIL00930
      LEFTB=0                                                           TIL00940
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      IF(NBTU.EQ.0) GO TO 305                                          TIL00950
      CALL TUXYZ(NBTU,IBTU,INVBTU,BTUXYZ,MAXBTU,                       TIL00960
     A     KBUK,INTVLB,BXYZ,BGCV,                                      TIL00970
     1     KBU,INTVLB,KBUK,BXYZ,BGCV,                                  TIL00980
     2     TTRAJ,IVEC,LEFTB,IDU1)                                      TIL00990
      IF(IVEC.GT.0) IBTVEC=IVEC                                        TIL01000
  305 IRTVEC=0                                                         TIL01010
      ISIDE=2                                                          TIL01020
      LEFTR=0                                                          TIL01030
      IF(NRTU.EQ.0) GO TO 310                                          TIL01040
      CALL TUXYZ(NRTU,IRTU,INVRTU,RTUXYZ,MAXRTU,                       TIL01050
     A     KRUK,INTVLR,RXYZ,RGCV,                                      TIL01060
     1     KBU,INTVLB,KBUK,BXYZ,BGCV,                                  TIL01070
     3     TTRAJ,IVEC,LEFTR,IDU1)                                      TIL01080
      IF(IVEC.GT.0) IRTVEC=IVEC                                        TIL01090
  310 IF(LEFTB.EQ.0) GO TO 315                                         TIL01100
      ISIDE=1                                                          TIL01110
      CALL TU2XYZ(NBTU,IBTU,INVBTU,BTUXYZ,                             TIL01120
     1     KBU,INVRTU,RTUXYZ,                                          TIL01130
     2     IVEC,IDU1)                                                  TIL01140
      IF(IVEC.GT.0) IBTVEC=IVEC                                        TIL01150
  315 IF(LEFTR.EQ.0) GO TO 320                                         TIL01160
      ISIDE=2                                                          TIL01170
      CALL TU2XYZ(NRTU,IRTU,INVRTU,RTUXYZ,                             TIL01180
     1     KBU,INVBTU,BTUXYZ,                                          TIL01190
     2     IVEC,IDU1)                                                  TIL01200
  320 IF(NPHASE.LT.3) GO TO 380                                        TIL01210
      ISIDE=1                                                          TIL01220
      IF(IPVEC+IRVEC+IRTVEC .EQ. 0) GO TO 325                          TIL01230
      CALL RELATE(NBG,NBU,INTVLB,LBSYST,KBUSEG,                        TIL01240
     1     BGCV,BXYZ,BPX1,IBSTAT,                                      TIL01250
     2     KBU,NRG,NRTU,INTVLR,INVRTU,NRU,LRSYST,ITRSEG,               TIL01260
     3     IPTU,RPX1,RGCV,KRUK,RXYZ,RTUXYZ,IRVEC,IRTVEC,IRSTAT,        TIL01270
     4     INFORM,LBRSYS,DATMSL,IDU1)                                  TIL01280
  325 IF(IRVEC+IBVEC+IBTVEC .EQ. 0) GO TO 330                          TIL01290
      ISIDE=2                                                          TIL01300
      CALL RELATE(NRG,NRU,INTVLR,LRSYST,KRUSEG,                        TIL01310
     1     RGCV,RXYZ,RPX1,IRSTAT,                                      TIL01320
     2     KBU,NBG,NBTU,INTVLB,INVBTU,NBU,LBSYST,ITBSEG,               TIL01330
     3     IBTU,BPX1,BGCV,KBUK,BXYZ,BTUXYZ,IBVEC,IBTVEC,IBSTAT,        TIL01340
     4     INFORM,LBRSYS,DATMSL,IDU1)                                  TIL01350
  330 IF(NPHASE.LT.4) GO TO 380                                        TIL01360
      ISIDE=1                                                          TIL01370
      CALL DETECT(KBU,NBTU,LBSYST,KBUSEG,BRAD,BXYZ,KBUK,INTVLB,        TIL01380
     1     BGCV,BPX1,RENV(1,IBNV),MAXBTU,IBSTAT,BTUXYZ,KBST,IBTU,      TIL01390
     2     KRU,NRTU,LRSYST,ITRSEG,RXYZ,KRUK,INTVLR,RGCV,RPX1,          TIL01400
     3     RJAM,IRTU,RTUXYZ,IRSTAT,KRHVT,                              TIL01410
     4     DATMSL,LBRSYS,INFORM,DATHOM,      IDU1)                     TIL01420
      ISIDE=2                                                          TIL01430
      CALL DETECT(KRU,NRTU,LRSYST,KRUSEG,RRAD,RXYZ,KRUK,INTVLR,        TIL01440
     1     RGCV,RPX1,RENV(1,IRNV),MAXRTU,IRSTAT,RTUXYZ,KRST,IRTU,      TIL01450
     2     KBU,NBTU,LBSYST,ITBSEG,BXYZ,KBUK,INTVLB,BGCV,BPX1,          TIL01460
     3     BJAM,IBTU,BTUXYZ,IBSTAT,KBHVT,                              TIL01470
     4     DATMSL,LBRSYS,INFORM,DATHOM,      IDU1)                     TIL01480
      IF(NPHASE.LT.5) GO TO 380                                        TIL01490
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      IF(ITIME.EQ.0) GO TO 380                                          TIL01500
      IF(IHVTIM.GT.ITIME) GO TO 3333                                    TIL01510
      IHVTIM=IHVTIM+IMISC(28)                                           TIL01520
      CALL HVTGT(IMISC(11),NBG,INTVLB,BGC,BGCV,                         TIL01530
     1     KBU,IBSTAT,KBUK,BXYZ,BREL,IMISC(10),KBHVT,                   TIL01540
     2     TIME    )                                                    TIL01550
      CALL HVTGT(IMISC(12),NRG,INTVLR,RGC,RGCV,                         TIL01560
     1     KRU,IRSTAT,KRUK,RXYZ,RREL,IMISC(9), KRHVT,                   TIL01570
     2     TIME    )                                                    TIL01580
3333  CONTINUE                                                          TIL01590
      ISIDE=1                                                           TIL01600
      CALL ALLOCA(NEXRTU,NBTU,MAXBTU,IBSTAT,LBSYST,IBTU,INVBTU,         TIL01610
     A     BTUXYZ,BPX1,BXYZ,BRAD,BENV(1,IBNV),KBUSEG,KBU,               TIL01620
     1     KBUK,NBU,                                                    TIL01630
     2     KRU,NRTU,ITBSEG,IRSTAT,INTVLR,RTUXYZ,KRUK,RGCV,RXYZ,KRHVT,   TIL01640
     3     RJAM,IRTU,RPX1,LRSYST,INVRTU,                                TIL01650
     4     TTRAJ,DATMSL,ZZSYS,SASYS,LBRSYS,INFORM,IDU1)                 TIL01660
      ISIDE=2                                                           TIL01670
      CALL ALLOCA(NEXRTU,NRTU,MAXRTU,IRSTAT,LRSYST,IRTU,INVRTU,         TIL01680
     A     RTUXYZ,RPX1,RXYZ,RRAD,RENV(1,IRNV),KRUSEG,KRU,               TIL01690
     1     KRUK,NRU,                                                    TIL01700
     2     KRU,NRTU,ITBSEG,IBSTAT,INTVLB,BTUXYZ,KBUK,BGCV,BXYZ,KBHVT,   TIL01710
     3     BJAM,IBTU,BPX1,LBSYST,INVBTU,                                TIL01720
     4     TTRAJ,DATMSL,ZZSYS,SASYS,LBRSYS,INFORM,IDU1)                 TIL01730
      IF(NPHASE.LT.6) GO TO 380                                         TIL01740
      ISIDE=1                                                           TIL01750
      CALL WPNTRM(KBU,KBUSEG,                                           TIL01760
     1     ITBSEG,IBSTAT,KRU,LRSYST,IRTU,MAXRTU,                        TIL01770
     2     INFORM,LBRSYS)                                               TIL01780
      ISIDE=2                                                           TIL01790
      CALL WPNTRM(KRU,KRUSEG,                                           TIL01800
     1     ITBSEG,IBSTAT,KBU,LBSYST,IBTU,MAXBTU,                        TIL01810
     2     INFORM,LBRSYS)                                               TIL01820
      ISIDE=1                                                           TIL01830
      CALL ACMTRM(NBTU,KBU,IBSTAT,BTUXYZ,IBTU,INVBTU,MAXBTU,            TIL01840
     1     KRU,IRSTAT,LRSYST,IRTU,MAXRTU,                               TIL01850
     2     DATMSL)                                                      TIL01860
      ISIDE=2                                                           TIL01870
      CALL ACMTRM(NRTU,KRU,IRSTAT,RTUXYZ,IRTU,INVRTU,MAXRTU,            TIL01880
     1     KBU,IBSTAT,LBSYST,IBTU,MAXBTU,                               TIL01890
     2     DATMSL)                                                      TIL01900
      ISIDE=1                                                           TIL01910
      CALL STATUS(NBTU,INVBTU,KBUSEG,IBTU,NEXBTU,KBU,ITBSEG,IBSTAT,     TIL01920
     A    MAXBTU,LBSYST,BGC,INTVLB,NBG,NBU,                             TIL01930
     1     KBUSEG,IRSTAT,KRU,IRTU,ITBSEG,                               TIL01940
     2     INFORM,LBRSYS)                                               TIL01950
      ISIDE=2                                                           TIL01960
      CALL STATUS(NRTU,INVRTU,KRUSEG,IRTU,NEXRTU,KRU,ITBSEG,IRSTAT,     TIL01970
     A    MAXRTU,LRSYST,RGC,INTVLR,NRG,NRU,                             TIL01980
     1     KBUSEG,IBSTAT,KBU,IBTU,ITBSEG,                               TIL01990
     2     INFORM,LBRSYS)                                               TIL02000
      ISIDE=1                                                           TIL02010
      CALL USTAT(KBU,IBSTAT,ITBSEG,NBTU,KBUK,                           TIL02020
     1     NRTU,INVRTU,IRTU,                                            TIL02030
     2     INFORM)                                                      TIL02040
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      ISIDE=2                                                          TIL02050
      CALL  USTAT(KRU,IRSTAT,ITRSEG,NRTU,KRUK,                         TIL02060
     1      NBTU,INVBTU,IBTU,                                          TIL02070
     2      INFORM)                                                    TIL02080
  380 CONTINUE                                                         TIL02090
      IF(JPRINT.EQ.0) GO TO 390                                        TIL02100
      JPRINT=0                                                         TIL02110
      TPRINT=TIME+PRSTEP                                               TIL02120
      IF(TPRINT.GT.PSTOP) TPRINT=100.                                  TIL02130
      IF(TPRINT.LT.PSTART) TPRINT=PSTART                               TIL02140
      IF(IMISC(7).EQ.0) GO TO 390                                      TIL02150
      ISIDE=1                                                          TIL02160
      CALL  SNAP(KRU,NBTU,LRSYST,LBRSYS,KBUSEG,ITBSEG,INFORM,          TIL02170
     1      IBSTAT,IBTU,INVBTU,BTUXYZ,  MAXBTU,NAMBU,NABSS,BXYZ,       TIL02180
     2      RXYZ,RTUXYZ,KRU)                                           TIL02190
      ISIDE=2                                                          TIL02200
      CALL  SNAP(KRU,NRTU,LRSYST,LBRSYS,KRUSEG,ITRSEG,INFORM,          TIL02210
     1      IRSTAT,IRTU,INVRTU,RTUXYZ,  MAXRTU,NAMRU,NARSS,RXYZ,       TIL02220
     2      BXYZ,BTUXYZ,KRU)                                           TIL02230
      IF(NPHASE.LT.2) RETURN                                           TIL02240
  390 TLAST=TIME                                                       TIL02250
      TIME=TIME+SSTEP                                                  TIL02260
      IF(TIME.LT.TIMEB) GO TO 3                                        TIL02270
  395 CONTINUE                                                         TIL02280
      RETURN                                                           TIL02290
      END                                                              TIL02300


      SUBROUTINE HVTGT(KVEC,NWG,INTVLW,WGC,WGCV,                       HVTG0010
     1      KTU,ITSTAT,KTUK,TXYZ,TREL,IVAL,KHVT,                       HVTG0020
     2      TIME    )                                                  HVTG0030
      DIMENSION TREL(4,1),ITSTAT(1),KTUK(4,1),INTVLW(1),WGC(8,6,1),    HVTG0040
     1      WGCV(8,5,1),TXYZ(50,1),KHVT(1)                             HVTG0050
      DIMENSION LHVT(50)                                               HVTG0060
C                                                                      HVTG0070
      NHVT=0                                                           HVTG0080
      VAL=IVAL                                                         HVTG0090
      IF(VAL.LT.1.) GO TO 115                                          HVTG0100
      DO 110 ITGT=1,KTU                                                HVTG0110
      KHV=KHVT(ITGT)/100                                               HVTG0120
      IF(KHV.EQ.0) GO TO 110                                           HVTG0130
      KHV=100                                                          HVTG0140
      IF(ITSTAT(ITGT).LT.2) GO TO 110                                  HVTG0150
      IF(VAL.GT.TREL(4,ITGT)) GO TO 110                                HVTG0160
      IF(MOD(KTUK(2,ITGT)/100000,10).NE.1) GO TO 110                   HVTG0170
      KHV=1100                                                         HVTG0180
      NHVT=NHVT+1                                                      HVTG0190
      LHVT(NHVT)=ITGT                                                  HVTG0200
  110 KHVT(ITGT)=KHV                                                   HVTG0210
      IF(NHVT.EQ.0) GO TO 115                                          HVTG0220
      DO 114 IG=1,NWG                                                  HVTG0230
      LEG=IABS(INTVLW(IG))                                             HVTG0240
      DELT=TIME-WGC(LEG,1,IG)                                          HVTG0250
      WX=WGC(LEG,2,IG)+WGCV(LEG,1,IG)*DELT                             HVTG0260
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      WY=WGC(LEG,3,IG)+WGCV(LEG,2,IG)*DELT                              HVTG0270
      GR2=1.E50                                                         HVTG0280
      DO 113 I=1,NHVT                                                   HVTG0290
      ITGT=LHVT(I)                                                      HVTG0300
      TX=TXYZ(ITGT,2)                                                   HVTG0310
      TY=TXYZ(ITGT,3)                                                   HVTG0320
      DX=TX-WX                                                          HVTG0330
      DY=TY-WY                                                          HVTG0340
      X=DX*DX+DY*DY                                                     HVTG0350
      IF(X.GT.GR2) GO TO 113                                            HVTG0360
      GR2=X                                                             HVTG0370
      IMIN=ITGT                                                         HVTG0380
  113 CONTINUE                                                          HVTG0390
      KHVT(IG)=IMIN+KHVT(IG)                                            HVTG0400
      IF(KVEC.EQ.0) GO TO 114                                           HVTG0410
      IF(INTVLW(IG+18).EQ. 1) GO TO 114                                 HVTG0420
      ITGT=IMIN                                                         HVTG0430
      INTVLW(IG)=10+LEG                                                 HVTG0440
      WGC(1,5,IG)=TXYZ(ITGT,2)                                          HVTG0450
      WGC(1,6,IG)=TXYZ(ITGT,3)                                          HVTG0460
  114 CONTINUE                                                          HVTG0470
  115 KHVT(19)=NHVT+KHVT(19)                                            HVTG0480
      RETURN                                                            HVTG0490
      END                                                               HVTG0500


      SUBROUTINE GCDATA(GC,GCV,NG,INTVAL,XR,YR)                         GCDA0010
      DIMENSION GC(8,6,18),GCV(8,5,18),INTVAL(1)                        GCDA0020
      DATA PI,RAD/3.141593, .0174533/                                   GCDA0030
      INTVAL(37)=XR                                                     GCDA0040
      INTVAL(38)=YR                                                     GCDA0050
      DO 100 I=1,NG                                                     GCDA0060
      INTVAL(I+18)=0                                                    GCDA0070
      INTVAL(I)=7                                                       GCDA0080
      DO 100 J=2,8                                                      GCDA0090
      HV=GC(J,5,I)                                                      GCDA0100
      K=HV                                                              GCDA0110
      H=K                                                               GCDA0120
      K=(HV-H)*1000.+.9                                                 GCDA0130
      V=K                                                               GCDA0140
      H=H*RAD                                                           GCDA0150
      GCV(J,5,I)=H                                                      GCDA0160
      IF(H.LT.PI) H=PI*.5-H                                             GCDA0170
      IF(H.GE.PI) H=PI*2.5-H                                            GCDA0180
      GCV(J,1,I)=V*COS(H)                                               GCDA0190
      GCV(J,2,I)=V*SIN(H)                                               GCDA0200
      GCV(J,3,I)=GC(J,6,I)                                              GCDA0210
      GCV(J,4,I)=V                                                      GCDA0220
  100 CONTINUE                                                          GCDA0230
      RETURN                                                            GCDA0240
      END                                                               GCDA0250
```

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      SUBROUTINE SONARM                                                  SONA0010
CSONAR                          15     5     8    12                     SONA0020
       COMMON/CSONAR/NSON,NSONMX,NBSON,NRSON,LASON,NAMSON( 2,15),        SONA0030
     1    KSONTY(15), SONSYS(12,15)                                      SONA0040
       COMMON /SONCRV/ IBA,IBB,IDA,IDB,IBOTTM,IACTIV,SRANGE(17),        SONA0050
     1      SMERIT(17)                                                   SONA0060
       IF(NSON.EQ.0) RETURN                                             SONA0070
       DO 100 I=1,IDB                                                   SONA0080
  100  SRANGE(I)=ALOG(SRANGE(I)*.4934)                                  SONA0090
       IF(IBOTTM.EQ.0) GO TO 110                                        SONA0100
       IA=IBA                                                           SONA0110
       IB=IBB                                                           SONA0120
       GO TO 115                                                        SONA0130
  110  IA=IDA                                                           SONA0140
       IB=IDB                                                           SONA0150
  115  DO 250 IS=1,NSON                                                 SONA0160
       IPASS=1                                                          SONA0170
       ICOL=12                                                          SONA0180
       SM=SONSYS(11,IS)-(SONSYS(8,IS)-SONSYS(9,IS))-SONSYS(10,IS)       SONA0190
       GO TO 160                                                        SONA0200
  150  IPASS=2                                                          SONA0210
       ICOL=6                                                           SONA0220
       SM=.5*(SONSYS(1,IS)+SONSYS(5,IS)-(SONSYS(2,IS)-SONSYS(3,IS))     SONA0230
     1                                              -SONSYS(4,IS))     SONA0240
  160  SM=ABS(SM)                                                       SONA0250
       IF(SM.GE.SMERIT(IA)) GO TO 200                                   SONA0260
       RM=0.1                                                           SONA0270
       GO TO 225                                                        SONA0280
  200  IF(SM.LT.SMERIT(IB)) GO TO 205                                   SONA0290
       RM=SRANGE(IB)                                                    SONA0300
       GO TO 220                                                        SONA0310
  205  I=IA                                                             SONA0320
  210  I=I+1                                                            SONA0330
       IF(I.GT.IB) GO TO 200                                            SONA0340
       SMI=SMERIT(I)                                                    SONA0350
       IF(SM.GT.SMI) GO TO 210                                          SONA0360
       J=I-1                                                            SONA0370
       SMJ=SMERIT(J)                                                    SONA0380
       XS=(SM-SMJ)/(SMI-SMJ)                                            SONA0390
       RM=SRANGE(J)                                                     SONA0400
       RM=RM+XS*(SRANGE(I)-RM)                                          SONA0410
  220  RM=EXP(RM)                                                       SONA0420
  225  SONSYS(ICOL,IS)=RM                                               SONA0430
       IF(IPASS.EQ.1) GO TO 150                                         SONA0440
  250  CONTINUE                                                         SONA0450
       RETURN                                                           SONA0460
       END                                                              SONA0470


       SUBROUTINE SYSTEM(KPXS,KPLAT,KSYST,NPLAT,NAIR,NSYS,RADM,         SYST0010
     1      LBRSYS,IBRS,LENSYS,NUNIT,KUK,LSYST,IGPAIR,NWU,NWG,ISTAT,    SYST0020
     2      PX1,SAMDAT,WPNDAT,DATMSL,AIRCPT,NVALT,IACTIV,SONSYS,TTRAJ)  SYST0030
       COMMON/DEVICE/ N1,N2,N3,N4,N5,N6,N7,N8,N9,N10,N11,N12            SYST0040
       COMMON /BATTRY/ NBATT,MISRAD(2,10)                               SYST0050
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      DIMENSION KPXS(45,1),KPLAT(1),KSYST(1),KSTEMP(45),BETA(2),          SYST0060
     1     LBETA(2),RADM(36,1),LASB(5),LSAG(5),LJAM(5),LASW(5),LCM(5),    SYST0070
     2     LAA(5),LTB(5),LBRSYS(1),LSYST(1),KJK(4,1),LSAM(10)             SYST0080
      DIMENSION IGPAIR(1),NWU(1),ISTAT(1),LSYS(11),LTYPE(11),             SYST0090
     1     PX1(12,1),WPNDAT(15,1),SAMDAT(20,1),DATMSL(24,1)               SYST0100
     2,    SONSYS(12,1),TTRAJ(50,1)                                       SYST0110
      DATA LTYPE/3*1,6*2,2*3/                                            SYST0120
      DATA LSYS/20,12,0,-1,12,22,16,23,0,12,0/                           SYST0130
      JPACK(NM,LCOL,LS)=MOD(NM,100)*10000000+(NM/100)*10000+LCOL*100+LS  SYST0140
      NAMADD=0                                                           SYST0150
      IF(NAIR.EQ.82) NAMADD=200                                          SYST0160
      NSUB=NAIR+1                                                        SYST0170
      NSHIP=NAIR-1                                                       SYST0180
      NAM2=1000000                                                       SYST0190
      NAM3=100000                                                        SYST0200
      NAM4=10000                                                         SYST0210
      DO 100 IPLAT=1,NPLAT                                               SYST0220
      NAMEPL=KPLAT(IPLAT)                                                SYST0230
      NAMP=NAMEPL/NAM2                                                   SYST0240
      IF(NAMP.LE.NSUB .AND. NAMP.GE.NSHIP) GO TO 10                      SYST0250
      WRITE(N6,6100) IPLAT,NAMEPL                                        SYST0260
      CALL PAGE                                                          SYST0270
 6100 FORMAT(//6X,'PLATFORM',I6,'  CODE=',I10,' NOT A SHIP,A/C, OR SUP')SYST0280
      STOP                                                               SYST0290
   10 NSAM=0                                                             SYST0300
      NSAG=0                                                             SYST0310
      NJAM=0                                                             SYST0320
      NASW=0                                                             SYST0330
      NTB=0                                                              SYST0340
      NCM=0                                                              SYST0350
      NAA=0                                                              SYST0360
      NASB=0                                                             SYST0370
      DO 110 ISYS=1,NSYS                                                 SYST0380
  110 KSTEMP(ISYS)=KPXS(ISYS,IPLAT)                                      SYST0390
      BETA(1)=0.                                                         SYST0400
      BETA(2)=0.                                                         SYST0410
      LBETA(1)=0                                                         SYST0420
      LBETA(2)=0                                                         SYST0430
      IF(NAMP-NAIR) 121,122,123                                          SYST0440
  121 IPASS=1                                                            SYST0450
      KSYS=NAMADD+651                                                    SYST0460
      GO TO 130                                                          SYST0470
  122 IPASS=2                                                            SYST0480
      KSYS=NAMADD+657                                                    SYST0490
      GO TO 130                                                          SYST0500
  123 IPASS=2                                                            SYST0510
      KSYS=NAMADD+654                                                    SYST0520
  130 CALL SYSTST (KSYS,LS,NAMS,KSTEMP,NSYS,NAM3)                        SYST0530
      IF(LS.EQ.0) GO TO 140                                              SYST0540
      LCOL=MOD(KSYST(LS),100)                                            SYST0550
      IF(LCOL.EQ.0) GO TO 130                                            SYST0560
      IF(RADM(4,LCOL) .LE.0.) GO TO 130                                  SYST0570
      MODE=RADM(36,LCOL)+.1                                              SYST0580
      IF(MODE.GT.1) MODE=2                                               SYST0590
      R=RADM(1,LCOL)                                                     SYST0600
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      IF(B.LE.BETA(MODE)) GO TO 130                                    SYST0610
      BETA(MODE) =B                                                    SYST0620
      LBETA(MODE)=LCOL*100+LS                                          SYST0630
      GO TO 130                                                        SYST0640
  140 IF(IPASS.EQ.2) GO TO 150                                         SYST0650
      IPASS=2                                                          SYST0660
      KSYS=NAMADD+652                                                  SYST0670
      GO TO 130                                                        SYST0680
  150 ICOL=12-IACTIV*6                                                 SYST0690
      IPASS=1                                                          SYST0700
      KSYS=NAMADD+653                                                  SYST0710
      RSONR=0.                                                         SYST0720
      NSONR=0                                                          SYST0730
  152 CALL SYSTST(KSYS,LS,NAMS,KSTEMP,NSYS,NAM3)                       SYST0740
      IF(LS.EQ.0) GO TO 155                                            SYST0750
      LCOL=MOD(KSYST(LS),100)                                          SYST0760
      IF(LCOL.EQ.0) GO TO 152                                          SYST0770
      B=SONSYS(ICOL,LCOL)                                              SYST0780
      IF(RSONR.GE.B) GO TO 152                                         SYST0790
      RSONR=B                                                          SYST0800
      NSONR=LCOL*100+LS                                                SYST0810
      GO TO 152                                                        SYST0820
  155 IF(IPASS.EQ.2) GO TO 2                                           SYST0830
      IPASS=2                                                          SYST0840
      KSYS=NAMADD+655                                                  SYST0850
      GO TO 152                                                        SYST0860
    2 IF(NAMP-NAIR) 20,28,28                                           SYST0870
   20 KSYS=NAMADD+671                                                  SYST0880
  200 CALL SYSTST (KSYS,LS,NAMS,KSTEMP,NSYS,NAM3)                      SYST0890
      IF(LS.EQ.0) GO TO 240                                            SYST0900
      LRS=LS                                                           SYST0910
      LCOL=MOD(KSYST(LS),100)                                          SYST0920
      IF(LCOL.EQ.0) GO TO 200                                          SYST0930
      IF(RADM(4,LCOL).LE.0.) GO TO 200                                 SYST0940
      NRAD=NAMS/NAM4                                                   SYST0950
      DO 210 I=1,NBATT                                                 SYST0960
      LRAD=MISRAD(1,I)                                                 SYST0970
      IF(NRAD.NE.LRAD) GO TO 210                                       SYST0980
      LMIS=MISRAD(2,I)                                                 SYST0990
      GO TO 215                                                        SYST1000
  210 CONTINUE                                                         SYST1010
      GO TO 200                                                        SYST1020
  215 CALL SYSTST (LMIS,LS,NAMM,KSTEMP,NSYS,NAM4)                      SYST1030
      IF(LS.EQ.0) GO TO 200                                            SYST1040
      JCOL=MOD(KSYST(LS),100)                                          SYST1050
      IF(JCOL.EQ.0) GO TO 200                                          SYST1060
      NM=MOD(NAMM,10000)                                               SYST1070
      IF(NM.EQ.0) GO TO 200                                            SYST1080
      NR=MOD(NAMS,10000)                                               SYST1090
      IF(NR.EQ.0) GO TO 200                                            SYST1100
      NSAM=NSAM+1                                                      SYST1110
      LSAM(NSAM)=JPACK(NR,LCOL,LRS)                                    SYST1120
      NSAM=NSAM+1                                                      SYST1130
      LSAM(NSAM)=JPACK(NM,JCOL,LS)                                     SYST1140
      GO TO 200                                                        SYST1150
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240 KSYS=NAMADD+751                                                    SYST1160
    IPASS=1                                                            SYST1170
250 CALL SYSTST (KSYS,LS,NAMS,KSTEMP,NSYS,NAM3)                        SYST1180
    IF(LS.EQ.0) GO TO 260                                              SYST1190
    NM=MOD(NAMS,10000)                                                 SYST1200
    IF(NM.EQ.0) GO TO 250                                              SYST1210
    LCOL=MOD(KSYST(LS),100)                                            SYST1220
    IF(LCOL.EQ.0) GO TO 250                                            SYST1230
    NSAG=NSAG+1                                                        SYST1240
    LSAG(NSAG)=JPACK(NM,LCOL,LS)                                       SYST1250
    GO TO 250                                                          SYST1260
260 IF(IPASS.EQ.2) GO TO 28                                            SYST1270
    IPASS=2                                                            SYST1280
    KSYS=NAMADD+752                                                    SYST1290
    GO TO 250                                                          SYST1300
 28 KSYS=NAMADD+681                                                    SYST1310
280 CALL SYSTST (KSYS,LS,NAMS,KSTEMP,NSYS,NAM3)                        SYST1320
    IF(LS.EQ.0) GO TO 30                                               SYST1330
    NM=MOD(NAMS,10000)                                                 SYST1340
    IF(NM.EQ.0) GO TO 280                                              SYST1350
    LCOL=MOD(KSYST(LS),100)                                            SYST1360
    IF(LCOL.EQ.0) GO TO 280                                            SYST1370
    NJAM=NJAM+1                                                        SYST1380
    LJAM(NJAM)=JPACK(0,LCOL,LS)                                        SYST1390
    GO TO 280                                                          SYST1400
 30 IF(NAMP-NAIR) 31,31,40                                             SYST1410
 31 KSYS=NAMADD+731                                                    SYST1420
    IPASS=1                                                            SYST1430
310 CALL SYSTST (KSYS,LS,NAMS,KSTEMP,NSYS,NAM3)                        SYST1440
    IF(LS.EQ.0) GO TO 320                                              SYST1450
    NM=MOD(NAMS,10000)                                                 SYST1460
    IF(NM.EQ.0) GO TO 310                                              SYST1470
    LCOL=MOD(KSYST(LS),100)                                            SYST1480
    IF(LCOL.EQ.0) GO TO 310                                            SYST1490
    NASW=NASW+1                                                        SYST1500
    LASW(NASW)=JPACK(NM,LCOL,LS)                                       SYST1510
    GO TO 310                                                          SYST1520
320 IF(IPASS.EQ.2) GO TO 40                                            SYST1530
    IPASS=2                                                            SYST1540
    KSYS=NAMADD+741                                                    SYST1550
    GO TO 310                                                          SYST1560
 40 IF(NAMP-NAIR) 41,42,41                                             SYST1570
 41 IPASS=3                                                            SYST1580
    KSYS=NAMADD+721                                                    SYST1590
    GO TO 410                                                          SYST1600
 42 IPASS=1                                                            SYST1610
    KSYS=NAMADD+783                                                    SYST1620
    GO TO 410                                                          SYST1630
 43 IPASS=2                                                            SYST1640
    KSYS=NAMADD+784                                                    SYST1650
410 CALL SYSTST (KSYS,LS,NAMS,KSTEMP,NSYS,NAM3)                        SYST1660
    IF(LS.EQ.0) GO TO 44                                               SYST1670
    LCOL=MOD(KSYST(LS),100)                                            SYST1680
    IF(LCOL.EQ.0) GO TO 410                                            SYST1690
    NM=MOD(NAMS,10000)                                                 SYST1700
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      IF(NM.EQ.0) GO TO 410                                          SYST1710
      IF(IPASS.EQ.3) GO TO 435                                       SYST1720
      NASB=NASB+1                                                    SYST1730
      LASB(NASB)=JPACK(NM,LCOL,LS)                                   SYST1740
      GO TO 410                                                      SYST1750
  435 NTB=NTB+1                                                      SYST1760
      LTB(NTB)=JPACK(NM,LCOL,LS)                                     SYST1770
      GO TO 410                                                      SYST1780
   44 IF(IPASS-2) 43,41,48                                           SYST1790
   48 IF(NAMP-NAIR) 51,50,51                                         SYST1800
   50 KSYS=NAMADD+781                                                SYST1810
      GO TO 510                                                      SYST1820
   51 KSYS=NAMADD+761                                                SYST1830
  510 CALL SYSTST (KSYS,LS,NAMS,KSTEMP,NSYS,NAM3)                    SYST1840
      IF(LS.EQ.0) GO TO 60                                           SYST1850
      LCOL=MOD(KSYST(LS),100)                                        SYST1860
      IF(LCOL.EQ.0) GO TO 510                                        SYST1870
      NM=MOD(NAMS,10000)                                             SYST1880
      IF(NM.EQ.0) GO TO 510                                          SYST1890
      NCM=NCM+1                                                      SYST1900
      LCM(NCM)=JPACK(NM,LCOL,LS)                                     SYST1910
      GO TO 510                                                      SYST1920
   60 IF(NAMP-NAIR) 70,61,70                                         SYST1930
   61 KSYS=NAMADD+791                                                SYST1940
      IPASS=1                                                        SYST1950
  610 CALL SYSTST (KSYS,LS,NAMS,KSTEMP,NSYS,NAM3)                    SYST1960
      IF(LS.EQ.0) GO TO 62                                           SYST1970
      LCOL=MOD(KSYST(LS),100)                                        SYST1980
      IF(LCOL.EQ.0) GO TO 610                                        SYST1990
      NM=MOD(NAMS,10000)                                             SYST2000
      IF(NM.EQ.0) GO TO 610                                          SYST2010
      NAA=NAA+1                                                      SYST2020
      LAA(NAA)=JPACK(NM,LCOL,LS)                                     SYST2030
      GO TO 610                                                      SYST2040
   62 IF(IPASS.EQ.2) GO TO 70                                        SYST2050
      IPASS=2                                                        SYST2060
      KSYS=NAMADD+792                                                SYST2070
      GO TO 610                                                      SYST2080
   70 CONTINUE                                                       SYST2090
      KSHIP=0                                                        SYST2100
      KAIR=0                                                         SYST2110
      KSUB=0                                                         SYST2120
      KJAM=0                                                         SYST2130
      KRADR=0                                                        SYST2140
      KSONR=0                                                        SYST2150
      ISTART=IBRS+1                                                  SYST2160
      IF(NAMP.EQ.NSUB) GO TO 711                                     SYST2170
      ITYPE=1                                                        SYST2180
      DO 710 JTYPE=1,2                                               SYST2190
      LCOL=LBETA(JTYPE)                                              SYST2200
      NM=BETA(JTYPE)                                                 SYST2210
      IF(LCOL.EQ.0) GO TO 710                                        SYST2220
      KRADR=1                                                        SYST2230
      IBRS=IBRS+1                                                    SYST2240
      LBRSYS(IBRS)=(NM*10000+LCOL)*100+JTYPE*10+ITYPE                SYST2250
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  710 CONTINUE                                                          SYST2260
  711 IF(NSONR.EQ.0) GO TO 718                                          SYST2270
      KSONP=1                                                           SYST2280
      NM=RSONR*10.                                                      SYST2290
      IBRS=IBRS+1                                                       SYST2300
      LBRSYS(IBRS)=(NM*10000+NSONR)*100+17                              SYST2310
  718 IF(NCM.EQ.0) GO TO 73                                             SYST2320
      ITYPE=12                                                          SYST2330
      KSHIP=1                                                           SYST2340
      DO 720 I=1,NCM                                                    SYST2350
      IBRS=IBRS+1                                                       SYST2360
      LBRSYS(IBRS)=LCM(I)*100+ITYPE                                     SYST2370
  720 CONTINUE                                                          SYST2380
   73 IF(NASB.EQ.0) GO TO 74                                            SYST2390
      ITYPE=22                                                          SYST2400
      KSHIP=1                                                           SYST2410
      DO 730 I=1,NASB                                                   SYST2420
C                                                                       SYST2430
      IBRS=IBRS+1                                                       SYST2440
      LBRSYS(IBRS)=LASB(I)*100+ITYPE                                    SYST2450
  730 CONTINUE                                                          SYST2460
   74 IF(NAA.EQ.0) GO TO 75                                             SYST2470
      ITYPE=23                                                          SYST2480
      KAIR=1                                                            SYST2490
      DO 740 I=1,NAA                                                    SYST2500
      IBRS=IBRS+1                                                       SYST2510
      LBRSYS(IBRS)=LAA(I)*100+ITYPE                                     SYST2520
  740 CONTINUE                                                          SYST2530
   75 IF(NSAM.EQ.0) GO TO 76                                            SYST2540
      ITYPE=33                                                          SYST2550
      KAIR=1                                                            SYST2560
      DO 750 I=1,NSAM,2                                                 SYST2570
      IBRS=IBRS+1                                                       SYST2580
      LBRSYS(IBRS)=LSAM(I)*100+ITYPE                                    SYST2590
      IBRS=IBRS+1                                                       SYST2600
      LBRSYS(IBRS)=LSAM(I+1)*100+30                                     SYST2610
  750 CONTINUE                                                          SYST2620
   76 IF(NSAG.EQ.0) GO TO 77                                            SYST2630
      IF(NAMP.EQ.NSUB) GO TO 77                                         SYST2640
      ITYPE=43                                                          SYST2650
      KAIR=1                                                            SYST2660
      DO 760 I=1,NSAG                                                   SYST2670
      IBRS=IBRS+1                                                       SYST2680
      LBRSYS(IBRS)=LSAG(I)*100+ITYPE                                    SYST2690
  760 CONTINUE                                                          SYST2700
   77 IF(NASW.EQ.0) GO TO 78                                            SYST2710
      ITYPE=24                                                          SYST2720
      KSUR=1                                                            SYST2730
      DO 770 I=1,NASW                                                   SYST2740
      IBRS=IBRS+1                                                       SYST2750
      LBRSYS(IBRS)=LASW(I)*100+ITYPE                                    SYST2760
  770 CONTINUE                                                          SYST2770
   78 IF(NJAM.EQ.0) GO TO 781                                           SYST2780
      ITYPE=15                                                          SYST2790
      KJAM=1                                                            SYST2800
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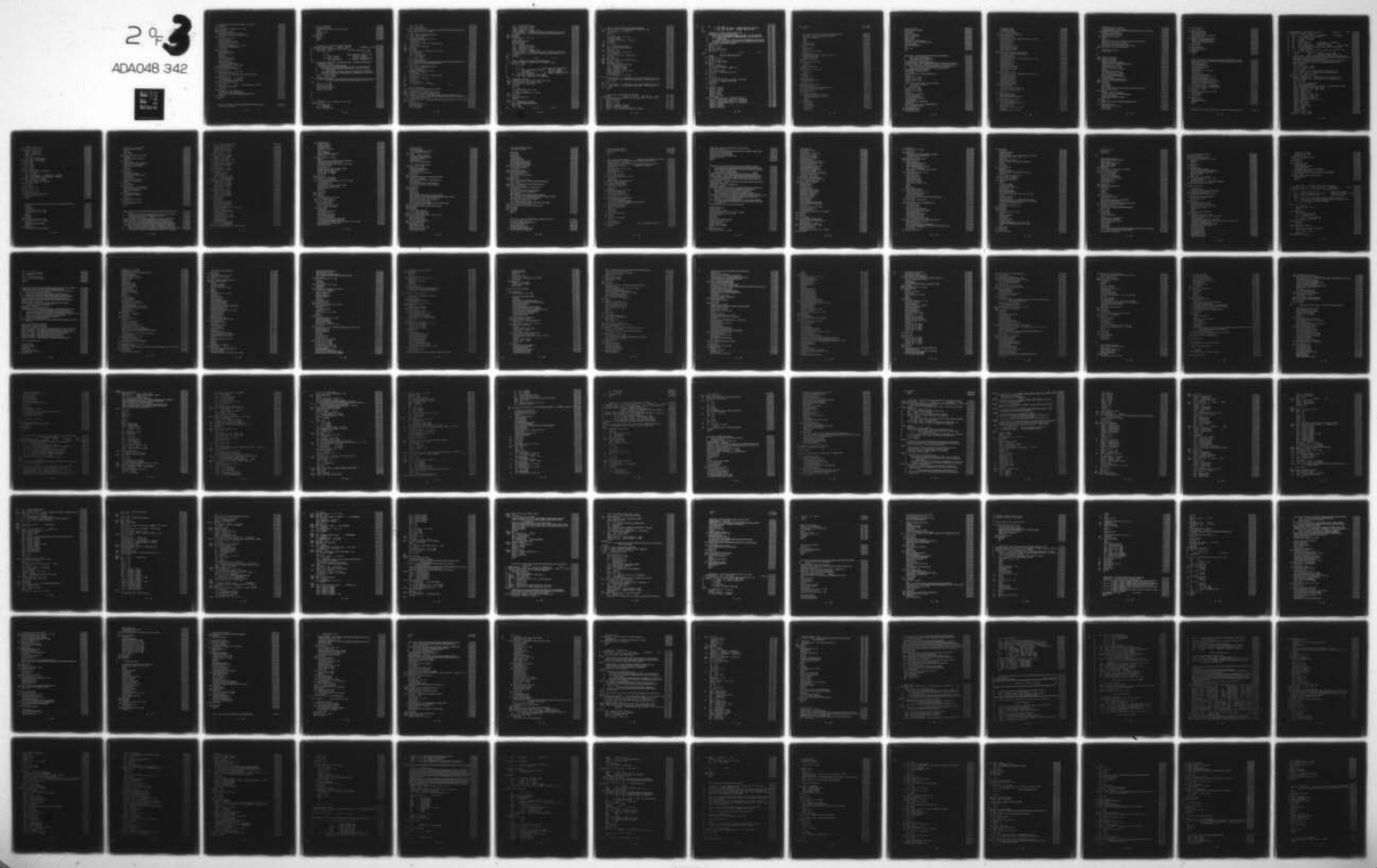
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      DO 780 I=1,NJAM                                                    SYST2810
      IPRS=IPRS+1                                                        SYST2820
      LPRSYS(IPRS)=LJAM(I)*100+ITYPE                                     SYST2830
  780 CONTINUE                                                           SYST2840
  781 IF(NTB.EQ.0) GO TO 783                                             SYST2850
      ITYPE=16                                                           SYST2860
      KSHIP=1                                                            SYST2870
      KSUB=1                                                             SYST2880
      DO 782 I=1,NTB                                                     SYST2890
      IPRS=IPRS+1                                                        SYST2900
      LPRSYS(IPRS)=LTB(I)*100+ITYPE                                      SYST2910
  782 CONTINUE                                                           SYST2920
  783 IF(NAMP.NE.NSHIP) GO TO 785                                        SYST2930
      KSYS=NAIR                                                          SYST2940
 7830 CALL SYSTST(KSYS,LS,NAMS,KSTEMP,NSYS,NAM2)                         SYST2950
      IF(LS.EQ.0) GO TO 785                                              SYST2960
      IPRS=IPRS+1                                                        SYST2970
      LPRSYS(IPRS)=MOD(NAMS,100)*1000000+NAMS/10000*100+20               SYST2980
      GO TO 7830                                                         SYST2990
  785 MASK=KRADR+KSONR*10                                                SYST3000
      MASK=MASK*10+KJAM                                                  SYST3010
C                                                                        SYST3020
C-- TEMPORARY MISSION CONSTRAINT ON RED SUBS                             SYST3030
      IF(NAMP.EQ.NSUB .AND. NAMADD.GT.0) KSUB=0                          SYST3040
C                                                                        SYST3050
      MASK=MASK*10+KSUB                                                  SYST3060
      MASK=MASK*10+KAIR                                                  SYST3070
      MASK=MASK*10+KSHIP                                                 SYST3080
C                                                                        SYST3090
      IF(NAMEPL/NAM3 .NE. NAMADD+624) GO TO 786                          SYST3100
      IF(KRADR.EQ.0) GO TO 786                                           SYST3110
C                                                                        SYST3120
      DO 7850 I=1,10                                                     SYST3130
      IPRS=IPRS+1                                                        SYST3140
 7850 LPRSYS(IPRS)=0                                                     SYST3150
      MASK=(MASK/10C)*100+1000011                                        SYST3160
      GO TO 787                                                          SYST3170
  786 IF(MASK.EQ.0) GO TO 85                                             SYST3180
  787 IPRS=IPRS+1                                                        SYST3190
      LPRSYS(IPRS)=0                                                     SYST3200
      IPRS=IPRS+1                                                        SYST3210
      LPRSYS(IPRS)=0                                                     SYST3220
      IPRS=IPRS+1                                                        SYST3230
      LPRSYS(IPRS)=MASK*10+MOD(NAMP,10)                                  SYST3240
   79 IF(IPRS.LT.ISTART) GO TO 85                                        SYST3250
      LAST=IPRS                                                          SYST3260
      LENGTH=LAST-ISTART+1                                               SYST3270
      ASSIGN 801 TO NU                                                   SYST3280
      DO 800 IU=1,NUNIT                                                  SYST3290
      IF(NAMEPL.NE.KUK(2,IU)) GO TO 800                                  SYST3300
      GO TO NU,(801,802)                                                 SYST3310
  801 LSYST(IU)=ISTART*1000000+LAST*100+IPLAT                            SYST3320
      ASSIGN 802 TO NU                                                   SYST3330
      GO TO 800                                                          SYST3340
  802 LSYST(IU)=(IPRS+1)*1000000+(IPRS+LENGTH)*100+IPLAT                 SYST3350
```

```
      DO 810 I=ISTART,LAST                                              SYST3360
      IBRS=IBRS+1                                                       SYST3370
  810 LBRSYS(IBRS)=LBRSYS(I)                                            SYST3380
      IF(IBRS.LE.LENSYS) GO TO 800                                      SYST3390
      CALL PAGE                                                         SYST3400
      WRITE(N6,6800) IBRS,LENSYS,(LBRSYS(K),K=1,IBRS)                   SYST3410
      STOP                                                              SYST3420
 6800 FORMAT(//6X,'LBRSYS ARRAY LENGTH EXCEEDED',//6X,2I10//            SYST3430
     1     (6X,10I10))                                                  SYST3440
  800 CONTINUE                                                          SYST3450
      GO TO 100                                                         SYST3460
   85 DO 850 IU=1,NUNIT                                                 SYST3470
      IF(NAMEPL.NE.KUK(2,IU)) GO TO 850                                 SYST3480
      LSYST(IU)=IPLAT                                                   SYST3490
  850 CONTINUE                                                          SYST3500
  100 CONTINUE                                                          SYST3510
      DO 900 IU=1,NUNIT                                                 SYST3520
      ISTAT(IU)=1                                                       SYST3530
      LS=LSYST(IU)                                                      SYST3540
      ISA=LS/1000000                                                    SYST3550
      IF(ISA.EQ.0) GO TO 900                                            SYST3560
      ISB=MOD(LS/100,10000)                                             SYST3570
      MASK=LBRSYS(ISB)                                                  SYST3580
      ITYPE=MOD(MASK,10)                                                SYST3590
      IF(ITYPE.NE.2) GO TO 900                                          SYST3600
      IVEC=1                                                            SYST3610
      NPL=KUK(2,IU)/10000                                               SYST3620
      ICAR=0                                                            SYST3630
      IF(MOD(MASK/10000000,10) .EQ. 0) IVEC=0                           SYST3640
      IG=KUK(3,IU)                                                      SYST3650
      IGB=IGPAIR(IG)/100                                                SYST3660
      ISS=ISB-1                                                         SYST3670
      DO 855 I=ISA,ISS                                                  SYST3680
      IS=I-1                                                            SYST3690
      IF(LBRSYS(I).EQ.0) GO TO 856                                      SYST3700
  855 CONTINUE                                                          SYST3710
  856 CONTINUE                                                          SYST3720
      IF(IS.EQ.ISB-2) IVEC=0                                            SYST3730
      IPASS=1                                                           SYST3740
      JS=0                                                              SYST3750
  860 IUB=NWU(IG)                                                       SYST3760
      IUA=IUB/100                                                       SYST3770
      IUB=IUA+MOD(IUB,100)-1                                            SYST3780
      ISYS=12                                                           SYST3790
      DO 870 IUI=IUA,IUB                                                SYST3800
      LS=LSYST(IUI)                                                     SYST3810
      ISUA=LS/1000000                                                   SYST3820
      IF(ISUA.EQ.0) GO TO 870                                           SYST3830
      ISUB=MOD(LS/100,10000)                                            SYST3840
      MASK=LBRSYS(ISUB)                                                 SYST3850
      ISUB=ISUB-1                                                       SYST3860
      KW=MOD(MASK,10)                                                   SYST3870
      IF(IVEC.EQ.0)   GO TO 867                                         SYST3880
      IF(MOD(MASK/10000000,10) .EQ. 1) GO TO 867                        SYST3890
      IST=ISUA-1                                                        SYST3900
```

```
865 ISI=ISI+1                                                          SYST3910
    IF(ISI.GT.ISUB) GO TO 867                                          SYST3920
    IF(MOD(LBRSYS(ISI),100) .NE. ISYS) GO TO 865                       SYST3930
866 IS=IS+1                                                            SYST3940
    JS=JS+1                                                            SYST3950
    IF(JS.GT.10) GO TO 867                                             SYST3960
    LBRSYS(IS)=IUI*100+10                                              SYST3970
867 IF(ICAR.GT.0) GO TO 870                                            SYST3980
    IF(KW.NE.1) GO TO 870                                              SYST3990
    DO 868 ISI=ISUA,ISUB                                               SYST4000
    KSYS=LBRSYS(ISI)                                                   SYST4010
    IF(KSYS/10000000 .EQ. 0) GO TO 868                                 SYST4020
    IF(MOD(KSYS,100) .NE. 20) GO TO 868                                SYST4030
    IF(MOD(KSYS/100,10000) .NE. NPL) GO TO 868                         SYST4040
    ICAR=IUI                                                           SYST4050
    LBRSYS(ISB-2)=(IUI*10000+ISI)*100                                  SYST4060
    GO TO 870                                                          SYST4070
868 CONTINUE                                                           SYST4080
870 CONTINUE                                                           SYST4090
    IF(IPASS.EQ.2) GO TO 900                                           SYST4100
    IF(IGB.EQ.0) GO TO 900                                             SYST4110
    DO 875 I=1,NWG                                                     SYST4120
    IF(MOD(IGPAIR(I),100) .NE. IGB) GO TO 875                          SYST4130
    IG=I                                                               SYST4140
    IPASS=2                                                            SYST4150
    GO TO 860                                                          SYST4160
875 CONTINUE                                                           SYST4170
900 CONTINUE                                                           SYST4180
    DO 905 I=1,NUNIT                                                   SYST4190
905 LSYST(I+NUNIT)=I                                                   SYST4200
    IUNIT=NUNIT                                                        SYST4210
    IUB=2*NUNIT                                                        SYST4220
    DO 920 IPASS=1,11                                                  SYST4230
    IUA=IUNIT+1                                                        SYST4240
    IF(IUA.GT.IUB) GO TO 918                                           SYST4250
    KSYS=LSYS(IPASS)                                                   SYST4260
    KTYPE=LTYPE(IPASS)                                                 SYST4270
    DO 912 IU=IUA,IUB                                                  SYST4280
    JU=LSYST(IU)                                                       SYST4290
    LS=LSYST(JU)                                                       SYST4300
    ISB=MOD(LS/100,10000)                                              SYST4310
    IF(ISB.GT.0) GO TO 907                                             SYST4320
    IF(KSYS.NE.0) GO TO 912                                            SYST4330
    IF(MOD(KUK(2,JU)/1000000,10).NE.KTYPE) GO TO 912                   SYST4340
906 IUNIT=IUNIT+1                                                      SYST4350
    K=LSYST(IUNIT)                                                     SYST4360
    LSYST(IUNIT)=JU                                                    SYST4370
    LSYST(IU)=K                                                        SYST4380
    GO TO 912                                                          SYST4390
907 MASK=LBRSYS(ISB)                                                   SYST4400
    IF(MOD(MASK,10).NE.KTYPE) GO TO 912                                SYST4410
    IF(KSYS) 910,906,908                                               SYST4420
908 ISA=LS/1000000                                                     SYST4430
    ISB=ISB-2                                                          SYST4440
    DO 909 I=ISA,ISB                                                   SYST4450
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AD-A048 342 LTV AEROSPACE CORP DALLAS TEX VOUGHT SYSTEMS DIV F/G 15/7
SEATIDE ANALYSIS PROCESS. VOLUME IID. NAVAL ENGAGEMENT MODEL (N--ETC(U)
FEB 75 DAAB09-72-C-0062
UNCLASSIFIED VSD-00.1636-VOL-2D-REV-A NL

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      IF(MOD(LBRSYS(I),100).EQ.KSYS) GO TO 906                          SYST4460
  909 CONTINUE                                                          SYST4470
      GO TO 912                                                         SYST4480
  910 IF(MASK.GT.10000000) GO TO 906                                    SYST4490
  912 CONTINUE                                                          SYST4500
  918 LSYST(IUR+IPASS)=0                                                SYST4510
      IF(IUNIT.LT.IUA) GO TO 920                                        SYST4520
      LSYST(IUR+IPASS)=IUA*10000+IUNIT                                  SYST4530
  920 CONTINUE                                                          SYST4540
      DO 940 IU=1,NUNIT                                                 SYST4550
      LS=LSYST(IU)                                                      SYST4560
      ISB=MOD(LS/100,10000)                                             SYST4570
      IF(ISB.EQ.0) GO TO 940                                            SYST4580
      MASK=LBRSYS(ISB)                                                  SYST4590
      IF(MASK.LT.10000000) GO TO 925                                    SYST4600
      LBRSYS(ISB-1)=99999990                                            SYST4610
      GO TO 940                                                         SYST4620
  925 ISL=ISB-2                                                         SYST4630
      ISA=LS/1000000                                                    SYST4640
      IPLAT=MOD(LS,100)                                                 SYST4650
      NMSHIP=0                                                          SYST4660
      NMAIR=0                                                           SYST4670
      KTYPE=MOD(MASK,10)                                                SYST4680
      DO 935 IS=ISA,ISL                                                 SYST4690
      JS=LBRSYS(IS)                                                     SYST4700
      KSYS=MOD(JS,100)                                                  SYST4710
      ICOL=MOD(JS/10000,100)                                            SYST4720
      IF(KSYS.NE.12)    GO TO 928                                       SYST4730
  926 K=TTRAJ(3,ICOL)*1.1                                               SYST4740
  927 IF(K.GT.NMSHIP) NMSHIP=K                                          SYST4750
      GO TO 935                                                         SYST4760
  928 IF(KSYS.NE.16)    GO TO 929                                       SYST4770
      K=WPNDAT(1,ICOL)*2.5                                              SYST4780
      IF(KTYPE.EQ.2) K=AIRCPT*PX1(NVALT,IPLAT)*2.                       SYST4790
      GO TO 927                                                         SYST4800
  929 IF(KSYS.EQ.22)    GO TO 926                                       SYST4810
      IF(KSYS.NE.23)    GO TO 931                                       SYST4820
      K=AIRCPT*PX1(NVALT,IPLAT)*2.                                      SYST4830
  930 IF(K.GT.NMAIR) NMAIR=K                                            SYST4840
      GO TO 935                                                         SYST4850
  931 IF(KSYS.NE.30    .AND.    KSYS.NE.43) GO TO 935                   SYST4860
      K=SAMDAT(1,ICOL)*3.5                                              SYST4870
      GO TO 930                                                         SYST4880
  935 CONTINUE                                                          SYST4890
      IF(NMAIR.GT.999) NMAIR=999                                        SYST4900
      IF(NMSHIP.GT.999) NMSHIP=999                                      SYST4910
      LBRSYS(ISB-1)=NMAIR*100000+NMSHIP*100+90                          SYST4920
  940 CONTINUE                                                          SYST4930
      RETURN                                                            SYST4940
      END                                                               SYST4950


      SUBROUTINE SYSTST (KSYS,LS,NAMSYS,KSTEMP,NSYS,LDIV)               SYST0010
      DIMENSION KSTEMP(1)                                               SYST0020
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      DO 100 IS=1,NSYS                                                  SYST0030
      NAMSYS=KSTEMP(IS)                                                 SYST0040
      IF(NAMSYS/LDIV .NE. KSYS) GO TO 100                               SYST0050
      LS=IS                                                             SYST0060
      KSTEMP(IS)=0                                                      SYST0070
      RETURN                                                            SYST0080
  100 CONTINUE                                                          SYST0090
      LS=0                                                              SYST0100
      RETURN                                                            SYST0110
      END                                                               SYST0120


      SUBROUTINE  ALLXYZ(TIME,IPRINT,N6,IXX)                            AXYZ0010
C   PGM=NEM. EVAN COTTEN.       VER.5   9-7-73          FORTRAN IV  EBCD AXYZ0020
C   TO PUT CURRENT POSITIONS IN ALL UNITS                               AXYZ0030
C       BXYZ(I,1) = TIME,              FOR RED---RXYZ(I,1) = TIME       AXYZ0040
C                 2  = X                                    2) = ETC.   AXYZ0050
C                 3  = Y                                                AXYZ0060
C                 4  = Z                  NOTE. TIME AND POSITION ARE   AXYZ0070
C                 5  = HEAD, RADIANS            LEFT AS IS WHEN         AXYZ0080
C                 6  = VEL , KNOTS              STATUS = KBUK(4,I)= 0   AXYZ0090
C                 7  = VERT.VEL.,KNOTS      OR  STATUS = KRUK(4,I)= 0   AXYZ0100
C**                                                                     AXYZ0110
      COMMON/GNAV/ BGCV(8,5,18),RGCV(8,5,18), INTVLB(38),INTVLR(38)     AXYZ0120
       DIMENSION  XYZ(6)                                                AXYZ0130
       COMMON/CNAVIG/ NGMX,BE,BF,RE,RF,                                 AXYZ0140
     1      NBG,BA,BB,BC,BD,KBGN(18),KBGK(18),BGC( 8,6,18),NBU(18),     AXYZ0150
     2      NRG,RA,RB,RC,RD,KRGN(18),KRGK(18),RGC( 8,6,18),NRU(18),     AXYZ0160
     3           TTIME,NUMX,                                            AXYZ0170
     4      KBU,KBUK(4,50),BREL(4,50),BXYZ(50,7),NAMBU(50,2),BV(50,8),  AXYZ0180
     5      KRU,KRUK(4,50),RREL(4,50),RXYZ(50,7),NAMRU(50,2),RV(50,8)   AXYZ0190
       DATA  RAD/0.0174533/                                             AXYZ0200
       DATA       ISW/  54321/                                          AXYZ0210
C**   STATEMENT FUNCTIONS                                               AXYZ0220
       FRSMIN(X)=FLOAT(IFIX(X))+FLOAT(IFIX((X-FLOAT(IFIX(X)))*60.5)/60) AXYZ0230
     1          + FLOAT(MOD(IFIX((X-FLOAT(IFIX(X)))*60.5 ),60)) *.01    AXYZ0240
C**                                                                     AXYZ0250
       ASSIGN 14 TO IBSW                                                AXYZ0260
       ASSIGN 34 TO IRSW                                                AXYZ0270
       IF(IXX.EQ.ISW) GO TO 1                                           AXYZ0280
       ASSIGN 15 TO IBSW                                                AXYZ0290
       ASSIGN 35 TO IRSW                                                AXYZ0300
C                                                                       AXYZ0310
C                                                                       AXYZ0320
C                                                                       AXYZ0330
C                                                                       AXYZ0340
C                                                                       AXYZ0350
C                                                                       AXYZ0360
  1    IXX = 0                                                          AXYZ0370
   10  IF (NBG.LE.0. OR .KBU.LE.0)  GO TO 31                            AXYZ0380
C**   BLU UNITS                                                         AXYZ0390
       DO 24 KG=1,NBG                                                   AXYZ0400
       KL  = NBU(KG)                                                    AXYZ0410
       KUG = MOD(KL,100)                                                AXYZ0420
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      KL   = KL / 100                                                    AXYZ0430
      KLA = KL + KUG - 1                                                 AXYZ0440
      GO TO IRSW,(14,15)                                                 AXYZ0450
   14 CALL GRPMOV(TIME,XYZ,IXY,RGC(1,1,KG),RGCV(1,1,KG),INTVLR(KG))      AXYZ0460
      IF(INTVLR(KG).LT.0) IXX=10                                         AXYZ0470
      GO TO 16                                                           AXYZ0480
   15 CALL  RLUXYZ(TIME,KG,XYZ,IXY)                                      AXYZ0490
      IXX = IXX + IXY*IXY                                                AXYZ0500
   16 DO 24 KU=KL,KLA                                                    AXYZ0510
      IF(KRUK(4,KU).EQ.0) GO TO 24                                       AXYZ0520
      RXYZ(KU,1) = TIME                                                  AXYZ0530
      DO 20 I=2,4                                                        AXYZ0540
   20 RXYZ(KU,I) = XYZ(I-1) + RREL(I-1,KU)                               AXYZ0550
      DO 22 I=5,7                                                        AXYZ0560
   22 RXYZ(KU,I) = XYZ(I-1)                                              AXYZ0570
   24 CONTINUE                                                           AXYZ0580
C**   RED UNITS                                                          AXYZ0590
   31 IF (NRG.LE.0. OR .KRU.LE.0)  GO TO 50                              AXYZ0600
      DO 44 KG=1,NRG                                                     AXYZ0610
      KL   = NRU(KG)                                                     AXYZ0620
      KUG = MOD(KL,100)                                                  AXYZ0630
      KL   = KL / 100                                                    AXYZ0640
      KLA = KL + KUG - 1                                                 AXYZ0650
      GO TO IRSW,(34,35)                                                 AXYZ0660
   34 CALL GRPMOV(TIME,XYZ,IXY,RGC(1,1,KG),RGCV(1,1,KG),INTVLR(KG))      AXYZ0670
      IF(INTVLR(KG).LT.0) IXX=IXX/10*10+1                                AXYZ0680
      GO TO 36                                                           AXYZ0690
   35 CALL  REDXYZ(TIME,KG,XYZ,IXY)                                      AXYZ0700
      IXX = IXX + IXY*IXY                                                AXYZ0710
   36 DO 44 KU=KL,KLA                                                    AXYZ0720
      IF(KRUK(4,KU).EQ.0) GO TO 44                                       AXYZ0730
      RXYZ(KU,1) = TIME                                                  AXYZ0740
      DO 40 I=2,4                                                        AXYZ0750
   40 RXYZ(KU,I) = XYZ(I-1) + RREL(I-1,KU)                               AXYZ0760
      DO 42 I=5,7                                                        AXYZ0770
   42 RXYZ(KU,I) = XYZ(I-1)                                              AXYZ0780
   44 CONTINUE                                                           AXYZ0790
   50 TTIME = TIME                                                       AXYZ0800
      IF (IPRINT.LE.0)  RETURN                                           AXYZ0810
C**       * * *                 * * *                 * * *              AXYZ0820
C**                                                                      AXYZ0830
      ENTRY  PRXYZ(N6)                                                   AXYZ0840
C  TO PRINT CURRENT POSITION OF ALL UNITS                                AXYZ0850
   52 IF (KRU.LE.0)  GO TO 58                                            AXYZ0860
 2000 FORMAT(6X,'BLU UNITS, TOTAL=',I5)                                  AXYZ0870
 2002 FORMAT(6X,'RED UNITS, TOTAL=',I5)                                  AXYZ0880
 2004 FORMAT( 5X,' UNIT  NAME',10X,'CODE',6X,'TYPE GRUP STAT',6X,        AXYZ0890
     1  'TIME',5X,'X-NM',6X,'Y-NM',5X,'Z-KFT',5X,'HEAD',6X,'VEL-KT',4X,  AXYZ0900
     2  'Z-KF/M',4X,'HOURS' )                                           AXYZ0910
 2006 FORMAT( 5X,I4,'.  ',2A4,2I10,2I5,F10.2,3F10.3,2F10.2,F10.3,F10.4)  AXYZ0920
C**   BLU UNITS                                                          AXYZ0930
      CALL  PAGE                                                         AXYZ0940
      WRITE(N6,2000) KRU                                                 AXYZ0950
      WRITE(N6,2004)                                                     AXYZ0960
      DO 56 J=1,KRU                                                      AXYZ0970
```

```
      TIM   = HRSMIN(BXYZ(J,1))                                          AXYZ0980
      ZKFT = BXYZ(J,4) * 6.080                                           AXYZ0990
      HEAD = BXYZ(J,5) / RAD                                             AXYZ1000
      ZFPM = BXYZ(J,7) * 6.080 / 60.                                     AXYZ1010
      WRITE(N6,2006)   J,(NAMBU( J,I),I=1,2),(KBUK(I, J),I=1,4),         AXYZ1020
     1   TIM,(BXYZ(J,I),I=2,3),ZKFT,HEAD,BXYZ(J,6),ZFPM,BXYZ(J,1)        AXYZ1030
 56   CONTINUE                                                           AXYZ1040
C**  RED UNITS                                                          AXYZ1050
 58   IF (KRU.LE.0)  GO TO 64                                            AXYZ1060
      CALL  PAGE                                                         AXYZ1070
      WRITE(N6,2002) KRU                                                 AXYZ1080
      WRITE(N6,2004)                                                     AXYZ1090
      DO 62 J=1,KRU                                                      AXYZ1100
      TIM   = HRSMIN(RXYZ(J,1))                                          AXYZ1110
      ZKFT = RXYZ(J,4) * 6.080                                           AXYZ1120
      HEAD = RXYZ(J,5) / RAD                                             AXYZ1130
      ZFPM = RXYZ(J,7) * 6.080 / 60.                                     AXYZ1140
      WRITE(N6,2006)   J,(NAMRU( J,I),I=1,2),(KRUK(I, J),I=1,4),         AXYZ1150
     1   TIM,(RXYZ(J,I),I=2,3),ZKFT,HEAD,RXYZ(J,6),ZFPM,RXYZ(J,1)        AXYZ1160
 62   CONTINUE                                                           AXYZ1170
 64   RETURN                                                             AXYZ1180
C**           * * *          * * *                 * * *                AXYZ1190
C                                                                       AXYZ1200
      ENTRY  BUNXYZ(TIME,KU,UXYZ,IPRINT,NG,IXX)                          AXYZ1210
C  TO FIND POSITION OF A SINGLE UNIT IN A GROUP - BLU                   AXYZ1220
C     UXYZ(1) =  TIME                                                   AXYZ1230
C          2  =  X                                                      AXYZ1240
C          3  =  Y                                                      AXYZ1250
C          4  =  Z                          NOTE. TIME AND POSITION ARE AXYZ1260
C          5  =  HEAD, RADIANS(PRINT DEG)     LEFT AS IS WHEN           AXYZ1270
C          6  =  VEL, KNOTS                   STATUS = KBUK(4,I) = 0    AXYZ1280
C          7  =  VERT.VEL.,KNOTS           OR  STATUS = KRUK(4,I) = 0    AXYZ1290
C     KU  = LINE NO. OF UNIT IF  KU.LT.1000                              AXYZ1300
C         = UNIT CODE, OTHERWISE, E.G. 2020100                           AXYZ1310
C**                                                                     AXYZ1320
      DIMENSION  UXYZ(7)                                                 AXYZ1330
 2010 FORMAT(1H0,5X,'UNIT XYZ FOR UNIT NO.=',I5)                         AXYZ1340
 2012 FORMAT(1H0,5X'NO UNIT NO.=',I10)                                   AXYZ1350
 100  IF (KBU.LE.0)  GO TO 1021                                          AXYZ1360
      KTRAN = 1                                                          AXYZ1370
      IXX = 0                                                            AXYZ1380
      K   = KU                                                           AXYZ1390
      IF (KU.LT.1000)  GO TO 104                                         AXYZ1400
      DO 102 J = 1, KBU                                                  AXYZ1410
      IF (KBUK(1,J).EQ.KU)  GO TO 103                                    AXYZ1420
 102  CONTINUE                                                           AXYZ1430
 1021 IXX = 2                                                            AXYZ1440
      WRITE(N6,2012) KU                                                  AXYZ1450
      RETURN                                                             AXYZ1460
 103  K   = J                                                            AXYZ1470
 104  KG  = MOD(KBUK(3,K),100)                                           AXYZ1480
     CALL BLUXYZ(TIME,KG,XYZ,IXY)                                        AXYZ1490
      IXX = IXY                                                          AXYZ1500
      GO TO 118                                                          AXYZ1510
C**           * * *          * * *                 * * *                AXYZ1520
```

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C                                                                       AXYZ1530
      ENTRY  RUNXYZ(TIME,KU,UXYZ,IPRINT,NG,IXX)                         AXYZ1540
C  TO FIND POSITION OF A SINGLE UNIT IN A GROUP - RED                   AXYZ1550
 110  IF (KRU.LE.0)  GO TO 1021                                         AXYZ1560
      KTRAN = 2                                                         AXYZ1570
      IXX = 0                                                           AXYZ1580
      K   = KU                                                          AXYZ1590
      IF (KU.LT.1000)  GO TO 114                                        AXYZ1600
      DO 112 J=1,KRU                                                    AXYZ1610
      IF (KRUK(1,J).EQ.KU)  GO TO 113                                   AXYZ1620
 112  CONTINUE                                                          AXYZ1630
      GO TO 1021                                                        AXYZ1640
 113  K   = J                                                           AXYZ1650
 114  KG  = MOD(KRUK(3,K),100)                                          AXYZ1660
      CALL REDXYZ(TIME,KG,XYZ,IXY)                                      AXYZ1670
      IXX = IXY                                                         AXYZ1680
 118  UXYZ(1) = TIME                                                    AXYZ1690
      IF (KTRAN.EQ.2)  GO TO 122                                        AXYZ1700
      DO 120 J=2,4                                                      AXYZ1710
 120  UXYZ(J) = XYZ(J-1) + BREL(J-1,K )                                 AXYZ1720
      GO TO 126                                                         AXYZ1730
 122  DO 124 J=2,4                                                      AXYZ1740
 124  UXYZ(J) = XYZ(J-1) + RREL(J-1,K )                                 AXYZ1750
 126  DO 128 J=5,7                                                      AXYZ1760
 128  UXYZ(J) = XYZ(J-1)                                                AXYZ1770
      IF (IPRINT.LE.0)  GO TO 134                                       AXYZ1780
      TIM  = HRSMIN(UXYZ(1))                                            AXYZ1790
      ZKFT = UXYZ(4) * 6.080                                            AXYZ1800
      HEAD = UXYZ(5) / RAD                                              AXYZ1810
      ZFPM = UXYZ(7) * 6.080 / 60.                                      AXYZ1820
      WRITE(N6,2010) KU                                                 AXYZ1830
      WRITE(N6,2004)                                                    AXYZ1840
      IF (KTRAN.EQ.2)  GO TO 132                                        AXYZ1850
C**  BLU                                                               AXYZ1860
      WRITE(N6,2006)  K ,(NAMBU(K ,I),I=1,2),(KBUK(I,K ),I=1,4),        AXYZ1870
     1   TIM,(UXYZ(  I),I=2,3),ZKFT,HEAD,UXYZ(  6),ZFPM,UXYZ(  1)       AXYZ1880
      GO TO 134                                                         AXYZ1890
C**  RED                                                               AXYZ1900
 132  WRITE(N6,2006)  K ,(NAMRU(K ,I),I=1,2),(KRUK(I,K ),I=1,4),        AXYZ1910
     1   TIM,(UXYZ(  I),I=2,3),ZKFT,HEAD,UXYZ(  6),ZFPM,UXYZ(  1)       AXYZ1920
 134  RETURN                                                            AXYZ1930
      END                                                               AXYZ1940


      SUBROUTINE BLUXYZ(TIME,KG,XYZ,IXX)                                XYZ 0010
C  PGM=NXX.              VER.2     9-7-73     FORTRAN IV      EBCD     XYZ 0020
C  TO INTERPOLATE FOR POSITION, VECTOR, AND ZDOT  AT TIME GIVEN        XYZ 0030
C     AND FOR GROUP KG                                                 XYZ 0040
C     XYZ(1) = X, NM                                                   XYZ 0050
C     XYZ(2) = Y, NM                                                   XYZ 0060
C     XYZ(3) = Z, NM                                                   XYZ 0070
C     XYZ(4) = HEADING, RADIANS                                        XYZ 0080
C     XYZ(5) = VELOCITY, KNOTS                                         XYZ 0090
C     XYZ(6) = ZDOT (VERTICAL VELOCITY), KNOTS                         XYZ 0100
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C                                                                       XYZ 0110
C      IXX     =  0, IF O.K.                                            XYZ 0120
C              = -1, IF TIME TOO EARLY.  RETURN EARLIEST POSITION       XYZ 0130
C              = +1, IF TIME TOO LATE.   RETURN LAST POSITION           XYZ 0140
C**                                                                     XYZ 0150
      DIMENSION  XYZ(6), A(8,6), H(8), V(8)                             XYZ 0160
      COMMON/CNAVIG/ NGMX,BE,BF,RE,RF,                                  XYZ 0170
     1     NBG,BA,BB,BC,BD,KBGN(18),KBGK(18),BGC( 8,6,18),NBU(18),      XYZ 0180
     2     NRG,RA,RB,RC,RD,KRGN(18),KRGK(18),RGC( 8,6,18),NRU(18),      XYZ 0190
     3          TTIME,NUMX,                                            XYZ 0200
     4     KBU,KBUK(4,50),BREL(4,50),BXYZ(50,7),NAMBU(50,2),BV(50,8),   XYZ 0210
     5     KRU,KRUK(4,50),RREL(4,50),RXYZ(50,7),NAMRU(50,2),RV(50,8)    XYZ 0220
      DATA RAD,PI/.0174533,3.14159/                                     XYZ 0230
    1 KTRAN = 1                                                         XYZ 0240
      DO 10 I = 2, 8                                                    XYZ 0250
      DO 10 J = 1, 6                                                    XYZ 0260
   10 A(I,J) = BGC(I,J,KG)                                              XYZ 0270
      GO TO 30                                                          XYZ 0280
C**                  * * *                 * * *                * * *  XYZ 0290
C                                                                       XYZ 0300
      ENTRY        REDXYZ(TIME,KG,XYZ,IXX)                              XYZ 0310
   11 KTRAN = 2                                                         XYZ 0320
      DO 20 I = 2, 8                                                    XYZ 0330
      DO 20 J = 1, 6                                                    XYZ 0340
   20 A(I,J) = RGC(I,J,KG)                                              XYZ 0350
   30 IXX = 0                                                           XYZ 0360
      DO 40 I = 2, 8                                                    XYZ 0370
      H(I) = AINT(A(I,5))                                               XYZ 0380
      J = (A(I,5) - H(I)) * 1000. + .9                                  XYZ 0390
      V(I) = J                                                          XYZ 0400
   40 H(I) = H(I) * RAD                                                 XYZ 0410
      IF (TIME - A(2,1)) 50, 60, 60                                     XYZ 0420
   50 IXX = -1                                                          XYZ 0430
      I = 2                                                             XYZ 0440
      GO TO 80                                                          XYZ 0450
   60 DO 70 I = 2, 8                                                    XYZ 0460
      IF (ABS(A(I,1)-TIME).LE..0001)  GO TO 80                          XYZ 0470
      IF (A(I,1) - TIME) 70, 80, 90                                     XYZ 0480
   70 CONTINUE                                                          XYZ 0490
      IXX = 1                                                           XYZ 0500
      I = 8                                                             XYZ 0510
   80 XYZ(1) = A(I,2)                                                   XYZ 0520
      XYZ(2) = A(I,3)                                                   XYZ 0530
      XYZ(3) = A(I,4)                                                   XYZ 0540
      XYZ(4) = H(I)                                                     XYZ 0550
      XYZ(5) = V(I)                                                     XYZ 0560
      XYZ(6) = A(I,6)                                                   XYZ 0570
      GO TO 100                                                         XYZ 0580
   90 R = (TIME-A(I-1,1)) / (A(I,1)-A(I-1,1))                           XYZ 0590
      XYZ(1) = (A(I,2)-A(I-1,2)) * R + A(I-1,2)                         XYZ 0600
      XYZ(2) = (A(I,3)-A(I-1,3)) * R + A(I-1,3)                         XYZ 0610
      XYZ(3) = (A(I,4)-A(I-1,4)) * R + A(I-1,4)                         XYZ 0620
      XYZ(4) = H(I-1)                                                   XYZ 0630
      XYZ(5) = V(I-1)                                                   XYZ 0640
      XYZ(6) = A(I-1,6)                                                 XYZ 0650
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100  RETURN                                                          XYZ 0660
     END                                                             XYZ 0670


     SUBROUTINE GRPMOV(TIME,XYZ,IXX,GC,GCV,LAST)                     GRPM0010
     DIMENSION XYZ(1), GC(8,6), GCV(8,5)                             GRPM0020
     DATA PI /3.141593/                                              GRPM0030
     IR=0                                                            GRPM0040
     IXX=0                                                           GRPM0050
     IS=0                                                            GRPM0060
     L=IABS(LAST)                                                    GRPM0070
   1 IF(L-8) 5,10,2                                                  GRPM0080
   2 IR=1                                                            GRPM0090
     L=MOD(L,10)                                                     GRPM0100
     GO TO 1                                                         GRPM0110
   5 IF(L.EQ.1) GO TO 935                                            GRPM0120
     L=L+1                                                           GRPM0130
  10 DELT=TIME-GC(L,1)                                               GRPM0140
     IF(ABS(DELT) .LT.  .0002) GO TO 80                              GRPM0150
     IF(DELT) 90,80,70                                               GRPM0160
  70 IF(IS) 94,72,73                                                 GRPM0170
  72 IS=1                                                            GRPM0180
  73 IF(L.EQ.8) GO TO 78                                             GRPM0190
     L=L+1                                                           GRPM0200
     GO TO 10                                                        GRPM0210
  90 IF(IS) 91,92,93                                                 GRPM0220
  92 IS=-1                                                           GRPM0230
  91 IF(L.EQ.2) GO TO 79                                             GRPM0240
     L=L-1                                                           GRPM0250
     GO TO 10                                                        GRPM0260
  78 IXX=1                                                           GRPM0270
     GO TO 80                                                        GRPM0280
  79 IXX=-1                                                          GRPM0290
  80 DO 85 I=1,3                                                     GRPM0300
  85 XYZ(I)=GC(L,I+1)                                                GRPM0310
     GO TO 100                                                       GRPM0320
  93 L=L-1                                                           GRPM0330
 935 DELT=TIME-GC(L,1)                                               GRPM0340
  94 DO 95 I=1,3                                                     GRPM0350
  95 XYZ(I)=GC(L,I+1)+DELT*GCV(L,I)                                  GRPM0360
 100 IF(IR.GT.0) GO TO 200                                           GRPM0370
 102 DO 110 I=4,6                                                    GRPM0380
     K=9-I                                                           GRPM0390
 110 XYZ(I)=GCV(L,K)                                                 GRPM0400
     IF(GCV(L,3).NE.0.) LAST=100                                     GRPM0410
     IF(IABS(LAST).NE.L) L=-L                                        GRPM0420
     LAST=L                                                          GRPM0430
     RETURN                                                          GRPM0440
 200 X=GC(1,5)                                                       GRPM0450
     Y=GC(1,6)                                                       GRPM0460
     DX=X-XYZ(1)                                                     GRPM0470
     DY=Y-XYZ(2)                                                     GRPM0480
     GC(1,2)=X                                                       GRPM0490
     GC(1,3)=Y                                                       GRPM0500
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      GC(1,4)=XYZ(3)                                                    GRPM0510
      GR=SQRT(DY*DY+DX*DX)                                              GRPM0520
      V=GCV(L,4)                                                        GRPM0530
      DELT=GR/V                                                         GRPM0540
      GCV(1,1)=V*DX/GR                                                  GRPM0550
      GCV(1,2)=V*DY/GR                                                  GRPM0560
      GCV(1,3)=0.                                                       GRPM0570
      GCV(1,4)=V                                                        GRPM0580
      HEAD=PI*.5-ATAN2(DY,DX)                                           GRPM0590
      IF(HEAD.LT.0.) HEAD=HEAD+2.*PI                                    GRPM0600
      GCV(1,5)=HEAD                                                     GRPM0610
      GC(1,1)=TIME+DELT                                                 GRPM0620
      L=1                                                               GRPM0630
      GO TO 102                                                         GRPM0640
      END                                                               GRPM0650


      SUBROUTINE TUXYZ(NWTU,IWTU,INVWTU,TUWXYZ,MAXWTU,                  TUXY0010
     A     KWUK,INTVLW,WXYZ,WGCV,                                       TUXY0020
     1     KTU,INTVLT,KTUK,TXYZ,TGCV,                                   TUXY0030
     2     TTRAJ,IVEC,ITEM,IDU1)                                        TUXY0040
      COMMON/ECONST/ VAR(15),IMISC(35)                                  TUXY0050
      COMMON /ETIME/ TIME,TIMEA,TIMEB,TBEGIN,TIMEND,TIMAX,TSTEP         TUXY0060
      DIMENSION TUWXYZ(8,1),INVWTU(1),KTUK(4,1),IWTU(1),INTVLT(1),      TUXY0070
     1     TXYZ(IDU1,7),TGCV(8,5,1),TUTXYZ(8,1),TTRAJ(50,1)             TUXY0080
     2,    KWUK(4,1),INTVLW(1),WXYZ(IDU1,1),WGCV(8,5,1)                 TUXY0090
      EQUIVALENCE(IMISC(3),NLPR)                                        TUXY0100
      EQUIVALENCE (VAR(8),AIRCPT)                                       TUXY0110
      DATA N6/6/                                                        TUXY0120
      NAMELIST/LOSTGT/ TIME,IW,NAME,ITGT                                TUXY0130
      ITEM=0                                                            TUXY0140
      ASSIGN 120 TO ISWT                                                TUXY0150
      ASSIGN 102 TO JSWT                                                TUXY0160
      ASSIGN 101 TO KSWT                                                TUXY0170
      GO TO 1                                                           TUXY0180
      ENTRY TU2XYZ(NWTU,IWTU,INVWTU,TUWXYZ,                             TUXY0190
     1     KTU,INTVLT,TUTXYZ,                                           TUXY0200
     2     IVEC,IDU1)                                                   TUXY0210
      ASSIGN 10 TO ISWT                                                 TUXY0220
      ASSIGN 103 TO JSWT                                                TUXY0230
      ASSIGN 150 TO KSWT                                                TUXY0240
    1 IVEC=0                                                            TUXY0250
      IF(NWTU.LE.0) RETURN                                              TUXY0260
      DO 150 IW=1,NWTU                                                  TUXY0270
      KV=IABS(INVWTU(IW))                                               TUXY0280
      IF(KV.EQ.0) GO TO 150                                             TUXY0290
      IWT=IWTU(IW)                                                      TUXY0300
      ITGT=MOD(IWT/100000,1000)                                         TUXY0310
      JTGT=ITGT                                                         TUXY0320
      IF(ITGT.GT.KTU) GO TO ISWT,(120,10)                               TUXY0330
      GO TO KSWT,(150,101)                                              TUXY0340
   10 ITGT=ITGT-KTU                                                     TUXY0350
  101 NAME=MOD(IWT,10)                                                  TUXY0360
      WX=TUWXYZ(1,IW)                                                   TUXY0370
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      WY=TUWXYZ(2,IW)                                                   TUXY0380
      WZ=TUWXYZ(3,IW)                                                   TUXY0390
      TVEC=TUWXYZ(8,IW)                                                 TUXY0400
      GO TO JSWT,(102,103)                                              TUXY0410
  102 IF(ITGT.EQ.0) GO TO 1025                                          TUXY0420
      ITG=KTUK(3,ITGT)                                                  TUXY0430
      LEGT=INTVLT(ITG)                                                  TUXY0440
      IF(LEGT.GT.0 .AND. TVEC.GT.TIME) GO TO 113                        TUXY0450
      LEG=IABS(LEGT)                                                    TUXY0460
      TX=TXYZ(ITGT,2)                                                   TUXY0470
      TY=TXYZ(ITGT,3)                                                   TUXY0480
      TZ=TXYZ(ITGT,4)                                                   TUXY0490
      TVX=TGCV(LEG,1,ITG)                                               TUXY0500
      TVY=TGCV(LEG,2,ITG)                                               TUXY0510
      TVZ=TGCV(LEG,3,ITG)                                               TUXY0520
      GO TO 104                                                         TUXY0530
 1025 ITGT=MOD(IWTU(MAXWTU+IW),10000)                                   TUXY0540
      IF(ITGT.GT.100) ITGT=ITGT/100                                     TUXY0550
      ITG=KWUK(3,ITGT)                                                  TUXY0560
      LEGT=INTVLW(ITG)                                                  TUXY0570
      IF(LEGT.GT.0 .AND. TVEC.GT.TIME) GO TO 113                        TUXY0580
      LEG=IABS(LEGT)                                                    TUXY0590
      TX=WXYZ(ITGT,2)                                                   TUXY0600
      TY=WXYZ(ITGT,3)                                                   TUXY0610
      TZ=WXYZ(ITGT,4)                                                   TUXY0620
      TVX=WGCV(LEG,1,ITG)                                               TUXY0630
      TVY=WGCV(LEG,2,ITG)                                               TUXY0640
      TVZ=WGCV(LEG,3,ITG)                                               TUXY0650
      GO TO 104                                                         TUXY0660
  103 LEGT=INTVLT(ITGT)                                                 TUXY0670
      IF(LEGT.GT.0 .AND. TVEC.GT.TIME) GO TO 113                        TUXY0680
      TX=TUTXYZ(1,ITGT)                                                 TUXY0690
      TY=TUTXYZ(2,ITGT)                                                 TUXY0700
      TZ=TUTXYZ(3,ITGT)                                                 TUXY0710
      TVX=TUTXYZ(4,ITGT)                                                TUXY0720
      TVY=TUTXYZ(5,ITGT)                                                TUXY0730
      TVZ=TUTXYZ(6,ITGT)                                                TUXY0740
  104 NV=MOD(KV/10,10)                                                  TUXY0750
      IV=MOD(KV,10)                                                     TUXY0760
      IF(IV.NE.0) GO TO 106                                             TUXY0770
      IF(TVEC.GE.TIME) GO TO 105                                        TUXY0780
      IF(NV.GT.0) GO TO 140                                             TUXY0790
      NV=1                                                              TUXY0800
  105 WVX=TUWXYZ(4,IW)                                                  TUXY0810
      WVY=TUWXYZ(5,IW)                                                  TUXY0820
      WV=SQRT(WVX*WVX+WVY*WVY)                                          TUXY0830
      GO TO 108                                                         TUXY0840
  106 NTRAJ=MOD(IWT/10,100)                                             TUXY0850
      IOFF=(IV-1)*25                                                    TUXY0860
      LV=TTRAJ(IOFF+2,NTRAJ)+.01                                        TUXY0870
      LADJ=MOD(LV,100)                                                  TUXY0880
      LV=LV/100                                                         TUXY0890
      IF(TVEC.GT.TIME) GO TO 107                                        TUXY0900
      NV=NV+1                                                           TUXY0910
      IF(NV.GT.LV) GO TO 140                                            TUXY0920
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      IF(NAME.NE.4) GO TO 107                                          TUXY0930
      IF(NV.NE.LADJ+1) GO TO 107                                       TUXY0940
      IWTU(MAXWTU+IW)=100000000+MOD(IWTU(MAXWTU+IW),100000000)         TUXY0950
  107 NOFF=(NV-1)*4+IOFF+4                                             TUXY0960
      WV=TTRAJ(NOFF+3,NTRAJ)                                           TUXY0970
      IF(WV.LT.0.) GO TO 140                                           TUXY0980
  108 NS=MOD(KV/100,100)                                               TUXY0990
      S=NS                                                             TUXY1000
      IVEC=1                                                           TUXY1010
      CALL INCEPT(TX,TY,TVX,TVY,WX,WY,WV,WVX,WVY,DELTI)                TUXY1020
      IF(DELTI.LT.0.) GO TO 1080                                       TUXY1030
      IF(DELTI.LT.AIRCPT) GO TO 1083                                   TUXY1040
      IF(IV.NE.0 .OR. JTGT.EQ.0) GO TO 1083                            TUXY1050
 1080 IF(NLPR.GT.0) WRITE(N6,LOSTGT)                                   TUXY1060
C                                                                      TUXY1070
      TUWXYZ(7,IW)=-100.                                               TUXY1080
      GO TO 150                                                        TUXY1090
C                                                                      TUXY1100
C                                                                      TUXY1110
C                                                                      TUXY1120
 1083 TINCPT=TIME+DELTI                                                TUXY1130
 1084 TUWXYZ(4,IW)=WVX                                                 TUXY1140
      TUWXYZ(5,IW)=WVY                                                 TUXY1150
      TUWXYZ(7,IW)=TINCPT-TSTEP                                        TUXY1160
      INVWTU(IW)=-(KV/100*100+NV*10+IV)                                TUXY1170
      IF(IV.EQ.0) GO TO 110                                            TUXY1180
      IF(NV.EQ.LV) GO TO 109                                           TUXY1190
      RTEST=TTRAJ(NOFF+6,NTRAJ)                                        TUXY1200
      N=NV+1                                                           TUXY1210
      HN=TTRAJ(NOFF+5,NTRAJ)                                           TUXY1220
      IF(N.NE.LADJ) GO TO 1085                                         TUXY1230
      HNP1=TTRAJ(NOFF+9,NTRAJ)                                         TUXY1240
      RNP1=TTRAJ(NOFF+10,NTRAJ)                                        TUXY1250
      DR=RTEST-RNP1                                                    TUXY1260
      HN=HNP1+(HN-HNP1)*(DR-S)/DR                                      TUXY1270
 1085 IF(NV.LT.LADJ) RTEST=RTEST-S                                     TUXY1280
10855 DX=TX-WX                                                         TUXY1290
      DY=TY-WY                                                         TUXY1300
      VX=TVX-WVX                                                       TUXY1310
      VY=TVY-WVY                                                       TUXY1320
      CALL GRTEST(DX,DY,VX,VY,RTEST,TINT,TSTART,TSTOP)                 TUXY1330
      DELTI=TSTART-TIME                                                TUXY1340
 1086 WVZ=0.                                                           TUXY1350
      IF(HN.LT..0033) HN=.0033                                         TUXY1360
      IF(DELTI.GT.0.) WVZ=(HN-WZ)/DELTI                                TUXY1370
      TUWXYZ(6,IW)=WVZ                                                 TUXY1380
      TUWXYZ(8,IW)=TSTART-TSTEP                                        TUXY1390
      GO TO 114                                                        TUXY1400
  109 IV=0                                                             TUXY1410
      INVWTU(IW)=-(KV/100000*100000+NV*10+IV)                          TUXY1420
      NS=0                                                             TUXY1430
  110 HN=T7+TVZ*DELTI                                                  TUXY1440
      IF(NS.EQ.0) GO TO 112                                            TUXY1450
      RTEST=S*.1                                                       TUXY1460
      GO TO 10855                                                      TUXY1470
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112 TSTART=TINCPT                                                    TUXY1480
    GO TO 1086                                                       TUXY1490
113 WVX=TUWXYZ(4,IW)                                                 TUXY1500
    WVY=TUWXYZ(5,IW)                                                 TUXY1510
    WVZ=TUWXYZ(6,IW)                                                 TUXY1520
    IF(ABS(WVZ).GT..01) KV=-KV                                       TUXY1530
    INVWTU(IW)=KV                                                    TUXY1540
114 TUWXYZ(1,IW)=WX+WVX*TSTEP                                        TUXY1550
    TUWXYZ(2,IW)=WY+WVY*TSTEP                                        TUXY1560
    TUWXYZ(3,IW)=WZ+WVZ*TSTEP                                        TUXY1570
    GO TO 150                                                        TUXY1580
120 ITEM=ITEM+1                                                      TUXY1590
    GO TO 150                                                        TUXY1600
140 INVWTU(IW)=KV                                                    TUXY1610
    TUWXYZ(7,IW)=TIME                                                TUXY1620
150 CONTINUE                                                         TUXY1630
    RETURN                                                           TUXY1640
    END                                                              TUXY1650


    SUBROUTINE GRTEST(DXO,DYO,VX,VY,RTEST,TINT,TSTART,TSTOP)         GRTE0010
    COMMON /ETIME/ TIME,TIMEA,TIMEB,TBEGIN,TIMEND,TIMAX,TSTEP        GRTE0020
    DGRA=VX*DXO+VY*DYO                                               GRTE0030
    DGRB=VX*VX+VY*VY                                                 GRTE0040
    GRO2=DXO*DXO+DYO*DYO                                             GRTE0050
    RTEST2=RTEST*RTEST                                               GRTE0060
    TWOA=2.*DGRB                                                     GRTE0070
    IF(TWOA.EQ.0.) GO TO 200                                         GRTE0080
    B=2.*DGRA                                                        GRTE0090
    C=GRO2-RTEST2                                                    GRTE0100
    RADCAL=B*B-2.*TWOA*C                                             GRTE0110
    IF(RADCAL.LE.0.) GO TO 205                                       GRTE0120
    RADCAL=SQRT(RADCAL)                                              GRTE0130
    TSTART=-(B+RADCAL)/TWOA+TIME                                     GRTE0140
    IF(TSTART.GT.TIMAX ) GO TO 205                                   GRTE0150
    TSTOP=(RADCAL-B)/TWOA+TIME                                       GRTE0160
    IF(TSTOP.LT.TIME ) GO TO 205                                     GRTE0170
    IF(TSTART.LT.TIME ) TSTART=TIME                                  GRTE0180
    IF(TSTOP.GT.TIMAX ) TSTOP=TIMAX                                  GRTE0190
201 TINT=TSTOP-TSTART                                                GRTE0200
    RETURN                                                           GRTE0210
200 IF(GRO2.GT.RTEST2) GO TO 205                                     GRTE0220
    TSTART=TIME                                                      GRTE0230
    TSTOP=TIMAX                                                      GRTE0240
    GO TO 201                                                        GRTE0250
205 TINT=0.                                                          GRTE0260
    TSTART=TIMAX                                                     GRTE0270
    TSTOP=TIME-TSTEP                                                 GRTE0280
    RETURN                                                           GRTE0290
    END                                                              GRTE0300


    SUBROUTINE GUID(TH,PSI,VEL,IG,IE,IL,PLP,PLV,SXT,SYT,CEP)         GUID0010
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C  PGM=NXX(NEM).  EVAN COTTEN   8-1-73              FORTRAN IV      ERCD    GUID0020
C  MIDCOURSE GUIDANCE ERRORS FOR,                                          GUID0030
C    IC   = 1,  ALL INERTIAL.     =2,AIRSPEED.      =3,DOPPLER.           GUID0040
C    NEEDS  BLOCK DATA IN  COMMON/CGUID/                                   GUID0050
C    TH     = FLIGHT TIME, HRS                                             GUID0060
C    PSI    = HEADING, RADIANS                                             GUID0070
C    VEL    = KNOTS                                                        GUID0080
C    IC     =1,ALL INERTIAN       =2,AIRSPEED     =3,DOPPLER               GUID0090
C    IE     =1,FOR 1970-75        =2,FOR 1975-80                           GUID0100
C    IL     =1,FOR LAND LAUNCH    =2,FOR SEA LAUNCH       =3,AIR LAUNCH    GUID0110
C    PLP    = 0.,FOR SMALLEST POSITION ERROR FOR PLATFORM TYPE             GUID0120
C           = 1.,FOR LARGEST                                               GUID0130
C    PLV    = 0.,FOR SMALLEST LAUCH VEL ERRORS FOR PLATFORM TYPE           GUID0140
C           = 1.,FOR LARGEST                                               GUID0150
C    RETURNS,          SXT,SYT=  STD.DEV. IN X & Y, NM.                    GUID0160
C                      CEP =     CIRCULAR PROBABLE ERROR,, NM              GUID0170
      COMMON/CGUID/ SDXP(2),SDYP(2),SKXP(2),SKYP(2),SEXP(2),SEYP(2),       GUID0180
     1SKX(2),SKY(2),SDRXT(2,3),SDRYT(2,3),SDRXDT(2,3),SDRYDT(2,3),THETA    GUID0190
      DIMENSION A(5),CX(7),CY(6),SX(7),SY(6)                               GUID0200
      DATA PI,G,R,WE,A,C/3.14159265,32.2,2.0926388E7,7.2921152E-5,         GUID0210
     10.675617,-0.115956,1.65078,-1.54296,0.509798,1.296E6/                GUID0220
      SPS = SIN(PSI)                                                       GUID0230
      CPS = COS(PSI)                                                       GUID0240
      VX = VEL * SPS * 1.6878                                              GUID0250
      VY = VEL * CPS * 1.6878                                              GUID0260
      T = TH * 3600.                                                       GUID0270
      SDRX = SDRXT(1,IL) + PLP*(SDRXT(2,IL)-SDRXT(1,IL))                   GUID0280
      SDRY = SDRYT(1,IL) + PLP*(SDRYT(2,IL)-SDRYT(1,IL))                   GUID0290
      GO TO (100, 200, 300), IC                                            GUID0300
  100 THETAR = THETA * PI / 180.                                           GUID0310
      SDRXD = SDRXDT(1,IL) + PLV*(SDRXDT(2,IL)-SDRXDT(1,IL))               GUID0320
      SDRYD = SDRYDT(1,IL) + PLV*(SDRYDT(2,IL)-SDRYDT(1,IL))               GUID0330
      WS = SQRT(G/R)                                                       GUID0340
      OWS = 1. / WS                                                        GUID0350
      RHOZ = VX / R * TAN(THETAR)                                          GUID0360
      WEY = WE * COS(THETAR)                                               GUID0370
      SPZ = SQRT((SEXP(IE)/WEY*2./C*PI)**2 + (SDRYD/(R*WEY))**2)           GUID0380
      CX(2) = SKXP(IE) * VX / 100. * OWS                                   GUID0390
      CY(2) = SKYP(IE) * VY / 100. * OWS                                   GUID0400
      CX(3) = SDRXD * OWS                                                  GUID0410
      CY(3) = SDRYD * OWS                                                  GUID0420
      CX(4) = SKY(IE) / 100. * VX                                          GUID0430
      CY(4) = SKX(IE) / 100. * VY                                          GUID0440
      CX(5) = SDXP(IE) * RHOZ * R                                          GUID0450
      CY(5) = SDYP(IE) * RHOZ * R                                          GUID0460
      CX(6) = SEYP(IE) * PI / C * R * 2.                                   GUID0470
      CY(6) = SPZ * VX                                                     GUID0480
      CX(7) = SPZ * VY                                                     GUID0490
      SWST = SIN(WS*T)                                                     GUID0500
      TM = T - OWS * SWST                                                  GUID0510
      SX(1) = SDRX                                                         GUID0520
      SY(1) = SDRY                                                         GUID0530
      DO 120 I = 2, 3                                                      GUID0540
      SX(I) = CX(I) * SWST                                                 GUID0550
  120 SY(I) = CY(I) * SWST                                                 GUID0560
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```
      DO 140 I = 4, 6                                                   GUID0570
      SX(I) = CX(I) * TM                                                GUID0580
  140 SY(I) = CY(I) * TM                                                GUID0590
      SX(7) = CX(7) * T                                                 GUID0600
      SY(6) = CY(6) * T                                                 GUID0610
      SXT = SX(7) * SX(7)                                               GUID0620
      SYT = 0.                                                          GUID0630
      DO 160 I = 1, 6                                                   GUID0640
      SXT = SXT + SX(I)*SX(I)                                           GUID0650
  160 SYT = SYT + SY(I)*SY(I)                                           GUID0660
      GO TO 400                                                         GUID0670
  200 CA = 0.02                                                         GUID0680
      CC = 0.02                                                         GUID0690
      GO TO 320                                                         GUID0700
  300 CA = 0.006                                                        GUID0710
      CC = 0.012                                                        GUID0720
  320 VGT = SQRT(VX**2 + VY**2) * T                                     GUID0730
      AT = CA * VGT                                                     GUID0740
      CT = CC * VGT                                                     GUID0750
      SXT = (AT*SPS)**2 + (CT*CPS)**2 + SDRX**2                         GUID0760
      SYT = (AT*CPS)**2 + (CT*SPS)**2 + SDRY**2                         GUID0770
  400 SXT = SQRT(SXT) / 6076.1                                          GUID0780
      SYT = SQRT(SYT) / 6076.1                                          GUID0790
      IF (SYT - SXT) 420, 420, 440                                      GUID0800
  420 RA = SYT / SXT                                                    GUID0810
      S = SXT                                                           GUID0820
      GO TO 460                                                         GUID0830
  440 RA = SXT / SYT                                                    GUID0840
      S = SYT                                                           GUID0850
  460 CEP = A(5) * RA                                                   GUID0860
      DO 480 I = 1, 3                                                   GUID0870
  480 CEP = (A(-I+5) + CEP) * RA                                        GUID0880
      CEP = (A(1) + CEP) * S                                            GUID0890
      RETURN                                                            GUID0900
      END                                                               GUID0910


      SUBROUTINE INCEPT(XT,YT,VXT,VYT,XI,YI,VI,VXI,VYI,DELTI)           INCE0010
      DELTI=-1.                                                         INCE0020
      DXO=XT-XI                                                         INCE0030
      DYO=YT-YI                                                         INCE0040
      IF(DXO.NE.0.) GO TO 100                                           INCE0050
      IF(DYO.NE.0.) GO TO 110                                           INCE0060
      VXI=0.                                                            INCE0070
      VYI=0.                                                            INCE0080
      DELTI=0.                                                          INCE0090
   10 RETURN                                                            INCE0100
  100 IF(DYO.NE.0.) GO TO 150                                           INCE0110
      IF(VI.LT.ABS(VYT)) RETURN                                         INCE0120
      VYI=VYT                                                           INCE0130
      VXI=SQRT(VI*VI-VYI*VYI)                                           INCE0140
      ITRY=0                                                            INCE0150
  101 VX=VXT-VXI                                                        INCE0160
      IF(VX.NE.0.) DELTI=-DXO/VX                                        INCE0170
```

```
      IF(DELTI.GE.0.) RETURN                                            INCE0180
      IF(ITRY.GT.0) RETURN                                              INCE0190
      ITRY=1                                                            INCE0200
      VXI=-VXI                                                          INCE0210
      GO TO 101                                                         INCE0220
  110 IF(VI.LT.ABS(VXT)) RETURN                                         INCE0230
      VXI=VXT                                                           INCE0240
      VYI=SQRT(VI*VI-VXI*VXI)                                           INCE0250
      ITRY=0                                                            INCE0260
  111 VY=VYT-VYI                                                        INCE0270
      IF(VY.NE.0.) DELTI=-DYO/VY                                        INCE0280
      IF(DELTI.GE.0.) RETURN                                            INCE0290
      IF(ITRY.GT.0) RETURN                                              INCE0300
      ITRY=1                                                            INCE0310
      VYI=-VYI                                                          INCE0320
      GO TO 111                                                         INCE0330
  150 E=DYO*VI                                                          INCE0340
      D=DYO*VXT-DXO*VYT                                                 INCE0350
      TWOA=2.*(DXO*DXO+DYO*DYO)                                         INCE0360
      B=2.*D*DXO                                                        INCE0370
      C=(D-E)*(D+E)                                                     INCE0380
      RADCAL=B*B-2.*TWOA*C                                              INCE0390
      IF(RADCAL ) 10,151,155                                            INCE0400
  151 ITRY=1                                                            INCE0410
      VYI=-B/TWOA                                                       INCE0420
  152 VY=VYT-VYI                                                        INCE0430
      IF(VY.NE.0.) DELTI=-DYO/VY                                        INCE0440
      IF(DELTI.LT.0.) GO TO 156                                         INCE0450
      VXI=-DXO/DYO*VY+VXT                                               INCE0460
      RETURN                                                            INCE0470
  155 RADCAL=SQRT(RADCAL)                                               INCE0480
      VYI=(RADCAL-B)/TWOA                                               INCE0490
      ITRY=0                                                            INCE0500
      GO TO 152                                                         INCE0510
  156 IF(ITRY.GT.0) RETURN                                              INCE0520
      ITRY=1                                                            INCE0530
      VYI=-(RADCAL+B)/TWOA                                              INCE0540
      GO TO 152                                                         INCE0550
      END                                                               INCE0560


      SUBROUTINE RELATE(NBG,NBU,INTVLB,LSYSB,KWSEG,BGCV,BXYZ,BPX1,      RELA0010
     1      IBSTAT,                                                     RELA0020
     2      KRU,NRG,NRTU,INTVLR,INVRTU,NRU,LSYST,KTSEG,ITRU,RPX1,       RELA0030
     3      RGCV,KRUK,RXYZ,RTUXYZ,IRVEC,ITVEC,IRSTAT,                   RELA0040
     4      INFORM,LBRSYS,WDATA,     IDU1)                              RELA0050
      COMMON /ETIME/ TIME,TIMEA,TIMEB,TBEGIN,TIMEND,TIMAX,TSTEP         RELA0060
      COMMON/DEVICE/ N1,N2,N3,N4,N5,N6,N7,N8,N9,N10,N11,N12             RELA0070
      COMMON/ECONST/ NSHIP,NAIR,NSUB,NVSEA,NVALT,PDTMIN,PDMIN,          RELA0080
     1      AIRCPT,EPNM,HMIN,PI,TWOPI,IENV,ISCAN,IPRAD,IMISC(35)        RELA0090
      DIMENSION INTVLB(1),LSYSB(1),KWSEG(1),INTVLR(1),INVRTU(1),        RELA0100
     1      NRU(1),LSYST(1),KTSEG(1),ITRU(1),INFORM(1),LBRSYS(1),       RELA0110
     2      BGCV(8,5,1),BXYZ(IDU1,7),BPX1(12,1),RGCV(8,5,1),RPX1(12,1), RELA0120
     3      RXYZ(IDU1,7),KRUK(4,1),RTUXYZ(8,1),WDATA(24,1),NBU(1)       RELA0130
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```
     4,     IRSTAT(1),IRSTAT(1)                                    RELA0140
      ASSIGN 490 TO ITSW3                                          RELA0150
      IF(IRVEC.GT.0) GO TO 107                                     RELA0160
      ASSIGN 200 TO IRSW1                                          RELA0170
      ASSIGN 206 TO IRSW2                                          RELA0180
      ASSIGN 410 TO IRSW3                                          RELA0190
      GO TO 108                                                    RELA0200
  107 ASSIGN 201 TO IRSW1                                          RELA0210
      ASSIGN 212 TO IRSW2                                          RELA0220
      ASSIGN 3 TO IRSW3                                            RELA0230
  108 IF(NRTU.EQ.0) GO TO 111                                      RELA0240
      ASSIGN 4 TO ITSW3                                            RELA0250
  111 IF(ITVEC.GT.0) GO TO 112                                     RELA0260
      ASSIGN 500 TO ITSW1                                          RELA0270
      ASSIGN 400 TO ITSW2                                          RELA0280
      GO TO 115                                                    RELA0290
  112 ASSIGN 201 TO ITSW1                                          RELA0300
      ASSIGN 402 TO ITSW2                                          RELA0310
  115 CONTINUE                                                     RELA0320
      DO 500 IBG=1,NBG                                             RELA0330
      K=INTVLB(IBG)                                                RELA0340
      IF(K.LT.0) GO TO 202                                         RELA0350
      GO TO IBSW1,(200,201)                                        RELA0360
  200 GO TO ITSW1,(201,500)                                        RELA0370
  201 ASSIGN 208 TO IBSW1                                          RELA0380
      ASSIGN 218 TO IBSW2                                          RELA0390
      ASSIGN 390 TO IBSW3                                          RELA0400
      ASSIGN 490 TO IBSW4                                          RELA0410
      ASSIGN 480 TO IBSW5                                          RELA0420
      GO TO 204                                                    RELA0430
  202 ASSIGN 212 TO IBSW1                                          RELA0440
      ASSIGN 3 TO IBSW2                                            RELA0450
      ASSIGN 300 TO IBSW3                                          RELA0460
      ASSIGN 402 TO IBSW4                                          RELA0470
      ASSIGN 412 TO IBSW5                                          RELA0480
  204 LEG=IABS(K)                                                  RELA0490
      K=NBU(IBG)                                                   RELA0500
      IBA=K/100                                                    RELA0510
      IBB=IBA+MOD(K,100)-1                                         RELA0520
      VXB=BGCV(LEG,1,IBG)                                          RELA0530
      VYB=BGCV(LEG,2,IBG)                                          RELA0540
      DO 490 IBU=IBA,IBB                                           RELA0550
      IF(IRSTAT(IBU).EQ.0) GO TO 490                               RELA0560
      IS=LSYSB(IBU)                                                RELA0570
      LS=MOD(IS/100,10000)                                         RELA0580
      IF(LS.EQ.0) GO TO 490                                        RELA0590
      MS=LBRSYS(LS)                                                RELA0600
      MASK=MOD(MS/10, 1000)                                        RELA0610
      IF(MASK.EQ.0) GO TO 490                                      RELA0620
      K=LBRSYS(LS-1)                                               RELA0630
      BAIP=K/100000                                                RELA0640
      BSHIP=MOD(K/100,1000)                                        RELA0650
      GO TO IBSW2,(206,212)                                        RELA0660
  206 GO TO IBSW1,(208,212)                                        RELA0670
  208 IF(MOD(MASK/10,10) .EQ. 0) GO TO 490                         RELA0680
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 212 KB=MOD(MS,10)                                                    RELA0690
     XB=BXYZ(IBU,2)                                                   RELA0700
     YB=BXYZ(IBU,3)                                                   RELA0710
     ZB=BXYZ(IBU,4)                                                   RELA0720
     LPLTW=MOD(IS,100)                                                RELA0730
     LS=LS-1                                                          RELA0740
     IS=IS/1000000                                                    RELA0750
     IF(KB.NE.NSUB) GO TO 213                                         RELA0760
     ASSIGN 309 TO ISBSW1                                             RELA0770
     GO TO 214                                                        RELA0780
 213 ASSIGN 302 TO ISBSW1                                             RELA0790
     HBM=ZB                                                           RELA0800
     IF(KB.NE.NAIR) HBM=BPX1(3,LPLTW)/FPNM                            RELA0810
     BLOSM=SQRT(HBM*(6880.+HBM))                                      RELA0820
     IF(MOD(MS/100000, 10) .EQ. 0) GO TO 214                          RELA0830
     DO 2136 KS=IS,LS                                                 RELA0840
     JS=LBRSYS(KS)                                                    RELA0850
     IF(MOD(JS,10) .NE. 1) GO TO 2136                                 RELA0860
     BETA=MOD(JS/1000CCC,1000)                                        RELA0870
     ASSIGN 304 TO IRDSW1                                             RELA0880
     ASSIGN 414 TO IRDSW2                                             RELA0890
     GO TO 215                                                        RELA0900
2136 CONTINUE                                                         RELA0910
 214 ASSIGN 306 TO IRDSW1                                             RELA0920
     ASSIGN 416 TO IRDSW2                                             RELA0930
 215 IF(MOD(MS/1000000,10).EQ. 0) GO TO 2152                          RELA0940
     DO 2150 KS=IS,LS                                                 RELA0950
     JS=LBRSYS(KS)                                                    RELA0960
     IF(MOD(JS,10) .NE. 7) GO TO 2150                                 RELA0970
     SETA=MOD(JS/10000CC,1000)                                        RELA0980
     SETA=SETA*.1                                                     RELA0990
     KSONR=1                                                          RELA1000
     GO TO 216                                                        RELA1010
2150 CONTINUE                                                         RELA1020
2152 SETA=0.                                                          RELA1030
     KSONR=0                                                          RELA1040
     IF(KB.EQ.NSUB) GO TO 490                                         RELA1050
 216 GO TO IBSW2,(218,3)                                              RELA1060
 218 GO TO IBSW3,(410,3)                                              RELA1070
   3 DO 390 IRG=1,NRG                                                 RELA1080
     LEGT=INTVLR(IRG)                                                 RELA1090
     IF(LEGT.LT.0) GO TO 300                                          RELA1100
     GO TO IBSW3,(390,300)                                            RELA1110
 300 K=NRU(IRG)                                                       RELA1120
     IRA=K/100                                                        RELA1130
     IRB=IRA+MOD(K,100)-1                                             RELA1140
     LEG=IABS(LEGT)                                                   RELA1150
     VXR=RGCV(LEG,1,IRG)                                              RELA1160
     VYR=RGCV(LEG,2,IRG)                                              RELA1170
     DO 380 IRU=IRA,IRB                                               RELA1180
     IF(IRSTAT(IRU).EQ.0) GO TO 380                                   RELA1190
     KR=MOD(KRUK(2,IRU)/1000000,10)                                   RELA1200
     IF(MOD(MASK/((10**KR)/10),10) .EQ. 0) GO TO 380                  RELA1210
     LPLTR=MOD(LSYST(IRU),100)                                        RELA1220
     XR=RXYZ(IRU,2)                                                   RELA1230
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      YR=RXYZ(IRU,3)                                                    RELA1240
      ZR=RXYZ(IRU,4)                                                    RELA1250
      IF(KR.EQ.NSUB) GO TO 309                                          RELA1260
      GO TO ISBSW1,(302,309)                                            RELA1270
  302 HR=ZR                                                             RELA1280
      IF(HR.LT.HMIN) HR=HMIN                                            RELA1290
      RLOS=SQRT(HR*(6880.+HR))                                          RELA1300
      TOTLOS=RLOS+RLOSM                                                 RELA1310
      RADIUS=RSHIP                                                      RELA1320
      IF(KR.EQ.2) RADIUS=RAIR                                           RELA1330
C                                                                       RELA1340
      GO TO IRDSW1,(306,304)                                            RELA1350
  304 K=6- KR/1 + 1/KR                                                  RELA1360
      RCS=RPX1(K,LPLTR)                                                 RELA1370
      RADSEE=BETA*RCS**.25                                              RELA1380
      X=1.1547*TOTLOS                                                   RELA1390
      IF(RADSEE.GT.X) RADSEE=X                                          RELA1400
      GO TO 308                                                         RELA1410
  306 RADSEE=0.                                                         RELA1420
  308 SIZE=.5*(RPX1(1,LPLTR)+RPX1(2,LPLTR))                             RELA1430
      VISUAL= .165*SIZE                                                 RELA1440
      IF(VISUAL.GT.TOTLOS) VISUAL=TOTLOS                                RELA1450
      SIGHT=RADSEE                                                      RELA1460
      IF(SIGHT.LT.VISUAL) SIGHT=VISUAL                                  RELA1470
      IF(SIGHT.GT.RADIUS) SIGHT=RADIUS                                  RELA1480
      GO TO 311                                                         RELA1490
  309 SIGHT=SETA                                                        RELA1500
  311 DXO=XR-XB                                                         RELA1510
      DYO=YR-YB                                                         RELA1520
      VX=VXR-VXB                                                        RELA1530
      VY=VYR-VYB                                                        RELA1540
      CALL NQUIRE(INFORM,KWSEG,IBU,IRU,ISEG)                            RELA1550
      CALL GRTEST(DXO,DYO,VX,VY,SIGHT,TINT,TSTART,TSTOP)                RELA1560
      IF(ABS(TINT) .LT. .003) GO TO 312                                 RELA1570
      IF(TSTART.GT.TIMEB) GO TO 312                                     RELA1580
      IF(ISEG.GT.0) GO TO 316                                           RELA1590
      CALL ADDSEG(INFORM,KWSEG,KTSEG,IBU,IRU,ISEG)                      RELA1600
  312 IF(ISEG.EQ.0) GO TO 380                                           RELA1610
  316 CALL UPSEG(INFORM,ISEG,TSTART,TSTOP)                              RELA1620
  380 CONTINUE                                                          RELA1630
  390 CONTINUE                                                          RELA1640
      GO TO ITSW3,(4,490)                                               RELA1650
    4 GO TO ITSW2,(402,400)                                             RELA1660
  400 GO TO IBSW4,(402,490)                                             RELA1670
  402 IF(MOD(MASK/10,10) .EQ. 0) GO TO 490                              RELA1680
  410 DO 480 IRU=1,NRTL                                                 RELA1690
      LEGT=INVRTU(IRU)                                                  RELA1700
      IF(LEGT) 412,480,411                                              RELA1710
  411 GO TO IBSW5,(480,412)                                             RELA1720
  412 XR=RTUXYZ(1,IRU)                                                  RELA1730
      YR=RTUXYZ(2,IRU)                                                  RELA1740
      ZR=RTUXYZ(3,IRU)                                                  RELA1750
      IF(ZR.LT.0.) GO TO 480                                            RELA1760
      VXR=RTUXYZ(4,IRU)                                                 RELA1770
      VYR=RTUXYZ(5,IRU)                                                 RELA1780
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      RLOS=SQRT(ZR*(6880.+ZR))                                          RELA1790
      TOTLOS=RLOS+BLOSM                                                 RELA1800
C                                                                       RELA1810
      DXO=XR-XB                                                         RELA1820
      DYO=YR-YB                                                         RELA1830
      VX=VXR-VXB                                                        RELA1840
      VY=VYR-VYB                                                        RELA1850
      ITU=ITRU(IRU)                                                     RELA1860
      KTU=MOD(ITU,10)                                                   RELA1870
      LPLTR=MOD(ITU/1000,100)                                           RELA1880
      NTRAJ=MOD(ITU/10,100)                                             RELA1890
      GO TO IRDSW2,(414,416)                                            RELA1900
  414 IF(KTU.EQ.2) GO TO 415                                            RELA1910
      RCS=WDATA(19,NTRAJ)                                               RELA1920
      GO TO 4150                                                        RELA1930
  415 RCS=RPX1(4,LPLTR)                                                 RELA1940
 4150 RADSEE=BETA*RCS**.25                                              RELA1950
      X=1.1547*TOTLOS                                                   RELA1960
      IF(RADSEE.GT.X) RADSEE=X                                          RELA1970
      GO TO 418                                                         RELA1980
  416 RADSEE=0.                                                         RELA1990
  418 IF(KTU.EQ.2) GO TO 419                                            RELA2000
      SIZE= .5*(WDATA(16,NTRAJ)+WDATA(17,NTRAJ))                        RELA2010
      GO TO 4190                                                        RELA2020
  419 SIZE= .5*(RPX1(1,LPLTR)+RPX1(2,LPLTR))                            RELA2030
 4190 VISUAL= .165*SIZE                                                 RELA2040
      IF(VISUAL.GT.TOTLOS) VISUAL=TOTLOS                                RELA2050
      SIGHT=RADSEE                                                      RELA2060
      IF(SIGHT.LT.VISUAL) SIGHT=VISUAL                                  RELA2070
      IF(SIGHT.GT.RAIR) SIGHT=RAIR                                      RELA2080
      JRU=IRU+KRU                                                       RELA2090
      CALL NQUIRE(INFORM,KWSEG,IBU,JRU,ISEG)                            RELA2100
      CALL GRTEST(DXO,DYO,VX,VY,SIGHT,TINT,TSTART,TSTOP)                RELA2110
      IF(ABS(TINT) .LT. .003) GO TO 420                                 RELA2120
      IF(TSTART.GT.TIMEB) GO TO 420                                     RELA2130
      IF(ISEG.GT.0) GO TO 424                                           RELA2140
      CALL ADDSEG(INFORM,KWSEG,KTSEG,IBU,JRU,ISEG)                      RELA2150
  420 IF(ISEG.EQ.0) GO TO 480                                           RELA2160
  424 CALL UPSEG(INFORM,ISEG,TSTART,TSTOP)                              RELA2170
  480 CONTINUE                                                          RELA2180
  490 CONTINUE                                                          RELA2190
  500 CONTINUE                                                          RELA2200
      RETURN                                                            RELA2210
      END                                                               RELA2220


      SUBROUTINE NQUIRE(INFORM,ISNSEG,ISENS,ITGT,ISEG)                  NQUI0010
      COMMON/STRCON/ JPK,IPK                                            NQUI0020
      DIMENSION INFORM(1),ISNSEG(1)                                     NQUI0030
      IPOINT=ISNSEG(ISENS)                                              NQUI0040
      ISEG=IPOINT/IPK                                                   NQUI0050
    1 IF(ISEG.EQ.0) RETURN                                              NQUI0060
      JTGT=MOD(INFORM(ISEG),IPK)                                        NQUI0070
      IF(JTGT.EQ.ITGT) RETURN                                           NQUI0080
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      JPOINT=INFORM(ISEG+1)                                              NQUI0090
      ISEG=MOD(JPOINT,IPK)                                               NQUI0100
      GO TO 1                                                            NQUI0110
      END                                                                NQUI0120


      SUBROUTINE ADDSEG(INFORM,       ISNSEG,ITGSEG,ISENS,ITGT,ISEG)     ADDS0010
      COMMON/DEVICE/ N1,N2,N3,N4,N5,N6,N7,N8,N9,N10,N11,N12              ADDS0020
      COMMON/STRCON/  JPK,IPK                                            ADDS0030
      COMMON/INFO/  LENINFO,LENSEG,MAXSEG,NEXSEG,LSTSEG,LZDSEG           ADDS0040
      DIMENSION INFORM(1),          ISNSEG(1),ITGSEG(1)                  ADDS0050
      DATA IPR/0/                                                        ADDS0060
      IF(NEXSEG.EQ.0) GO TO 180                                          ADDS0070
      ISEG=NEXSEG                                                        ADDS0080
      NEXSEG=INFORM(ISEG)                                                ADDS0090
      GO TO 190                                                          ADDS0100
  180 LSEG=LSTSEG+LENSEG                                                 ADDS0110
      IF(LSEG.GT.MAXSEG) GO TO 210                                       ADDS0120
      ISEG=LSEG                                                          ADDS0130
      LSTSEG=LSEG                                                        ADDS0140
  190 INFORM(ISEG)=ISENS*IPK+ITGT                                        ADDS0150
      DO 200 IADD=4,LENSEG                                               ADDS0160
  200 INFORM(ISEG+IADD-1)=0                                              ADDS0170
      JPOINT=ISNSEG(ISENS)                                               ADDS0180
      IADD=1                                                             ADDS0190
      IST=ISENS                                                          ADDS0200
  201 IF(JPOINT.GT.0) GO TO 203                                          ADDS0210
      JPOINT=ISEG*IPK+ISEG                                               ADDS0220
      INFORM(ISEG+IADD)=0                                                ADDS0230
      IF(IADD.EQ.2) GO TO 207                                            ADDS0240
      GO TO 205                                                          ADDS0250
  203 JPOINT=JPOINT/IPK*IPK+ISEG                                         ADDS0260
      LSEG=MOD(JPOINT,IPK)                                               ADDS0270
      INFORM(ISEG+IADD)=LSEG*IPK                                         ADDS0280
      INFORM(LSEG+IADD)=INFORM(LSEG+IADD)+ISEG                           ADDS0290
      IF(IADD.EQ.2) GO TO 207                                            ADDS0300
  205 ISNSEG(ISENS)=JPOINT                                               ADDS0310
      JPOINT=ITGSEG(ITGT)                                                ADDS0320
      IADD=2                                                             ADDS0330
      IST=ITGT                                                           ADDS0340
      GO TO 201                                                          ADDS0350
  207 ITGSEG(ITGT)=JPOINT                                                ADDS0360
      RETURN                                                             ADDS0370
  210 ISEG=0                                                             ADDS0380
      IF(IPR.GT.0) RETURN                                                ADDS0390
      IPR=1                                                              ADDS0400
      CALL PAGE                                                          ADDS0410
      WRITE(N6,6000)                                                     ADDS0420
 6000 FORMAT(////'                    FULL INFORMATION ARRAY')           ADDS0430
      RETURN                                                             ADDS0440
      END                                                                ADDS0450
```

```
      SUBROUTINE UPSEG (INFORM,ISEG,TSTART,TSTOP)                       UPSE0010
      DIMENSION INFORM(1)                                               UPSE0020
      COMMON /ETIME/ TIME,TIMEA,TIMEB,TBEGIN,TIMEND,TIMAX,TSTEP         UPSE0030
      ITA=(TSTART-TBEGIN)*1000.                                         UPSE0040
      ITB=(TSTOP-TBEGIN)*1000.                                          UPSE0050
      INFORM(ISEG+4)=ITA*100000+ITB                                     UPSE0060
      INFORM(ISEG+5)=0                                                  UPSE0070
      RETURN                                                            UPSE0080
      END                                                               UPSE0090


      SUBROUTINE DETECT(NWU,NWTU,LSYSW,KWSEG,WRAD,WXYZ,KWUK,            DETE0010
     1     INTVLW,WGCV,WPX1,ENV,MAXWTU,IWSTAT,TUWXYZ,KSYSW,IWTU,         DETE0020
     2     NTU,NTTU,LSYST,KTSEG,TXYZ,KTUK,INTVLT,TGCV,TPX1,AJAM,         DETE0030
     3     ITTU,TUTXYZ,ITSTAT,KHVT,                                      DETE0040
     4     TDATA,LBRSYS,INFORM,CMRAD,                    IDU1)           DETE0050
      COMMON/DEVICE/ N1,N2,N3,N4,N5,N6,N7,N8,N9,N10,N11,N12             DETE0060
      COMMON /ETIME/ TIME,TIMEA,TIMEB,TBEGIN,TIMEND,TIMAX,TSTEP         DETE0070
      COMMON/ECONST/ NSHIP,NAIR,NSUB,NVSEA,NVALT,PDTMIN,PDMIN,          DETE0080
     1     AIRCPT,FPNM,HMIN,PI,TWOPI,IENV,ISCAN,IPRAD,IMISC(35)          DETE0090
      COMMON/STRCON/ JPK,IPK                                            DETE0100
      COMMON /WORK/   IWORK(100),WORKI(100),WORKJ(100),JWORK(100)       DETE0110
      DIMENSION KWORK(500)                                              DETE0120
      EQUIVALENCE (IWORK(1),KWORK(1))                                   DETE0130
      DIMENSION KHVT(1)                                                 DETE0140
      DIMENSION LSYSW(1),LBRSYS(1),KWSEG(1),WRAD(36,1),INFORM(1),       DETE0150
     1     WXYZ(IDU1,7),TXYZ(IDU1,7),KWUK(4,1),INTVLW(1),               DETE0160
     2     WGCV(8,5,1),WPX1(12,1),LSYST(1),KTSEG(1),                    DETE0170
     3     KTUK(4,1),INTVLT(1),TGCV(8,5,1),TPX1(12,1),                  DETE0180
     4     ENV(1),AJAM(6,3,1),ITTU(1),TUTXYZ(8,1),TDATA(24,1)           DETE0190
      DIMENSION TAR(6),ETC(4),TRAD(10),RANGE(10),PDTECT(10),ANG(10),    DETE0200
     1     DYN(10),ITSTAT(1),IWSTAT(1),KSYSW(1),TUWXYZ(8,1),            DETE0210
     2     CMRAD(36,1),IWTU(1),RADCOL(36)                               DETE0220
      NAMELIST/RADR/ IW,KW,WZ,IRAD,ITGT,KT,TZ,RCS,ALTGT,RDRNGE,         DETE0230
     1     GR,PDRAD,BETA,ALFA,FREQ,BEAM,IJAM,KJAM,JAMON,JAM,JAMR,       DETE0240
     2     ETC,TAR,TIME                                                 DETE0250
      NAMELIST/DTECT/ TIME,IW,ITGT,KPD,PD,GR                            DETE0260
C                                                                       DETE0270
      ICLASS=IMISC(21)                                                  DETE0280
      IPRSAV=IPRAD                                                      DETE0290
      ASSIGN 170 TO LPRAD                                               DETE0300
      IF(IMISC(3).GT.1) ASSIGN 1700 TO LPRAD                            DETE0310
      CALL ERRSET(208,300,-1,1,0,0)                                     DETE0320
      TRAD(1)=TIME                                                      DETE0330
      TAR(5)=0.                                                         DETE0340
      TAR(6)=0.                                                         DETE0350
      ITIME=(TIME-TBEGIN)*1000.                                         DETE0360
      ITTIME=ITIME+IMISC(1)                                             DETE0370
      JAMON=IMISC(2)                                                    DETE0380
      ASSIGN 105 TO LJSET                                               DETE0390
      ASSIGN 171 TO LWSET                                               DETE0400
      IW=1                                                              DETE0410
   10 IPSEG=KWSEG(IW)                                                   DETE0420
      IF(IPSEG.LE.0) GO TO 200                                          DETE0430
```

```
      IS=LSYSW(IW)                                                    DETE0440
      LPLTW=MOD(IS,100)                                               DETE0450
      IS=IS/100                                                       DETE0460
      IF(IS.EQ.0) GO TO 200                                           DETE0470
      ASSIGN 14 TO IWSET                                              DETE0480
      ASSIGN 120 TO JWSET                                             DETE0490
      ASSIGN 160 TO KWSET                                             DETE0500
      ISEG=IPSEG/IPK                                                  DETE0510
    1 IF(ISEG.EQ.0) GO TO 200                                         DETE0520
      ITGT=MOD(INFORM(ISEG),IPK)                                      DETE0530
      ISTAT=ITSTAT(ITGT)                                              DETE0540
      IF(ISTAT.LE.0) GO TO 180                                        DETE0550
      LOSTA=INFORM(ISEG+4)                                            DETE0560
      LOSTB=MOD(LOSTA,100000)                                         DETE0570
      LOSTA=LOSTA/100000                                              DETE0580
      IF(ITIME.LT.LOSTA) GO TO 18                                     DETE0590
      IF(ITIME.GT.LOSTB) GO TO 180                                    DETE0600
      IDTECT=INFORM(ISEG+5)                                           DETE0610
      IF(IDTECT) 11,12,11                                             DETE0620
   11 NEXT=IABS(IDTECT)/10000                                         DETE0630
      IF(ITIME.LT.NEXT) GO TO 18                                      DETE0640
   12 GO TO JWSET,(120,121)                                           DETE0650
  120 ASSIGN 121 TO JWSET                                             DETE0660
      WX=WXYZ(IW,2)                                                   DETE0670
      WY=WXYZ(IW,3)                                                   DETE0680
      WZ=WXYZ(IW,4)                                                   DETE0690
      IWG=KWUK(3,IW)                                                  DETE0700
      LEGW=IABS(INTVLW(IWG))                                          DETE0710
      WVX=WGCV(LEGW,1,IWG)                                            DETE0720
      WVY=WGCV(LEGW,2,IWG)                                            DETE0730
      ISB=MOD(IS,10000)                                               DETE0740
      MASK=LBRSYS(ISB)                                                DETE0750
      KW=MOD(MASK,10)                                                 DETE0760
      MASK=MASK/10                                                    DETE0770
      ISA=IS/10000                                                    DETE0780
      KRADR=MOD(MASK/10000,10)                                        DETE0790
      KSONR=MOD(MASK/100000,10)                                       DETE0800
      ISB=ISB-1                                                       DETE0810
      IF(KSONR.EQ.0) GO TO 1203                                       DETE0820
      DO 1202 IS=ISA,ISB                                              DETE0830
      JSYS=LBRSYS(IS)                                                 DETE0840
      IF(MOD(JSYS,10).EQ.7) GO TO 1204                                DETE0850
 1202 CONTINUE                                                        DETE0860
      KSONR=0                                                         DETE0870
 1203 SETA=0.                                                         DETE0880
      GO TO 1205                                                      DETE0890
 1204 ISON=MOD(JSYS/10000,100)                                        DETE0900
      SETA=MOD(JSYS/1000000,1000)                                     DETE0910
      SETA=SETA*.1                                                    DETE0920
      IF(SETA.EQ.0.) KSONR=0                                          DETE0930
 1205 IF(KRADR.EQ.0) GO TO 1207                                       DETE0940
      DO 1206 IS=ISA,ISB                                              DETE0950
      JSYS=LBRSYS(IS)                                                 DETE0960
      IF(MOD(JSYS,10).EQ.1) GO TO 1208                                DETE0970
 1206 CONTINUE                                                        DETE0980
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      KRADR=0                                                          DETE0990
 1207 ASSIGN 170 TO IWSET                                              DETE1000
      GO TO 121                                                        DETE1010
 1208 HMAST=0.                                                         DETE1020
      IF(KW.NE.NAIR) HMAST=WPX1(3,LPLTW)                               DETE1030
      IRAD=MOD(JSYS/10000,100)                                         DETE1040
      DO 1209 I=1,36                                                   DETE1050
 1209 RADCOL(I)=WRAD(I,IRAD)                                           DETE1060
 1210 BETA=RADCOL(1)                                                   DETE1070
      ALFA=RADCOL(2)                                                   DETE1080
      FREQ=30000./RADCOL(3)                                            DETE1090
      FTC(4)=RADCOL(36)                                                DETE1100
      BEAM=.5*(RADCOL(22)/57.3)                                        DETE1110
      WZF    =WZ*FPNM+HMAST                                            DETE1120
      IF(WZF.LE.0.) ASSIGN 170 TO IWSET                                DETE1130
      FTC(1)=WZF                                                       DETE1140
  121 IF(ITGT.LE.NTU)GO TO 130                                         DETE1150
      JTGT=ITGT-NTU                                                    DETE1160
      ITU=ITTU(JTGT)                                                   DETE1170
      KT=MOD(ITU,10)                                                   DETE1180
      TX=TUTXYZ(1,JTGT)                                                DETE1190
      TY=TUTXYZ(2,JTGT)                                                DETE1200
      TZ=TUTXYZ(3,JTGT)                                                DETE1210
      IF(TZ.GT.0.) GO TO 124                                           DETE1220
      PD=0.                                                            DETE1230
      KPD=0                                                            DETE1240
      GO TO 174                                                        DETE1250
  124 TVX=TUTXYZ(4,JTGT)                                               DETE1260
      TVY=TUTXYZ(5,JTGT)                                               DETE1270
      IF(KT.EQ.NAIR) GO TO 125                                         DETE1280
      ICOL=MOD(ITU/10,100)                                             DETE1290
      RCS=TDATA(15,ICOL)                                               DETE1300
      ALTGT=.5*(TDATA(16,ICOL)+TDATA(17,ICOL))                         DETE1310
      GO TO 135                                                        DETE1320
  125 IPLTT=MOD(ITU/1000,100)                                          DETE1330
      GO TO 131                                                        DETE1340
  130 KT=MOD(KTUK(2,ITGT)/1000000,10)                                  DETE1350
      TX=TXYZ(ITGT,2)                                                  DETE1360
      TY=TXYZ(ITGT,3)                                                  DETE1370
      TZ=TXYZ(ITGT,4)                                                  DETE1380
      IF(TZ.LT.HMIN) TZ=HMIN                                           DETE1390
      IPLTT=MOD(LSYST(ITGT),100)                                       DETE1400
      ITG=KTUK(3,ITGT)                                                 DETE1410
      LEGT=IABS(INTVLT(ITG))                                           DETE1420
      TVX=TGCV(LEGT,1,ITG)                                             DETE1430
      TVY=TGCV(LEGT,2,ITG)                                             DETE1440
      IF(KT.EQ.NSUB) GO TO 135                                         DETE1450
  131 ALTGT=.5*(TPX1(1,IPLTT)+TPX1(2,IPLTT))                           DETE1460
      IF(KT.EQ.NAIR) GO TO 134                                         DETE1470
      RCS=TPX1(6,IPLTT)                                                DETE1480
      GR=SQRT((TX-WX)**2+(TY-WY)**2)                                   DETE1490
      CALL SHIPXS(WZF,GR,RCS,TPX1(3,IPLTT),XCS,C,ICK)                  DETE1500
      IF(ICK.EQ.0) RCS=XCS                                             DETE1510
      GO TO 135                                                        DETE1520
  134 RCS=TPX1(4,IPLTT)                                                DETE1530
```

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135 CX=TX-WX                                                          DETE1540
    CY=TY-WY                                                          DETE1550
    GR2=DX*DX+DY*DY                                                   DETE1560
    GR=SQRT(GR2)                                                      DETE1570
    IF(KW.NE.NSUB .AND. KT.NE.NSUB) GO TO 139                         DETE1580
    IF(KSONR.EQ.0) GO TO 180                                          DETE1590
    PDSON=0.                                                          DETE1600
    PD=GR2/(SETA*SETA)                                                DETE1610
    IF(PD.LT.100.) PDSON=EXP(-.693*PD)                                DETE1620
    KPD=20                                                            DETE1630
    PD=PDSON                                                          DETE1640
    GO TO 174                                                         DETE1650
139 RV=.165*ALTCT                                                     DETE1660
    PDVIS=0.                                                          DETE1670
    PD=GR2/(RV*RV)                                                    DETE1680
    IF(PD.LT.100.) PDVIS=EXP(-.693*PD)                                DETE1690
    PDRAD=0.                                                          DETE1700
    GO TO IWSET,(14,145,170)                                          DETE1710
 14 ASSIGN 145 TO IWSET                                               DETE1720
    GO TO LJSET,(105,111)                                             DETE1730
105 ASSIGN 111 TO LJSET                                               DETE1740
    ITYPE=5                                                           DETE1750
    JAM=0                                                             DETE1760
    DO 110 IT=1,NTU                                                   DETE1770
    IS=LSYST(IT)/100                                                  DETE1780
    IF(IS.EQ.0) GO TO 110                                             DETE1790
    IA=IS/10000                                                       DETE1800
    IB=MOD(IS,10000)                                                  DETE1810
    MASK=LBRSYS(IB)/10                                                DETE1820
    IF(MOD(MASK/1000,10) .EQ. 0) GO TO 110                            DETE1830
    IB=IB-1                                                           DETE1840
    DO 1000 IS=IA,IB                                                  DETE1850
    JSYS=LBRSYS(IS)                                                   DETE1860
    IF(MOD(JSYS,10) .NE. ITYPE) GO TO 1000                            DETE1870
    IF(JSYS/10000000C0+JAMON.EQ.0) GO TO 1000                         DETE1880
    ICOL=MOD(JSYS/10000,100)                                          DETE1890
    JAM=JAM+1                                                         DETE1900
    JWORK(JAM)=IT*100+ICOL                                            DETE1910
1000 CONTINUE                                                         DETE1920
 110 CONTINUE                                                         DETE1930
 111 CONTINUE                                                         DETE1940
    IF(JAM.EQ.0) GO TO 145                                            DETE1950
    JAMR=0                                                            DETE1960
    DO 140 JM=1,JAM                                                   DETE1970
    IJ=JWORK(JM)                                                      DETE1980
    IT=IJ/100                                                         DETE1990
    IJ=MOD(IJ,100)                                                    DETE2000
    DO 141 K=1,3                                                      DETE2010
    IF(FREQ.LT.AJAM(5,K,IJ)) GO TO 141                                DETE2020
    IF(FREQ.GT.AJAM(6,K,IJ)) GO TO 141                                DETE2030
    KJ=K                                                              DETE2040
    GO TO 142                                                         DETE2050
141 CONTINUE                                                          DETE2060
    GO TO 140                                                         DETE2070
142 XJ=TXYZ(IT,2)                                                     DETE2080
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      YJ=TXYZ(IT,3)                                                    DETE2090
      DXJ=XJ-WX                                                        DETE2100
      DYJ=YJ-WY                                                        DETE2110
C                                                                      DETE2120
C                                                                      DETE2130
C                                                                      DETE2140
      ANGJ=ATAN2(DXJ,DYJ)                                              DETE2150
      SOJR=SQRT(DXJ*DXJ+DYJ*DYJ)                                       DETE2160
      JAMR=JAMR+1                                                      DETE2170
      IWORK(JAMR)=KJ*100+IJ                                            DETE2180
      WORKI(JAMR)=ANGJ                                                 DETE2190
      WORKJ(JAMR)=SOJR                                                 DETE2200
  140 CONTINUE                                                         DETE2210
      IF(JAMR.GT.0) ASSIGN 16 TO KWSET                                 DETE2220
  145 GO TO KWSET,(16,160)                                             DETE2230
   16 ANGT=ATAN2(DX,DY)                                                DETE2240
      DO 161 IJ=1,JAMR                                                 DETE2250
      A=ABS(ANGT-WORKI(IJ))                                            DETE2260
      IF(A.GT.PI) A=TWOPI-A                                            DETE2270
      IF(A.GT.BEAM) GO TO 161                                          DETE2280
      IJAM=IWORK(IJ)                                                   DETE2290
      ETC(2)=WORKJ(IJ)                                                 DETE2300
      GO TO 162                                                        DETE2310
  161 CONTINUE                                                         DETE2320
  160 RDRNGE=BETA*RCS**.25                                             DETE2330
      ETC(2)=0.                                                        DETE2340
      ETC(3)=0.                                                        DETE2350
      IJAM=1                                                           DETE2360
      KJAM=1                                                           DETE2370
      GO TO 165                                                        DETE2380
  162 KJAM=IJAM/100                                                    DETE2390
      IJAM=MOD(IJAM,100)                                               DETE2400
      ETC(3)=2.                                                        DETE2410
      GJ2=10.**(.1*AJAM(2,KJAM,IJAM))                                  DETE2420
      PJ2=AJAM(1,KJAM,IJAM)                                            DETE2430
      RDRNGE=ALFA*(500./PJ2*(1.26/GJ2)**.25)                           DETE2440
  165 IF(RDRNGE.LT.GR) GO TO 170                                       DETE2450
      IF(IPRAD.GE.0) GO TO 17                                          DETE2460
      PDRAD=EXP(-.693*GR2/(RDRNGE*RDRNGE))                             DETE2470
      GO TO 170                                                        DETE2480
   17 VX=TVX-WVX                                                       DETE2490
      VY=TVY-WVY                                                       DETE2500
      TZF=TZ*FPNM                                                      DETE2510
      DGRA=VX*DX+VY*DY                                                 DETE2520
      VC=0.                                                            DETE2530
      IF(GR.GT.0.) VC=DGRA/GR                                          DETE2540
      DZ=ABS(WZF-TZF)/FPNM                                             DETE2550
      RANGE(1)=SQRT(GR2+DZ*DZ)                                         DETE2560
      TAR(1)=ALTGT                                                     DETE2570
      TAR(2)=RCS                                                       DETE2580
      TAR(3)=TZF                                                       DETE2590
      TAR(4)=VC                                                        DETE2600
      CALL RADAR(RADCOL,ENV,ETC,TAR,AJAM(1,KJAM,IJAM),TRAC,RANGE,      DETE2610
     1     PDTECT,ANG,DYN,ICK,ISCAN,IPRAD)                             DETE2620
      PDRAD=PDTECT(ISCAN+1)                                            DETE2630
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      GO TO LPRAD,(1700,170)                                              DETE2640
 1700 WRITE(N6,RADR)                                                      DETE2650
  170 GO TO LWSET,(171,230)                                               DETE2660
  171 IF(PDVIS.GT.PDRAD) GO TO 172                                        DETE2670
      PD=PDRAD                                                            DETE2680
      KPD=10                                                              DETE2690
      GO TO 174                                                           DETE2700
  172 PD=PDVIS                                                            DETE2710
      KPD=0                                                               DETE2720
  174 IPD=100.*PD                                                         DETE2730
      IF(IPD.GT.99) IPD=99                                                DETE2740
      IDTECT=10000*IDTIME+100*KPD+IPD                                     DETE2750
      IF(PD.GE.PDMIN) GO TO 175                                           DETE2760
      IDTECT=-IDTECT                                                      DETE2770
      GO TO 176                                                           DETE2780
  175 IF(KT.NE.1) GO TO 1755                                              DETE2790
      IF(IPD.LT.ICLASS) GO TO 1755                                        DETE2800
      JPD=KHVT(ITGT)                                                      DETE2810
      IF(JPD/100 .EQ. 0) KHVT(ITGT)=JPD+100                               DETE2820
 1755 IF(ISTAT.GT.1) GO TO 176                                            DETE2830
C                                                                         DETE2840
C  DETECTION GAINED                                                       DETE2850
C                                                                         DETE2860
      ITSTAT(ITGT)=2                                                      DETE2870
      IF(IMISC(3).GT.0) WRITE(N6,DTECT)                                   DETE2880
  176 INFORM(ISEG+5)=IDTECT                                               DETE2890
   18 ISEG=MOD(INFORM(ISEG+1),IPK)                                        DETE2900
      GO TO 1                                                             DETE2910
  180 INFORM(ISEG+4)=2147400000                                           DETE2920
      INFORM(ISEG+5)=0                                                    DETE2930
      GO TO 18                                                            DETE2940
  200 IW=IW+1                                                             DETE2950
      IF(IW.LE.NWU) GO TO 10                                              DETE2960
      IF(NWTU.EQ.0) GO TO 240                                             DETE2970
      IF(IMISC(6).LT.0) GO TO 240                                         DETE2980
      ASSIGN 230 TO LWSET                                                 DETE2990
      EMAST=0.                                                            DETE3000
      IW=0                                                                DETE3010
      IF(IPRAD.LT.0) IPRAD=0                                              DETE3020
  220 IW=IW+1                                                             DETE3030
      IF(IW.GT.NWTU) GO TO 240                                            DETE3040
      IF(IWSTAT(IW+NWU).LE.0) GO TO 220                                   DETE3050
      ITU=IWTU(IW)                                                        DETE3060
      IF(MOD(ITU,10).NE.4) GO TO 220                                      DETE3070
      IF(MOD(IWTU(MAXWTU+IW)/100000000,10).NE.1) GO TO 220                DETE3080
      IROW=MOD(ITU/1000,100)                                              DETE3090
      IRAD=MOD(KSYSW(IROW)/100,100)                                       DETE3100
      IF(IRAD.EQ.0) GO TO 228                                             DETE3110
      ITGT=ITU/100000                                                     DETE3120
      KW=MOD(ITU,10)                                                      DETE3130
      WX=TUWXYZ(1,IW)                                                     DETE3140
      WY=TUWXYZ(2,IW)                                                     DETE3150
      WZ=TUWXYZ(3,IW)                                                     DETE3160
      WVX=TUWXYZ(4,IW)                                                    DETE3170
      WVY=TUWXYZ(5,IW)                                                    DETE3180
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      ASSIGN 14 TO IWSET                                                DETE3190
      ASSIGN 160 TO KWSET                                               DETE3200
      DO 225 I=1,36                                                     DETE3210
  225 RADCOL(I)=CMRAD(I,IRAD)                                           DETE3220
      GO TO 1210                                                        DETE3230
  228 IPD=99                                                            DETE3240
      GO TO 235                                                         DETE3250
  230 IJAM=ETC(3)+.5                                                    DETE3260
      IPD=PDRAD*100.                                                    DETE3270
      IF(IPD.GT.99) IPD=99                                              DETE3280
      IPD=IJAM*100+IPD                                                  DETE3290
      IF(IMISC(3).GT.0) WRITE(N6,RADR)                                  DETE3300
  235 ITU=IWTU(MAXWTU+IW)                                               DETE3310
      IWTU(MAXWTU+IW)=IPD*1000000+MOD(ITU,1000000)                      DETE3320
      GO TO 220                                                         DETE3330
  240 CALL ERRSET(208,300,300,2,0,0)                                    DETE3340
      IPRAD=IPRSAV                                                      DETE3350
      RETURN                                                            DETE3360
      END                                                               DETE3370


      SUBROUTINE  SHIPXS(H1,R,SIG,  HS,SIGA,H,IXX)                      SHXS0010
C  PGM=NXX.L.O.G.       VER.1  7-16-73      FORTRAN IV          EPCD   SHXS0020
C  TO FIND THE VISIBLE RADAR X-SECT. OF A SURFACE SHIP                  SHXS0030
C  FOR                                                                  SHXS0040
C     H1   = RADAR HEIGHT, FT.          / R    = RANGE TO SHIP,NM      SHXS0050
C     SIG  = RADAR X-SECT.OF SHIP, M2 / C    = AREA DIST.CONSTANT, WHERESHXS0060
C     HS   = VERTICAL DIM.SHIP,FT.     /       (1.0.LE.C.LE.2.0)       SHXS0070
C  OUTPUT                                                               SHXS0080
C     SIGA = RADAR X-SECTION VISIBLE ABOVE HORIZON, SQ.METERS           SHXS0090
C     H    = ALTITUDE OF CENTROID OF VISIBLE AREA, FT.ABOVE SURFACE     SHXS0100
C     IXX  = +1  IF RANGE R.GT.RADAR HORIZON                            SHXS0110
C          = 0   IF O.K.                                                SHXS0120
C***                                                                    SHXS0130
      DATA  C/2.0/                                                      SHXS0140
  1   IF (HS.GT.0.)  GO TO 8                                            SHXS0150
      IXX = -1                                                          SHXS0160
      RETURN                                                            SHXS0170
C** RADAR HORIZON                                                       SHXS0180
  8   IF (H1.LE.0.)  H1 = 0.                                            SHXS0190
      RH1  = 1.2289*SQRT(H1)                                            SHXS0200
      HB   = 0.7 * HS                                                   SHXS0210
      RH   = RH1 + 1.2289*SQRT(HB)                                      SHXS0220
      IF (R.LT.RH)  GO TO 10                                            SHXS0230
C*** NOT VISIBLE                                                        SHXS0240
      IXX = +1                                                          SHXS0250
      RETURN                                                            SHXS0260
C*** COMPLETELY VISIBLE                                                 SHXS0270
 10   IXX  = 0                                                          SHXS0280
      IF (R.GT.RH1+.0001)  GO TO 12                                     SHXS0290
      SIGA = SIG                                                        SHXS0300
      H    = HB / (C+1.0)                                               SHXS0310
      RETURN                                                            SHXS0320
C** PARTIALLY VISIBLE                                                   SHXS0330
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12    R2    = R - RH1                                                    SHXS0340
      HH    = (R2 / 1.2289)**2                                           SHXS0350
      IF (HH.GT.HB)  HH = HB                                             SHXS0360
      HA    = HB - HH                                                    SHXS0370
      SIGA = SIG*( (HA/HB)**C)                                           SHXS0380
      H     = HH + HA / (C+1.0)                                          SHXS0390
      RETURN                                                             SHXS0400
      END                                                                SHXS0410


      SUBROUTINE ALLOCA(NEXTU,LASTU,MAXTU,IWSTAT,LSYSW,IWTU,INVWTU,      ALL00010
     1  TUWXYZ,WPX1,WXYZ,WRAD,ENV,KWSEG,KWU,KWUK,NWUG,                   ALL00020
     2  NTU,NTTU,KTSEG,ITSTAT,INTVLT,TUTXYZ,KTUK,TGCV,TXYZ,KHVT,         ALL00030
     3      AJAM,ITTU,TPX1,LSYST,INVTTU,                                 ALL00040
     4      TTRAJ,DATASM,WPNDAT,SAMDAT,LBRSYS,INFORM,IDU1)               ALL00050
      COMMON/ECONST/ NSHIP,NAIR,NSUB,NVSEA,NVALT,PDTMIN,PDMIN,           ALL00060
     1      AIRCPT,FPNM,HMIN,PI,TWOPI,IENV,ISCAN,IPRAD,IMISC(35)         ALL00070
      COMMON/DEVICE/ N1,N2,N3,N4,N5,N6,N7,N8,N9,N10,N11,N12              ALL00080
      COMMON /ETIME/ TIME,TIMEA,TIMEB,TBEGIN,TIMEND,TIMAX,TSTEP          ALL00090
      COMMON /STRCON/ JPK,IPK                                            ALL00100
      COMMON /WORK/ IWORK(50),JWORK(50),WORKI(50),WORKJ(50),             ALL00110
     1      LSHIP(40),LDET(220),LACVEC(40)                               ALL00120
      DIMENSION KWORK(500)                                               ALL00130
      EQUIVALENCE (IWORK(1),KWORK(1))                                    ALL00140
      DIMENSION IWSTAT(1),LSYSW(1),IWTU(1),INVWTU(1),TUWXYZ(8,1),        ALL00150
     1      TTRAJ(50,1),DATASM(24,1),WPNDAT(15,1),SAMDAT(20,1),          ALL00160
     2      WPX1(12,1),WXYZ(IDU1,7),KTSEG(1),ITSTAT(1),INTVLT(1),        ALL00170
     3      TUTXYZ(8,1),KTUK(4,1),TGCV(8,5,1),TXYZ(IDU1,7),AJAM(6,3,1),  ALL00180
     4      WRAD(36,1),ITTU(1),TPX1(12,1),LSYST(1),ENV(1)                ALL00190
     5,     LBRSYS(1),INFORM(1),INVTTU(1),KWSEG(1)                       ALL00200
     6,     KWUK(4,1),NWUG(1),KHVT(1)                                    ALL00210
      DIMENSION TRAD(10),PDTECT(10),ANG(10),DYN(10),RANGE(10),ETC(4),    ALL00220
     1      TAP(6)                                                       ALL00230
C                                                                        ALL00240
      DIMENSION MXGAGE(5),LGRP(18)                                       ALL00250
      EQUIVALENCE (IMISC(4),ISIDE)                                       ALL00260
      EQUIVALENCE (IMISC(20),LRATE)                                      ALL00270
      NAMELIST/CMLNCH/ TIME,IWPN,ITU,IWPNTU,KW,KSYS,ITGT,KT,GR,IPD       ALL00280
      NAMELIST/ACVECT/ TIME,IWPN,ITU,IWPNTU,KW,KSYS,ITGT,KT,GR,IPD       ALL00290
      NAMELIST/SSWPN/  TIME,IWPN,KW,KSYS,ITGT,KT,GR,TRUNIN,IPD           ALL00300
      NAMELIST/  SAM/ TIME,IWPN,KSYS,TA,TFA,GR,ITGT,KT,PDT              ALL00310
      NAMELIST/SAGUN/ TIME,IWPN,KSYS,TA,TFA,GR,ITGT,KT                   ALL00320
      NAMELIST/AAMDEF/ TIME,IWPN,KSYS,TFA,GR,ITGT,KT                     ALL00330
      NAMELIST /SAMLST/ TIME,IWPN,ITGT,NWSTAT,GR,X,RDRNGE,PDT           ALL00340
C                                                                        ALL00350
      DATA MAXX/2147400000/                                              ALL00360
C                                                                        ALL00370
      DO 110 I=1,5                                                       ALL00380
      IS=IMISC(I+30)                                                     ALL00390
      LS=MOD(IS,100)                                                     ALL00400
      IS=IS/100                                                          ALL00410
      IF(IS.EQ.0) IS=LS                                                  ALL00420
      IF(ISIDE.EQ.1) LS=IS                                               ALL00430
  110 MXGAGE(I)=LS                                                       ALL00440
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      ASSIGN 546 TO IRPASS                                                    ALL00450
      ASSIGN 465 TO IRFAIL                                                    ALL00460
      IF(IMISC(19).LT. 20) IMISC(19)=20                                       ALL00470
      RSTMIN=IMISC(19)                                                        ALL00480
      RSTMIN=RSTMIN*.001                                                      ALL00490
      NHVT=MOD(KHVT(19),100)                                                  ALL00500
      TRAD(1)=TIME                                                            ALL00510
      TAR(5)=0.                                                               ALL00520
      TAR(6)=0.                                                               ALL00530
      ICHEK=IMISC(29)                                                         ALL00540
      TPACK=TIME-TSTEP                                                        ALL00550
      TZERO=TIME-TBEGIN                                                       ALL00560
      JAMON=IMISC(2)                                                          ALL00570
      NLPR=IMISC(3)                                                           ALL00580
      ITIME=TZERO*1000.                                                       ALL00590
      ASSIGN 311 TO KSWT1                                                     ALL00600
      NVEC=0                                                                  ALL00610
      KMASK=12                                                                ALL00620
      DO 125 I=1,2                                                            ALL00630
      DO 120 IW=1,KWU                                                         ALL00640
      LS=LSYSW(IW)                                                            ALL00650
      ISB=MOD(LS/100,10000)                                                   ALL00660
      IF(ISB.EQ.0) GO TO 120                                                  ALL00670
      MASK=LPRSYS(ISB)                                                        ALL00680
      IF(MASK.NE.KMASK) GO TO 120                                             ALL00690
      IF(IWSTAT(IW).LE.0) GO TO 120                                           ALL00700
      NVEC=NVEC+1                                                             ALL00710
      LACVEC(NVEC)=IW                                                         ALL00720
  120 CONTINUE                                                                ALL00730
      IF(I.EQ.1) NASM=NVEC                                                    ALL00740
      KMASK=102                                                               ALL00750
  125 CONTINUE                                                                ALL00760
      NAAM=NVEC-NASM                                                          ALL00770
      NDET=0                                                                  ALL00780
      DO 220 ITGT=1,NTU                                                       ALL00790
      KSEG=KTSEG(ITGT)                                                        ALL00800
      IF(KSEG.EQ.0) GO TO 220                                                 ALL00810
      NTSTAT=ITSTAT(ITGT)                                                     ALL00820
      IF(NTSTAT.LE.0) GO TO 220                                               ALL00830
      KT=MOD(KTUK(2,ITGT)/1000000,10)                                         ALL00840
      IF(NTSTAT-2 .GE. MXGAGE(KT)) GO TO 220                                  ALL00850
      IVAL=0                                                                  ALL00860
      IF(KHVT(ITGT)/1000 .GT. 0) IVAL=100                                     ALL00870
      ISEG=KSEG/IPK                                                           ALL00880
  205 IF(ISEG.EQ.0) GO TO 220                                                 ALL00890
      IPD=INFORM(ISEG+5)                                                      ALL00900
      IF(IPD.GT.0) GO TO 214                                                  ALL00910
  210 ISEG=MOD(INFORM(ISEG+2),IPK)                                            ALL00920
      GO TO 205                                                               ALL00930
  214 IF(NDET.LT.220) GO TO 215                                               ALL00940
      WRITE(N6,6214)                                                          ALL00950
 6214 FORMAT('  *** SUBROUTINE ALLOCA, DETECTION ARRAY LDET FULL ***')        ALL00960
      GO TO 224                                                               ALL00970
  215 NDET=NDET+1                                                             ALL00980
      IPD=MOD(IPD,100)+IVAL                                                   ALL00990
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      LDET(NDET)=IPD*10000+ISEG                                          ALL01000
      GO TO 210                                                          ALL01010
  220 CONTINUE                                                           ALL01020
      IF(NDET.EQ.0) GO TO 400                                            ALL01030
  224 ASSIGN 226 TO ISWVEC                                               ALL01040
      IVEC=0                                                             ALL01050
  225 GO TO ISWVEC,(226,232,237)                                         ALL01060
  226 MAX=LDET(1)/10000                                                  ALL01070
      IMAX=1                                                             ALL01080
      DO 230 I=1,NDET                                                    ALL01090
      K=LDET(I)/10000                                                    ALL01100
      IF(K.LE.MAX) GO TO 230                                             ALL01110
      MAX=K                                                              ALL01120
      IMAX=I                                                             ALL01130
  230 CONTINUE                                                           ALL01140
      IF(MAX.EQ.0) GO TO 400                                             ALL01150
      IPD=MAX                                                            ALL01160
      IVAL=MAX/100                                                       ALL01170
      MAX=LDET(IMAX)                                                     ALL01180
      LDET(IMAX)=0                                                       ALL01190
      ISEG=MOD(MAX,10000)                                                ALL01200
      KSEG=INFORM(ISEG)                                                  ALL01210
      ITGT=MOD(KSEG,IPK)                                                 ALL01220
      KT=MOD(KTUK(2,ITGT)/1000000,10)                                    ALL01230
      NTSTAT=ITSTAT(ITGT)                                                ALL01240
      MGAGE=MXGAGE(KT)+2                                                 ALL01250
      IF(NTSTAT.GE.MGAGE) GO TO 225                                      ALL01260
      TX=TXYZ(ITGT,2)                                                    ALL01270
      TY=TXYZ(ITGT,3)                                                    ALL01280
      TZ=TXYZ(ITGT,4)                                                    ALL01290
      IWPN=KSEG/IPK                                                      ALL01300
      NWSTAT=IWSTAT(IWPN)                                                ALL01310
      IF(NWSTAT.LE.0) GO TO 225                                          ALL01320
  231 IS=LSYSW(IWPN)                                                     ALL01330
      IPLAT=MOD(IS,100)                                                  ALL01340
      IS=IS/100                                                          ALL01350
      ISB=MOD(IS,10000)                                                  ALL01360
      ISA=IS/10000                                                       ALL01370
      MASK=LPRSYS(ISB)                                                   ALL01380
      ISS=ISB-3                                                          ALL01390
      KW=MOD(MASK,10)                                                    ALL01400
      IF(IVEC.EQ.1) GO TO 239                                            ALL01410
      IVEC=MOD(MASK/10000000,10)                                         ALL01420
      IF(IVEC.EQ.0) GO TO 239                                            ALL01430
      ISEG=0                                                             ALL01440
      IF(KT.EQ.NAIR) GO TO 234                                           ALL01450
      KCM=10                                                             ALL01460
      ICM=ISA                                                            ALL01470
      ICMB=ISS                                                           ALL01480
      ASSIGN 232 TO ISWVEC                                               ALL01490
  232 ICM=ICM+1                                                          ALL01500
      IF(NTSTAT.GE.MGAGE) GO TO 224                                      ALL01510
      IF(ICM.GT.ICMB) GO TO 233                                          ALL01520
      ISYS=LPRSYS(ICM)                                                   ALL01530
      IF(MOD(ISYS,100) .NE. KCM) GO TO 232                               ALL01540
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      IWPN=MOD(ISYS/100,100)                                          ALL01550
      NWSTAT=IWSTAT(IWPN)                                             ALL01560
      IF(NWSTAT.LE.0) GO TO 232                                       ALL01570
      CALL NQUIRE(INFORM,KWSEG,IWPN,ITGT,ISEG)                        ALL01580
      GO TO 231                                                       ALL01590
  233 IF(NASM.EQ.0) GO TO 224                                         ALL01600
      IAC=1                                                           ALL01610
      IBC=NASM                                                        ALL01620
      GO TO 235                                                       ALL01630
  234 IF(NAAM.EQ.0) GO TO 224                                         ALL01640
      IAC=NASM+1                                                      ALL01650
      IBC=NVEC                                                        ALL01660
  235 IF(NTSTAT.GE.MGAGE) GO TO 224                                   ALL01670
      ASSIGN 237 TO ISWVEC                                            ALL01680
      DO 236 I=IAC,IBC                                                ALL01690
      IWPN=LACVEC(I)                                                  ALL01700
      WX=WXYZ(IWPN,2)                                                 ALL01710
      WY=WXYZ(IWPN,3)                                                 ALL01720
      DX=TX-WX                                                        ALL01730
      DY=TY-WY                                                        ALL01740
      GR2=DX*DX+DY*DY                                                 ALL01750
  236 IWORK(I)=GR2                                                    ALL01760
  237 IF(NTSTAT.GE.MGAGE) GO TO 224                                   ALL01770
      MIN=IWORK(IAC)                                                  ALL01780
      IMIN=IAC                                                        ALL01790
      DO 238 I=IAC,IBC                                                ALL01800
      K=IWORK(I)                                                      ALL01810
      IF(K.GE.MIN) GO TO 238                                          ALL01820
      IMIN=I                                                          ALL01830
      MIN=K                                                           ALL01840
  238 CONTINUE                                                        ALL01850
      IF(MIN.EQ.MAXX) GO TO 224                                       ALL01860
      IWORK(IMIN)=MAXX                                                ALL01870
      IWPN=LACVEC(IMIN)                                               ALL01880
      NWSTAT=IWSTAT(IWPN)                                             ALL01890
      IF(NWSTAT.LE.0) GO TO 237                                       ALL01900
      GO TO 231                                                       ALL01910
  239 IF(ISEG.GT.0 .AND. INFORM(ISEG+6).GT.0) GO TO 225               ALL01920
      WX=WXYZ(IWPN,2)                                                 ALL01930
      WY=WXYZ(IWPN,3)                                                 ALL01940
      WZ=WXYZ(IWPN,4)                                                 ALL01950
      DX=TX-WX                                                        ALL01960
      DY=TY-WY                                                        ALL01970
      GR2=DX*DX+DY*DY                                                 ALL01980
      GR=SQRT(GR2)                                                    ALL01990
      IF(KT-NAIR) 240,270,265                                         ALL02000
  240 ASSIGN 247 TO ISWT3                                             ALL02010
      ASSIGN 285 TO ISWT1                                             ALL02020
      ASSIGN 242 TO ISWT4                                             ALL02030
      IF(NHVT.EQ.0) GO TO 241                                         ALL02040
      IF(IVAL.GT.0) GO TO 241                                         ALL02050
      IG=KWUK(3,IWPN)                                                 ALL02060
      IHVT=MOD(KHVT(IG),100)                                          ALL02070
      IF(ITSTAT(IHVT).NE.2) GO TO 241                                 ALL02080
      X=MOD(LBRSYS(ISB-1)/100,10000)                                  ALL02090
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      IF(.5*Y.LT.GR ) GO TO 225                                          ALL02100
  241 CONTINUE                                                           ALL02110
      KSYS=12                                                            ALL02120
      IAC=4                                                              ALL02130
      GO TO 280                                                          ALL02140
  242 NSALVO=DATASM( 5,ICOL ) + .5                                       ALL02150
      ISALVO=0                                                           ALL02160
      ASSIGN 243 TO ISWT2                                                ALL02170
      IRP=IROW                                                           ALL02180
      IRPD=99                                                            ALL02190
      GO TO 305                                                          ALL02200
  243 ISALVO=ISALVO+1                                                    ALL02210
      DATASM(22,ICOL )=DATASM(22,ICOL)+1.                                ALL02220
      IF(NLPR.GT.0) WRITE(N6,CMLNCH)                                     ALL02230
C                                                                        ALL02240
C  CRUISE MISSILE LAUNCHED                                               ALL02250
C                                                                        ALL02260
      IF(ISALVO.EQ.NSALVO) GO TO 245                                     ALL02270
      GO TO 305                                                          ALL02280
  245 TRUNIN=-TZERO                                                      ALL02290
      RTIME=DATASM( 6,ICOL )                                             ALL02300
      GO TO 330                                                          ALL02310
  247 IF(KW.EQ.NAIR) GO TO 255                                           ALL02320
  248 KSYS=16                                                            ALL02330
      ASSIGN 225 TO ISWT3                                                ALL02340
  249 ASSIGN 250 TO ISWT1                                                ALL02350
      GO TO 280                                                          ALL02360
  250 RMAX=WPNDAT( 1,ICOL )                                              ALL02370
      IF(GR.GT.RMAX) GO TO 282                                           ALL02380
      RTIME=WPNDAT( 6,ICOL )                                             ALL02390
      TRUNIN=GR/WPNDAT(2,ICOL )                                          ALL02400
      IF(NLPR.GT.0) WRITE(N6,SSWPN)                                      ALL02410
      GO TO 330                                                          ALL02420
  255 KSYS=22                                                            ALL02430
      ASSIGN 285 TO ISWT1                                                ALL02440
  256 IF(NTSTAT.GE.MGAGE) GO TO 225                                      ALL02450
      ASSIGN 260 TO ISWT3                                                ALL02460
      ASSIGN 305 TO ISWT4                                                ALL02470
      ASSIGN 262 TO ISWT2                                                ALL02480
  257 IRP=IPLAT                                                          ALL02490
      IAC=2                                                              ALL02500
      Z=.5*(WZ+TZ)                                                       ALL02510
      BZ=WPX1(7,IPLAT)/6.080                                             ALL02520
      VA=WPX1(NVSEA,IPLAT)                                               ALL02530
      VB=WPX1(NVALT,IPLAT)                                               ALL02540
      WV=VA+(VB-VA)*Z/BZ                                                 ALL02550
      IF(WV.GT.VB) WV=VB                                                 ALL02560
      LCAR=LBRSYS(ISB-2)                                                 ALL02570
      ICAR=IABS(LCAR/10000000)                                           ALL02580
      IF(LCAR.LE.0) GO TO 280                                            ALL02590
      IF(IWSTAT(ICAR).GT.0) GO TO 259                                    ALL02600
  258 LCAR=-LCAR                                                         ALL02610
      LBRSYS(ISB-2)=LCAR                                                 ALL02620
      GO TO 280                                                          ALL02630
  259 IF(LBRSYS(MOD(LCAR/100,10000)).EQ.0) GO TO 258                     ALL02640
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      CX=WXYZ(ICAR,2)                                                  ALL02650
      CY=WXYZ(ICAR,3)                                                  ALL02660
      DX=CX-TX                                                         ALL02670
      DY=CY-TY                                                         ALL02680
      GCT2=DX*DX+DY*DY                                                 ALL02690
      IF(GR2 .GT. 1.01*GCT2) GO TO 225                                 ALL02700
      GO TO 280                                                        ALL02710
  260 KSYS=16                                                          ALL02720
      ASSIGN 272 TO ISWT1                                              ALL02730
      ASSIGN 225 TO ISWT3                                              ALL02740
      GO TO 280                                                        ALL02750
C                                                                      ALL02760
C  A/C HAS BEEN VECTORED                                               ALL02770
C                                                                      ALL02780
  262 JTIME=MAXX                                                       ALL02790
      IF(LCAR.LE.0) GO TO 264                                          ALL02800
C                                                                      ALL02810
      LINE=MOD(LCAR/100,10000)                                         ALL02820
      DX=CX-WX                                                         ALL02830
      DY=CY-WY                                                         ALL02840
      RESTOR=SQRT(DX*DX+DY*DY)/WV                                      ALL02850
      IF(RESTOR.LT.RSTMIN) RESTOR=RSTMIN                               ALL02860
      JTIME=RESTOR*1000.                                               ALL02870
      LS=LBRSYS(LINE)                                                  ALL02880
      IF(LS/1000000.EQ.0) GO TO 263                                    ALL02890
      KSB=MOD(LSYSW(ICAR)/100,10000)-2                                 ALL02900
      IF(LBRSYS(KSB).GT.ITIME*100) GO TO 263                           ALL02910
      LBRSYS(KSB)=(ITIME+LRATE)*100                                    ALL02920
      LBRSYS(LINE)=LS-1000000                                          ALL02930
      JTIME=JTIME+ITIME                                                ALL02940
      GO TO 264                                                        ALL02950
  263 JTIME=JTIME+LINE*100000                                          ALL02960
  264 IWSTAT(IWPN)=-JTIME                                              ALL02970
      IF(NLPR.GT.0) WRITE(N6,ACVECT)                                   ALL02980
      GO TO 335                                                        ALL02990
  265 IF(NTSTAT.GE.MGAGE) GO TO 225                                    ALL03000
      ASSIGN 272 TO ISWT1                                              ALL03010
      KSYS=24                                                          ALL03020
      IF(KW.EQ.NAIR) GO TO 256                                         ALL03030
      ASSIGN 248 TO ISWT3                                              ALL03040
      GO TO 249                                                        ALL03050
  270 IF(NTSTAT.GE.MGAGE) GO TO 225                                    ALL03060
      IF(KW.NE.NAIR) GO TO 225                                         ALL03070
      IF(MOD(MASK/10,1000).NE. 010) GO TO 225                          ALL03080
      KSYS=23                                                          ALL03090
      ASSIGN 225 TO ISWT3                                              ALL03100
      ASSIGN 272 TO ISWT1                                              ALL03110
      GO TO 257                                                        ALL03120
  272 IV=0                                                             ALL03130
      NS=WPNDAT(1,ICOL)*10.+.5                                         ALL03140
      IF(NS.GT.999) NS=999                                             ALL03150
      ITG=KTUK(3,ITGT)                                                 ALL03160
      LEG=IABS(INTVLT(ITG))                                            ALL03170
      TVX=TGCV(LEG,1,ITG)                                              ALL03180
      TVY=TGCV(LEG,2,ITG)                                              ALL03190
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      CALL  INCEPT(TX,TY,TVX,TVY,WX,WY,WV,WVX,WVY,DELTI)                ALL03200
      IF(DELTI.LE.0.) GO TO 225                                         ALL03210
      IF(DELTI.GT.AIRCPT) GO TO 225                                     ALL03220
      ASSIGN 276 TO ISWT2                                               ALL03230
      GO TO 305                                                         ALL03240
  276 TUWXYZ(4,ITU)=WVX                                                 ALL03250
      TUWXYZ(5,ITU)=WVY                                                 ALL03260
      GO TO 262                                                         ALL03270
  280 IS=ISA-1                                                          ALL03280
  282 IS=IS+1                                                           ALL03290
      IF(IS.GT.ISS) GO TO ISWT3,(247,225,248,260)                       ALL03300
      ISYS=LRRSYS(IS)                                                   ALL03310
      IF(MOD(ISYS,100) .NE. KSYS) GO TO 282                             ALL03320
      IAVAIL=ISYS/1C00C0000                                             ALL03330
      ISTOCK=MOD(ISYS/1C00000C,100)                                     ALL03340
      IF(ISTOCK*IAVAIL .EQ. 0) GO TO 282                                ALL03350
      ICOL=MOD(ISYS/10C00,100)                                          ALL03360
      IROW=MOD(ISYS/10C,100)                                            ALL03370
      GO TO ISWT1, (285,250,272)                                        ALL03380
  285 IV=1                                                              ALL03390
      IOFF=0                                                            ALL03400
  290 RMAX=TTRAJ(IOFF+3,ICOL)                                           ALL03410
      IF(GR.GT.RMAX) GO TO 282                                          ALL03420
      RMIN=TTRAJ(IOFF+4,ICOL)                                           ALL03430
      IF(GR.GT.RMIN) GO TO 300                                          ALL03440
      IF(IV.EQ.2) GO TO 282                                             ALL03450
      IV=2                                                              ALL03460
      IOFF=25                                                           ALL03470
      GO TO 290                                                         ALL03480
  300 NS=RMAX-GR                                                        ALL03490
      GO TO ISWT4,(242,305)                                             ALL03500
  305 IF(NEXTU.EQ.0) GO TO 310                                          ALL03510
      ITU=NEXTU                                                         ALL03520
      NEXTU=IWTU(ITU)                                                   ALL03530
      GO TO 315                                                         ALL03540
  310 GO TO KSWT1, (311,282)                                            ALL03550
  311 IF(LASTU.LT.MAXTU) GO TO 312                                      ALL03560
      WRITE(N6,6310)                                                    ALL03570
 6310 FORMAT(  .6X,'TEMPORARY UNIT MATRIX FULL')                        ALL03580
      ASSIGN 282 TO KSWT1                                               ALL03590
      IF(IAC.EQ.4 .AND. ISALVO.GT.0) GO TO 245                          ALL03600
      GO TO 282                                                         ALL03610
  312 IF(IAC.EQ.2) GO TO 314                                            ALL03620
      IF(ISEG.GT.0) GO TO 314                                           ALL03630
      CALL ADDSEG(INFORM,KWSEG,KTSEG,IWPN,ITGT,ISEG)                    ALL03640
      IF(ISEG.EQ.0) GO TO 225                                           ALL03650
  314 LASTU=LASTU+1                                                     ALL03660
      ITU=LASTU                                                         ALL03670
  315 TUWXYZ(1,ITU)=WX                                                  ALL03680
      TUWXYZ(2,ITU)=WY                                                  ALL03690
      TUWXYZ(3,ITU)=WZ                                                  ALL03700
      TUWXYZ(7,ITU)=TIMEX                                               ALL03710
      TUWXYZ(8,ITU)=TRACK                                               ALL03720
      IWPNTU=ITU+KWU                                                    ALL03730
      IWSTAT(IWPNTU)=1                                                  ALL03740
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      IWTU(ITU)=ITGT*100000+IRP*1000+ICOL*10+IAC                        ALL03750
      I=GR*10.+.5                                                       ALL03760
      IF(IAC.EQ.2) I=ICAR                                               ALL03770
      IF(IAC.EQ.2) IRPD=IROW+ISTOCK*100                                 ALL03780
      IWTU(MAXTU+ITU)=  I*100+ICO+IWPN+IRPD*10000000                    ALL03790
      INVWTU(ITU)=ITIME*100000+NS*100+IV                                ALL03800
      GO TO ISWT2,(243,262,276)                                         ALL03810
  330 JTIME=(TZERO+RTIME)*1000.                                         ALL03820
      KTIME=(TZERO+TRUNIN)*1000.                                        ALL03830
      IF(JTIME.LT.KTIME) JTIME=KTIME                                    ALL03840
      IF(ISEG.EQ.0) CALL ADDSEG(INFORM,KWSEG,KTSEG,IWPN,ITGT,ISEG)      ALL03850
      IF(ISEG.EQ.0) GO TO 225                                           ALL03860
      INFORM(ISEG+3)=GR*10.+.5                                          ALL03870
      INFORM(ISEG+6)=IS*100000+JTIME                                    ALL03880
      INFORM(ISEG+7)=ITIME*100000+KTIME                                 ALL03890
      K=1000000                                                         ALL03900
      IF(ISTOCK.EQ.99) K=0                                              ALL03910
      LBRSYS(IS)=ISYS-100000000-K                                       ALL03920
  335 NTSTAT=NTSTAT+1                                                   ALL03930
      ITSTAT(ITGT)=NTSTAT                                               ALL03940
      GO TO 225                                                         ALL03950
  400 CONTINUE                                                          ALL03960
      ASSIGN 477 TO KCHEK                                               ALL03970
      IF(MOD(ICHEK,10).GT.0) ASSIGN 4765 TO KCHEK                       ALL03980
      ASSIGN 495 TO LJSET                                               ALL03990
      ASSIGN 520 TO KJSET                                               ALL04000
      IF(NTTU.EQ.0) GO TO 600                                           ALL04010
      NDET=0                                                            ALL04020
      DO 420 I=1,NTTU                                                   ALL04030
      IF(INVTTU(I).EQ.0) GO TO 420                                      ALL04040
      IF(TUTXYZ(3,I).LE.0.) GO TO 420                                   ALL04050
      K=I+NTU                                                           ALL04060
      IF(ITSTAT(K).GE.MXGAGE(4)+2 ) GO TO 420                           ALL04070
      KSEG=KTSEG(K)                                                     ALL04080
      IF(KSEG.EQ.0) GO TO 420                                           ALL04090
      ISEG=KSEG/IPK                                                     ALL04100
      T=TUTXYZ(7,I)                                                     ALL04110
      JTIME=(T-TBEGIN)*1000.                                            ALL04120
      IF(JTIME.LT.0) GO TO 420                                          ALL04130
      IF(ITTU(I)/100000.EQ.0) JTIME=22000                               ALL04140
  405 IF(ISEG.EQ.0) GO TO 420                                           ALL04150
      IPD=INFORM(ISEG+5)                                                ALL04160
      IF(IPD.LE.0) GO TO 415                                            ALL04170
      NDET=NDET+1                                                       ALL04180
      LDET(NDET)=JTIME*10000+K                                          ALL04190
      GO TO 420                                                         ALL04200
  415 ISEG=MOD(INFORM(ISEG+2),IPK)                                      ALL04210
      GO TO 405                                                         ALL04220
  420 CONTINUE                                                          ALL04230
      IF(NDET.EQ.0) GO TO 600                                           ALL04240
  425 MIN=LDET(1)                                                       ALL04250
      IMIN=1                                                            ALL04260
      DO 430 I=1,NDET                                                   ALL04270
      K=LDET(I)                                                         ALL04280
      IF(K.GE.MIN) GO TO 430                                            ALL04290
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      MIN=K                                                                 ALL04300
      IMIN=I                                                                ALL04310
  430 CONTINUE                                                              ALL04320
      IF(MIN.EQ.MAXX) GO TO 600                                             ALL04330
      LDET(IMIN)=MAXX                                                       ALL04340
      ITGT=MOD(MIN,10000)                                                   ALL04350
      ITU=ITGT-NTU                                                          ALL04360
      KSEG=KTSEG(ITGT)                                                      ALL04370
      ISEG=KSEG/IPK                                                         ALL04380
      MSHIP=0                                                               ALL04390
      MGRP=0                                                                ALL04400
      TX=TUTXYZ(1,ITU)                                                      ALL04410
      TY=TUTXYZ(2,ITU)                                                      ALL04420
      TZ=TUTXYZ(3,ITU)                                                      ALL04430
      TVX=TUTXYZ(4,ITU)                                                     ALL04440
      TVY=TUTXYZ(5,ITU)                                                     ALL04450
      TVZ=TUTXYZ(6,ITU)                                                     ALL04460
      TVEC=TUTXYZ(8,ITU)                                                    ALL04470
      TLOS=SQRT(TZ*(6880.+TZ))                                              ALL04480
  435 IF(ISEG.EQ.0) GO TO 440                                               ALL04490
      IF(INFORM(ISEG+5).LE.0) GO TO 437                                     ALL04500
      KSEG=INFORM(ISEG)                                                     ALL04510
      IWPN=KSEG/IPK                                                         ALL04520
      IC=KWUK(3,IWPN)                                                       ALL04530
      IF(MGRP.EQ.0) GO TO 4365                                              ALL04540
      DO 436 I=1,MGRP                                                       ALL04550
      IF(LGRP(I).EQ.IG) GO TO 437                                           ALL04560
  436 CONTINUE                                                              ALL04570
 4365 MGRP=MGRP+1                                                           ALL04580
      LGRP(MGRP)=IG                                                         ALL04590
  437 ISEG=MOD(INFORM(ISEG+2),IPK)                                          ALL04600
      GO TO 435                                                             ALL04610
  440 IF(MGRP.EQ.0) GO TO 425                                               ALL04620
      DO 448 K=1,MGRP                                                       ALL04630
      IG=LGRP(K)                                                            ALL04640
      IUB=NWUC(IG)                                                          ALL04650
      IUA=IUB/100                                                           ALL04660
      IUB=IUA+MOD(IUB,100)-1                                                ALL04670
      DO 448 IWPN=IUA,IUB                                                   ALL04680
      IF(IWSTAT(IWPN).LE.0) GO TO 448                                       ALL04690
      IS=LSYSW(IWPN)                                                        ALL04700
      ISB=MOD(IS/100,10000)                                                 ALL04710
      IF(ISB.EQ.0) GO TO 448                                                ALL04720
      IF(MOD(LBRSYS(ISB)/100,10).EQ.0) GO TO 448                            ALL04730
      CALL NQUIRE(INFORM,KWSEG,IWPN,ITGT,ISEG)                              ALL04740
      IF(ISEG.GT.0 .AND. INFORM(ISEG+6).GT.0) GO TO 448                     ALL04750
      WX=WXYZ(IWPN,2)                                                       ALL04760
      WY=WXYZ(IWPN,3)                                                       ALL04770
      DX=TX-WX                                                              ALL04780
      DY=TY-WY                                                              ALL04790
      DR2=DX*DX+DY*DY                                                       ALL04800
      RAIR=LBRSYS(ISB-1)/100000                                             ALL04810
      IF(DR2.GT.RAIR*RAIR) GO TO 448                                        ALL04820
      HMAST=0.                                                              ALL04830
      KW=MOD(LBRSYS(ISB),10)                                                ALL04840
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      IF(KW.EQ.2) GO TO 447                                          ALL04850
      LPLTW=MOD(IS,100)                                              ALL04860
      HMAST=WPX1(3,LPLTW)/FPNM                                       ALL04870
  447 HMAST=HMAST+WXYZ(IWPN,4)                                       ALL04880
      X=1.1547*(TLOS+SQRT(HMAST*(6880.+HMAST)))                      ALL04890
      IF(GR2.GT.X*X) GO TO 448                                       ALL04900
      I=SQRT(GR2)                                                    ALL04910
      MSHIP=MSHIP+1                                                  ALL04920
      LSHIP(MSHIP)=I*1000000 +ISEG*100 +IWPN                         ALL04930
  448 CONTINUE                                                       ALL04940
  450 IF(MSHIP.EQ.0) GO TO 425                                       ALL04950
  451 MIN=LSHIP(1)                                                   ALL04960
      IMIN=1                                                         ALL04970
      DO 455 I=1,MSHIP                                               ALL04980
      K=LSHIP(I)                                                     ALL04990
      IF(K.GE.MIN) GO TO 455                                         ALL05000
      MIN=K                                                          ALL05010
      IMIN=I                                                         ALL05020
  455 CONTINUE                                                       ALL05030
      IF(MIN.EQ.MAXX) GO TO 425                                      ALL05040
      LSHIP(IMIN)=MAXX                                               ALL05050
      I=MIN/1000000                                                  ALL05060
      ISEG=MOD(MIN/100, 10000)                                       ALL05070
      IWPN=MOD(MIN,100)                                              ALL05080
      IS=LSYSW(IWPN)                                                 ALL05090
      LPLTW=MOD(IS,100)                                              ALL05100
      ISA=IS/1000000                                                 ALL05110
      ISB=MOD(IS/100,10000)                                          ALL05120
      ISS=ISB-3                                                      ALL05130
      ASSIGN 478 TO ISWT3C                                           ALL05140
      ASSIGN 475 TO ISWT3B                                           ALL05150
      KW=MOD(LBRSYS(ISB),10)                                         ALL05160
      IF(KW.EQ.NAIR) GO TO 456                                       ALL05170
      KSYS=33                                                        ALL05180
      ASSIGN 457 TO ISWT1                                            ALL05190
      ASSIGN 468 TO ISWT2                                            ALL05200
      ASSIGN 472 TO ISWT3                                            ALL05210
      ASSIGN 480 TO ISWT4                                            ALL05220
      ASSIGN 555 TO ISWT5                                            ALL05230
      GO TO 460                                                      ALL05240
  456 KSYS=23                                                        ALL05250
      GO TO 458                                                      ALL05260
  457 KSYS=43                                                        ALL05270
  458 ASSIGN 451 TO ISWT1                                            ALL05280
      ASSIGN 466 TO ISWT2                                            ALL05290
      ASSIGN 474 TO ISWT3                                            ALL05300
      ASSIGN 549 TO ISWT4                                            ALL05310
      ASSIGN 560 TO ISWT5                                            ALL05320
  460 IS=ISA-1                                                       ALL05330
  465 IS=IS+1                                                        ALL05340
      IF(IS.GT.ISS) GO TO ISWT1,(457,451)                            ALL05350
      ISYS=LBRSYS(IS)                                                ALL05360
      IF(MOD(ISYS,100).NE.KSYS) GO TO 465                            ALL05370
      IAVAIL=ISYS/100000000                                          ALL05380
      GO TO ISWT2,(466,468)                                          ALL05390
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466 ISTOCK=MOD(ISYS/1000000,100)                                    ALL05400
    GO TO 470                                                      ALL05410
468 JSYS=LBRSYS(IS+1)                                              ALL05420
    ISTOCK=MOD(JSYS/1000000,100)                                   ALL05430
470 IF(ISTOCK*IAVAIL.EQ.0) GO TO 465                               ALL05440
    ICOL=MOD(ISYS/10000,100)                                       ALL05450
    GO TO ISWT3,(472,474)                                          ALL05460
472 IRAD=ICOL                                                      ALL05470
    ICOL=MOD(JSYS/10000,100)                                       ALL05480
474 GO TO ISWT3B, (475,476,4783)                                   ALL05490
475 WX=WXYZ(IWPN,2)                                                ALL05500
    WY=WXYZ(IWPN,3)                                                ALL05510
    WZ=WXYZ(IWPN,4)                                                ALL05520
    IF(KW.EQ.NAIR) GO TO 478                                       ALL05530
    ASSIGN 476 TO ISWT3B                                           ALL05540
476 CONTINUE                                                       ALL05550
    INC=IMISC(22)                                                  ALL05560
    CALL SAMLT(TIME,ICOL,WX,WY,WZ,0.,0.,TX,TY,TZ,TVX,TVY,TVZ,      ALL05570
   1           INC,TA,TB,TFA,TFB,0)                                ALL05580
    IF(INC.EQ.0) GO TO 465                                         ALL05590
    IF(TA.GT.TIME) GO TO 465                                       ALL05600
    GO TO KCHEK,(4765,477)                                         ALL05610
4765 IF(TFA+TIME .GT. TVEC) GO TO 465                              ALL05620
477 GO TO ISWT3C, (478,479)                                        ALL05630
478 DX=TX-WX                                                       ALL05640
    DY=TY-WY                                                       ALL05650
    DZ=TZ-WZ                                                       ALL05660
    GR2=DX*DX+DY*DY+DZ*DZ                                          ALL05670
    GR=SQRT(GR2)                                                   ALL05680
    JTU=ITTL(ITU)                                                  ALL05690
    KT=MOD(JTU,10)                                                 ALL05700
    ASSIGN 479 TO ISWT3C                                           ALL05710
    IF(KW.NE.NAIR) GO TO 479                                       ALL05720
    ASSIGN 4783 TO ISWT3B                                          ALL05730
4783 IF(GR.GT.WPNDAT(1,ICOL)) GO TO 465                            ALL05740
    IF(IMISC(22).EQ.0 .AND. ABS(DZ/GR).GT. .5) GO TO 465           ALL05750
    RTIME=WPNDAT(6,ICOL)                                           ALL05760
    WV=WPNDAT(2,ICOL)                                              ALL05770
    CALL INCEPT(TX,TY,TVX,TVY,WX,WY,WV,WVX,WVY,TFA)                ALL05780
    IF(TFA.LT.0.) GO TO 465                                        ALL05790
    GO TO 548                                                      ALL05800
479 GO TO ISWT4, (480,549)                                         ALL05810
480 HMAST=WPX1(3,LPLTW)                                            ALL05820
    BETA=WRAD(1,IRAD)                                              ALL05830
    ALFA=WRAD(2,IRAD)                                              ALL05840
    FREQ=30000./WRAD(3,IRAD)                                       ALL05850
    BEAM=WRAD(22,IRAD)/57.3                                        ALL05860
    BEAM=.5*BEAM                                                  ALL05870
    ETC(1)=WZ*EPNM+HMAST                                           ALL05880
    ETC(4)=WRAD(36,IRAD)                                           ALL05890
    IF(KT.EQ.NAIR) GO TO 485                                       ALL05900
    KCOL=MOD(JTU/10,100)                                           ALL05910
    RCS=DATASM(19,KCOL)                                            ALL05920
    ALTGT=.5*(DATASM(16,KCOL)+DATASM(17,KCOL))                     ALL05930
    GO TO 490                                                      ALL05940
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  485 IPLTT=MOD(JTU/10CC,100)                                          ALL05950
      ALTGT=.5*(TPX1(1,IPLTT)+TPX1(2,IPLTT))                           ALL05960
      RCS=TPX1(4,IPLTT)                                                ALL05970
  490 GO TO LJSET,(495,501)                                            ALL05980
  495 ASSIGN 501 TO LJSET                                              ALL05990
      KSYSAV=KSYS                                                      ALL06000
      ITYPE=5                                                          ALL06010
      JAM=0                                                            ALL06020
      DO 500 IT=1,NTU                                                  ALL06030
      MS=LSYST(IT)/100                                                 ALL06040
      IF(MS.EQ.0) GO TO 500                                            ALL06050
      IA=MS/10000                                                      ALL06060
      IB=MOD(MS,10000)                                                 ALL06070
      MASK=LBRSYS(IB)/10                                               ALL06080
      IF(MOD(MASK/1000,10) .EQ. 0) GO TO 500                           ALL06090
      IB=IB-1                                                          ALL06100
      DO 5000 MS=IA,IB                                                 ALL06110
      KSYS=LBRSYS(MS)                                                  ALL06120
      IF(MOD(KSYS,10) .NE. ITYPE) GO TO 5000                           ALL06130
      IF(KSYS/10000000CC+JAMON.EQ.0) GO TO 5000                        ALL06140
      IJAM=MOD(KSYS/10000,100)                                         ALL06150
      JAM=JAM+1                                                        ALL06160
      JWORK(JAM)=IT*100+IJAM                                           ALL06170
 5000 CONTINUE                                                         ALL06180
  500 CONTINUE                                                         ALL06190
      KSYS=KSYSAV                                                      ALL06200
      IF(JAM.GT.0) ASSIGN 503 TO KJSET                                 ALL06210
  501 GO TO KJSET,(503,520)                                            ALL06220
  503 JAMR=0                                                           ALL06230
      DO 510 JM=1,JAM                                                  ALL06240
      IJ=JWORK(JM)                                                     ALL06250
      IT=IJ/100                                                        ALL06260
      IJ=MOD(IJ,100)                                                   ALL06270
      DO 505 K=1,3                                                     ALL06280
      IF(FREQ.LT.AJAM(5,K,IJ)) GO TO 505                               ALL06290
      IF(FREQ.GT.AJAM(6,K,IJ)) GO TO 505                               ALL06300
      KJ=K                                                             ALL06310
      GO TO 506                                                        ALL06320
  505 CONTINUE                                                         ALL06330
      GO TO 510                                                        ALL06340
  506 XJ=TXYZ(IT,2)                                                    ALL06350
      YJ=TXYZ(IT,3)                                                    ALL06360
      DXJ=XJ-WX                                                        ALL06370
      DYJ=YJ-WY                                                        ALL06380
C                                                                      ALL06390
C                                                                      ALL06400
C                                                                      ALL06410
      ANGJ=ATAN2(DXJ,DYJ)                                              ALL06420
      SOJR=SQRT(DXJ*DXJ+DYJ*DYJ)                                       ALL06430
      JAMR=JAMR+1                                                      ALL06440
      IWORK(JAMR)=KJ*100+IJ                                            ALL06450
      WORKI(JAMR)=ANGJ                                                 ALL06460
      WORKJ(JAMR)=SOJR                                                 ALL06470
  510 CONTINUE                                                         ALL06480
      IF(JAMR.EQ.0) GO TO 520                                          ALL06490
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      ANGT=ATAN2(DX,DY)                                                 ALL06500
      DO 515 IJ=1,JAMR                                                  ALL06510
      A=ABS(ANGT-WORK1(IJ))                                             ALL06520
      IF(A.GT.PI) A=TWOPI-A                                             ALL06530
      IF(A.GT.BEAM) GO TO 515                                           ALL06540
      IJAM=IWORK(IJ)                                                    ALL06550
      ETC(2)=WORKJ(IJ)                                                  ALL06560
      GO TO 525                                                         ALL06570
  515 CONTINUE                                                          ALL06580
  520 RDRNGE=BETA*RCS**.25                                              ALL06590
      ETC(2)=0.                                                         ALL06600
      ETC(3)=0.                                                         ALL06610
      IJAM=1                                                            ALL06620
      KJAM=1                                                            ALL06630
      GO TO 530                                                         ALL06640
  525 KJAM=IJAM/100                                                     ALL06650
      IJAM=MOD(IJAM,100)                                                ALL06660
      ETC(3)=2.                                                         ALL06670
      GJ2=10.**(.1*AJAM(2,KJAM,IJAM))                                   ALL06680
      PJ2=AJAM(1,KJAM,IJAM)                                             ALL06690
      RDRNGE=ALFA*(500./PJ2*(1.26/GJ2)**.25)                            ALL06700
  530 IF(RDRNGE.LT.GR) GO TO IRFAIL,(465,620)                           ALL06710
      IF(IPRAD.GE.0) GO TO 532                                          ALL06720
      PDT=EXP(-.693*GR2/(RDRNGE*RDRNGE))                                ALL06730
      GO TO 545                                                         ALL06740
  532 VX=TVX                                                            ALL06750
      VY=TVY                                                            ALL06760
      DGRA=VX*DX+VY*DY                                                  ALL06770
      VC=0.                                                             ALL06780
      IF(GR.GT.0.) VC=DGRA/GR                                           ALL06790
      TAR(1)=ALTGT                                                      ALL06800
      TAR(2)=RCS                                                        ALL06810
      TAR(3)=TZ*FPNM                                                    ALL06820
      TAR(4)=VC                                                         ALL06830
      RANGE(1)=GR                                                       ALL06840
      CALL RADAR(WRAD(1,IRAD),ENV,ETC,TAR,AJAM(1,KJAM,IJAM),TRAD,RANGE, ALL06850
     1     PDTECT,ANG,DYN,ICK,ISCAN,IPRAD)                              ALL06860
      PDT = PDTECT(ISCAN+1)                                             ALL06870
  545 IF(PDT.LT.PDTM(N)) GO TO IRFAIL,(465,620)                         ALL06880
      GO TO IPPASS, (614,546)                                           ALL06890
  546 IF(NLPR.GT.0) WRITE(N6,SAM)                                       ALL06900
C                                                                       ALL06910
C  SAM LAUNCHED                                                         ALL06920
C                                                                       ALL06930
      GO TO 550                                                         ALL06940
  548 IF(NLPR.GT.0) WRITE(N6,AAMDEF)                                    ALL06950
C                                                                       ALL06960
C  DEFENSIVE AAM LAUNCHED                                               ALL06970
C                                                                       ALL06980
      GO TO 551                                                         ALL06990
  549 CONTINUE                                                          ALL07000
      IF(NLPR.GT.0) WRITE(N6,SAGUN)                                     ALL07010
C                                                                       ALL07020
C  SA GUN ASSIGNED                                                      ALL07030
C                                                                       ALL07040
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  550 RTIME=SAMDAT(6,ICOL)                                                    ALL07050
  551 IF(RTIME.LT.TFA) RTIME=TFA                                              ALL07060
      IF(ISEG.EQ.0) CALL ADDSEG(INFORM,KWSEG,KTSEG,IWPN,ITGT,ISEG)            ALL07070
      IF(ISEG.EQ.0) GO TO 451                                                 ALL07080
      JTIME=(TZERO+RTIME)*1000.                                               ALL07090
      INFORM(ISEG+6)=IS*100000+JTIME                                          ALL07100
      KTIME=(TZERO+TFA)*1000.                                                 ALL07110
      INFORM(ISEG+7)=ITIME*100000+KTIME                                       ALL07120
      INFORM(ISEG+3)=GR*10.+.5                                                ALL07130
      K=1000000                                                               ALL07140
      IF(ISTOCK.EQ.99) K=0                                                    ALL07150
      GO TO ISWT5,(555,560)                                                   ALL07160
  555 LRRSYS(IS)=ISYS-100000000                                               ALL07170
      LRRSYS(IS+1)=JSYS-K                                                     ALL07180
      GO TO 570                                                               ALL07190
  560 LRRSYS(IS)=ISYS-100000000-K                                             ALL07200
  570 ITSTAT(ITGT)=ITSTAT(ITGT)+1                                             ALL07210
      GO TO 425                                                               ALL07220
  600 CONTINUE                                                                ALL07230
C                                                                             ALL07240
C         SAM TRACK RADAR RECHECK AT TSTEP BEFORE INTERCEPT                   ALL07250
C                                                                             ALL07260
      IF(ICHEK.LT.10) GO TO 700                                               ALL07270
      IF(NTTU.EQ.0) GO TO 700                                                 ALL07280
      NEXT=(TZERO+TSTEP)*1000.                                                ALL07290
      ASSIGN 620 TO IRFAIL                                                    ALL07300
      ASSIGN 614 TO IRPASS                                                    ALL07310
      ITU=0                                                                   ALL07320
  610 ITU=ITU+1                                                               ALL07330
      IF(ITU.GT.NTTU) GO TO 700                                               ALL07340
      IF(INVTTU(ITU).EQ.0) GO TO 610                                          ALL07350
      ITGT=ITU+NTU                                                            ALL07360
      IF(ITSTAT(ITGT).LE.2) GO TO 610                                         ALL07370
      ISEG=KTSEG(ITGT)/IPK                                                    ALL07380
  612 IF(ISEG.EQ.0) GO TO 610                                                 ALL07390
      IWORD=INFORM(ISEG+7)                                                    ALL07400
      IF(IWORD.EQ.0) GO TO 614                                                ALL07410
      ITDI=MOD(IWORD,100000)                                                  ALL07420
      IF(ITDI.GT.NEXT) GO TO 614                                              ALL07430
      IF(ITDI.LT.ITIME) GO TO 614                                             ALL07440
      LINE=INFORM(ISEG+6)/100000                                              ALL07450
      ISYS=LRRSYS(LINE)                                                       ALL07460
      KSYS=MOD(ISYS,100)                                                      ALL07470
      IF(KSYS.EQ.33) GO TO 616                                                ALL07480
  614 ISEG=MOD(INFORM(ISEG+2),IPK)                                            ALL07490
      GO TO 612                                                               ALL07500
  616 TX=TUTXYZ(1,ITU)                                                        ALL07510
      TY=TUTXYZ(2,ITU)                                                        ALL07520
      TZ=TUTXYZ(3,ITU)                                                        ALL07530
      TVX=TUTXYZ(4,ITU)                                                       ALL07540
      TVY=TUTXYZ(5,ITU)                                                       ALL07550
      TLOS=SQRT(TZ*(6880.+TZ))                                                ALL07560
      JTU=ITTU(ITU)                                                           ALL07570
      KT=MOD(JTU,10)                                                          ALL07580
      IWPN=INFORM(ISEG)/IPK                                                   ALL07590
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      NWSTAT=IWSTAT(IWPN)                                                ALL07600
      IF(NWSTAT.LE.0) GO TO 620                                          ALL07610
      WX=WXYZ(IWPN,2)                                                    ALL07620
      WY=WXYZ(IWPN,3)                                                    ALL07630
      WZ=WXYZ(IWPN,4)                                                    ALL07640
      IS=LSYSW(IWPN)                                                     ALL07650
      LPLTW=MOD(IS,100)                                                  ALL07660
      HMAST=WPXY(3,LPLTW)/FPNM+WZ                                        ALL07670
      DX=TX-WX                                                           ALL07680
      DY=TY-WY                                                           ALL07690
      DZ=TZ-WZ                                                           ALL07700
      GR2=DX*DX+DY*DY+DZ*DZ                                              ALL07710
      GR=SQRT(GR2)                                                       ALL07720
      X=1.1547*(TLOS+SQRT(HMAST*(6880.+HMAST)))                          ALL07730
      IF(GR.GT.X) GO TO 620                                              ALL07740
      IRAD=MOD(ISYS/10000,100)                                           ALL07750
      GO TO 480                                                          ALL07760
C                                                                        ALL07770
C        SAM LOST AT RECHECK                                             ALL07780
C                                                                        ALL07790
  620 INFORM(ISEC+7)=0                                                   ALL07800
      IF(NLPR.GT.0) WRITE(N6,SAMLST)                                     ALL07810
      GO TO 614                                                          ALL07820
  700 CONTINUE                                                           ALL07830
      RETURN                                                             ALL07840
      END                                                                ALL07850
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      SUBROUTINE  SAMLT(T1,KL,XL,YL,ZL,HA,HB,XT,YT,ZT,U,V,W,INX,         SAML0010
     1                  TA,TB,TEA,TEB,IPRINT)                            SAML0020
C  PGM=NXX(NEM). L.D.G.       VER.3   10-5-73      FORTRAN IV      EBCD  SAML0030
C  MODS.101,149,150,172,194,195,216.                    VER.3    1-25-75 SAML0040
C  TO FIND EARLIEST AND LATEST SAM LAUNCH TIMES PERMITTED.                SAML0050
C     T1     = CURRENT TIME, HRS                                         SAML0060
C     KL     = LAUNCHER TYPE INDEX, 1.LE.KL.LE.N                         SAML0070
C     XL,YL,ZL = EAST,NORTH,& VERTICAL COORD. OF  LAUNCHER, NM           SAML0080
C     XT,YT,ZT = COORD. OF TARGET, NM                                    SAML0090
C     U , V, W = VELOCITY COMPONENTS OF TARGET, KNOTS                    SAML0100
C     INX  = 0, NO FIRE CONTROL SOLUTION, TA = TB = T1                   SAML0110
C     TA     = EARLIEST PERMISSIBLE LAUNCH TIME.GE.T1                    SAML0120
C     TB     = LATEST  PERMISSIBLE LAUNCH TIME.GE.TA                     SAML0130
C     IPRINT= 0, NO PRINT.     =1, PRINT.                                SAML0140
C     HA,HB = MIN AND MAX AZIMUTH LIMITS  (0,PI2)                        SAML0150
C***                                                                     SAML0160
C$AMLT                  8,12,15,                                         SAML0170
      COMMON/CSAMLT/L,M,N,RMN(15),RMX(15),EMN(15),EMX(15),ZMX(15),       SAML0180
     1 XMX(15),  RT(8,12,15)                                             SAML0190
C***                                                                     SAML0200
C     L,M,N = DIMENSIONS OF  RT. THESE ARE SET IN BLOCK DATA.            SAML0210
C     KLTYP(KL)= THE CATALOG CODE OF LAUNCHER TYPE  KL.                  SAML0220
C     RMN(KL),RMX(KL) = MIN & MAX RANGES,NM, OF SAM TYPE KL.             SAML0230
C     EMN(KL),EMX(KL) = MIN & MAX ELEV ANGLES                            SAML0240
C     ZMX(KL),XMX(KL) = MAX VERTICAL & HORIZONTAL SECTOR LIMITS          SAML0250
C     RT(I,J,KL) = TIME OF FLIGHT CONTOURS FOR LAUNCHER KL.              SAML0260
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C***                                                                    SAML0270
C**STATEMENT FUNCTIONS                                                  SAML0280
      SSQF(X,Y,Z)  =  X**2 + Y**2 + Z**2                                SAML0290
      EFF (X,Y,Z)  =  ATAN2(Z,SQRT(X**2 + Y**2) )                       SAML0300
      HFF (X,Y )   =  ATAN2(X, Y)                                       SAML0310
      DATA  PI2,RAD/6.28319,57.29578/                                   SAML0320
      NAMELIST/NAMA/KLL,TIME,X1,Y1,Z1,UU,VV,WW,R1,H1,E1,TAUZ,DZ         SAML0330
      NAMELIST/NAMB/TAUZ,DZ,XZ,YZ,ZZ,RZ,HZ,EZ,DESCB                    SAML0340
      NAMELIST/NAMC/DESCB,TAURB1,TAURB2                                 SAML0350
      NAMELIST/NAMD/TAU2,X2,Y2,Z2,R2,H2,E2,INR2,INE2,TF2                SAML0360
      NAMELIST/NAME/TAU3,X3,Y3,Z3,R3,H3,E3,INR3,INE3,TF3                SAML0370
      NAMELIST/NAMF/TIME,TAA,TBB,INXX                                   SAML0380
C***                                                                    SAML0390
      KOPT=INX                                                          SAML0400
      N6  = 6                                                           SAML0410
 1    INX = 0                                                           SAML0420
      KPRINT = 1                                                        SAML0430
      TIME = T1                                                         SAML0440
      UU = U                                                            SAML0450
      VV = V                                                            SAML0460
      WW = W                                                            SAML0470
      KLL = KL                                                          SAML0480
      RASQ = RMN(KL)**2                                                 SAML0490
      RBSQ = RMX(KL)**2                                                 SAML0500
      EA   = EMN(KL) / RAD                                              SAML0510
      EB   = EMX(KL) / RAD                                              SAML0520
      ZA   = .0                                                         SAML0530
      ZB   = ZMX(KL) / 6.080                                            SAML0540
      XBSQ= XMX(KL)**2                                                  SAML0550
      X1   = XT - XL                                                    SAML0560
      Y1   = YT - YL                                                    SAML0570
      Z1   = ZT - ZL                                                    SAML0580
      R1SQ = SSQF(X1,Y1,Z1)                                             SAML0590
      R1   = SQRT(R1SQ)                                                 SAML0600
      E1   = EFF (X1,Y1,Z1)                                             SAML0610
      H1   = HFF (X1,Y1)                                                SAML0620
      IF (H1.LT..0)   H1=H1 + PI2                                       SAML0630
      UVSQ = U**2 + V**2                                                SAML0640
      TAUZ = -(U*X1 + V*Y1) / UVSQ                                      SAML0650
      DZ   = -1.                                                        SAML0660
C**   IS TARGET RECEDING                                                SAML0670
      IF (TAUZ.GE..0)  GO TO 10                                         SAML0680
C**   NO INTERCEPT. PRINT OPTION                                        SAML0690
 8    INX = 0                                                           SAML0700
      TA  = T1                                                          SAML0710
      TB  = T1                                                          SAML0720
      IF (IPRINT.LE.0) RETURN                                           SAML0730
      GO TO (65,64,63) , KPRINT                                         SAML0740
C**   IS TARGET TRACK COMPLETELY OUTSIDE SECTOR                         SAML0750
C**   LOOK AT CROSSING POINT                                            SAML0760
 10   DZ  = ABS(U*Y1 - V*X1) / SQRT(UVSQ)                               SAML0770
      DZSQ = DZ * DZ                                                    SAML0780
      IF (DZSQ.GE.RBSQ)  GO TO 8                                        SAML0790
      DESCB =  7777.                                                    SAML0800
      XZ  = X1 + U*TAUZ                                                 SAML0810
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      IF (ABS(XZ).LE..0001)    XZ=.0001                                    SAML0820
      YZ   = Y1 + V*TAUZ                                                   SAML0830
      ZZ   = Z1 + W*TAUZ                                                   SAML0840
      RZSQ = SSQF(XZ,YZ,ZZ)                                                SAML0850
      EZ   = EFF (XZ,YZ,ZZ)                                                SAML0860
      HZ   = HFF (XZ,YZ)                                                   SAML0870
      IF (HZ.LT..0)   HZ=HZ + PI2                                          SAML0880
      RZ   = SQRT(RZSQ)                                                    SAML0890
      KPRINT = 2                                                           SAML0900
      IF (RZSQ.GE.RBSQ)  GO TO 8                                           SAML0910
C***  LOOK AT OUTER SHELL INTERSECTIONS                                    SAML0920
 12   A  =  UVSQ + W**2                                                    SAML0930
      B  =  2.*(U*X1 + V*Y1 + W*Z1)                                        SAML0940
      CB =  R1SQ - RBSQ                                                    SAML0950
      DESCB = B**2  - 4.*A*CB                                              SAML0960
      IF (DESCB.LE..0)  GO TO 8                                            SAML0970
C***  TARGET GOES THRU OUTER SHELL. FIND TIMES.                            SAML0980
      DESC = SQRT(DESCB)                                                   SAML0990
      TAURB1 = (-B - DESC) / (2.*A)                                        SAML1000
      TAURB2 = (-B + DESC) / (2.*A)                                        SAML1010
C***  IS TARGET IN OUTER SHELL LONG ENUF                                   SAML1020
      IF((TAURB2 - TAURB1).GE..0003)  GO TO 13                             SAML1030
 121  KPRINT = 3                                                           SAML1040
      GO TO 8                                                              SAML1050
C**   PREPARE FOR AZIMUTH TESTS                                           SAML1060
 13   HAA = HA                                                             SAML1070
      HBB = HB                                                             SAML1080
      IF (HAA.LT..0)  HAA = HAA + PI2                                      SAML1090
      IF (HBB.LT..0)  HBB = HBB + PI2                                      SAML1100
      HOFF = .0                                                            SAML1110
      IF (HAA.LE.HBB)  GO TO 131                                           SAML1120
      HOFF = PI2 - HAA                                                     SAML1130
      HAA  = .0                                                            SAML1140
      HBB = HBB + HOFF                                                     SAML1150
 131  ITESTH = 1                                                           SAML1160
      DHH = HBB - HAA                                                      SAML1170
      IF ((DHH.GT.(PI2-.01)).OR.(ABS(DHH).LT..01))  ITESTH=0               SAML1180
C***  IS  PZ  IN SECTOR                                                    SAML1190
 14   INZ = 0                                                              SAML1200
      IF (ITESTH.EQ.0)  GO TO 141                                          SAML1210
      HZM = AMOD(HZ + HOFF, PI2)                                           SAML1220
      IF (HZM.LT.HAA.OR.HZM.GT.HBB)  GO TO 15                              SAML1230
 141  IF ((EZ.GE.EA.AND.EZ.LE.EB).AND.(ZZ.LE.ZB).AND.                      SAML1240
     1     ((XZ**2+YZ**2).LE.XBSQ).AND.                                   SAML1250
     2     (RZSQ.GE.RASQ.AND.RZSQ.LE.RBSQ) )  INZ=1                       SAML1260
C***  IS P1 INSIDE OUTER SHELL. CHOOSE  PS21.                              SAML1270
 15   TAUS21 = .0                                                          SAML1280
      IF (TAURB1.LE..0)  GO TO 16                                          SAML1290
      TAUS21= TAURB1                                                       SAML1300
 16   XS21  = X1 + U*TAUS21                                                SAML1310
      YS21  = Y1 + V*TAUS21                                                SAML1320
      ZS21  = Z1 + W*TAUS21                                                SAML1330
      IF (ZS21.LT..0)  GO TO 121                                           SAML1340
      PS21  = SSQF(XS21,YS21,ZS21)                                         SAML1350
      ES21  = EFF (XS21,YS21,ZS21)                                         SAML1360
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      HS21  = HFF (XS21,YS21 )                                          SAML1370
      IF (HS21.LT..0)   HS21=HS21 + PI2                                 SAML1380
C***  IS PS21 IN SECTOR                                                 SAML1390
      INS21 = 0                                                         SAML1400
      IF (ITESTH.EQ.0)  GO TO 17                                        SAML1410
      HS21M = AMOD(HS21 + HOFF, PI2)                                    SAML1420
      IF (HS21M.LT.HAA.OR.HS21M.GT.HBB)  GO TO 18                       SAML1430
 17   IF ((ES21.GE.EA.AND.ES21.LE.EB).AND.(ZS21.LE.ZB).AND.             SAML1440
     1     ((XS21**2+YS21**2).LE.XBSQ).AND.                            SAML1450
     2     (RS21.GE.RASQ.AND.RS21.LE.RBSQ) )  INS21=1                  SAML1460
C***  SEARCH FOR TIME ENTER SECTOR                                      SAML1470
 18   IF (INS21.EQ.1)  GO TO 28                                         SAML1480
      TAUS22= TAUZ                                                      SAML1490
      DTAU  = TAUS22 - TAUS21                                           SAML1500
      IF (DTAU.LT..0002)  GO TO 121                                     SAML1510
      DT    = AMAX1(DTAU/10.,.00005)                                    SAML1520
      TAUS22= TAUS22 - DT                                               SAML1530
      TAU   = TAUS21                                                    SAML1540
      KS1   = 1                                                         SAML1550
 20   TAU = TAU + DT                                                    SAML1560
      X   = X1 + U*TAU                                                  SAML1570
      Y   = Y1 + V*TAU                                                  SAML1580
      Z   = Z1 + W*TAU                                                  SAML1590
      IF (Z.LT..0.OR.Z.GT.ZB)  GO TO 22                                 SAML1600
      IF ((X**2+Y**2).GT.XBSQ)  GO TO 22                                SAML1610
      RSQ = SSQF(X,Y,Z)                                                 SAML1620
      E   = EFF (X,Y,Z)                                                 SAML1630
C***  TEST POINT                                                        SAML1640
      IF (ITESTH.EQ.0)  GO TO 21                                        SAML1650
      H   = HFF(X,Y)                                                    SAML1660
      IF (H.LT..0)   H=H + PI2                                          SAML1670
      HM  = AMOD(H + HOFF, PI2)                                         SAML1680
      IF (HM.LT.HAA.OR.HM.GT.HBB)  GO TO 22                             SAML1690
 21   IF ((E.GE.EA.AND.E.LE.EB).AND.(RSQ.GE.RASQ))  GO TO 24            SAML1700
 22   IF (TAU.LT.TAUS22)  GO TO 20                                      SAML1710
      IF (KS1.GE.2)       GO TO 26                                      SAML1720
      IF (INZ.EQ.0)       GO TO 121                                     SAML1730
      IF (DT.LT..00005)  GO TO 121                                      SAML1740
      TAUS22= TAUS22 + DT                                               SAML1750
      DT    = 0.1 * DT                                                  SAML1760
      TAUS22= TAUS22 - DT                                               SAML1770
      GO TO 20                                                          SAML1780
C***  POUNCED. DROP STEP SIZE. FIND ENTER SECTOR                        SAML1790
 24   IF (KS1.GE.2)  GO TO 26                                           SAML1800
      TAUS22= TAU                                                       SAML1810
      TAU   = TAU - DT                                                  SAML1820
      DT    = 0.1 * DT                                                  SAML1830
      TAUS22= TAUS22 - DT                                               SAML1840
      KS1 = 2                                                           SAML1850
      GO TO 20                                                          SAML1860
C***  HERE IS THE TIME THE TARGET ENTERS THE SECTOR                     SAML1870
 26   TAU2 = TAU                                                        SAML1880
      GO TO 40                                                          SAML1890
 28   TAU2 = TAUS21                                                     SAML1900
C***  SEARCH FOR TIME LEAVE SECTOR                                      SAML1910
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 40     IF ( INZ.EQ.1)  GO TO 50                                          SAML1920
        TAUS31 = TAU2                                                     SAML1930
        TAUS32 = TAU7                                                     SAML1940
        DTAU = TAUS32 - TAUS31                                            SAML1950
        IF (DTAU.LE..0002)  GO TO 121                                     SAML1960
        DT   = AMAX1(DTAU/10.,.00005)                                     SAML1970
        TAUS32= TAUS32 - DT                                               SAML1980
        TAU   = TAUS31                                                    SAML1990
        KS2   = 1                                                         SAML2000
 42     TAU = TAU + DT                                                    SAML2010
        X   = X1 + U*TAU                                                  SAML2020
        Y   = Y1 + V*TAU                                                  SAML2030
        Z   = Z1 + W*TAU                                                  SAML2040
        IF (Z.LT..0.OR.Z.GT.ZB)  GO TO 46                                 SAML2050
        RSQ = SSQF(X,Y,Z)                                                 SAML2060
        E   = EFF (X,Y,Z)                                                 SAML2070
C**     TEST POINT                                                        SAML2080
        IF (ITESTH.EQ.0)  GO TO 43                                        SAML2090
        F   = FFF(X,Y)                                                    SAML2100
        IF (F.LT..0)   H=H + PI2                                          SAML2110
        HM  = AMOD(F + HOFF, PI2)                                         SAML2120
        IF (HM.LT.HAA.OR.HM.GT.HBB)  GO TO 46                             SAML2130
 43     IF ((E.GE.EA.AND.E.LE.EB).AND.(RSQ.GE.RASQ))  GO TO 44            SAML2140
        GO TO 46                                                          SAML2150
 44     IF (TAU.LT.TAUS32)  GO TO 42                                      SAML2160
        IF (KS2.GE.2)       GO TO 48                                      SAML2170
        IF (DT.LT..00005)  GO TO 50                                       SAML2180
        TAUS32= TAUS32 + DT                                               SAML2190
        DT    = 0.1 * DT                                                  SAML2200
        TAUS32= TAUS32 - DT                                               SAML2210
        GO TO 42                                                          SAML2220
C**     BOUNDED.  DROP STEP SIZE. FIND LEAVE SECTOR.                      SAML2230
 46     IF (KS2.GE.2)  GO TO 48                                           SAML2240
        TAUS32= TAU                                                       SAML2250
        TAU   = TAU - DT                                                  SAML2260
        DT    = 0.1 * DT                                                  SAML2270
        TAUS32= TAUS32 - DT                                               SAML2280
        KS2   = 2                                                         SAML2290
        GO TO 42                                                          SAML2300
C***    HERE IS THE TIME THE TARGET LEAVES THE SECTOR, OR REACHES THE     SAML2310
C         CROSSING POINT, OR THE LAUNCHER.                                SAML2320
 48     TAU3  = TAU                                                       SAML2330
        GO TO 54                                                          SAML2340
 50     TAU3  = TAU7                                                      SAML2350
C***    GET TIME OF FLIGHT AT POINT  P2 .                                 SAML2360
 54     X2  = X1 + U*TAU2                                                 SAML2370
        Y2  = Y1 + V*TAU2                                                 SAML2380
        Z2  = Z1 + W*TAU2                                                 SAML2390
        R2  = SQRT(SSQF(X2,Y2,Z2) )                                       SAML2400
        E2  = EFF (X2,Y2,Z2) * RAD                                        SAML2410
        CALL  CONINT(RT,L,M,N,KL,R2,E2,TF2,INR2,INE2)                     SAML2420
        TF2 = TF2 / 3600.                                                 SAML2430
        TFA = TF2                                                         SAML2440
        TA  = AMAX1(T1+TAU2-TF2, T1)                                      SAML2450
C***    GET TIME OF FLIGHT AT POINT  P3 .                                 SAML2460
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      X3   = X1 + U*TAU3                                                    SAML2470
      Y3   = Y1 + V*TAU3                                                    SAML2480
      Z3   = Z1 + W*TAU3                                                    SAML2490
      R3   = SQRT( SSQF(X3,Y3,Z3) )                                         SAML2500
      E3   = EFF (X3,Y3,Z3) * RAD                                           SAML2510
      CALL  CONINT(RT,L,M,N,KL,R3,E3,TF3,INR3,INE3)                         SAML2520
      TF3 = TF3 / 3600.                                                     SAML2530
      TFB = TF3                                                             SAML2540
      TB   = AMAX1(T1+TAU3-TF3, T1, TA)                                     SAML2550
      IF (TA.LT.TB)  INX=1                                                  SAML2560
C                                                                           SAML2570
C**  INTERPOLATE INTERCEPT FLIGHT TIME(TFA) WHEN TA = CURRENT TIME(T1)      SAML2580
C                                                                           SAML2590
      IF(INX.EQ.0) GO TO 59                                                 SAML2600
      IF(TAU2.GE.TFA) GO TO 59                                              SAML2610
      IF(KOPT.NE.0) GO TO 59                                                SAML2620
      LOOP=0                                                                SAML2630
 56   TCEPT=(TAU2+TAU3)*.5                                                  SAML2640
      X2=X1+U*TCEPT                                                         SAML2650
      Y2=Y1+V*TCEPT                                                         SAML2660
      Z2=Z1+W*TCEPT                                                         SAML2670
      R2=SQRT(SSQF(X2,Y2,Z2))                                               SAML2680
      E2=EFF(X2,Y2,Z2)*RAD                                                  SAML2690
      CALL CONINT(RT,L,M,N,KL,R2,E2,TFA,INR2,INE2)                          SAML2700
      TFA=TFA/3600.                                                         SAML2710
      DELT=TFA-TCEPT                                                        SAML2720
      IF(ABS(DELT).LE. .0002) GO TO 59                                      SAML2730
      LOOP=LOOP+1                                                           SAML2740
      IF(LOOP.GE.10) GO TO 59                                               SAML2750
      IF(DELT) 57,59,58                                                     SAML2760
 57   TAU3=TCEPT                                                            SAML2770
      GO TO 56                                                              SAML2780
 58   TAU2=TCEPT                                                            SAML2790
      GO TO 56                                                              SAML2800
 59   CONTINUE                                                              SAML2810
      IF (IPRINT.LE.0)  GO TO 70                                            SAML2820
C**  PRINT OPTIONS                                                         SAML2830
 60   TAA = TA                                                              SAML2840
      TBB = TB                                                              SAML2850
      INXX = INX                                                            SAML2860
      WRITE(N6,NAME)                                                        SAML2870
 61   IF (IPRINT.LE.1)  GO TO 65                                            SAML2880
      H3   = HFF(X3,Y3) * RAD                                               SAML2890
      IF (H3.LT..0)   H3=H3 + 360.                                          SAML2900
      WRITE(N6,NAME)                                                        SAML2910
 62   H2   = HFF(X2,Y2) * RAD                                               SAML2920
      IF (H2.LT..0)   H2=H2 + 360.                                          SAML2930
      WRITE(N6,NAMD)                                                        SAML2940
 63   IF (IPRINT.LE.2)  GO TO 64                                            SAML2950
      WRITE(N6,NAMC)                                                        SAML2960
 64   IF (IPRINT.LE.1)  GO TO 65                                            SAML2970
      HZ   = HZ * RAD                                                       SAML2980
      EZ   = EZ * RAD                                                       SAML2990
      WRITE(N6,NAMB)                                                        SAML3000
 65   IF (IPRINT.LE.0)  GO TO 70                                            SAML3010
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      H1   = H1 * RAD                                                    SAML3020
      E1   = E1 * RAD                                                    SAML3030
      WRITE(N6,NAMA)                                                     SAML3040
 70   RETURN                                                             SAML3050
      END                                                                SAML3060


      SUBROUTINE  CONINT(RT,L,M,N,KN,R,A,Z,INR,INA)                      CINT0010
C  PGM=NXX. L.D.G.        VER.1  8-11-73          FORTRAN IV     EBCD    CINT0020
C  TO INTERPOLATE BETWEEN CONTOURS. 3-DIM. STORAGE OF 2-WAY TABLES.      CINT0030
C  BORDERED TABLES. 1ST COL= CONTOUR VALUES, Z                           CINT0040
C                   1ST ROW= ANGLE IN POLAR COORD., A.                   CINT0050
C                   CORNER = 100*M + N,  MATRIX M X N INCL BORDERS.      CINT0060
C  TABLED VALUES = POLAR LENGTH TO CONTOUR, RT.                          CINT0070
C  ASSUMES, (1) CONTOURS ARE SINGLE VALUED WITH RESPECT TO ANGLE 'A'.    CINT0080
C           (2) BORDER VALUES MUST INCREASE.                             CINT0090
C           (3) IF OUTSIDE INTERVAL, USES NEAREST VALUE                  CINT0100
C           (4) IF R.LT.MIN, INR=-1.  IF R.GT.MAX, INR=+1.               CINT0110
C           (5) IF A.LT.MIN, INA=-1.  IF A.GT.MAX, INA=+1.               CINT0120
C  RETURNS  Z = INTERPOLATED CONTOUR VALUE FOR POINT (A,R)               CINT0130
C***                                                                     CINT0140
C  NOTE. SUBROUTINE WORKS EQUALLY WELL FOR CONTOURS DEFINED IN           CINT0150
C        RECTANGULAR  X VS Y  COORD. E.G. LET X=A, Y=R.                 CINT0160
C***                                                                     CINT0170
      DIMENSION  RT(L,M,N)                                               CINT0180
 1    INR = 0                                                            CINT0190
      INA = 0                                                            CINT0200
 2    IM  = RT(1,1,KN) + 0.1                                             CINT0210
      IN  = MOD(IM,100)                                                  CINT0220
      IM  = IM / 100                                                     CINT0230
C***  CONSIDER ANGLE  A                                                  CINT0240
      AMX = RT(1,IN,KN)                                                  CINT0250
      AMN = RT(1, 2,KN)                                                  CINT0260
      IF (A - AMX)  6, 4, 4                                              CINT0270
 4    INA = 1                                                            CINT0280
      P   = 0.                                                           CINT0290
      Q   = 1.                                                           CINT0300
      IA  = IN - 1                                                       CINT0310
      GO TO 16                                                           CINT0320
 6    IF (AMN - A) 10, 8, 8                                              CINT0330
 8    INA = -1                                                           CINT0340
      P   = 1.                                                           CINT0350
      Q   = 0.                                                           CINT0360
      IA  = 2                                                            CINT0370
      GO TO 16                                                           CINT0380
C***  SEARCH FOR ANGLE BOUNDS                                            CINT0390
 10   DO 12 J=3,IN                                                       CINT0400
      IF (RT(1,J,KN) - A) 12,14,14                                       CINT0410
 12   CONTINUE                                                           CINT0420
      GO TO 4                                                            CINT0430
 14   IA  = J - 1                                                        CINT0440
      A1  = RT(1,IA,KN)                                                  CINT0450
      A2  = RT(1,IA+1,KN)                                                CINT0460
      P   = (A-A2) / (A1-A2)                                             CINT0470
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      Q    = 1.0 - P                                                    CINT0480
C***  CONSIDER RADIUS  R                                                CINT0490
 16   RMN = P*RT(2,IA,KN) + Q*RT(2,IA+1,KN)                            CINT0500
      IF (RMN - R) 20,18,18                                            CINT0510
 18   INR = -1                                                         CINT0520
      S   = 1.                                                         CINT0530
      T   = 0.                                                         CINT0540
      IR  = 2                                                          CINT0550
      GO TO 26                                                         CINT0560
 20   R1  = RMN                                                        CINT0570
      DO 22 I=3,IM                                                     CINT0580
      R2  = P*RT(I,IA,KN) + Q*RT(I,IA+1,KN)                            CINT0590
      IF (R2 - R) 22,24,24                                             CINT0600
 22   R1  = R2                                                         CINT0610
      INR = +1                                                         CINT0620
      S   = 0.                                                         CINT0630
      T   = 1.                                                         CINT0640
      IR  = IM-1                                                       CINT0650
      GO TO 26                                                         CINT0660
 24   IR  = I - 1                                                      CINT0670
      S   = (R-R2) / (R1-R2)                                           CINT0680
      T   = 1.0 - S                                                    CINT0690
 26   Z   = S*RT(IR,1,KN) + T*RT(IR+1,1,KN)                            CINT0700
      RETURN                                                           CINT0710
      END                                                              CINT0720
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      SUBROUTINE WPNTRM(KWU,KWSEG,                                     WPNT0010
     1     KTSEG,ITSTAT,KTU,LSYST,ITTU,MAXWTU,                         WPNT0020
     2     INFORM,LBRSYS)                                              WPNT0030
      COMMON/ECONST/ VAP(15),IMISC(35)                                 WPNT0040
      COMMON/STRCON/  JPK,IPK                                          WPNT0050
      COMMON /ETIME/ TIME,TIMEA,TIMEB,TBEGIN,TIMEND,TIMAX,TSTEP        WPNT0060
      DIMENSION KWSEG(1),KTSEG(1),INFORM(1),LBRSYS(1),ITSTAT(1)        WPNT0070
      DIMENSION LSYST(1),ITTU(1)                                       WPNT0080
      DIMENSION JWP(4),WEP(5),JTG(5),TGT(5)                            WPNT0090
      DATA JWP,JTG,WEP,TGT/9*0,      10*0./                            WPNT0100
      NAMELIST/SAMGSS/ TIME,IWPN,KSYS,ITGT,KSTATE                      WPNT0110
      NLPR=IMISC(3)                                                    WPNT0120
      ISIDE=IMISC(4)                                                   WPNT0130
      IPR=IMISC(5)                                                     WPNT0140
      INIT=0                                                           WPNT0150
      N6=6                                                             WPNT0160
      ITIME=(TIME-TBEGIN)*1000.                                        WPNT0170
      DO 150 IWU=1,KWU                                                 WPNT0180
      KSEG=KWSEG(IWU)                                                  WPNT0190
      ISEG=KSEG/IPK                                                    WPNT0200
  100 IF(ISEG.EQ.0) GO TO 150                                          WPNT0210
      IWORD=INFORM(ISEG+7)                                             WPNT0220
      IF(IWORD.EQ.0) GO TO 110                                         WPNT0230
      ITDI=MOD(IWORD,100000)                                           WPNT0240
      IF(ITDI.EQ.0) GO TO 109                                          WPNT0250
      IF(ITDI.GT.ITIME) GO TO 140                                      WPNT0260
      ITGT=MOD(INFORM(ISEG),10000)                                     WPNT0270
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      IF(ITSTAT(ITGT).LE.0) GO TO 109                                    WPNT0280
      LINE=INFORM(ISEG+6)/100000                                         WPNT0290
      ISYS=LBRSYS(LINE)                                                  WPNT0300
      ITYPE=MOD(ISYS,100)                                                WPNT0310
      IF(ITYPE.EQ.0) GO TO 109                                           WPNT0320
      IF(ITYPE.EQ.33) ISYS=LBRSYS(LINE+1)                                WPNT0330
      JWP(1)=MOD(ISYS/100,100)                                           WPNT0340
      JWP(3)=INFORM(ISEG)/10000                                          WPNT0350
      JWP(4)=0                                                           WPNT0360
      RANGE=INFORM(ISEG+3)                                               WPNT0370
      WEP(1)=RANGE*.1                                                    WPNT0380
      TL=IWORD/100000                                                    WPNT0390
      TC=ITOI                                                            WPNT0400
      WEP(2)=(TC-TL)*.001                                                WPNT0410
      JTGT=ITGT-KTU                                                      WPNT0420
      IF(JTGT.GT.0) GO TO 102                                            WPNT0430
      JTG(1)=1                                                           WPNT0440
      JTG(2)=ITGT                                                        WPNT0450
      JTG(4)=MOD(LSYST(ITGT),100)                                        WPNT0460
      GO TO 105                                                          WPNT0470
  102 ITTU1=ITTU(JTGT)                                                   WPNT0480
      JTG(1)=MOD(ITTU1,10)/2                                             WPNT0490
      JTG(2)=MOD(ITTU(MAXWTU+JTGT),100)                                  WPNT0500
      IRP=MOD(ITTU1/1000,100)                                            WPNT0510
      JTG(3)=IRP                                                         WPNT0520
      JTG(4)=IRP                                                         WPNT0530
  105 CONTINUE                                                           WPNT0540
      CALL KILLEX(INIT,ISIDE,JWP,WEP,JTG,TGT,IPR,KSTATE)                 WPNT0550
      IF(KSTATE.GT.0) ITSTAT(ITGT)=KSTATE*1000+MOD(ITSTAT(ITGT),1000)    WPNT0560
      IF(KSTATE.EQ.0) ITSTAT(ITGT)=-1                                    WPNT0570
      IF(NLPR.EQ.0) GO TO 109                                            WPNT0580
      IWPN=INFORM(ISEG)/10000                                            WPNT0590
      KSYS=MOD(LBRSYS(LINE),100)                                         WPNT0600
      WRITE(N6,SAMGSS)                                                   WPNT0610
C                                                                        WPNT0620
C  POSSIBLE INTERCEPT UNIT KILLED                                        WPNT0630
C POSSIBLE PRIMARY UNIT KILLED                                           WPNT0640
C                                                                        WPNT0650
  109 CONTINUE                                                           WPNT0660
C                                                                        WPNT0670
C  FINAL DISPOSITION FOR SAMS, SAGS, GENERAL WPNS                        WPNT0680
C                                                                        WPNT0690
      INFORM(ISEG+7)=0                                                   WPNT0700
  110 IWORD=INFORM(ISEG+6)                                               WPNT0710
      IF(IWORD.EQ.0) GO TO 115                                           WPNT0720
      ITES=MOD(IWORD,100000)                                             WPNT0730
      IF(ITES.GT.ITIME) GO TO 140                                        WPNT0740
      LINE=IWORD/100000                                                  WPNT0750
      LBRSYS(LINE)=LBRSYS(LINE)+100000000                                WPNT0760
      INFORM(ISEG+6)=0                                                   WPNT0770
  115 IWORD=INFORM(ISEG+4)                                               WPNT0780
      IF(ITIME.LT.MOD(IWORD,100000)) GO TO 140                           WPNT0790
      CALL DELSEG(INFORM,KWSEG,KTSEG,ISEG)                              WPNT0800
  140 ISEG=MOD(INFORM(ISEG+1),IPK)                                       WPNT0810
      GO TO 100                                                          WPNT0820
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  150 CONTINUE                                                          WPNT0830
      RETURN                                                            WPNT0840
      END                                                               WPNT0850


      SUBROUTINE  KILLEX(INIT,KSIDE,JWP,WEP,JTG,TGT,IPRNT,KSTAA)       KILX0010
C*** PGM=NXX(NEM)   L.D.G.      12-7-73          FORTRAN IV    EBCD   KILX0020
CMCCACC.PRINT VAR=1081,1211,1261,1460,1481,1631,1760,1781,1931. 12-6-74 KILX0030
C       NAMELIST=4740-4800,5020-5070.                                   KILX0040
C     TO INITIALIZE FOR EACH MONTE CARLO PASS. THEN KILL AND UPDATE     KILX0050
C***  WEAPONS                                                           KILX0060
      DIMENSION  JWP(4), WEP(5)                                         KILX0070
C     INIT  = 0, DO NOT INITIALIZE IN THIS CALL                         KILX0080
C     TIME  = BATTLE TIME IN HOURS                                      KILX0090
C     JSIDE = SIDE OF THE ATTACKER (1=BLU), (2=RED)                     KILX0100
C     JWP(1)= KSA, ROW NUMBER IN KBST( ) OR KRST( )                     KILX0110
C        (2)= UNUSED                                                    KILX0120
C        (3)= KUA, UNIT INDEX IN KBUK OR KRUK OF UNIT WHICH LAUNCHED    KILX0130
C        (4)= JAM, (=0,NO JAM),(=1,JAM)                                 KILX0140
C     WEP(1)= RNG, RANGE TO TARGET AT LAUCH (GUN OPENFIRE), NM          KILX0150
C        (2)= TOFG, TIME OF FLIGHT OR DURATION OF GUNFIRE               KILX0160
C                                                                       KILX0170
C***  TARGETS                                                           KILX0180
      DIMENSION  JTG(5), TGT(5)                                         KILX0190
C     JTG(1)= JPT,(=1,PERMANENT UNIT),(=2,TEMPORARY UNIT)               KILX0200
C        (2)= KU ,TARGET UNIT INDEX IN KBUK(I,KU) OR KRUK(I,KU)         KILX0210
C                 IF A PERMANENT UNIT                                   KILX0220
C        (3)= KSB, ROW NUMBER IN KBST(KSB) OR KRST(KSB) IF TEMPORARY    KILX0230
C     (4)= KPB, TARGET TYPE INDEX IN KBPT(KPB) OR KRPT(KPB)             KILX0240
C        (5)= UNUSED                                                    KILX0250
C     TGT( )= UNUSED                                                    KILX0260
CKILLF                                                                  KILX0270
      COMMON/CKILLF/LVSHP,MVSHP,NVSHP,VULSHP(5,12,1),NUA,NUNMX,         KILX0280
     1 KSTATE(100),PKLAST(100),PPROD(100),CUMWT(100),VULCST(100),       KILX0290
     2 VUKILL(100),VWKILL(100),VULFS,VULFA,VULFM                        KILX0300
C***                                                                    KILX0310
      COMMON/DEVICE/ N1,N2,N3,N4,N5,N6,N7,N8,N9,N10,N11,N12             KILX0320
      COMMON/INOUU/ IPR(16),JPAR(16), PAR(16),LABEL                     KILX0330
      COMMON/INOUT/NLINE,NPAGE,DUMA(35), NCODE(19)                      KILX0340
     1,IDUMB(72), NFLAG, NFLAG2                                         KILX0350
CNAVIC                                                                  KILX0360
      COMMON/CNAVIG/ NGMX,BE,BF,RE,RF,                                  KILX0370
     1     NBG,BA,BB,BC,BD,KBGN(18),KBGK(18),BGC( 8,6,18),NBU(18),      KILX0380
     2     NRG,RA,RB,RC,RD,KRGN(18),KRGK(18),RGC( 8,6,18),NRU(18),      KILX0390
     3          TTIME,NUMX,                                            KILX0400
     4     KBU,KBUK(4,50),BREL(4,50),BXYZ(50,7),NAMBU(50,2),BV(50,8),   KILX0410
     5     KRU,KRUK(4,50),RREL(4,50),RXYZ(50,7),NAMRU(50,2),RV(50,8)   KILX0420
CPLAT  VS  SYSTEMS  (SUBSYSTEMS)                                        KILX0430
      COMMON/CPLAT/NBP,NBPMX,NBSS,NBSSMX,NBSPP(15),NBPWS(45),           KILX0440
     1   NAMBP(2,15),KBPT(15),NABSS(2,45),KBST(45),KBPXS(45,15),       KILX0450
     2   BPX1(12,15),                                                  KILX0460
     3          NRP,NRPMX,NRSS,NRSSMX,NRSPP(15),NRPWS(45),             KILX0470
     4   NAMRP(2,15),KRPT(15),NARSS(2,45),KRST(45),KRPXS(45,15),       KILX0480
     5   RPX1(12,15)                                                   KILX0490
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CMSLSYS                              16      2      2      6      6      24     50  KILX0500
      COMMON /CMSLSY/ NMSL,NMSLMX,NBSSM,NBASM,NRSSM,NRASM,LATMSL,LTRAJ,           KILX0510
     1    NAMMSL(2,16),KMSLTY(16),                                               KILX0520
     2    DATMSL(24,16), TTRAJ(50,16)                                            KILX0530
CZZSYS                               25      11     12    15                     KILX0540
      COMMON/CZZSYS/NZZSYS,NZZSMX,NBZSYS,NRZSYS,LAZZ,NAMSYS(2,25),               KILX0550
     1    KZZTYP(25),ZZSYS(15,25)                                                KILX0560
CSAMLT                    8,12,15,                                              KILX0570
      COMMON/CSAMLT/L,M,N,RMN(15),RXM(15),ZMN(15),ZMX(15),                       KILX0580
     1 XMX(15),  RT(8,12,15)                                                     KILX0590
CSASYS                               15      4      4      2      4     20      KILX0600
      COMMON/CSASYS/ NSASYS,NSASMX,NBGUN,NBSAM,NRGUN,NRSAM, LASA,                KILX0610
     1    NAMSA(2,15),KSATYP(15),SASYS(20,15)                                    KILX0620
CRADAR                                                                          KILX0630
      COMMON/CRADAR/NBSR,NRTR,NBRMX,NBJ,NBJMX,                                  KILX0640
     1   BRAD(36,17),BENV(6,2),BETC(4,2),BTAR(6,3),BJAM(6,3,2),                 KILX0650
     2               NRSR,NRTR,NRRMX,NRJ,NRJMX,                                 KILX0660
     3   RRAD(36,15),RENV(6,2),RETC(4,2),RTAR(6,3),RJAM(6,3,2)                  KILX0670
CHOMER                                                                          KILX0680
      COMMON/CHOMER/ NHOM,NHOMMX,NAMHOM(2,10),KHOMTY(10),DATHOM(36,10)          KILX0690
      COMMON/ETIME/TIME,TIMEA,TIMEB,TBEGIN,TIMEND,TIMAX,TSTEP                   KILX0700
 2001 FORMAT(1HO,'ERROR IN KILLEX. EL=',F6.2,',  TIME=',F10.4,                 KILX0710
     1       ',  SIDE=',I3/                                                     KILX0720
     2   6X,'KWEPTY=',I10,',   KSA,KUA,JAM,RNG=',3I5,F8.2/                     KILX0730
     3   6X,'KTGTTY=',I10,',   JPT,KU ,KSB,KPB=',4I5)                          KILX0740
C***                                                                            KILX0750
 1    JSIDE = KSIDE                                                            KILX0760
      IPRINT = IPRNT                                                           KILX0770
      KSTAA = -1                                                               KILX0780
      IF (INIT.EQ.0)   GO TO 20                                                KILX0790
C***  INITIALIZE                                                               KILX0800
      INIT = 0                                                                 KILX0810
      NUNMX = NUMX + NUMX                                                      KILX0820
      NUN   = KBU + KRU                                                        KILX0830
      NSYTMX = NBSSMX + NRSSMX                                                 KILX0840
      NSYT = NBSS + NRSS                                                       KILX0850
C     IF (VULFS*VULFA*VULFM.GT..00001)   GO TO 8                               KILX0860
      VULFS = .5                                                               KILX0870
      VULFA = .1                                                               KILX0880
      VULFM = .1                                                               KILX0890
 8    DO 10 I=1,NUNMX                                                          KILX0900
      KSTATE(I) = 5                                                            KILX0910
      PPROD(I) = 1.                                                            KILX0920
      PKLAST(I) = .0                                                           KILX0930
      CUMWT(I) = .0                                                            KILX0940
      VULOST(I) = .0                                                           KILX0950
 10   VUKILL(I) = .0                                                           KILX0960
      DO 12 I=1,NSYTMX                                                         KILX0970
 12   VWKILL(I) = .0                                                           KILX0980
      RETURN                                                                   KILX0990
C***  SETUP TO EVALUATE KILL                                                   KILX1000
 20   KSA = JWP(1)                                                             KILX1010
      KPA = JWP(2)                                                             KILX1020
      KUA = JWP(3)                                                             KILX1030
      JAM = JWP(4)                                                             KILX1040
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      RNG = WEP(1)                                                          KILX1050
      TOFG= WEP(2)                                                          KILX1060
      JPT = JTG(1)                                                          KILX1070
      KU  = JTG(2)                                                          KILX1080
      KSB = JTG(3)                                                          KILX1090
      KPB = JTG(4)                                                          KILX1100
      KWEAP = KSA                                                           KILX1110
      KWUNI = KUA                                                           KILX1120
      KTGTU = KU                                                            KILX1130
      KTGTTY = 0                                                            KILX1140
      KWEPTY = 0                                                            KILX1150
      E1 = 20.                                                              KILX1160
      GO TO (24,26), JSIDE                                                  KILX1170
C***  ERROR MESSAGE                                                         KILX1180
 22   IF (IPRINT.LE.0)   RETURN                                             KILX1190
      WRITE(N6,2001) E1,TIME,JSIDE,KWEPTY,KSA,KUA,JAM,RNG,KTGTTY,           KILX1200
     1       JPT,KU,KSB,KPB                                                 KILX1210
      IF (E1.LT.20C.)   RETURN                                              KILX1220
      IPRINT = 2                                                            KILX1230
      GO TO 9001                                                            KILX1240
C***  BLU OR RED WEAPON                                                     KILX1250
 24   KWEPTY = KBST(KSA)                                                    KILX1260
      NAWT1 = NABSS(1,KSA)                                                  KILX1270
      NAWT2 = NABSS(2,KSA)                                                  KILX1280
      NAWU1 = NAMBU(KUA,1)                                                  KILX1290
      NAWU2 = NAMBU(KUA,2)                                                  KILX1300
      KWUTYP= KBUK(2,KUA)                                                   KILX1310
      KADD = 70                                                             KILX1320
      KWKILL = KSA                                                          KILX1330
      KUKILL = KUA                                                          KILX1340
      GO TO 28                                                              KILX1350
 26   KWEPTY = KRST(KSA)                                                    KILX1360
      NAWT1 = NARSS(1,KSA)                                                  KILX1370
      NAWT2 = NARSS(2,KSA)                                                  KILX1380
      NAWU1 = NAMRU(KSA,1)                                                  KILX1390
      NAWU2 = NAMRU(KSA,2)                                                  KILX1400
      KWUTYP= KRUK(2,KUA)                                                   KILX1410
      KADD = 90                                                             KILX1420
      KWKILL = NBSS + KSA                                                   KILX1430
      KUKILL = KBU + KUA                                                    KILX1440
 28   KWEP = MOD(KWEPTY,100)                                                KILX1450
      E1  = 28.01                                                           KILX1460
      IF (KWEP.LE.0)   GO TO 22                                             KILX1470
      KWEPT = KWEPTY / 10000                                                KILX1480
      KTESTA = KWEPT / 100                                                  KILX1490
      KWEPTR = MOD(KWEPTY/100,100)                                          KILX1500
      DO 32 I=2,9                                                           KILX1510
      KTEST = KADD + I                                                      KILX1520
      IF (KTEST.EQ.KTESTA)  GO TO 34                                        KILX1530
 32   CONTINUE                                                              KILX1540
      E1  = 32.01                                                           KILX1550
      GO TO 22                                                              KILX1560
 34   KTRANW = I - 1                                                        KILX1570
C***  BLU OR RED TARGET                                                     KILX1580
      GO TO (36,46), JSIDE                                                  KILX1590
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C***  RED TARGET                                                    KILX1600
 36    NATU1 = NAMRU(KU,1)                                          KILX1610
       NATU2 = NAMRU(KU,2)                                          KILX1620
       KUNIT = KRUK(2,KU)/10000                                     KILX1630
       GO TO (38,40), JPT                                           KILX1640
C***  SHIP, ACFT, SUB   -   TARGET   -   RED                        KILX1650
 38    KULOST = KBU + KU                                            KILX1660
       KTARG = KU                                                   KILX1670
       KTGTTY = KRUK(2,KU)                                          KILX1680
       VALTGT = RRFL(4,KU)                                          KILX1690
       KTEST = KRPT(KPB)                                            KILX1700
       F1  = 38.03                                                  KILX1710
       IF (KTEST.NE.KTGTTY)   GO TO 22                              KILX1720
       KTGTT  = KTGTTY / 10000                                      KILX1730
       KTG = KPB                                                    KILX1740
       ELN = RPX1(1,KTG)                                            KILX1750
       SPN = RPX1(2,KTG)                                            KILX1760
       HGT = RPX1(3,KTG)                                            KILX1770
       VULO = RPX1(11,KTG)                                          KILX1780
       VUL1 = RPX1(12,KTG)                                          KILX1790
       GO TO 60                                                     KILX1800
C***  SSM  &  ASM     -     TARGET    -     RED                     KILX1810
 40    KTGTTY = KRST(KSB)                                           KILX1820
       NATW1 = NARSS(1,KSB)                                         KILX1830
       NATW2 = NARSS(2,KSB)                                         KILX1840
       KTARG = KSB                                                  KILX1850
 42    CONTINUE                                                     KILX1860
       VALTGT=0.                                                    KILX1870
       KTGTT = KTGTTY / 10000                                       KILX1880
       KTG = MOD(KTGTTY,100)                                        KILX1890
       ELN = DATMSL(16,KTG)                                         KILX1900
       SPN = DATMSL(17,KTG)                                         KILX1910
       HGT = DATMSL(18,KTG)                                         KILX1920
       RVUL = DATMSL(20,KTG)                                        KILX1930
       IF (RVUL.GT..001)   GO TO 44                                 KILX1940
       RVUL = .5*(VULFM*ELN*SPN*HGT)**.333333                       KILX1950
 44    GO TO 60                                                     KILX1960
C***  BLU TARGET                                                    KILX1970
 46    NATU1 = NAMBU(KU,1)                                          KILX1980
       NATU2 = NAMBU(KU,2)                                          KILX1990
       KUNIT = KBUK(2,KU)/10000                                     KILX2000
       GO TO (48,50), JPT                                           KILX2010
C***  SHIP, ACFT, SUB   -   TARGET   -   BLU                        KILX2020
 48    KULOST = KU                                                  KILX2030
       KTARG = KU                                                   KILX2040
       KTGTTY = KBUK(2,KU)                                          KILX2050
       VALTGT = BRFL(4,KU)                                          KILX2060
       KTEST  = KBPT(KPB)                                           KILX2070
       F1  = 48.03                                                  KILX2080
       IF (KTEST.NE.KTGTTY)   GO TO 22                              KILX2090
       KTGTT = KTGTTY / 10000                                       KILX2100
       KTG = KPB                                                    KILX2110
       ELN = BPX1(1,KTG)                                            KILX2120
       SPN = BPX1(2,KTG)                                            KILX2130
       HGT = BPX1(3,KTG)                                            KILX2140
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      VULO = BPX1(11,KTG)                                              KILX2150
      VUL1 = BPX1(12,KTG)                                              KILX2160
      GO TO 60                                                         KILX2170
C***  SSM & ASM     -     TARGET    -    BLU                           KILX2180
 50   KTGTTY = KBST(KSB)                                               KILX2190
      NATW1 = NABSS(1,KSB)                                             KILX2200
      NATW2 = NABSS(2,KSB)                                             KILX2210
      KTARG = KSB                                                      KILX2220
      GO TO 42                                                         KILX2230
C***                                                                   KILX2240
C***  BRANCH FOR WEAPON TYPES                                          KILX2250
 60   RWQ = -2.                                                        KILX2260
      SIQ = -2.                                                        KILX2270
      BI  = -2.                                                        KILX2280
      SIGA= -2.                                                        KILX2290
      SIGC = -2.                                                       KILX2300
      CCAP = -2.                                                       KILX2310
      PCAP = -2.                                                       KILX2320
      PKSS = -2.                                                       KILX2330
      GO TO (200,200,200,500,800,700,800,900), KTRANW                  KILX2340
C***  TORPEDOES, ASWP, ASROC, FRAS   -   WEAPON KILL                   KILX2350
 200  RMX = ZZSYS( 1,KWEP)                                            KILX2360
      VEL = ZZSYS( 2,KWEP)                                             KILX2370
      WWT = ZZSYS( 3,KWEP)                                             KILX2380
      REL = ZZSYS( 4,KWEP)                                             KILX2390
      SAL = ZZSYS( 5,KWEP)                                             KILX2400
      SIG = ZZSYS( 7,KWEP) * .849                                      KILX2410
      BIA = ZZSYS( 8,KWEP)                                             KILX2420
      RL1 = ZZSYS( 9,KWEP)                                             KILX2430
      PKE = ZZSYS(10,KWEP)                                             KILX2440
      WHT = ZZSYS(14,KWEP)                                             KILX2450
      PHIT= ZZSYS(15,KWEP)                                             KILX2460
      IF (SAL.LT. .01)   SAL=1.                                        KILX2470
      IF (RNG.LT..0)   RNG = .8*RMX                                    KILX2480
      IF (PKE.GT. 1.E-6)   GO TO 202                                   KILX2490
 202  RVUL = .5*(VULFS*FLN*SPN*HGT)**.333333                           KILX2500
C***  BRANCH FOR WARHEAD TYPE                                          KILX2510
      IF (WHT.GT. .01)   GO TO 212                                     KILX2520
C***  HE WARHEAD V SHIPS                                               KILX2530
      IF (PHIT.GT. .0001)   GO TO 206                                  KILX2540
 203  BI  = .849*BIA*RNG*6.080                                         KILX2550
      SIQ = SIG**2 + BI**2                                             KILX2560
 204  RWQ = (RVUL+RL1)**2                                              KILX2570
      PHIT = 1.                                                        KILX2580
 205  IF (SIQ.LT. .001)   GO TO 206                                    KILX2590
      PHIT = 1. - EXP(-.5 * RWQ/SIQ)                                   KILX2600
 206  CALL  KILLHE(VULO,KULOST,VALTGT,WWT,REL,SAL,PHIT,KUKILL,         KILX2610
     1             KWKILL, PK)                                         KILX2620
      GO TO 9000                                                       KILX2630
C                                                                      KILX2640
C***  NUCLEAR WARHEAD VS SHIP                                          KILX2650
 212  RWQ = (RVUL+RL1)**2                                              KILX2660
      IF (PHIT.LT. .0001)   GO TO 214                                  KILX2670
 213  SIQ = -.5*RWQ/ALOG(1.-PHIT)                                      KILX2680
      GO TO 216                                                        KILX2690
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 214    BI   = .849*BIA*RNG*6.080                                          KILX2700
        SIQ  = SIG**2 + BI**2                                              KILX2710
C***   ADJUST FOR  RL1.GT.0  (CAPTURE RADIUS FOR HOMING TORPEDOES,ETC.)    KILX2720
 215    IF (RL1.LT. 1.)   GO TO 216                                        KILX2730
        IF (RVUL.LT. 10.)   RVUL=10.                                       KILX2740
        SIQ = (SIQ*RVUL**2) / (RVUL+RL1)**2                                KILX2750
 216    CALL  KILLNW(VULO,VUL1,KULOST,VALTGT,WWT,REL,SAL,SIQ,              KILX2760
     1              KUKILL,KWKILL,PKSS,PK)                                 KILX2770
        GO TO 9000                                                         KILX2780
C***                                                                       KILX2790
C***   SURFACE TO AIR GUNS    -    WEAPON KILL                            KILX2800
 500    GO TO 700                                                          KILX2810
C***                                                                       KILX2820
C***   SURFACE TO AIR MISSILES    -    WEAPON KILL                        KILX2830
        DATA  PHARDA,PHARDM/ 10.,  5. /                                    KILX2840
 700    RMX = SASYS( 1,KWEP)                                               KILX2850
        TOF = 3600.* TOFG                                                  KILX2860
        ANGLE = 10.                                                        KILX2870
        CALL TLU23(RT,L,M,N,KWEP,TOF,ANGLE,RTF,INDY,INDX,INY,INX)          KILX2880
        VEL  = SASYS( 2,KWEP)                                              KILX2890
        WWT  = SASYS( 3,KWEP)                                              KILX2900
        REL  = SASYS( 4,KWEP)                                              KILX2910
        SAL  = SASYS( 5,KWEP)                                              KILX2920
        SIG  = SASYS( 7,KWEP) * .849                                       KILX2930
        BIA  = SASYS( 8,KWEP)                                              KILX2940
        RL1  = SASYS( 9,KWEP)                                              KILX2950
        PKE  = SASYS(10,KWEP)                                              KILX2960
        WHT  = SASYS(14,KWEP)                                              KILX2970
        PHIT= SASYS(15,KWEP)                                               KILX2980
        RWQ  = -2.                                                         KILX2990
        SIQ  = -2.                                                         KILX3000
        BI   = -2.                                                         KILX3010
        IF (SAL.LT. .01)   SAL=1.                                          KILX3020
C***   IS TARGET AN AIRCRAFT OR A MISSILE                                  KILX3030
        KTEST = KTGTT / 100                                                KILX3040
        KAM = 2                                                            KILX3050
        IF (KTEST.EQ.62.OR.KTEST.EQ.82)   KAM=1                            KILX3060
        PK   = PKE                                                         KILX3070
        IF (PKE.GT. 1.E-6)   GO TO 750                                     KILX3080
        IF (PHIT.GT.1.E-6)   GO TO 740                                     KILX3090
        PHARD = PHARDM                                                     KILX3100
        IF (KAM.EQ.2)   GO TO 708                                          KILX3110
        PHARD = PHARDA                                                     KILX3120
        RVUL = .5*(VULFA*ELN*SPN*HGT)**.333333                             KILX3130
 708    KTEST = WHT + .01                                                  KILX3140
        IF (KTEST.NE.2)   GO TO 710                                        KILX3150
        IF (RL1.LT. .01)   RL1= 5.                                         KILX3160
        GO TO 712                                                          KILX3170
C***   HE WARHEAD                                                          KILX3180
 710    IF (RL1.LT. .01)   RL1=.23*WWT/SQRT(PHARD)                         KILX3190
 712    RWQ = (RVUL+RL1)**2                                                KILX3200
        BI   = BIA                                                         KILX3210
        SIQ = SIG**2 + BI**2                                               KILX3220
        PHIT = 1.                                                          KILX3230
        IF (SIQ.LT. .001)   GO TO 740                                      KILX3240
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      PHIT = 1. - EXP(-.5*RWQ/SIQ)                                          KILX3250
      GO TO 740                                                             KILX3260
C***                                                                        KILX3270
 74C  NSAL = SAL + .01                                                      KILX3280
      PHIT = 1. - (1.-PHIT*REL)**NSAL                                       KILX3290
      PK   = PHIT                                                           KILX3300
C***  KILL RECORD                                                           KILX3310
 75C  XRN = UPN(DUMMY)                                                      KILX3320
      PRNG = 1.                                                             KILX3330
      IF (RTF.LE..75*RMX .AND.RTF.GE..25*RMX)  GO TO 7501                   KILX3340
      PRNG = 0.8                                                            KILX3350
      IF (RTF.LE..0 .OR. RTF.GE.RMX)   GO TO 7501                           KILX3360
      X  = RTF / RMX                                                        KILX3370
      PRNG = -3.2*(X-.25)**2 + 1.0                                          KILX3380
      IF (X.GE..75)   PRNG = -3.2*(X-.75)**2 + 1.0                          KILX3390
 75C1 PK = PK * PRNG                                                        KILX3400
      KSTAA = 1                                                             KILX3410
      IF (XRN.LT.PK )   KSTAA = 0                                           KILX3420
      IF (KSTAA.GE.1)   GO TO 9010                                          KILX3430
      VUKILL(KUKILL) = VUKILL(KUKILL) + VALTGT                              KILX3440
      VWKILL(KWKILL) = VWKILL(KWKILL) + VALTGT                              KILX3450
      GO TO (752,754), KAM                                                  KILX3460
C***  AIRCRAFT TARGET ONLY                                                  KILX3470
 752  VULOST(KULOST) = VALTGT + VULOST(KULOST)                              KILX3480
      KSTATE(KULOST) = 0                                                    KILX3490
      GO TO 9012                                                            KILX3500
C***  MISSILE TARGET ONLY                                                   KILX3510
 754  DATMSL(LATMSL,KTG) = DATMSL(LATMSL,KTG) + 1.                          KILX3520
      GO TO 9012                                                            KILX3530
C****                                                                       KILX3540
C***  SSM  &  ASM   -    WEAPON KILL                                        KILX3550
 80C  RWQ  = -2.                                                           KILX3560
      SIQ  = -2.                                                            KILX3570
      BI   = -2.                                                            KILX3580
      SIGA = -2.                                                            KILX3590
      SIGC = -2.                                                            KILX3600
      DCAP = -2.                                                            KILX3610
      PCAP = -2.                                                            KILX3620
      RMX  = DATMSL( 1,KWEP)                                                KILX3630
      VEL  = DATMSL( 2,KWEP)                                                KILX3640
      WWT  = DATMSL( 3,KWEP)                                                KILX3650
      REL  = DATMSL( 4,KWEP)                                                KILX3660
      SAL  = DATMSL( 5,KWEP)                                                KILX3670
      SIG  = DATMSL( 7,KWEP) * .849                                         KILX3680
      BIA  = DATMSL( 8,KWEP)                                                KILX3690
      CODEM= DATMSL( 9,KWEP)                                                KILX3700
      SIGJ = DATMSL(10,KWEP) * .849                                         KILX3710
      CTERM= DATMSL(11,KWEP)                                                KILX3720
      CMID = DATMSL(12,KWEP)                                                KILX3730
      TRAJ = DATMSL(13,KWEP)                                                KILX3740
      WHT  = DATMSL(14,KWEP)                                                KILX3750
      PHIT = DATMSL(15,KWEP)                                                KILX3760
C***                                                                        KILX3770
      IF (SAL.LT. .01)   SAL=1.                                             KILX3780
      IF (RNG.LT. .0)   RNG = .8*RMX                                        KILX3790
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      RL1 = .0                                                          KILX3800
      RVUL = .5*(VULFS*ELN*SPN*HGT)**.333333                            KILX3810
      IF (JAM.GE.1)   SIG = SIGJ                                        KILX3820
      KWEP3 = MOD(KWEPT/10,10)                                          KILX3830
      KWEP4 = MOD(KWEPT,10)                                             KILX3840
C***  CASE NO.  1                                                       KILX3850
      IF (PHIT.LT. .0001)   GO TO 804                                   KILX3860
      IF (WHT.LT. .01)   GO TO 206                                      KILX3870
      GO TO 212                                                         KILX3880
C***  ANALYZE GUIDANCE                                                  KILX3890
 804  KGTERM= GTERM + .1                                                KILX3900
      KGTXX = MOD(KGTERM,100)                                           KILX3910
      KGMID = GMID + .1                                                 KILX3920
      KGMXX = MOD(KGMID ,100)                                           KILX3930
      KODM = (CODEM*100.) + .1                                          KILX3940
      IF (KGTXX.NE.0 .OR. KGMXX.NE.0)   GO TO 806                       KILX3950
C***  NO GUIDANCE TYPE SPECIFIED.  USE CEP,BIAS,RL1 INPUTS              KILX3960
      IF (WHT.LT. .01)   GO TO 203                                      KILX3970
      GO TO 214                                                         KILX3980
 806  IF (KODM.LE.0)   GO TO 808                                        KILX3990
C***  MIDCOURSE GUIDANCE SETUP                                          KILX4000
      IG  = KODM / 10000                                                KILX4010
      IE  = MOD(KODM/1000,10)                                           KILX4020
      IL  = MOD(KODM/100,10)                                            KILX4030
      PLP = MOD(KODM/10,10) * .1                                        KILX4040
      PLV = (KODM/10) * .1                                              KILX4050
      F1  = 806.06                                                      KILX4060
      IF (VEL.LE. 1.)   GO TO 22                                        KILX4070
      TH  = RNG / VEL                                                   KILX4080
      PSI = 1.                                                          KILX4090
      F1  = 806.08                                                      KILX4100
      IF (IG*IE*IL.LE.0)   GO TO 22                                     KILX4110
      IF (IG.GT.3.OR.IE.GT.2.OR.IL.GT.3)   GO TO 22                     KILX4120
      CALL  GUID(TH,PSI,VEL,IG,IE,IL,PLP,PLV,SXT,SYT,A)                 KILX4130
      SIGA = .849 * A * 6080.                                           KILX4140
C***  HOMING RADAR SETUP                                                KILX4150
 808  IF (KWEPTR.LE.0)   GO TO 810                                      KILX4160
      SEOV = DATHOM(2,KWEPTR) * .0174533                                KILX4170
      IF (SEOV.GE. 3. .OR. SEOV.LT. .0)   SEOV = 3.                     KILX4180
      BETALE = DATHOM(1,KWEPTR)                                         KILX4190
      IF (JAM.GE.1)   BETALE=DATHOM(2,KWEPTR)                           KILX4200
      IF (BETALE.GT.RNG)   BETALE=RNG                                   KILX4210
      DCAP = BETALE * TAN(.5*SEOV) * 6080.                              KILX4220
 810  IF (KGTXX/10.EQ.4)   GO TO 820                                    KILX4230
C***                                                                    KILX4240
C***  NO TERMINAL HOMING RADAR            *********                     KILX4250
      IF (KGMXX.LT.51 .OR. KGMXX.GT.53)   GO TO 814                     KILX4260
C***  CASE 4.1                                                          KILX4270
C***  AUTOPILOT, DOPPLER, OR INERTIAL + TRACK COMMAND                   KILX4280
      F1  = 810.02                                                      KILX4290
      IF (KODM.LE.0)   GO TO 22                                         KILX4300
      BI  = .849*BIA*RNG*6.080                                          KILX4310
      IF (BI.GT.SIGA)   BI=SIGA                                         KILX4320
      SIG = SIG**2 + BI**2                                              KILX4330
 812  IF (WHT.GT. .01)   GO TO 216                                      KILX4340
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      GO TO 204                                                          KILX4350
 814  IF (KGMXX.NE.54)  GO TO 818                                        KILX4360
C***  CASE NO.  4.2                                                      KILX4370
C***  INERTIAL ONLY (LAUNCH & FORGET)  -   NO TERMINAL                   KILX4380
      E1  = 812.01                                                       KILX4390
      IF (KODM.LE.0)  GO TO 22                                           KILX4400
      SIQ = SIG**2 + SIGA**2                                             KILX4410
      GO TO 812                                                          KILX4420
C***  CASE NO.  4.3                                                      KILX4430
C***  ANY MIDCOURSE + VIDEO  -  NO TERMINAL                              KILX4440
 818  E1  = 818.00                                                       KILX4450
      IF (KGMXX.NE.55)  GO TO 22                                         KILX4460
 819  SIQ = SIG**2                                                       KILX4470
      GO TO 812                                                          KILX4480
C***                                                                     KILX4490
C***  WITH TERMINAL HOMING RADAR        **********                       KILX4500
 820  E1  = 820.00                                                       KILX4510
      IF (KWEPTR.LE.0)  GO TO 22                                         KILX4520
      IF (KGMXX.NE.0)  GO TO 822                                         KILX4530
C***  CASE NO.  5.                                                       KILX4540
C***  TERMINAL, NO MIDCOURSE                                             KILX4550
      GO TO 819                                                          KILX4560
 822  E1  = 822.00                                                       KILX4570
      IF (KGMXX.LT.51.OR.KGMXX.GT.53)  GO TO 830                         KILX4580
      IF (KODM.LE.0)  GO TO 22                                           KILX4590
C***  CASE NO.  6.1                                                      KILX4600
C***  TERMINAL + MIDCOURSE (AUTO,DOPP,INERT + TC)                        KILX4610
      R    = RNG - BETALF                                                KILX4620
      PCAP = 1.                                                          KILX4630
      IF (R.LT. 5.0001)  GO TO 824                                       KILX4640
      TH   = R / VEL                                                     KILX4650
      CALL  GUID(TH,PSI,VEL,IG,IE,IL,PLP,PLV,SXT,SYT,A)                  KILX4660
      SIGC = .849 * A * 6080.                                            KILX4670
      IF (SIGC.LE. 10.001)  GO TO 824                                    KILX4680
      PCAP = 1. - EXP(-.5*(DCAP/SIGC)**2)                                KILX4690
 824  PHIT = 1.                                                          KILX4700
      IF (SIG.LT. 1.)  GO TO 826                                         KILX4710
      PHIT = 1. - EXP(-.5*(RVUL/SIG)**2)                                 KILX4720
 826  PHIT = PHIT * PCAP                                                 KILX4730
      IF (WHT.LT. .01)  GO TO 206                                        KILX4740
      IF (PHIT.LT. .0002)  GO TO 9000                                    KILX4750
      GO TO 212                                                          KILX4760
C***  CASE NO  6.2                                                       KILX4770
C***  ANY + VIDEO + TERMINAL                                             KILX4780
 830  E1  = 830.00                                                       KILX4790
      IF (KGMXX.NE.55)  GO TO 22                                         KILX4800
      GO TO 819                                                          KILX4810
C***                                                                     KILX4820
C***  AIR TO AIR MISSILES & GUNS  -  WEAPON KILL                         KILX4830
 900  REL = ZZSYS( 4,KWEP)                                              KILX4840
      RMX = ZZSYS( 1,KWEP)                                               KILX4850
      VEL = ZZSYS( 2,KWEP)                                               KILX4860
      WWT = ZZSYS( 3,KWEP)                                               KILX4870
      SAL = ZZSYS( 5,KWEP)                                               KILX4880
      SIG = ZZSYS( 7,KWEP) * .849                                        KILX4890
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      PIA = ZZSYS( 8,KWEP)                                              KILX4900
      RL1 = ZZSYS( 9,KWEP)                                              KILX4910
      PKE = ZZSYS(10,KWEP)                                              KILX4920
      WHT = ZZSYS(14,KWEP)                                              KILX4930
      PHIT= ZZSYS(15,KWEP)                                              KILX4940
      RWQ = -2.                                                         KILX4950
      SIQ = -2.                                                         KILX4960
      PI  = -2.                                                         KILX4970
      PK  = -2.                                                         KILX4980
      IF (RNG.GT..0)   GO TO 902                                        KILX4990
      RNG = .8 * RMX                                                    KILX5000
      RTF = .6 * RMX                                                    KILX5010
      TOFG= RTF / VEL                                                   KILX5020
      GO TO 904                                                         KILX5030
  902 RTF = VEL * TOFG                                                  KILX5040
  904 CONTINUE                                                          KILX5050
      IF (SAL.LT. .01)   SAL= 1.                                        KILX5060
C***  IS TARGET AN AIRCRAFT OR A MISSILE                                KILX5070
      KTEST = KTGTT/100                                                 KILX5080
      KAM = 2                                                           KILX5090
      IF (KTEST.EQ.62.OR.KTEST.EQ.82)   KAM=1                           KILX5100
      PK  = PKE                                                         KILX5110
      IF (PKE.GT. 1.E-6)   GO TO 750                                    KILX5120
      IF(PHIT.GT.1.E-6)   GO TO 740                                     KILX5130
      PK  =  .12345                                                     KILX5140
      GO TO 750                                                         KILX5150
C***                                                                    KILX5160
C***  PRINT OPTIONS                                                     KILX5170
 9000 KSTAA = KSTATE(KULOST)                                            KILX5180
      IF (IPRINT.LE.0)   RETURN                                         KILX5190
      NAMELIST/WEAPA/TIME,JSIDE,KWEAP,KWEPT,KWUNI,KWUTYP,PHIT,         KILX5200
     1              PCAP,VWK,VUK                                        KILX5210
      NAMELIST/WEAPB/RWQ,RVUL,RL1,PHIT,SIQ,SIG,BI,SIGA,                 KILX5220
     1         SIGC,DCAP,PCAP                                           KILX5230
      NAMELIST/TARGA/TIME,JSIDE,KTARG,KTGTT,PKSS,CUM,PKLST,VULST,KSTAT  KILX5240
      NAMELIST/TARGB/VALTGT,VULO,VUL1,RVUL                              KILX5250
      NAMELIST/TARGC/TIME,JSIDE,KTARG,KTGTT,KTGTU,KUNIT                 KILX5260
 9001 CUM   = CUMWT(KULOST)                                             KILX5270
      PKLST = PKLAST(KULOST)                                            KILX5280
      VULST = VULOST(KULOST)                                            KILX5290
      KSTAT = KSTATE(KULOST)                                            KILX5300
      VUK   = VUKILL(KUKILL)                                            KILX5310
      VWK   = VWKILL(KWKILL)                                            KILX5320
 9002 WRITE(N6,WEAPA)                                                   KILX5330
      IF (IPRINT.GE.2)   WRITE(N6,WEAPB)                                KILX5340
      K   = KTGTT/100                                                   KILX5350
      IF (K.GE.61.AND.K.LE.63)   GO TO 9004                             KILX5360
      IF (K.GE.81.AND.K.LE.83)   GO TO 9004                             KILX5370
C***  NOT A SHIP, AIRPLANE, OR SUB                                      KILX5380
      WRITE(N6,TARGC)                                                   KILX5390
      RETURN                                                            KILX5400
 9004 WRITE(N6,TARGA)                                                   KILX5410
      IF (IPRINT.GE.2)   WRITE(N6,TARGB)                                KILX5420
      RETURN                                                            KILX5430
C***                                                                    KILX5440
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C***  PRINT OPTIONS FOR SAMS & GUNS                                    KILX5450
C***  NO KILL                                                          KILX5460
 9010  IF (IPRINT.LE.0)  RETURN                                        KILX5470
       NAMELIST/WEAPC/TIME,JSIDE,KWEAP,KWEPT,KWUNI,KWUTYP,XRN,PK       KILX5480
       NAMELIST/WEAPD/TIME,JSIDE,KWEAP,KWEPT,KWUNI,KWUTYP,XRN,         KILX5490
     1               PK,VWK,VUK                                        KILX5500
       NAMELIST/WEAPE/RWQ,RVUL,RL1,PHIT,SIQ,SIG,BI                     KILX5510
       NAMELIST/TARGD/TIME,JSIDE,KTARG,KTGTT,KTGTU,KUNIT,VULST,KSTAT   KILX5520
       NAMELIST/TARGE/TIME,JSIDE,KTARG,KTGTT,KTGTU,KUNIT,NULST,KSTAT   KILX5530
       WRITE(N6,WEAPC)                                                 KILX5540
       WRITE(N6,TARGC)                                                 KILX5550
       RETURN                                                          KILX5560
C***  KILL                                                             KILX5570
 9012  IF (IPRINT.LE.0)   RETURN                                       KILX5580
       VUK = VUKILL(KUKILL)                                            KILX5590
       VWK = VWKILL(KWKILL)                                            KILX5600
       WRITE(N6,WEAPD)                                                 KILX5610
       IF (IPRINT.GE.2)   WRITE(N6,WEAPE)                              KILX5620
       GO TO (9016,9018), KAM                                          KILX5630
C***  AIRCRAFT TARGET                                                  KILX5640
 9016  VULST = VULOST(KULOST)                                          KILX5650
       KSTAT = KSTAA                                                   KILX5660
       WRITE(N6,TARGD)                                                 KILX5670
       RETURN                                                          KILX5680
C***  MISSILE TARGET                                                   KILX5690
 9018  NULST = DATMSL(LATMSL,KTG) + .1                                 KILX5700
       KSTAT = KSTAA                                                   KILX5710
       WRITE (N6,TARGE)                                                KILX5720
       RETURN                                                          KILX5730
       END                                                             KILX5740


       SUBROUTINE KILLHE(VULO,KULOST,VALTGT,WWT,REL,SAL,PHIT,KUKILL,   KILH0010
     1               KWKILL,PK)                                        KILH0020
C  PGM=NXX(NEM).  L.D.G.       12-5-73   FORTRAN IV          EBCD     KILH0030
C  MODS.KT=100,549,550.CVAPK=330,670.CVCGVUL=220,230   VER.3   12-30-74 KILH0040
C   TO KILL SHIPS WITH  HE  OR  NUCLEAR WARHEADS                       KILH0050
C     AND UPDATE RECORDS                                               KILH0060
C  PK     = CUM PROB OF KILL                                          KILH0070
C  VULO   =  SHIP VULNERABILITY CODE (VN)  =                          KILH0080
C  KULOST=  SHIP UNIT HIT                                             KILH0090
C  VALTGT=  SHIP UNIT VALUE                                           KILH0100
C  WWT    =  WARHEAD WT, LBS OF HE,  KT FOR NUCLEAR                   KILH0110
C  REL    =  RELIABILITY                                              KILH0120
C  SAL    =  SALVO SIZE                                               KILH0130
C  PHIT   =  PROB OF HIT                                              KILH0140
C  KUKILL=  PLATFORM UNIT WHOSE WEAPON DID THE KILL                   KILH0150
C  KWKILL=  WEAPON TYPE POINTER WHICH DID THE KILL                    KILH0160
CKILLF                                                               KILH0170
       COMMON/CKILLF/LVSHP,MVSHP,NVSHP,VULSHP(5,12,1),NUN,NUNMX,       KILH0180
     1 KSTATE(100),PKLAST(100),PPROD(100),CUMWT(100),VULOST(100),      KILH0190
     2 VUKILL(100),VWKILL(100),VULFS,VULFA,VULFM                       KILH0200
C**  BSHP, CSHP = CURVE FIT FOR HE KILL BY SHIP TYPE                   KILH0210
       DIMENSION  BSHP(4), CSHP(4)                                     KILH0220
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      DATA  BSHP/5625.,4388.,1607., 910./                              KILH0230
      DATA  CSHP/2.177,1.5216,2.174,1.721/                             KILH0240
C***  HE WARHEAD KILL                                                  KILH0250
 1    CUM = CUMWT(KULOST) + WWT*REL*SAL*PHIT                           KILH0260
      CUMWT(KULOST) = CUM                                              KILH0270
      IV  = VULO + .01                                                 KILH0280
      PK  = 1. - EXP(-(CUM/BSHP(IV))**CSHP(IV))                        KILH0290
      XRN = URN(DUMMY)                                                 KILH0300
      K   = KULOST                                                     KILH0310
      CALL  STATE(KSTATE(K),PKLAST(K),PPROD(K), PK,XRN)                KILH0320
      IF (VULO.GT. 1.1)   GO TO 10                                     KILH0330
      IF (KSTATE(K).LE.0.AND.PK.LT..9)  KSTATE(K)=1                    KILH0340
 10   VAL  = PKLAST(K) * VALTGT                                        KILH0350
      DVAL = VAL - VULOST(K)                                           KILH0360
      VULOST(K) = VAL                                                  KILH0370
      VUKILL(KUKILL) = VUKILL(KUKILL) + DVAL                           KILH0380
      VWKILL(KWKILL) = VWKILL(KWKILL) + DVAL                           KILH0390
      RETURN                                                           KILH0400
C******                                                                KILH0410
      ENTRY  KILLNW(VULO,VUL1,KULOST,VALTGT,WWT,REL,SAL,SIG,KUKILL,    KILH0420
     1              KWKILL,PKSS,PK)                                    KILH0430
C****$*                                                                KILH0440
C  TO KILL SHIPS WITH NUCLEAR WARHEADS                                 KILH0450
C  SIG   = SIGMA SQUARED, ACCURACY IN FEET SQUARED.                    KILH0460
C  PKSS  = SINGLE SHOT PROB OF KILL                                    KILH0470
C  PK    = CUM PROB OF KILL                                            KILH0480
 20   PK  = .0                                                         KILH0490
      IVN = (100.*VUL1) + .1                                           KILH0500
      IF (IVN.LE.0)   RETURN                                           KILH0510
      XX  = IVN / 1000                                                 KILH0520
      Y   = MOD(IVN/100,10)                                            KILH0530
      F   = MOD(IVN/10,10)                                             KILH0540
      B   = MOD(IVN,10)                                                KILH0550
      CALL  WRAD(XX,Y,F,B,WWT/1000.,RNUC)                              KILH0560
      IF (RNUC.LE..001)   RETURN                                       KILH0570
      RWQ = (RNUC*6080.)**2                                            KILH0580
      PKSS = 1. - EXP(-.5/(.04+(SIG/RWQ)))                            KILH0590
      K    = KULOST                                                    KILH0600
      NSAL = SAL + .1                                                  KILH0610
      DO 26 I= 1,NSAL                                                  KILH0620
      PK   = 1. - (1.-PKLAST(K)) * (1.-PKSS*REL)                       KILH0630
      XRN  = URN(DUMMY)                                                KILH0640
      CALL  STATE(KSTATE(K),PKLAST(K),PPROD(K), PK,XRN)                KILH0650
C**  NO COMPLETE A/C CARRIER KILL                                       KILH0660
      IF (VULO.GT. 1.1)   GO TO 24                                     KILH0670
      IF (KSTATE(K).LE.0.AND.PK.LT..9)  KSTATE(K)=1                    KILH0680
 24   VAL  = PKLAST(K) * VALTGT                                        KILH0690
      DVAL = VAL - VULOST(K)                                           KILH0700
      VULOST(K) = VAL                                                  KILH0710
      VUKILL(KUKILL) = VUKILL(KUKILL)+ DVAL                            KILH0720
      VWKILL(KWKILL) = VWKILL(KWKILL) + DVAL                           KILH0730
 26   CONTINUE                                                         KILH0740
C**  ADJUST NUCLEAR KILL TO EQUIV HE WEIGHT                             KILH0750
      IV   = VULO + .01                                                KILH0760
      CUMWT(KULOST) = BSHP(IV) * ((-ALOG(1.-PK))**(1./CSHP(IV)))       KILH0770
```

```
      RETURN                                                            KILH0780
      END                                                               KILH0790


      SUBROUTINE DELSEG(INFORM,ISNSEG,ITGSEG,ISEG)                      INF00010
      COMMON/STRCON/  JPK,IPK                                           INF00020
      COMMON/INFO/  LENIFO,LENSEG,MAXSEG,NEXSEG,LSTSEG,LZCSEG           INF00030
      DIMENSION INFORM(1),ISNSEG(1),ITGSEG(1)                           INF00040
      IST=INFORM(ISEG)                                                  INF00050
      ISENS=IST/IPK                                                     INF00060
      ITGT=MOD(IST,IPK)                                                 INF00070
      IADD=2                                                            INF00080
      JPOINT=ITGSEG(ITGT)                                               INF00090
   21 IPOINT=INFORM(ISEG+IADD)                                          INF00100
      LSEG=IPOINT/IPK                                                   INF00110
      NSEG=MOD(IPOINT,IPK)                                              INF00120
      IF(LSEG.EQ.0) GO TO 211                                           INF00130
      INFORM(LSEG+IADD)=INFORM(LSEG+IADD)/IPK*IPK+NSEG                  INF00140
      IF(NSEG.EQ.0) GO TO 215                                           INF00150
  210 INFORM(NSEG+IADD)=MOD(INFORM(NSEG+IADD),IPK)+LSEG*IPK             INF00160
      GO TO 218                                                         INF00170
  211 IF(NSEG.EQ.0) GO TO 212                                           INF00180
      JPOINT=MOD(JPOINT,IPK)+NSEG*IPK                                   INF00190
      GO TO 210                                                         INF00200
  212 JPOINT=C                                                          INF00210
      GO TO 218                                                         INF00220
  215 JPOINT=JPOINT/IPK*IPK+LSEG                                        INF00230
  218 IF(IADD.EQ.1) GO TO 219                                           INF00240
      ITGSEG(ITGT)=JPOINT                                               INF00250
      IADD=1                                                            INF00260
      JPOINT=ISNSEG(ISENS)                                              INF00270
      GO TO 21                                                          INF00280
  219 ISNSEG(ISENS)=JPOINT                                              INF00290
      INFORM(ISEG)=NEXSEG                                               INF00300
      NEXSEG=ISEG                                                       INF00310
      RETURN                                                            INF00320
      END                                                               INF00330


      SUBROUTINE  STATE(KSTATE,PKLAST,PPROD, PK, URN)                   STAT0010
C  PGM=NXX(NEM).  L.D.G.  NEW SUBR.                    12-18-74 STAT0020
C  TO ASSIGN KSTATE BY LEVEL OF PK, AND STORE PKLAST, ETC.           STAT0030
C  KSTATE = 5, ALIVE.  ALL SYSTEMS OPERATIONAL                       STAT0040
C         = 4, RADARS. ALL SEARCH RADARS OUT                         STAT0050
C         = 3, SAMS.                                                 STAT0060
C         = 2, GUNS.                                                 STAT0070
C         = 1, NOT USED                                              STAT0080
C         = 0, SUNK.  REMOVED FROM GAME                              STAT0090
C***                                                                 STAT0100
 1    IF (KSTATE.LE.0)  GO TO 30                                      STAT0110
      PKLAST = PK                                                     STAT0120
      ISTATE = (5.*PK + 1.00001)                                      STAT0130
      IF (ISTATE.GE.5)  ISTATE=6                                      STAT0140
```

```
      KSTATE = 6 - ISTATE                                              STAT0150
30    RETURN                                                           STAT0160
      END                                                              STAT0170


      FUNCTION URN(IDUM)                                               URN 0010
      REAL*8 III,ZZZ,XXX,PPP                                           URN 0020
      COMMON/URN1/ III ,ZZZ,XXX,PPP                                    URN 0030
    1 ZZZ=III*XXX                                                      URN 0040
      J=ZZZ                                                            URN 0050
      XXX=ZZZ-J+J/PPP                                                  URN 0060
      IF(XXX.GT.1.) GO TO 1                                            URN 0070
      URN=XXX                                                          URN 0080
      RETURN                                                           URN 0090
      END                                                              URN 0100


      FUNCTION XNRN(IDUM)                                              XNRN0010
      TOTAL=0.                                                         XNRN0020
      DO 5 I=1,12                                                      XNRN0030
    5 TOTAL=TOTAL+URN(IDUM)                                            XNRN0040
      XNRN=TOTAL-6.                                                    XNRN0050
      RETURN                                                           XNRN0060
      END                                                              XNRN0070


      SUBROUTINE ACMTRM(NWTU,KWU,IWSTAT,TUWXYZ,IWTU,INVWTU,MAXWTU,     ACMT0010
     1     KTU,ITSTAT,LSYST,ITTU,MAXTTU,                               ACMT0020
     2     DATMSL)                                                     ACMT0030
      COMMON/ECONST/ VAR(15),IMISC(35)                                 ACMT0040
      COMMON /ETIME/ TIME,TIMEA,TIMEB,TBEGIN,TIMEND,TIMAX,TSTEP        ACMT0050
      DIMENSION DATMSL(24,1)                                           ACMT0060
      DIMENSION IWSTAT(1),ITSTAT(1),IWTU(1),TUWXY/(8,1)                ACMT0070
      DIMENSION LSYST(1),ITTU(1),INVWTU(1)                             ACMT0080
      DIMENSION JWP(4),WEP(5),JTG(5),TGT(5)                            ACMT0090
      DATA JWP,JTG,WEP,TGT/9*0,      10*0./                            ACMT0100
      NAMELIST/ACMHIT/ TIME,IWPNTU,ITU,IACM,ITGT,KSTATE                ACMT0110
      N6=6                                                             ACMT0120
      NLPR=IMISC(3)                                                    ACMT0130
      ISIDE=IMISC(4)                                                   ACMT0140
      IPR=IMISC(5)                                                     ACMT0150
      INIT=0                                                           ACMT0160
      IF(NWTU.EQ.0) RETURN                                             ACMT0170
      DO 280 ITU=1,NWTU                                                ACMT0180
      IU=ITU+KWU                                                       ACMT0190
      IF(IWSTAT(IU).LE.0) GO TO 280                                    ACMT0200
      TINCPT=TUWXYZ(7,ITU)                                             ACMT0210
      IF(TINCPT.GT.TIME) GO TO 280                                     ACMT0220
C                                                                      ACMT0230
      IWTU1=IWTU(ITU)                                                  ACMT0240
      ITGT=IWTU1/100000                                                ACMT0250
      IACM=MOD(IWTU1,10)                                               ACMT0260
```

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      IF(TINCPT.EQ.-10C.) GO TO 250                                    ACMT0270
      IF(ITGT.EQ.C) GO TO 270                                          ACMT0280
      IF(ITSTAT(ITGT).LE.0) GO TO 250                                  ACMT0290
      IWTU2=IWTU(MAXWTU+ITU)                                           ACMT0300
C                                                                      ACMT0310
      IROW=MOD(IWTU1/1C00,100)                                         ACMT0320
      LOOP=1                                                           ACMT0330
      LJ=IWTU2/1000000                                                 ACMT0340
      IRPD=MOD(LJ,100)                                                 ACMT0350
      LJ=LJ/100                                                        ACMT0360
      IF(IACM.EQ.2) GO TO 100                                          ACMT0370
      IF(IRPD.GE.IMISC(6)) GO TO 10                                    ACMT0380
C----------  CM HAS TOO LITTLE RADAR DETECTION TO ACQUIRE ITS TGT      ACMT0390
      KSTATE=-100                                                      ACMT0400
      GO TO 202                                                        ACMT0410
   10 JWP(4)=LJ/2                                                      ACMT0420
      ICOL=MOD(IWTU1/1C,100)                                           ACMT0430
      DATMSL(23,ICOL)=DATMSL(23,ICOL)+1.                               ACMT0440
      RANGE=MOD(IWTU2/100,10000)                                       ACMT0450
      GO TO 1C1                                                        ACMT0460
  100 IROW=IRPD                                                        ACMT0470
      IF(LJ.GT.LOOP) LOOP=LJ                                           ACMT0480
      JWP(4)=0                                                         ACMT0490
      RANGE=-10.                                                       ACMT0500
  1C1 JWP(1)=IROW                                                      ACMT0510
      JWP(3)=MOD(IWTU2,100)                                            ACMT0520
      WEP(1)=RANGE*.1                                                  ACMT0530
      TL=IABS(INVWTU(ITU))/100000                                      ACMT0540
      TC=(TINCPT-TBEGIN)*1000.                                         ACMT0550
      WEP(2)=(TC-TL)*.001                                              ACMT0560
      JTG(2)=ITGT                                                      ACMT0570
      JTGT=ITGT-KTU                                                    ACMT0580
      IF(JTGT.GT.0) GO TO 102                                          ACMT0590
      JTG(1)=1                                                         ACMT0600
      JTG(4)=MOD(LSYST(ITGT),100)                                      ACMT0610
      GO TO 105                                                        ACMT0620
  1C2 ITTU1=ITTU(JTGT)                                                 ACMT0630
      JTG(1)=MOD(ITTU1,1C)/2                                           ACMT0640
      JTG(2)=MOD(ITTU(MAXTTU+JTGT),100)                                ACMT0650
      IRP=MOD(ITTU1/1000,100)                                          ACMT0660
      JTG(3)=IRP                                                       ACMT0670
      JTG(4)=IRP                                                       ACMT0680
  1C5 CONTINUE                                                         ACMT0690
      DO 200 LJ=1,LOOP                                                 ACMT0700
      J=LJ                                                             ACMT0710
      CALL KILLEX(INIT,ISIDE,JWP,WEP,JTG,TGT,IPR,KSTATE)               ACMT0720
      IF(KSTATE.GT.0) ITSTAT(ITGT)=KSTATE*1000+MOD(ITSTAT(ITGT),1000)  ACMT0730
      IF(KSTATE.NE.0) GO TO 200                                        ACMT0740
      ITSTAT(ITGT)=-1                                                  ACMT0750
      GO TO 201                                                        ACMT0760
  2C0 CONTINUE                                                         ACMT0770
  2C1 IWTU(MAXWTU+ITU)=IWTU2-J*100000000                               ACMT0780
  202 IF(NLPR.EQ.0) GO TO 250                                          ACMT0790
      IWPNTU=IU                                                        ACMT0800
      WRITE(N6,ACMHIT)                                                 ACMT0810
```

```
C                                                                       ACMT0820
C  POSSIBLE PRIMARY UNIT KILLED                                         ACMT0830
C  POSSIBLE INTERCEPT UNIT KILLED                                       ACMT0840
C                                                                       ACMT0850
C                                                                       ACMT0860
C  FINAL DISPOSITION INTERCEPT UNIT                                     ACMT0870
C                                                                       ACMT0880
  250 IF(IACM.EQ.4) GO TO 270                                           ACMT0890
      IF(ITGT.EQ.0) GO TO 270                                           ACMT0900
      IWTU(ITU)=MOD(IWTU1,100000)                                       ACMT0910
      INVWTU(ITU)=((IABS(INVWTU(ITU))/100000)*100000                    ACMT0920
      TUWXYZ(8,ITU)=TIME-TSTEP                                          ACMT0930
      TUWXYZ(7,ITU)=TIMAX                                               ACMT0940
      GO TO 280                                                         ACMT0950
  270 IWSTAT(IU)=-10                                                    ACMT0960
  280 CONTINUE                                                          ACMT0970
      RETURN                                                            ACMT0980
      END                                                               ACMT0990


      SUBROUTINE TLU23(ZT,L,M,N,KN,Y,X,Z,INDY,INDX,INY,INX)             TL230010
C  PGM=NU6(CGSM) VER.1, 05-12-71. L.D.GREGORY 3-53300. FORTRAN IV.EBCD  TL230020
C  THREE DIMENSIONAL STORAGE OF 2-WAY TABLES                            TL230030
C  INX AND INY = -1,0,+1 ACCORDING TO IF LT,EQ,GT TABULATED INTERVAL    TL230040
C      DOUBLE INTERPOLATION FROM 2-DIMENSION BORDERED TABLE IN ZT(L,M)  TL230050
C      BORDER VALUES MUST INCREASE.                                     TL230060
C      IF NOT IN TABULATED INTERVAL, USES NEAREST VALUE.                TL230070
C      KN = TABLE NO. IN 3-DIMENSIONAL ARRAY                            TL230080
      DIMENSION ZT( L, M, N)                                            TL230090
      INX=0                                                             TL230100
      INY=0                                                             TL230110
 1    XX=X                                                              TL230120
      YY=Y                                                              TL230130
      IM=(ZT(1,1,KN) + 0.1)                                             TL230140
      IN=MOD(IM,100)                                                    TL230150
      IM=IM/100                                                         TL230160
      YM=ZT(IM,1,KN)                                                    TL230170
      XN=ZT(1,IN,KN)                                                    TL230180
 3    IF (YY-YM) 24, 24, 20                                             TL230190
 20   INY=1                                                             TL230200
      YY=YM                                                             TL230210
      IY=IM                                                             TL230220
 24   IF (XX-XN) 5, 5, 26                                               TL230230
 26   INX=1                                                             TL230240
      XX=XN                                                             TL230250
      IX=IN                                                             TL230260
 5    YS=ZT(2,1,KN)                                                     TL230270
      XS=ZT(1,2,KN)                                                     TL230280
      IF (YY-YS) 28, 30, 30                                             TL230290
 28   INY=-1                                                            TL230300
      YY=YS                                                             TL230310
      IY=3                                                              TL230320
 30   IF (XX-XS) 32, 34, 34                                             TL230330
 32   INX=-1                                                            TL230340
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      XX=XS                                                              TL230350
      IX=3                                                               TL230360
34    I=2                                                                TL230370
      DO 10 K=3,IM                                                       TL230380
      I=I+1                                                              TL230390
      IF (ZT(I,1,KN)-YY) 10, 12, 12                                      TL230400
10    CONTINUE                                                           TL230410
12    YU=ZT(I,1,KN)                                                      TL230420
      YL=ZT(I-1,1,KN)                                                    TL230430
      IY=I                                                               TL230440
      INDY=I-1                                                           TL230450
      I=2                                                                TL230460
      DO 14 K=3,IN                                                       TL230470
      I=I+1                                                              TL230480
      IF (ZT(1,I,KN)-XX) 14, 16, 16                                      TL230490
14    CONTINUE                                                           TL230500
16    XU=ZT(1,I,KN)                                                      TL230510
      XL=ZT(1,I-1,KN)                                                    TL230520
      IX=I                                                               TL230530
      INDX=I-1                                                           TL230540
      AX = (XU-XX)/(XU-XL)                                               TL230550
      AY = (YU-YY)/(YU-YL)                                               TL230560
      ZLL= ZT(IY-1,IX-1,KN)                                              TL230570
      ZLU= ZT(IY-1,IX  ,KN)                                              TL230580
      ZUL= ZT(IY  ,IX-1,KN)                                              TL230590
      ZUU= ZT(IY  ,IX  ,KN)                                              TL230600
      ZL  = AX*ZLL+(1.0-AX)*ZLU                                          TL230610
      ZU  = AX*ZUL+(1.0-AX)*ZUU                                          TL230620
      Z   = AY*ZL +(1.0-AY)*ZU                                           TL230630
      IF (INY) 40, 42, 41                                                TL230640
40    INDY=INDY-1                                                        TL230650
      GO TO 42                                                           TL230660
41    INDY=INDY+1                                                        TL230670
42    IF (INX) 44, 46, 45                                                TL230680
44    INDX=INDX-1                                                        TL230690
      GO TO 46                                                           TL230700
45    INDX=INDX+1                                                        TL230710
46    RETURN                                                             TL230720
      END                                                                TL230730


      SUBROUTINE WRAD(DAMSUS,POQ,DSKF,GOAB,WWW,RAD)                      WRAD0010
      DIMENSION    PA(13), PS(13), QA(9), QS(9)                          WRAD0020
      DATA PA /2.3700,1.7805,1.1712,0.5890,0.0250,-0.4694,-0.8881,       WRAD0030
     1        -1.2055,-1.5192,-1.8557,-2.1754,-2.4583,-2.7033/            WRAD0040
      DATA PS /1.8669,1.3202,0.7606,0.2875,-0.1499,-0.5516,-0.9206,      WRAD0050
     1        -1.2166,-1.5192,-1.8557,-2.1754,-2.4583,-2.7033/            WRAD0060
      DATA QA /2.4667,1.9092,1.2136,0.5451,0.0827,-0.3137,-0.7226,       WRAD0070
     1        -1.1678,-10.0000/                                           WRAD0080
      DATA QS /1.9844,1.4382,0.8418,0.2973,-0.1712,-0.5806,-1.0529,      WRAD0090
     1        -1.5497,-10.0000/                                           WRAD0100
      IF (DAMSUS .GE. 75.)            GO TO 90                           WRAD0110
     ADVN=DAMSUS                                                         WRAD0120
     IVN=1                                                               WRAD0130
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      C=5.485                                                          WRAD0140
      IBT=2                                                            WRAD0150
      IF(POQ.LT..01)      GO TO 2                                      WRAD0160
      IVN=2                                                            WRAD0170
      D=2.742                                                          WRAD0180
    2 IF(GOAR.LT..01)      IBT=1                                       WRAD0190
      IF(DSKF.LT..01)      GO TO 60                                    WRAD0200
      A=DSKF*.1                                                        WRAD0210
      Q=A-1.                                                           WRAD0220
      AB=(.02/WWW)**(1./3.)*A                                          WRAD0230
      IF(IVN.EQ.2)      GO TO 5                                        WRAD0240
      R=(AB**2-2.*Q+SQRT((2.*Q-AB**2)**2-4.*Q**2))*.5                  WRAD0250
      GO TO 20                                                         WRAD0260
    5 R=(.02/WWW)**(A*1.58/D)+1.-A                                     WRAD0270
      N=IVN+1                                                          WRAD0280
      DO 10 I=1,50                                                     WRAD0290
      F=(R-1.+A)/AB                                                    WRAD0300
      X=F**N-R                                                         WRAD0310
      IF(ABS(X).LE..0001)      GO TO 20                                WRAD0320
      XP=N*F**(IVN)/AB                                                 WRAD0330
      R=R-X/XP                                                         WRAD0340
   10 CONTINUE                                                         WRAD0350
   20 ADVN=CAMSUS+D*ALOG(R)                                            WRAD0360
   60  DO 65   I = 2,13                                               WRAD0370
          X    = (I - 1) * 5                                          WRAD0380
          IF (ADVN .LE. X)                GO TO 70                   WRAD0390
   65  CONTINUE                                                        WRAD0400
       I       =  13                                                  WRAD0410
   70  IF ((I .GT. 9).AND.(IVN .EQ. 2)) GO TO 90                      WRAD0420
       IHI     =  I                                                   WRAD0430
       ILO     =  I - 1                                               WRAD0440
       X       = (ILO - 1) * 5                                        WRAD0450
       DVN     =  ADVN - X                                            WRAD0460
       GO TO (75,78),IVN                                              WRAD0470
   75  GO TO (76,77),IBT                                              WRAD0480
   76  Y       =  PS(ILO)                                             WRAD0490
       Z       =  PS(IHI)                                             WRAD0500
       GO TO 85                                                       WRAD0510
   77  Y       =  PA(ILO)                                             WRAD0520
       Z       =  PA(IHI)                                             WRAD0530
       GO TO 85                                                       WRAD0540
   78  GO TO (79,80),IBT                                              WRAD0550
   79  Y       =  QS(ILO)                                             WRAD0560
       Z       =  QS(IHI)                                             WRAD0570
       GO TO 85                                                       WRAD0580
   80  Y       =  QA(ILO)                                             WRAD0590
       Z       =  QA(IHI)                                             WRAD0600
   85  SS      =  (Y - Z) * 0.2                                       WRAD0610
       Y       =  Y - (SS * DVN)                                      WRAD0620
       RAD     =  EXP(Y)  * WWW**(1./3.)                              WRAD0630
       GO TO 95                                                       WRAD0640
   90  RAD     =  0.0                                                 WRAD0650
   95  RETURN                                                         WRAD0660
       END                                                            WRAD0670
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      SUBROUTINE STATUS(NWTU,INVWTU, KWSEG,IWTU,NEXTU,KWU,ITWSEG,          STAT0010
     1      IWSTAT,MAXWTU,LSYSW,WGC,INTVLW,NWG,NWUG,                       STAT0020
     2      KTSEG,ITSTAT,KTU,ITTU,ITTSEG,                                  STAT0030
     3      INFORM,LBRSYS)                                                 STAT0040
      COMMON/ECONST/ NSHIP,NAIR,NSUB,NVSEA,NVALT,PDTMIN,PDMIN,             STAT0050
     1      AIRCPT,FPNM,HMIN,PI,TWOPI,IENV,ISCAN,IPRAD,IMISC(35)           STAT0060
      EQUIVALENCE (IMISC(20),LRATE)                                        STAT0070
      COMMON /ETIME/ TIME,TIMEA,TIMEB,TBEGIN,TIMEND,TIMAX,TSTEP            STAT0080
      DIMENSION ITSTAT(1),INVWTU(1),  KWSEG(1), IWTU(1),ITWSEG(1),         STAT0090
     1      IWSTAT(1),KTSEG(1),INFORM(1),LBRSYS(1),LSYSW(1)                STAT0100
     2,     ITTU(1),ITTSEG(1),WGC(8,6,1),INTVLW(1),NWUG(1)                 STAT0110
      DIMENSION KSIDE(2),LPGRP(18,2),KEYSYS(8), KUNIT(50,2)                STAT0120
      DATA KEYSYS/20,12,22,23,33,16,24,43/                                 STAT0130
      DATA NKEY,KPG/8,3/                                                   STAT0140
      EQUIVALENCE (IMISC(4),ISIDE)                                         STAT0150
C                                                                          STAT0160
      ITIME=(TIME-TBEGIN)*1000.                                            STAT0170
      NUNIT=KWU+NWTU                                                       STAT0180
      DO 380 IU=1,NUNIT                                                    STAT0190
      ISTAT=IWSTAT(IU)                                                     STAT0200
      ITU=IU-KWU                                                           STAT0210
      IF(ISTAT) 300,380,330                                                STAT0220
  300 ISTAT=IABS(ISTAT)                                                    STAT0230
      IF(ISTAT.EQ.1) GO TO 350                                             STAT0240
      IF(ISTAT.GT.2000000000) GO TO 355                                    STAT0250
      IF(ISTAT.EQ.10) GO TO 340                                            STAT0260
      IF(ISTAT.LT.100000) GO TO 310                                        STAT0270
      ISB=MOD(LSYSW(IU)/100,10000)-2                                       STAT0280
      ICAR=LBRSYS(ISB)/1000000                                             STAT0290
      IF(IWSTAT(ICAR).GT.0) GO TO 302                                      STAT0300
  301 LBRSYS(ISB)=-LBRSYS(ISB)                                             STAT0310
      IWSTAT(IU)= -2100000000                                              STAT0320
      GO TO 355                                                            STAT0330
  302 LINE=ISTAT/100000                                                    STAT0340
      JTIME=MOD(ISTAT,100000)                                              STAT0350
      LS=LBRSYS(LINE)                                                      STAT0360
      IF(LS.EQ.0) GO TO 301                                                STAT0370
      IF(LS/100000.EQ.0) GO TO 355                                         STAT0380
      KSB=MOD(LSYSW(ICAR)/100,10000)-2                                     STAT0390
      IF(LBRSYS(KSB).GT.ITIME*100) GO TO 355                               STAT0400
      LBRSYS(KSB)=(ITIME+LRATE)*100                                        STAT0410
      LBRSYS(LINE)=LS-1000000                                              STAT0420
      IWSTAT(IU)=-(JTIME+ITIME)                                            STAT0430
      GO TO 355                                                            STAT0440
  310 IF(ISTAT.GT.ITIME) GO TO 355                                         STAT0450
      IWSTAT(IU)=1                                                         STAT0460
      GO TO 355                                                            STAT0470
  330 IWSTAT(IU)=MOD(ISTAT,1000)                                           STAT0480
      IF(IU.LE.KWU) GO TO 375                                              STAT0490
      IF(MOD(IWTU(ITU),10) .EQ. 4) GO TO 380                               STAT0500
      ITGT=MOD(IWTU(ITU)/100000,1000)                                      STAT0510
      IF(ITSTAT(ITGT).LE.0) GO TO 345                                      STAT0520
      IF(ITGT.LE.KTU) GO TO 380                                            STAT0530
      JTU=ITGT-KTU                                                         STAT0540
      JTGT=MOD(ITTU(JTU)/100000,1000)                                      STAT0550
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      IF(IWSTAT(JTGT))345,345,380                                          STAT0560
  340 IF(MOD(IWTU(ITU),10) .EQ. 4) GO TO 350                               STAT0570
  345 LU=MOD(IWTU(MAXWTU+ITU),100)                                         STAT0580
      ISB=MOD(LSYSW(LU)/100,10000)                                         STAT0590
      LINE=MOD(LBRSYS(ISB-2)/100,10000)                                    STAT0600
      IF(LINE) 350,348,346                                                 STAT0610
  346 LS=LBRSYS(LINE)                                                      STAT0620
      IF(LS.EQ.0) GO TO 350                                                STAT0630
      LBRSYS(LINE)=LS+1000000                                              STAT0640
      GO TO 350                                                            STAT0650
  348 IWSTAT(LU)=1                                                         STAT0660
      KROW=IWTU(MAXWTU+ITU)                                                STAT0670
      KS=KROW/100000000                                                    STAT0680
      KROW=MOD(KROW/1000000,100)                                           STAT0690
      ISS=ISB-3                                                            STAT0700
      ISA=LSYSW(LU)/100000                                                 STAT0710
      DO 349 I=ISA,ISS                                                     STAT0720
      LS=LBRSYS(I)                                                         STAT0730
      IF(MOD(LS/100,100) .NE. KROW) GO TO 349                              STAT0740
      LBRSYS(I)=MOD(LS,1000000)+KS*100000+(LS/100000000)*100000000         STAT0750
      GO TO 350                                                            STAT0760
  349 CONTINUE                                                             STAT0770
  350 IWSTAT(IU)=0                                                         STAT0780
      IF(IU.LE.KWU) GO TO 355                                              STAT0790
  352 IWTU(ITU)=NEXTU                                                      STAT0800
      NEXTU=ITU                                                            STAT0810
      INVWTU(ITU)=0                                                        STAT0820
      GO TO 360                                                            STAT0830
  355 ISEG=KWSEG(IU)/10000                                                 STAT0840
  356 IF(ISEG.EQ.0) GO TO 360                                              STAT0850
      IF(INFORM(ISEG+7).EQ.0) GO TO 357                                    STAT0860
      INFORM(ISEG+4)=0                                                     STAT0870
      INFORM(ISEG+5)=0                                                     STAT0880
      INFORM(ISEG+6)=0                                                     STAT0890
      GO TO 358                                                            STAT0900
  357 CALL DELSEG(INFORM,KWSEG,ITTSEG,ISEG)                                STAT0910
  358 ISEG=MOD(INFORM(ISEG+1),10000)                                       STAT0920
      GO TO 356                                                            STAT0930
C                                                                          STAT0940
  360 KSEG=ITWSEG(IU)                                                      STAT0950
      ISEG=KSEG/10000                                                      STAT0960
  365 IF(ISEG.EQ.0) GO TO 380                                              STAT0970
      IWORD=INFORM(ISEG+6)                                                 STAT0980
      IF(IWORD.EQ.0) GO TO 370                                             STAT0990
      LINE=IWORD/10000                                                     STAT1000
      LBRSYS(LINE)=LBRSYS(LINE)+100000000                                  STAT1010
  370 CALL DELSEG(INFORM,KTSEG,ITWSEG,ISEG)                                STAT1020
      ISEG=MOD(INFORM(ISEG+2),10000)                                       STAT1030
      GO TO 365                                                            STAT1040
  375 KSTATE=ISTAT/100                                                     STAT1050
C                                                                          STAT1060
      IS=LSYSW(IU)                                                         STAT1070
      ISB=MOD(IS/100,10000)                                                STAT1080
      IF(ISB.EQ.0) GO TO 380                                               STAT1090
      MASK=LBRSYS(ISB)                                                     STAT1100
```

```
      KW=MOD(MASK,10)                                                   STAT1110
      IF(KW.EQ.2) GO TO 380                                             STAT1120
      IWSTAT(IU)=ISTAT                                                  STAT1130
  376 IF(KSTATE.EQ.0 .OR. KSTATE.GE.5) GO TO 380                        STAT1140
C                                                                       STAT1150
 3775 ISA=IS/1000000                                                    STAT1160
      ISB=ISB-3                                                         STAT1170
      DO 379 I=ISA,ISB                                                  STAT1180
      KSYS=MOD(LBRSYS(I),100)                                           STAT1190
      IF(KSYS.EQ.11) GO TO 378                                          STAT1200
      IF(KSYS.EQ.21) GO TO 378                                          STAT1210
      IF(KSTATE.GE.4) GO TO 379                                         STAT1220
      IF(KSYS.EQ.33) GO TO 378                                          STAT1230
      IF(KSTATE.GE.3) GO TO 379                                         STAT1240
      IF(KSYS.EQ.43) GO TO 378                                          STAT1250
      IF(KSYS.EQ.12) GO TO 378                                          STAT1260
      IF(KSYS.EQ.20) GO TO 378                                          STAT1270
      GO TO 379                                                         STAT1280
  378 LBRSYS(I)=0                                                       STAT1290
  379 CONTINUE                                                          STAT1300
  380 CONTINUE                                                          STAT1310
C                                                                       STAT1320
C         RENDEVOUS LOGIC                                               STAT1330
C                                                                       STAT1340
      IF(IMISC(ISIDE+12).EQ.0) GO TO 650                                STAT1350
      IF(INTVLW(19).NE.0) GO TO 600                                     STAT1360
      NPG=0                                                             STAT1370
      JKEY=0                                                            STAT1380
      DO 590 IG=1,NWG                                                   STAT1390
      IKEY=JKEY+1                                                       STAT1400
      K=NWUG(IG)                                                        STAT1410
      IUA=K/100                                                         STAT1420
      IUB=IUA+MOD(K,100)-1                                              STAT1430
      DO 585 K=1,NKEY                                                   STAT1440
      KEY=KEYSYS(K)                                                     STAT1450
      DO 580 IU=IUA,IUB                                                 STAT1460
      IS=LSYSW(IU)/100                                                  STAT1470
      IF(IS.EQ.0) GO TO 580                                             STAT1480
      ISB=MOD(IS,10000)-3                                               STAT1490
      ISA=IS/10000                                                      STAT1500
      DO 540 I=ISA,ISB                                                  STAT1510
      LS=LBRSYS(I)                                                      STAT1520
      KSYS=MOD(LS,100)                                                  STAT1530
      IF(KSYS.NE.KEY) GO TO 540                                         STAT1540
      JKEY=JKEY+1                                                       STAT1550
      KUNIT(JKEY,ISIDE)=IU                                              STAT1560
      GO TO 580                                                         STAT1570
  540 CONTINUE                                                          STAT1580
  580 CONTINUE                                                          STAT1590
      IF(JKEY.GE.IKEY) GO TO 586                                        STAT1600
  585 CONTINUE                                                          STAT1610
      INTVLW(IG+18)=-1                                                  STAT1620
      GO TO 590                                                         STAT1630
  586 IF(KEY.GT.KPG) GO TO 587                                          STAT1640
      NPG=NPG+1                                                         STAT1650
```

```
      LPGRP(NPG,ISIDE)=IG                                              STAT1660
  587 INTVLW(IG+18)=KEY*10000+IKEY*100+JKEY                            STAT1670
  590 CONTINUE                                                         STAT1680
      KSIDE(ISIDE)=NPG                                                 STAT1690
C                                                                      STAT1700
  600 NPG=KSIDE(ISIDE)                                                 STAT1710
      IF(NPG) 650,625,605                                              STAT1720
  605 DO 610 I=1,NPG                                                   STAT1730
      IG=LPGRP(I,ISIDE)                                                STAT1740
      IF(INTVLW(IG+18).NE.1)  GO TO 625                                STAT1750
  610 CONTINUE                                                         STAT1760
      KSIDE(ISIDE)=-1                                                  STAT1770
      NPG=-1                                                           STAT1780
  625 DO 640 IG=1,NWG                                                  STAT1790
      KEY=INTVLW(IG+18)                                                STAT1800
      IF(KEY.EQ.1) GO TO 640                                           STAT1810
      IF(NPG.LT.0) GO TO 637                                           STAT1820
      IF(KEY.LT.0) GO TO 640                                           STAT1830
      LEAVE=0                                                          STAT1840
      ILIVE=0                                                          STAT1850
      JKEY=MOD(KEY,100)                                                STAT1860
      IKEY=MOD(KEY/100,100)                                            STAT1870
      KEY=KEY/10000                                                    STAT1880
      DO 635 K=IKEY,JKEY                                               STAT1890
      IU=KUNIT(K,ISIDE)                                                STAT1900
      IF(IWSTAT(IU)) 634,635,627                                       STAT1910
  627 IS=LSYSW(IU)/100                                                 STAT1920
      ISB=MOD(IS,10000)-3                                              STAT1930
      ISA=IS/10000                                                     STAT1940
      DO 630 I=ISA,ISB                                                 STAT1950
      LS=LBRSYS(I)                                                     STAT1960
      KSYS=MOD(LS,100)                                                 STAT1970
      IF(KSYS.NE.KEY) GO TO 630                                        STAT1980
      IF(KSYS.EQ.33) LS=LBRSYS(I+1)                                    STAT1990
      IF(MOD(LS/1000000,100).GT.0) GO TO 640                           STAT2000
  630 CONTINUE                                                         STAT2010
      LEAVE=LEAVE+1                                                    STAT2020
  634 ILIVE=ILIVE+1                                                    STAT2030
  635 CONTINUE                                                         STAT2040
      IF(ILIVE.EQ.0) GO TO 637                                         STAT2050
      IF(LEAVE.EQ.0) GO TO 640                                         STAT2060
  637 INTVLW(IG+18)=1                                                  STAT2070
      LEG=IABS(INTVLW(IG))                                             STAT2080
      INTVLW(IG)=10+LEG                                                STAT2090
      WCC(1,5,IG)=INTVLW(37)                                           STAT2100
      WCC(1,6,IG)=INTVLW(38)                                           STAT2110
  640 CONTINUE                                                         STAT2120
C                                                                      STAT2130
  650 CONTINUE                                                         STAT2140
      RETURN                                                           STAT2150
      END                                                              STAT2160


      SUBROUTINE USTAT(KWU,IWSTAT,ITWSEG,NWTU,KWUK,                    USTA0010
```

```
     1      NTTU,INVTTU,ITTU,                                          USTA0020
     2      INFORM)                                                    USTA0030
       COMMON /ETIME/ TIME,TIMEA,TIMEB,TBEGIN,TIMEND,TIMAX,TSTEP      USTA0040
       COMMON /WORK/ KSTAT(500)                                       USTA0050
       DIMENSION KWUK(4,1)                                            USTA0060
       DIMENSION IWSTAT(1),ITWSEG(1),INFORM(1),INVTTU(1),ITTU(1)      USTA0070
       NUNIT=KWU+NWTU                                                 USTA0080
       DO 310 I=1,NUNIT                                               USTA0090
  310  KSTAT(I)=0                                                     USTA0100
       IF(NTTU.EQ.0) GO TO 350                                        USTA0110
       DO 340 ITU=1,NTTU                                              USTA0120
       IF(INVTTU(ITU).EQ.0) GO TO 340                                 USTA0130
       ITGT=MOD(ITTU(ITU)/10000,1000)                                 USTA0140
       IF(ITGT.EQ.0) GO TO 340                                        USTA0150
       KSTAT(ITGT)=KSTAT(ITGT)+1                                      USTA0160
  340  CONTINUE                                                       USTA0170
  350  DO 380 IU=1,NUNIT                                              USTA0180
       ISTAT=IWSTAT(IU)                                               USTA0190
       IF(ISTAT.LE.0) GO TO 378                                       USTA0200
       KSTATE=ISTAT/1000                                              USTA0210
       NGAGE=KSTAT(IU)                                                USTA0220
       IF(NGAGE.EQ.0) GO TO 355                                       USTA0230
       ASSIGN 368 TO ISWT                                             USTA0240
       ASSIGN 368 TO KSWT                                             USTA0250
       GO TO 358                                                      USTA0260
  355  ASSIGN 366 TO ISWT                                             USTA0270
       ASSIGN 364 TO KSWT                                             USTA0280
       ISTAT=1                                                        USTA0290
  358  KSEG=ITWSEG(IU)                                                USTA0300
       ISEG=KSEG/10000                                                USTA0310
  360  IF(ISEG.EQ.0) GO TO 370                                        USTA0320
       IF(INFORM(ISEG+7)) 363,363,362                                 USTA0330
  362  NGAGE=NGAGE+1                                                  USTA0340
       GO TO ISWT,(368,366)                                           USTA0350
  363  GO TO KSWT,(368,364)                                           USTA0360
  364  IF(INFORM(ISEG+5)) 368,368,365                                 USTA0370
  365  ISTAT=2                                                        USTA0380
  366  ASSIGN 368 TO ISWT                                             USTA0390
       ASSIGN 368 TO KSWT                                             USTA0400
  368  ISEG=MOD(INFORM(ISEG+2),10000)                                 USTA0410
       GO TO 360                                                      USTA0420
  370  IF(NGAGE.GT.0) ISTAT=NGAGE+2                                   USTA0430
C                                                                     USTA0440
C  POSSIBLE          UNIT DETECTION LOSS                              USTA0450
C                                                                     USTA0460
       IWSTAT(IU)=ISTAT                                               USTA0470
  378  IF(IU.GT.KWU) GO TO 380                                        USTA0480
       IF(ISTAT) 3784,3786,3782                                       USTA0490
 3782  JSTATE=KWUK(4,IU)/100                                          USTA0500
       IF(KSTATE.GT.0) JSTATE=KSTATE                                  USTA0510
       ISTAT=ISTAT+JSTATE*100                                         USTA0520
       GO TO 3786                                                     USTA0530
 3784  ISTAT=-1                                                       USTA0540
 3786  KWUK(4,IU)=ISTAT                                               USTA0550
  380  CONTINUE                                                       USTA0560
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      RETURN                                                            USTA0570
      END                                                               USTA0580


      SUBROUTINE SNAP(NWU,NWTU,LSYSW,LBRSYS,KWSEG,KTSEG,INFORM,         SNAP0010
     1      IWSTAT,IWTU,INVWTU,TUWXYZ,MAXTU,NAMU,NAMS,WXYZ,             SNAP0020
     2      TXYZ,TUTXYZ,NTU)                                            SNAP0030
      DIMENSION LSYSW(1),LBRSYS(1),KWSEG(1),KTSEG(1),INFORM(1),         SNAP0040
     1      IWSTAT(1),IWTU(1),INVWTU(1),TUWXYZ(8,1)                     SNAP0050
     2,     TXYZ(50,7),NAMU(50,2),NAMS(2,1)                             SNAP0060
     3,     WXYZ(50,1),TUTXYZ(8,1)                                      SNAP0070
      COMMON/ECONST/ VAR(15),IMISC(35)                                  SNAP0080
      COMMON/STRCON/  JPK,IPK                                           SNAP0090
      COMMON/DEVICE/ N1,N2,N3,N4,N5,N6,N7,N8,N9,N10,N11,N12             SNAP0100
      COMMON /FTIME/ TIME,TIMEA,TIMEB,TBEGIN,TIMEND,TIMAX,TSTEP         SNAP0110
      EQUIVALENCE (IMISC(4),ISIDE)                                      SNAP0120
      DATA IBLU,IRED/' BLU',' RED'/                                     SNAP0130
      NSIDE=IBLU                                                        SNAP0140
      IF(ISIDE.EQ.2) NSIDE=IRED                                         SNAP0150
      IPR=IMISC(7)                                                      SNAP0160
      CALL PAGE                                                         SNAP0170
      JTIME=(TIME-TBEGIN)*1000.                                         SNAP0180
      IF(IPR.LT.3) GO TO 300                                            SNAP0190
      WRITE(N6,6100) TIME,JTIME,ISIDE                                   SNAP0200
 6100 FORMAT(///' INFORMATION SNAPSHOT, TIME=',F8.4,I7,' SIDE=',I2/ )   SNAP0210
      WRITE(N6,6110)                                                    SNAP0220
 6110 FORMAT('   SYSTEMS DATA'/)                                        SNAP0230
      DO 110 I=1,NWU                                                    SNAP0240
      K=LSYSW(I)                                                        SNAP0250
      IF(K.EQ.0) GO TO 110                                              SNAP0260
      ISA=K/1000000                                                     SNAP0270
      ISB=MOD(K/100,10000)                                              SNAP0280
      WRITE(N6,6111) I,K,(LBRSYS(L),L=ISA,ISB)                          SNAP0290
  110 CONTINUE                                                          SNAP0300
 6111 FORMAT(1X,I4,3X,10I12/(8X,10I12))                                 SNAP0310
  200 IF(IPR.LT.4) GO TO 300                                            SNAP0320
      WRITE(N6,6100) TIME,JTIME,ISIDE                                   SNAP0330
      WRITE(N6,6210)                                                    SNAP0340
 6210 FORMAT('   INFORMATION SEGMENT DATA'/)                            SNAP0350
      DO 210 I=1,NWU                                                    SNAP0360
      K=KWSEG(I)                                                        SNAP0370
      IF(K.EQ.0) GO TO 210                                              SNAP0380
      ISEG=K/IPK                                                        SNAP0390
      JSEG=ISEG+7                                                       SNAP0400
      WRITE(N6,6211) I,K,(INFORM(L),L=ISEG,JSEG)                        SNAP0410
   21 ISEG=MOD(INFORM(ISEG+1),IPK)                                      SNAP0420
      IF(ISEG.EQ.0) GO TO 210                                           SNAP0430
      JSEG=ISEG+7                                                       SNAP0440
      WRITE(N6,6212) (INFORM(L),L=ISEG,JSEG)                            SNAP0450
      GO TO 21                                                          SNAP0460
  210 CONTINUE                                                          SNAP0470
 6211 FORMAT(1X,I4,3X,I12,5X,8I12)                                      SNAP0480
 6212 FORMAT(25X,8I12)                                                  SNAP0490
      IF(NWTU.EQ.0) GO TO 410                                           SNAP0500
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  300 CONTINUE                                                          SNAP0510
      WRITE(N6,6100) TIME,JTIME,ISIDE                                   SNAP0520
      WRITE(N6,6310) NSIDE                                              SNAP0530
 6310 FORMAT('   TEMPORARY UNIT DATA FOR',A4/)                          SNAP0540
      WRITE(N6,6313)                                                    SNAP0550
      DO 310 I=1,NWTU                                                   SNAP0560
      K=INVWTU(I)                                                       SNAP0570
      IF(K.EQ.0) GO TO 310                                              SNAP0580
      ITU=I+NWU                                                         SNAP0590
      IWTU1=IWTU(I)                                                     SNAP0600
      IAC=MOD(IWTU1,10)                                                 SNAP0610
      J=I+MAXTU                                                         SNAP0620
      IWTU2=IWTU(J)                                                     SNAP0630
      LU=MOD(IWTU2,100)                                                 SNAP0640
      IF(IAC.EQ.4) GO TO 304                                            SNAP0650
      NAM1=NAMU(LU,1)                                                   SNAP0660
      NAM2=NAMU(LU,2)                                                   SNAP0670
      GO TO 305                                                         SNAP0680
  304 J=MOD(IWTU1/1000,100)                                             SNAP0690
      NAM1=NAMS(1,J)                                                    SNAP0700
      NAM2=NAMS(2,J)                                                    SNAP0710
  305 ITGT=IWTU1/10000                                                  SNAP0720
      WX=TUWXYZ(1,I)                                                    SNAP0730
      WY=TUWXYZ(2,I)                                                    SNAP0740
      WZ=TUWXYZ(3,I)                                                    SNAP0750
      VX=TUWXYZ(4,I)                                                    SNAP0760
      VY=TUWXYZ(5,I)                                                    SNAP0770
      IF(ITGT.EQ.0) GO TO 306                                           SNAP0780
      IF(ITGT.GT.NTU) GO TO 307                                         SNAP0790
      DX=TXYZ(ITGT,2)-WX                                                SNAP0800
      DY=TXYZ(ITGT,3)-WY                                                SNAP0810
      GO TO 308                                                         SNAP0820
  306 ICAR=MOD(IWTU2/100,100)                                           SNAP0830
      IF(ICAR.EQ.0) ICAR=LU                                             SNAP0840
      DX=WXYZ(ICAR,2)-WX                                                SNAP0850
      DY=WXYZ(ICAR,3)-WY                                                SNAP0860
      GO TO 308                                                         SNAP0870
  307 L=ITGT-NTU                                                        SNAP0880
      DX=TUTXYZ(1,L)-WX                                                 SNAP0890
      DY=TUTXYZ(2,L)-WY                                                 SNAP0900
  308 GR=SQRT(DX*DX+DY*DY)                                              SNAP0910
      V=SQRT(VX*VX+VY*VY)                                               SNAP0920
      WRITE(N6,6311) ITU,NAM1,NAM2,IWSTAT(ITU),LU,ITGT,WX,WY,WZ,V,GR,   SNAP0930
     1               (TUWXYZ(L,I),L=6,8)                                SNAP0940
      IF(IPR.LT.2) GO TO 310                                            SNAP0950
      WRITE(N6,6312) IWTU1,IWTU2,K                                      SNAP0960
  310 CONTINUE                                                          SNAP0970
 6311 FORMAT(1X,I3,'=',2A4,I3,I6,I6,3X,8G12.5)                          SNAP0980
 6312 FORMAT(5X,'IWTU=',I12,',',I12,'    INVWTU=',I12)                 SNAP0990
 6313 FORMAT(1X,'UNIT  NAME  STAT ORIGIN TGTU', 6X,'X,NM',              SNAP1000
     1      8X,'Y,NM',8X,'Z,NM',6X,'VXY,KT',7X,'RANGE',7X,'VZ,KT',     SNAP1010
     2      5X,'TINCEPT',5X,'TVECTOR'/)                                SNAP1020
  410 IF(IPR.LT.4) RETURN                                               SNAP1030
C     CALL PAGE                                                         SNAP1040
      WRITE(N6,6100) TIME,JTIME,ISIDE                                   SNAP1050
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      WRITE(N6,6410)                                                    SNAP1060
 6410 FORMAT('   UNIT STATUS AND TGTSEG CODES'/)                        SNAP1070
      JWU=NWU+NWTU                                                      SNAP1080
      WRITE(N6,6411) (I,IWSTAT(I),KTSEG(I),I=1,JWU)                     SNAP1090
 6411 FORMAT((5(2X,I3,'=',2I10)))                                       SNAP1100
      RETURN                                                            SNAP1110
      END                                                               SNAP1120


      SUBROUTINE  SUMOUT(KPAS)                                          SUM 0010
C  PGM=NXX(NEM)    L.D.G.       12-17-73          FORTRAN IV    EBCD    SUM 0020
C     TO 1.INITIALIZ E  2.SUMMARIZE  3.PRINT                            SUM 0030
C     AT END OF EACH MONTE CARLO PASS                                   SUM 0040
CKILLF                                                                  SUM 0050
      COMMON/CKILLF/LVSHP,MVSHP,NVSHP,VULSHP(5,12,1),NUN,NUNMX,         SUM 0060
     1 KSTATE(100),PKLAST(100),PPROD(100),CUMWT(100),VULOST(100),       SUM 0070
     2 VUKILL(100),VWKILL(100),VULFS,VULFA,VULFM                        SUM 0080
C***                                                                    SUM 0090
      COMMON/DEVICE/ N1,N2,N3,N4,N5,N6,N7,N8,N9,N10,N11,N12             SUM 0100
      COMMON/INOUU/ IPR(16),JPAR(16), PAR(16),LABEL                     SUM 0110
      COMMON/INOUT/NLINE,NPAGE,DUMA(35), NCODE(19)                      SUM 0120
     1,IDUMB(72), NFLAG, NFLAG2                                         SUM 0130
CNAVIG                                                                  SUM 0140
      COMMON/CNAVIG/ NGMX,BE,BF,RE,RF,                                  SUM 0150
     1     NBG,BA,BB,BC,BD,KBGN(18),KBGK(18),BGC( 8,6,18),NBU(18),      SUM 0160
     2     NRG,RA,RB,RC,RD,KRGN(18),KRGK(18),RGC( 8,6,18),NRU(18),      SUM 0170
     3          TTIME,NUMX,                                            SUM 0180
     4     KBU,KBUK(4,50),BREL(4,50),BXYZ(50,7),NAMBU(50,2),BV(50,8),   SUM 0190
     5     KRU,KRUK(4,50),RREL(4,50),RXYZ(50,7),NAMRU(50,2),RV(50,8)    SUM 0200
CPLAT  VS  SYSTEMS  (SUBSYSTEMS)                                        SUM 0210
      COMMON/CPLAT/NBP,NBPMX,NBSS,NBSSMX,NBSPP(15),NBPWS(45),           SUM 0220
     1   NAMBP(2,15),KBPT(15),NABSS(2,45),KBST(45),KBPXS(45,15),       SUM 0230
     2   BPX1(12,15),                                                  SUM 0240
     3              NRP,NRPMX,NRSS,NRSSMX,NRSPP(15),NRPWS(45),         SUM 0250
     4   NAMRP(2,15),KRPT(15),NARSS(2,45),KRST(45),KRPXS(45,15),       SUM 0260
     5   RPX1(12,15)                                                   SUM 0270
CSUMM                                                                   SUM 0280
      COMMON/CSUMM/ SUMWT(100),SUMLST(100),SUMVUK(100),SUMVWK(100)      SUM 0290
CFORMATS                                                                SUM 0300
 2000  FORMAT(6X,'SEATIDE  -  NAVAL ENGAGEMENT MODEL  -',' SUMMARY AFTESUM 0310
     1R RANDOMIZED PASS NO.=', I3// 6X, A4,' SUMMARY BY UNITS'/         SUM 0320
     2 6X,'UNIT  NAME',6X,'TYPE GRUP STAT  PK   EHE-LBS',               SUM 0330
     3 4X,'VALU LOST  VALU KILLED', 5X,'AVG EHE',6X,'AVG LOST',         SUM 0340
     4 2X,'AVG KILLED'/ )                                               SUM 0350
 2002  FORMAT(3X,I6,'.',2X,2A4,1X, 3I5, F6.3, F8.0,5(1X,F12.3) )        SUM 0360
 2004  FORMAT(1HO,5X,'TOTAL 'A4,'VALUE LOST THIS PASS=',G13.6/           SUM 0370
     1            6X,'TOTAL AVERAGE VALUE LOST IN FIRST ',I3,' PASSES=',SUM 0380
     2            G13.6)                                                SUM 0390
CDATA                                                                   SUM 0400
      DATA  BLU,RED/'BLU ','RED '/                                      SUM 0410
      DATA  ROTATE,RAD/ 30., .0174533/                                  SUM 0420
      NSYTMX  = NBSSMX + NRSSMX                                         SUM 0430
      NSYT  = NBSS + NRSS                                               SUM 0440
      IF (KPAS.GT.1)   GO TO 12                                         SUM 0450
```

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C***  INITIALIZE                                                    SUM 0460
      DO 10 I=1,NUNMX                                              SUM 0470
      SUMWT(I) = 0.                                                SUM 0480
      SUMLST(I) = 0.                                               SUM 0490
      SUMVUK(I) = 0.                                               SUM 0500
10    SUMVWK(I) = 0.                                               SUM 0510
   12 CONTINUE                                                     SUM 0520
C***  CUM & TRANSER                                                SUM 0530
20    DO 22 I=1,NUN                                                SUM 0540
      SUMWT(I) = SUMWT(I) + CUMWT(I)                               SUM 0550
      SUMLST(I) = SUMLST(I) + VULOST(I)                            SUM 0560
22    SUMVUK(I) = SUMVUK(I) + VUKILL(I)                            SUM 0570
      DO 24 I=1,NSYT                                               SUM 0580
24    SUMVWK(I) = SUMVWK(I) + VWKILL(I)                            SUM 0590
C***  PRINT SUMMARIES                                              SUM 0600
      DO 50 KSIDE=1,2                                              SUM 0610
      GO TO (32,34), KSIDE                                         SUM 0620
32    NU  = KBU                                                    SUM 0630
      KA  = 1                                                      SUM 0640
      KB  = KBU                                                    SUM 0650
      BOR = BLU                                                    SUM 0660
      ASSIGN 42 TO KS1                                             SUM 0670
      GO TO 40                                                     SUM 0680
34    NU = KRU                                                     SUM 0690
      KA  = KBU + 1                                                SUM 0700
      KB  = KBU + KRU                                              SUM 0710
      BOR = RED                                                    SUM 0720
      ASSIGN 44 TO KS1                                             SUM 0730
40    CALL PAGE                                                    SUM 0740
      WRITE(N6,2000)  KPAS, BOR                                    SUM 0750
      ATOTLS = 0.                                                  SUM 0760
      TOTLST = 0.                                                  SUM 0770
      JU  = 0                                                      SUM 0780
      DO 48 KU=KA,KB                                               SUM 0790
      JU = JU + 1                                                  SUM 0800
      GO TO KS1, (42,44)                                           SUM 0810
42    NAMA = NAMBU(JU,1)                                           SUM 0820
      NAMB = NAMBU(JU,2)                                           SUM 0830
      KTY  = KBUK(2,JU) / 10000                                    SUM 0840
      KGR  = KBUK(3,JU)                                            SUM 0850
      KST  = KBUK(4,JU)                                            SUM 0860
      GO TO 46                                                     SUM 0870
44    NAMA = NAMRU(JU,1)                                           SUM 0880
      NAMB = NAMRU(JU,2)                                           SUM 0890
      KTY  = KRUK(2,JU) / 10000                                    SUM 0900
      KGR  = KRUK(3,JU)                                            SUM 0910
      KST  = KRUK(4,JU)                                            SUM 0920
46    PK  = PKLAST(KU)                                             SUM 0930
      AEHE= SUMWT(KU) / KPAS                                       SUM 0940
      AVL = SUMLST(KU) / KPAS                                      SUM 0950
      AVUK= SUMVUK(KU) / KPAS                                      SUM 0960
      ATOTLS= ATOTLS + AVL                                         SUM 0970
      EHE = CUMWT(KU)                                              SUM 0980
      VL  = VULOST(KU)                                             SUM 0990
      VUK = VUKILL(KU)                                             SUM 1000
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      TOTLST= TOTLST + VL                                                SUM 1010
      WRITE(N6,2002) JU,NAMA,NAMB,KTY,KGR,KST,PK,EHE,VL,VUK,             SUM 1020
     1               AEHE,AVL,AVUK                                       SUM 1030
 48   CONTINUE                                                           SUM 1040
      WRITE(N6,2004)  BOR,TOTLST,KPAS,ATOTLS                             SUM 1050
 50   CONTINUE                                                           SUM 1060
C*** ROTATE                                                             SUM 1070
   60 CEP=5.                                                            SUM 1080
      KTRAN=MOD(KPAS,3)+1                                               SUM 1090
      KA=KPAS/3+1                                                       SUM 1100
      A=ROTATE                                                          SUM 1110
      AR=XNRN(IDUM)*A/10.                                               SUM 1120
      XC=RA                                                             SUM 1130
      YC=RB                                                             SUM 1140
      XR=XNRN(IDUM)*CEP*.849                                            SUM 1150
      YR=XNRN(IDUM)*CEP*.849                                            SUM 1160
      IF(KA.GE.2) GO TO 62                                              SUM 1170
      AR=0.                                                             SUM 1180
      XR=0.                                                             SUM 1190
      YR=0.                                                             SUM 1200
   62 A=A+AR                                                            SUM 1210
      IF(KTRAN.EQ.3) A=-2.*A                                            SUM 1220
      JA=A+.01                                                          SUM 1230
      A=JA                                                              SUM 1240
      SINA=SIN(.0174533*A)                                              SUM 1250
      COSA=COS(.0174533*A)                                              SUM 1260
      DO 66 K=1,NRG                                                     SUM 1270
      DO 66 I=2,8                                                       SUM 1280
      X=RGC(I,2,K)                                                      SUM 1290
      Y=RGC(I,3,K)                                                      SUM 1300
      JHV=1000.*(RGC(I,5,K)+.0004)                                      SUM 1310
      JH=JHV/1000                                                       SUM 1320
      JV=MOD(JHV,1000)                                                  SUM 1330
      XA=X-XC                                                           SUM 1340
      YA=Y-YC                                                           SUM 1350
      RGC(I,2,K)=XA*COSA+YA*SINA+XC+XR                                  SUM 1360
      RGC(I,3,K)=-XA*SINA+YA*COSA+YC+YR                                 SUM 1370
      JH=JH+JA                                                          SUM 1380
      IF(JH.LT.0) JH=JH+360                                             SUM 1390
      IF(JH.GE.360) JH=JH-360                                           SUM 1400
      RGC(I,5,K)=FLOAT(JH*1000+JV)/1000.                                SUM 1410
   66 CONTINUE                                                          SUM 1420
      RETURN                                                            SUM 1430
      END                                                               SUM 1440


      BLOCK  DATA                                                       BLKA0010
     REAL*8 III,ZZZ,XXX,PPP                                             BLKA0020
      COMMON/URN1/ III,ZZZ,XXX,PPP                                      BLKA0030
      COMMON/CGUID/ SDXP(2),SDYP(2),SKXP(2),SKYP(2),SEXP(2),SEYP(2),    BLKA0040
     1SKX(2),SKY(2),SDRXT(2,3),SDRYT(2,3),SDRXDT(2,3),SDRYDT(2,3),THETA BLKA0050
      COMMON/BATTRY/ NBATT,MISRAD(2,10)                                 BLKA0060
      COMMON /SONCRV/  IPA,IBB,IDA,IDB,IBOTTM,IACTIV,SRANGE(17),        BLKA0070
     1      SMERIT(17)                                                  BLKA0080
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      COMMON/ECONST/ NSHIP,NAIR,NSUB,NVSEA,NVALT,PDTMIN,PDMIN,          BLKA0090
     1      AIRCPT,FPNM,HMIN,PI,TWOPI,IENV,ISCAN,IPRAD,IMISC(35)        BLKA0100
      COMMON/DEVICE/ND(12)                                              BLKA0110
      COMMON/INOUU /IPR(16),JPAR(16),PAR(16),LABEL                      BLKA0120
      DATA III,ZZZ,XXX,PPP/4194305.D0,0.D0,.3243D0,2147483647D0/        BLKA0130
      DATA SDXP,SDYP,SKXP,SKYP,SEXP,SEYP,SKX,SKY,SDRXT,SDRYT,SDRXDT,    BLKA0140
     1SDRYDT/C.6E-4,0.3E-4,0.6F-4,0.3F-4,0.02,0.01,0.02,0.01,0.01,0.005,BLKA0150
     20.01,0.C05,0.03,C.C15,C.C3,0.015,0.,600.,600.,6000.,600.,6000.,0.,BLKA0160
     3600.,60C.,6CCC.,600.,6000.,0.,0.,0.25,1.,1.,3.,0.,0.,0.25,1.,1.,  BLKA0170
     43./,THETA/3C./                                                    BLKA0180
      DATA NBATT/7/                                                     BLKA0190
      DATA MISRAD/6711,7713, 6712,7711, 6713,7712, 6714,7714,           BLKA0200
     1      8711,9711, 8713,9713, 8712,9712     /                      BLKA0210
      DATA IBA,IBB,IDA,IDB,IBOTTM,IACTIV/1,13,14,17,1,0/                BLKA0220
      DATA SRANGE/2.,5.,7.7,20.,30.,40.,50.,60.,80.,100.,120.,          BLKA0230
     1      15C.,18C.,2.,5.,7.7,18./                                   BLKA0240
      DATA SMERIT/62.,80.,92.,94.,95.,97.,101.,107.,108.,110.,          BLKA0250
     1      115.,116.,120.,62.,80.,92.,120./                           BLKA0260
      DATA NSHIP,NAIR,NSUB,NVSEA,NVALT,IPRAD,ISCAN,IENV                 BLKA0270
     1      /1,2,3,6,9,C,3,4/                                           BLKA0280
      DATA PDTMIN,PDMIN,AIRCPT,FPNM,HMIN,PI,TWOPI                       BLKA0290
     1      /.5,.5,1.,6C8C.,.CC33,3.141593,6.283186/                    BLKA0300
      DATA IMISC/35*0/                                                  BLKA0310
       DATA  ND/1,2,3,4,5,6,7,8,9,10,11,12/                             BLKA0320
       DATA  IPR/1,0,1,1,12*1/                                          BLKA0330
       DATA JPAR/16*1/                                                  BLKA0340
       DATA  PAR/16*1.0/                                                BLKA0350
       DATA LABEL/ 1/                                                   BLKA0360
      END                                                               BLKA0370


      BLOCK DATA                                                        BLKB0010
C   PGM=NEM.  EVAN COTTEN. VER.3  7-26-73IBM 370   FORTRAN IV.    EBCD  BLKB0020
C     BLOCK  B                                                          BLKB0030
      COMMON/CNAVIG/ NGMX,BE,BF,RE,RF,                                  BLKB0040
     1      NBG,BA,BB,BC,BD,KBGN(18),KBGK(18),BGC( 8,6,18),NBU(18),     BLKB0050
     2      NRG,RA,RB,RC,RD,KRGN(18),KRGK(18),RGC( 8,6,18),NRU(18),     BLKB0060
     3          TTIME,NUMX,                                             BLKB0070
     4      KBU,KBUK(4,50),BREL(4,50),BXYZ(50,7),NAMBU(50,2),BV(50,8),  BLKB0080
     5      KRU,KRUK(4,50),RREL(4,50),RXYZ(50,7),NAMRU(50,2),RV(50,8)   BLKB0090
CRADAR                                                                  BLKB0100
      COMMON/CRADAR/NBSR,NBTR,NBRMX,NBJ,NBJMX,                          BLKB0110
     1   BRAD(36,17),BENV(6,2),BETC(4,2),BTAR(6,3),BJAM(6,3,2),         BLKB0120
     2             NRSR,NRTR,NRRMX,NRJ,NRJMX,                           BLKB0130
     3   RRAD(36,15),RENV(6,2),RETC(4,2),RTAR(6,3),RJAM(6,3,2)          BLKB0140
CSASYS                          15     4     4     2     4     20       BLKB0150
      COMMON/CSASYS/ NSASYS,NSASMX,NBGUN,NBSAM,NRGUN,NRSAM, LASA,       BLKB0160
     1    NAMSA(2,15),KSATYP(15),SASYS(20,15)                         BLKB0170
C                                                                       BLKB0180
      DATA  NGMX,NUMX/18,50/, NBG,NRG,KBL,KRU/4*0/                      BLKB0190
      DATA  BA,BB,BC,BD,RA,RB,RC,RD  / 8*.0/                            BLKB0200
      DATA  KBGN,KBGK,NBU,KRGN,KRGK,NRU/108*0/                          BLKB0210
      DATA  KBUK,KRUK/400*0/                                            BLKB0220
      DATA  BGC,RGC/1728*.0/, BREL,RREL/400*.0/, BXYZ,RXYZ/700*.0/      BLKB0230
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      DATA  PV,RV/800*.0/                                                    BLKB0240
C                                                                            BLKB0250
      DATA  NBRMX,NRRMX,NBJMX,NRJMX/ 17,15, 2, 2/                            BLKB0260
      DATA  BENV/4.,0.,0.,1.,1.E-6,0.,4.,0.,0.,1.,1.E-8,0./                  BLKB0270
      DATA  RENV/4.,0.,0.,1.,1.E-6,0.,4.,0.,0.,1.,1.E-8,0./                  BLKB0280
      DATA  BETC/ 50.,     100.,0.,1.,150.,     150.,0.,1./                  BLKB0290
      DATA  RETC/ 12160.,     100.,0.,1.,24320.,     150.,0.,1./             BLKB0300
      DATA  BTAR/ 500.,1000., 20., 20., 2*0.,                                BLKB0310
     1            675.,5000., 20., 20., 2*0.,                               BLKB0320
     2           1000.,10000.,20., 20., 2*0./                               BLKB0330
      DATA  RTAR/ 13.7,   1.,  608., 533.2, 2*0.,                            BLKB0340
     1            30.,   10.,24320., 533.2, 2*0.,                           BLKB0350
     2           500., 1000.,   20.,   20., 2*0./                           BLKB0360
      DATA  RJAM/ 36*0./                                                     BLKB0370
      DATA  RJAM/2000., 0.,25.E+6,1.  ,200.,225.,                            BLKB0380
     1  1000., 0.,70.E+6,1.  ,2965.,3035.,                                   BLKB0390
     2  1000., 0.,100.E+6,1.  ,3450.,3550.,                                  BLKB0400
     3   500., 0., 75.E+6,1.  ,5390.,5465.,                                  BLKB0410
     4   500., 0., 75.E+6,1.  ,5465.,5540.,                                  BLKB0420
     5   500., 0., 75.E+6,1.  ,5540.,5615. /                                 BLKB0430
      DATA  SASYS/ 300*0./                                                   BLKB0440
      END                                                                    BLKB0450


C     SUBROUTINE RADAR(RAD,ENV,ETC,TAR,AMJ,TRAD,RANGE,PDA,ANG,DYN,ITST,    RADA0010
C    1IRNG,IPRNT)                                                           RADA0020
C  MODS.CALL SIGDS=3030.                                  VER.2   11-25-74  RADA0030
C*************************************************************************  RADA0040
C                                                                       *    RADA0050
C                          ADRAD MOD 2 COMPUTER PROGRAM                 *    RADA0060
C                                                                       *    RADA0070
C*************************************************************************  RADA0080
C                                                                            RADA0090
C                                                                            RADA0100
C     DEFENSIVE RADAR PERFORMANCE AGAINST AIRBORNE TARGETS                   RADA0110
C     CASE 1 AIRBORNE TARGET WITHOUT ECM                                     RADA0120
C     CASE 2 AIRBORNE TARGET WITH COLOCATED NOISE JAMMER                     RADA0130
C     CASE 3 AIRBORNE TARGET WITH STANDOFF JAMMER                            RADA0140
C*************************************************************************RADA0150
C                                                                            RADA0160
C     INPUT PARAMETERS REQUIRED IN THE NAMELIST ARE AS FOLLOWS               RADA0170
C                                                                            RADA0180
C                          RADAR PARAMETERS                                  RADA0190
C                                                                            RADA0200
C     XLAMDA = RECEIVER CENTER FREQUENCY WAVELENGTH, CENTIMETERS             RADA0210
C     PWR = GENERATED RADAR POWER, WATTS                                     RADA0220
C     GTDB = RADAR TRANSMIT ANTENNA GAIN, DB                                 RADA0230
C     GRDB = RECEIVER ANTENNA GAIN (MAIN LOBE), DB                           RADA0240
C     SNRDDB=                                                                RADA0250
C     XNFDB = RADAR RECEIVER NOISE FIGURE, DB                                RADA0260
C     BR = RADAR RECEIVER BANDWIDTH, HERTZ                                   RADA0270
C     XLTDB = SYSTEM LOSSES AHEAD OF RF AMPLIFIER, DB                        RADA0280
C     XLRDB = RECEIVER LOSSES SUCH AS EFFICIENCY OR ANTENNA PATTERN, DB      RADA0290
C     XLSDB = RADAR SYSTEM LOSSES, DB                                        RADA0300
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C      MOD= TYPE OF MODULATION USED                                          RADA0310
C           MOD = 1  UNCOMPRESSED PULSE                                      RADA0320
C           MOD = 2  PULSE COMPRESSION                                       RADA0330
C           MOD = 3  PULSE BURST                                             RADA0340
C           MOD = 4  CW                                                      RADA0350
C           MOD = 5  FM-CW                                                   RADA0360
C           MOD = 6  MTI                                                     RADA0370
C           MOD = 7  PULSE DOPPLER                                           RADA0380
C      TAU = RADAR PULSE WIDTH, MICRO SECONDS                                RADA0390
C      PRF = PULSE REPETITION RATE, PULSES PER SECOND                        RADA0400
C      FAN = THE NUMBER OF PULSES WHICH CHANGE IN FREQUENCY BY               RADA0410
C            THE RECIPROCAL OF THE PULSE WIDTH                               RADA0420
C      PCRAT = PULSE COMPRESSION RATIO, NUMERIC                              RADA0430
C      ITYPE= TYPE OF NORMALIZED ANTENNA GAIN FUNCTION.                      RADA0440
C           = 1 IS SYMMETRICAL SINX/X PATTERN                                RADA0450
C           = 2 IS A CSC SQUARED FUNCTION                                    RADA0460
C      PHIZER = MINMUM ANGLE OFF ANTENNA BORESIGHT AXIS AT                   RADA0470
C               WHICH THE PATTERN FUNCTION BECOMES A CSC SQUARED             RADA0480
C               FUNCTION                                                     RADA0490
C      RATEI = ANTENNA AZIMUTH SCAN RATE, DEGREES PER SECOND                 RADA0500
C      BWA = ANTENNA AZIMUTH BEAMWIDTH, DEGREES                              RADA0510
C      BWE = BEAM WIDTH OF ANTENNA IN ELEVATION, DEGREES                     RADA0520
C      TILT = MAIN BEAM ELEVATION ANGLE (DEG)                                RADA0530
C      TA = ANTENNA TEMPERATURE, DEGREES K                                   RADA0540
C      EINSTR = INSTRUMENT ERROR IN ANGLE IN MRAD                            RADA0550
C      TI = INTEGRATION OR SMOOTHING TIME DURING TRACK                       RADA0560
C      AZ = AZIMUTH COMPONENT OF THE SEOV , DEGREES                          RADA0570
C      EL = ELEVATION COMPONENT OF SEOV (DEGREES)                            RADA0580
C      TF = FRAME TIME,SECONDS (TIME TO SEARCH THE SEOV)                     RADA0590
C                                                                            RADA0600
C                     ENVIRONMENT AND DETECTION CRITERIA                     RADA0610
C                                                                            RADA0620
C      ISS = SEA STATE NUMBER                                                RADA0630
C      RATE = RAINFALL RATE IN MM/HR                                         RADA0640
C      ALPHA = RAINFALL ATTENUATION IN DB/METER AT SPECIFIED RAINFALL        RADA0650
C              RATE AND WAVELENGTH (XLAMDA)                                  RADA0660
C      NSW = SWERLING FACTOR                                                 RADA0670
C      PFA = PROBABILITY OF FALSE ALARM                                      RADA0680
C                                                                            RADA0690
C                     SEQUENCE DEPENDENT                                     RADA0700
C                                                                            RADA0710
C      HI = RADAR HEIGHT (FT)                                                RADA0720
C      SOR = JAMMER STAND-OFF RANGE IN NAUTICAL MILES                        RADA0730
C      JAM = 0 FOR NO JAMMING                                                RADA0740
C          = 1 FOR JAMMER COLOCATED WITH TARGET                              RADA0750
C          = 2 FOR STAND-OFF JAMMER                                          RADA0760
C      NMODE = 1 FOR RADAR OPERATING IN SURVEILLANCE(SEARCH) MODE            RADA0770
C      NMODE = 2 FOR RADAR OPERATING IN TRACK MODE (TILTR=ELVA)              RADA0780
C              AND USING SIMULTANEOUS LOBING(MONOPULSE)                      RADA0790
C      NMODE = 3 FOR RADAR OPERATING IN TRACK MODE(TILTR = ELVA)             RADA0800
C              AND USING CONICAL SCAN                                        RADA0810
C      NMODE = 4 FOR RADAR OPERATING IN LIMITED VOLUME SEARCH                RADA0820
C                                                                            RADA0830
C                     TARGET CHARACTERISTICS                                 RADA0840
C                                                                            RADA0850
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C      ALTGT = PROJECTED LENGTH OF TARGET ORTHOGONAL TO THE RADAR          RADA0860
C              LINE-OF-SIGHT, FEET                                         RADA0870
C      SIGMAT = RADAR CROSS SECTION OF THE TARGET, SQUARE METERS           RADA0880
C      H2 = TARGET HEIGHT (FT)                                             RADA0890
C      VRELK = RELATIVE CLOSING VELOCITY, KNOTS                            RADA0900
C      DR = RANGE IN NMI AT WHICH THE TARGET BEGINS ITS DESCENT            RADA0910
C      NOTE  IF TARGET MAINTAINS CONSTANT ALTITUDE, SET DR = 0.0           RADA0920
C      AK20 = DESCENT CONSTANT  MAINTAINS CONSTANT H/R DURING              RADA0930
C              FLIGHT                                                      RADA0940
C                                                                          RADA0950
C                          JAMMER CHARACTERISTICS                          RADA0960
C                                                                          RADA0970
C      PJ = GENERATED JAMMER POWER, WATTS                                  RADA0980
C      GJDB = TRANSMIT ANTENNA GAIN OF JAMMERSIGNAL, DB                    RADA0990
C      BJ = JAMMER SIGNAL BANDWIDTH, ALWAYS EQUAL TO OR GREATER THAN BR    RADA1000
C      XLJDB = LOSSES IN THE JAMMER TRANSMITTER CHAIN SUCH AS ANTENNA      RADA1010
C              AND WAVEGUIDE LOSSES, DB                                    RADA1020
C                                                                          RADA1030
C                                                                          RADA1040
      SUBROUTINE RADAR(RAD,ENV,ETC,TAR,AMJ,TRAD,RANGE,PDA,ANG,DYN,ITST,  RADA1050
     1IPNG,IPRNT)                                                         RADA1060
      COMMON/INOUT/NLINE,NPAGE,PCODE(20),IDUM(108)                        RADA1070
      DIMENSION DAT(49),RAD(31),ENV(6),ETC(4),TAR(6),AMJ(4),TRAD(10),     RADA1080
     1RANGE(10),PDA(11),ANG(10),DYN(10)                                   RADA1090
      COMMON /BLK0/BETA,ALFA,XLAMDA,PWR,GTDB,GRDB,SNRODB,XNEDB,BR,XLTDB,  RADA1100
     1XLRDB,XLSDB,AMOD,TAU,PRF,FAN,PCRAT,PHIMAX,TYPE,PHIZER,RATE1,BWA,   RADA1110
     2PWF,TILT,TA,EINSTR,TI,AZ,EL,TF,XK,AISS,RATE,ALPHA,ANSW,PFA,HR,H1,  RADA1120
     3SOR,AJAM,ANMODE,ALTGT,SIGMAT,H2,VRELK,DR,AK20,PJ,GJDB,BJ,XLJDB,    RADA1130
     4ISS,ITYPE,NMODE,VREL                                                RADA1140
      COMMON /BLK3/ EE, RC, DX, IHACK ,ELVA, CC, REC(10), TC              RADA1150
      EQUIVALENCE (DAT(1),XLAMDA)                                         RADA1160
 1001 FORMAT(6X,19HI N P U T   D A T A,25X31HR A D A R   P A R A M E T ERADA1170
     1 R S/6X7HXLAMDA=1PE10.3,11H,   PR    =1PE10.3,10H,   GTDR =,1PE10.RADA1180
     23,10H,   GRDB =,1PE10.3,11X,          1PE10.3,10H,   XNE  =,1PE10.RADA1190
     33,1H,/6X7HBR    =1PE10.3,11H,   XL    =1PE10.3,10H,   XLR  =1PE10.RADA1200
     43,10H,   XLSDB=,1PE10.3,11H,   AMOD  =1PE10.3,10H,   TAU  =,1PE10.RADA1210
     53,1H,/6X7HER    =1PE10.3,11H,   FAN   =1PE10.3,10H,   PCRAT=1PE10.RADA1220
     63,10H,   TYPE =,1PE10.3,11H,   PHIZER=1PE10.3,10H,   RATE1=,1PE10.RADA1230
     73,1H,/6X7HBWE   =1PE10.3,11H,   BWD   =1PE10.3,10H,   TILT =1PE10.RADA1240
     83,10H,   TA   =,1PE10.3,11H,   EINSTR=1PE10.3,10H,   TI   =,1PE10.RADA1250
     93,1H,/6X7HAZ    =1PE10.3,11H,   EL    =1PE10.3,10H,   TF   =1PE10.RADA1260
     13,1H,/3CX67HE N V I R O N M E N T   A N D   D E T E C T I O N   C RADA1270
     2R I T E R I A/6X7HAISS  =1PE10.3,11H,   RATE  =1PE10.3,10H,   ALPHRADA1280
     3A=,1PE10.3,10H,   ANSW =,1PE10.3,11H,   PFA   =1PE10.3,1H,/48X35HSRADA1290
     4 E Q U E N C E   D E P E N D E N T/6X7HH1    =1PE10.3,11H,   SJDR RADA1300
     5 =1PE10.3,10H,   SOR  =,1PE10.3,10H,   AJAM =,1PE10.3,11H,   ANMODRADA1310
     6E=1PE10.3,1H,/44X43HT A R G E T   C H A R A C T E R I S T I C S/6XRADA1320
     77HALNGTH=1PE10.3,11H,   SIGMAT=1PE10.3,10H,   H2   =,1PE10.3,10H, RADA1330
     8  VREL =,1PE10.3,11H,   DR    =1PE10.3,10H,   AK20 =,1PE10.3,1H,/4RADA1340
     94X43HJ A M M E R   C H A R A C T E R I S T I C S)                   RADA1350
 1002 FORMAT(6X7HPJ    =1PE10.3,11H,   GJDB  =1PE10.3,10H,   BJ   =,1PE1RADA1360
     10.3,10H,   XLJ   =,1PE10.3,1H,/)                                   RADA1370
 1003 FORMAT(12X4HTIME11X5HRANGE8X9HPROB.DET.7X7HHANDOFF8X7HDYNAMIC)      RADA1380
 1004 FORMAT(12X4HTIME11X5HRANGE8X9HPROB.DET.6X9HMAX TRACK7X7HDYNAMIC)    RADA1390
 1005 FORMAT(12X4HSEC.12X3HNMI5X9HPER  LOOK5X11HERROR(MRAD)5X9HRANGE(DR)RADA1400
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     1/)                                                                    RADA1410
 1006 FORMAT(4X1P5E15.3)                                                    RADA1420
      XNSCAN=0.                                                             RADA1430
      RCMIN=.5*(1.+ABS(ETC(1)-TAR(3))/6080.)                                RADA1440
      RCSUM=0.                                                              RADA1450
      RCA(IRNG+1)=0.                                                        RADA1460
      ITST=0                                                                RADA1470
C---- QUICK OUT FOR RADAR HORIZON LIMITATION ----------                     RADA1480
      IF(1.2289*(SQRT(ETC(1))+SQRT(TAR(3))) .GE. RANGE(1)) GO TO 18         RADA1490
      ITST=-1                                                               RADA1500
      RETURN                                                                RADA1510
   18 DO 180 I = 1, IRNG                                                    RADA1520
      RCA(I) = 0.                                                           RADA1530
  180 REC(I) = RANGE(I)                                                     RADA1540
      TRAD(1)=TRAD(1)*3600.                                                 RADA1550
      DO 1 I = 1, 29                                                        RADA1560
      K = I + 2                                                             RADA1570
    1 DAT(I) = RAD(K)                                                       RADA1580
      DO 4 I = 1, 6                                                         RADA1590
      DAT(I+39) = TAR(I)                                                    RADA1600
      DAT(I+29) = ENV(I)                                                    RADA1610
      GO TO (2,2,2,2,4,4), I                                                RADA1620
    2 DAT(I+45) = AMJ(I)                                                    RADA1630
      DAT(I+35) = ETC(I)                                                    RADA1640
    4 CONTINUE                                                              RADA1650
      MOD = AMOD + .1                                                       RADA1660
      ISS = AISS + .1                                                       RADA1670
      NSW = ANSW + .1                                                       RADA1680
      JAM = AJAM + .1                                                       RADA1690
      ITYPE = TYPE + .1                                                     RADA1700
      NMODE = ANMODE + .1                                                   RADA1710
      IF (IPRNT - 1) 300, 300, 200                                          RADA1720
  200 IF (NLINE - 38) 220, 220, 210                                         RADA1730
  210 CALL PAGE                                                             RADA1740
  220 IF (IPRNT - 1) 300, 240, 230                                          RADA1750
  230 WRITE(6,1001) XLAMDA,PWR,GTDB,GRDB,SNRDDB,XNEDB,BR,XLTDB,XLRDB,       RADA1760
     1XLSDB,AMOD,TAU,PRF,FAN,PCRAT,TYPE,PHIZER,RATE1,BWA,BWE,TILT,TA,       RADA1770
     2EINSTR,TI,AZ,EL,TF,AISS,RATE,ALPHA,ANSW,PEA,HI,SJDB,SCR,AJAM,         RADA1780
     3ANMODE,ALTGT,SIGMAT,H2,VRELK,DR,AK20                                  RADA1790
      WRITE(6,1002)  BJ,GJDB,BJ,XLJDB                                       RADA1800
      NLINE = NLINE + 15                                                    RADA1810
  240 GO TO (250, 260, 260, 250), NMODE                                     RADA1820
  250 WRITE(6,1003)                                                         RADA1830
      GO TO 270                                                             RADA1840
  260 WRITE(6,1004)                                                         RADA1850
  270 WRITE(6,1005)                                                         RADA1860
      NLINE = NLINE + 3                                                     RADA1870
  300 CC = 1.                                                               RADA1880
      DEGRAD = 57.29578                                                     RADA1890
      C = 9.84368                                                           RADA1900
      AK = 1.38E-23                                                         RADA1910
      RE2= 1.69893E7                                                        RADA1920
      XL   = 10. ** (.1*XLTDB)                                              RADA1930
      XNE = 10. ** (.1*XNEDB)                                               RADA1940
      ALNGTH = ALTGT * .3048C1                                              RADA1950
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      VPEL = VPELK * 1.6878                                                  RADA1960
      IF(VPEL.LT. .1) VPEL=.1                                                RADA1970
      H2TEMP=H2                                                              RADA1980
      PRTEMP = PWR                                                           RADA1990
      TAUTMP = TAU                                                           RADA2000
      PNODET = 1.                                                            RADA2010
      GO TO (6, 5, 5, 7), NMODE                                              RADA2020
    5 TO1 = TI                                                               RADA2030
      GO TO 7                                                                RADA2040
    6 TO1 = BWA / RATE1                                                      RADA2050
      TC = 36C. / RATE1                                                      RADA2060
      GO TO 8                                                                RADA2070
    7 TC = 6.                                                                RADA2080
    8 PHORAD = PHIZER/57.2957795DC                                           RADA2090
C     COMPUTE SYSTEM NOISE TEMPERATURE                                       RADA2100
      TS = TA/XL +((XL-1.)/XL)*290. + (XNF-1.)*290.                          RADA2110
C     COMPUTE SIGNAL PROCESSING GAIN, SPGDB                                  RADA2120
C     SPGDB SIGNAL PROCESSING GAIN BASED ON SNRODB = 22.4 FOR ONE PULSE      RADA2130
C     PD = 0.9 AND PFA = 1.E-8  SWERLING CASE 1 AND SQ LAW DETECTOR          RADA2140
      IF (MOD .NE. 2) GO TO 11                                               RADA2150
      PWR = PWR * PCRAT                                                      RADA2160
      TAU = TAU / PCRAT                                                      RADA2170
   11 GAIN = 10.**(GTDB/10.)                                                 RADA2180
      PRDB = 10. * ALOG10(PWR)                                               RADA2190
C CONVERT XLAMDA IN CM TO METERS                                             RADA2200
      D1 = .01*XLAMDA                                                        RADA2210
      WSQRDB = 20.*ALOG10(D1)                                                RADA2220
      XNUMDB = PRDB + GTDB + GRDB + WSQRDB                                   RADA2230
      P3DB = 33.                                                             RADA2240
      DENDB = P3DB + XLSDB                                                   RADA2250
      XKDB = XNUMDB - DENDB                                                  RADA2260
      RCSDB = 10.*ALOG10(SIGMAT)                                             RADA2270
      THET1 = BWA / 57.29578                                                 RADA2280
      THET2 = BWE / 57.29578                                                 RADA2290
      XK2 = THET1*THET2                                                      RADA2300
      XK1 = 150.*TAU                                                         RADA2310
      XRN = ((RATE**1.6)*5.6919*1.6E-6)/XLAMDA**4                            RADA2320
      XKLG = XKDB/10.                                                        RADA2330
      XK = 10.**XKLG                                                         RADA2340
      H1MET = H1*.3048                                                       RADA2350
      RH1 = 1.2289 * SQRT(H1)                                                RADA2360
      HALFAZ = THET1/2.                                                      RADA2370
      HALFEL = THET2/2.                                                      RADA2380
      T1 = TAN(HALFAZ)                                                       RADA2390
      T2 = TAN(HALFEL)                                                       RADA2400
      TILTR = TILT/57.29578                                                  RADA2410
      TILTE = TILTR                                                          RADA2420
      PJDB = 10.*ALOG10(PJ)                                                  RADA2430
      PRDB = 10.*ALOG10(BR)                                                  RADA2440
      PJDB = 10.*ALOG10(BJ)                                                  RADA2450
      GO TO (13, 13, 13, 12), NMODE                                          RADA2460
   12 OMEGA = 4.*3.1416/GAIN                                                 RADA2470
      ELANG = EL/DEGRAD                                                      RADA2480
      ANGMAX = TILTE + ELANG/2.                                              RADA2490
      ANGMIN = TILTE - ELANG/2.                                              RADA2500
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      AZANG = AZ/DEGRAD                                                  RADA2510
      SEDV = 3.1416*TAN(ELANG/2.)*TAN(AZANG/2.)                          RADA2520
      TDS = TE*OMEGA/SEDV                                                RADA2530
      TD1 = TDS                                                          RADA2540
   13 TD2 = (C*TAU*1.E-6)/(4.*VREL)                                      RADA2550
      TD = AMIN1(TD1, TD2)                                               RADA2560
      XN = PRF * TD                                                      RADA2570
      N = INT(XN)                                                        RADA2580
      FA = -ALOG10(PFA)                                                  RADA2590
      SRDB = 9.2*ALOG10(XN) -2.6*ALOG10(XN)                              RADA2600
C  COMPUTE DETECTION RANGE IN THE ABSENCE OF ECM                         RADA2610
      IHACK = 0                                                          RADA2620
      CALL REACT                                                         RADA2630
      IHACK = 1                                                          RADA2640
      DO 20  I = 1, IRNG                                                 RADA2650
      IF (I .NE. 1) TRAD(I) = TRAD(I-1) + TC                             RADA2660
      CALL REACT                                                         RADA2670
      IF(IHACK.EQ.3) GO TO 50                                            RADA2680
      REDB = 10.*ALOG10(RE)                                              RADA2690
      RMET = RC*1.852E3                                                  RADA2700
      IF (NMODE .NE. 4) GO TO 14                                         RADA2710
      IF (TILT) 16, 15, 15                                               RADA2720
   16 IF (ELVA .GT. ANGMAX) GO TO 135                                    RADA2730
      IF (ELVA .LT. ANGMIN) GO TO 50                                     RADA2740
      GO TO 14                                                           RADA2750
   15 IF(ELVA.GT.ANGMAX) GO TO 50                                        RADA2760
      IF(ELVA.LT.ANGMIN) GO TO 135                                       RADA2770
   14 EGLINT = (350.*ALNGTH)/RMET                                        RADA2780
      IF(EGLINT.LE..001) EGLINT = 0.                                     RADA2790
      EE = EGLINT**2 + EINSTR**2                                         RADA2800
      IF (RC .LE.DR) H2 = AK2C*RMET*3.28084                              RADA2810
      RMETDB = 10.*ALOG10(RMET)                                          RADA2820
      PSTDB = XKDB + RCSDB + 4.*REDB -4.*RMETDB                          RADA2830
C     COMPUTE RAIN CLUTTER RETURN, PRCA (WATTS)                          RADA2840
      VRN = .785*(RMET**2)*XK2*XK1                                       RADA2850
      PRC =  (XK*VRN*XRN*(EE**4))/((RMET**4)*EAN)                        RADA2860
      PN = AK*TS*RR                                                      RADA2870
      ATTDB = 2.*ALPHA*RMET                                              RADA2880
      AT1 = -0.1*ATTDB                                                   RADA2890
      ATT = 10.**AT1                                                     RADA2900
      PSTADB = PSTDB - ATTDB                                             RADA2910
      PRCA = PRC*ATT                                                     RADA2920
      PSTALG = PSTADB*0.1                                                RADA2930
      PSTA = 10.**PSTALG                                                 RADA2940
C  COMPUTE SEA CLUTTER RETURN, PSCA (WATTS)                              RADA2950
      E4 = H1MET/RMET                                                    RADA2960
      E5 = RMET/RE2                                                      RADA2970
      IF (RC .GT.RH1)  GO TO 71                                          RADA2980
      ARG = E4-E5                                                        RADA2990
      IF(ARG.GE.1.) GO TO 50                                             RADA3000
      PSI = ARSIN(ARG)                                                   RADA3010
      XK4 = TAN(PSI)                                                     RADA3020
   45 ACL = 2.*RMET*XK1*T1/COS(PSI)                                      RADA3030
      CALL SIGDS(ISS, XLAMDA, PSI, SIGDDB)                               RADA3040
C  DELETE CARDS DOWN TO STATEMENT  70                                    RADA3050
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   70 CONTINUE                                                          RADA3060
      ACLDB = 10.*ALOG10(ACL)                                           RADA3070
      SIGCDB = ACLDB + SIGODB                                           RADA3080
   71 ARG1 = F4 + F5                                                    RADA3090
      PHI = ARSIN(ARG1)                                                 RADA3100
      IF(NMODE.GT.1) TILTR = ELVA                                       RADA3110
      BWDR = BWE / 57.29578                                             RADA3120
      IF (RC .GT.RH1)  GO TO 72                                         RADA3130
      IF (ITYPE .EQ. 1) CALL FGAIN(GD,TILTR,-PHI,BWDR)                  RADA3140
      IF (ITYPE .EQ. 2) CALL FGCSC(GD,TILTR,-PHI,PHORAD)                RADA3150
C     COMPUTE ANTENNA PATTERN FACTOR,FC, TO BE USED IN THE              RADA3160
C     CALCULATION OF SEA CLUTTER RETURN.                                RADA3170
C     NOTE   NO PROPAGATION FACTOR MUST BE COMPUTED, SINCE IT IS        RADA3180
C     INCLUDED IN THE MEASURED VALUES OF SIGMO.                         RADA3190
      FC = GD                                                           RADA3200
      F1 = FC**4                                                        RADA3210
      FCDB4 = 10.*ALOG10(F1)                                            RADA3220
      PSCDB = XNUMDB + SIGCDB - DENDB - 40.*ALOG10(RMET) + FCDB4        RADA3230
      ATT1DB = 2.*ALPHA*RMET                                            RADA3240
      PSCADB = PSCDB - ATT1DB                                           RADA3250
      PSCALG = 0.1*PSCADB                                               RADA3260
      PSCA =(10.**PSCALG)/FAN                                           RADA3270
      GO TO 73                                                          RADA3280
   72 PSCA = 0.0                                                        RADA3290
   73 JM = JAM + 1                                                      RADA3300
      GO TO (75, 80, 85), JM                                            RADA3310
   75 AJR = 0.                                                          RADA3320
      GO TO 102                                                         RADA3330
   80 RJ = RMET                                                         RADA3340
      GO TO 90                                                          RADA3350
   85 RJ = SOP * 1852.                                                  RADA3360
   90 ATT2DB = ALPHA*RJ                                                 RADA3370
      AJUPDB = PJDB + GJDB + BRDB + GRDB + WSQRDB -ATT2DB + 2.*FEDB     RADA3380
      AJDNDB = 20.*ALOG10(12.56) + 20.*ALOG10(RJ) + BJDB + XLJDB        RADA3390
     1  +XLRDB                                                          RADA3400
      AJRDB = AJUPDB - AJDNDB                                           RADA3410
      AJRDLG = AJRDB*.1                                                 RADA3420
      AJR = 10.**AJRDLG                                                 RADA3430
  102 AJLO = PN + PRCA + AJR + PSCA                                     RADA3440
      XLOWDB = 10.*ALOG10(AJLO)                                         RADA3450
      SNR1DB = PSTADB-XLOWDB                                            RADA3460
      IF(SNR1DB.LE.-26.)      SNR1DB=-26.                               RADA3470
      SNRDB = SNR1DB + SPGDB                                            RADA3480
      SNR = 10.**(0.1*SNRDB)                                            RADA3490
      CALL MAPSWR(SNR1DB,N,FA,NSW,PD)                                   RADA3500
      IF(NMODE.EQ.4) PDJ = PD                                           RADA3510
C     IF(NMODE.EQ.4) PNODET = (1. - PDJ)*PNODET                         RADA3520
C     IF(NMODE.EQ.1) PNODET = (1. - PD)*PNODET                          RADA3530
      PDCUM = 1. - PNODET                                               RADA3540
      STOTAL = PSTA + PSCA + PRCA + AJR                                 RADA3550
      DYN1 = STOTAL/PN                                                  RADA3560
      DYNRDB = 10.*ALOG10(DYN1)                                         RADA3570
  107 GO TO (120, 121, 122, 121), NMODE                                 RADA3580
  120 THT = THET1                                                       RADA3590
      FC = 0.5                                                          RADA3600
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      EP = 0.1                                                          RADA3610
      GO TO 124                                                         RADA3620
  121 EC = 1.                                                           RADA3630
      GO TO 123                                                         RADA3640
  122 EC = 2.                                                           RADA3650
  123 THT = THET2                                                       RADA3660
      EP = 1.5                                                          RADA3670
  124 CALL ANGER(VAR,SNR,THT,EC,EP)                                     RADA3680
      PDSUM=PDSUM+PD                                                    RADA3690
      EC = SQRT(VAR + EE)                                               RADA3700
      RANGE(I) = RC                                                     RADA3710
      PDA(I) = PD                                                       RADA3720
      ANG(I) = EC                                                       RADA3730
      DYN(I) = DYNRDB                                                   RADA3740
      IF(IPRNT.EQ.0) GO TO 135                                          RADA3750
      WRITE(6,1006) TRAD(I),RC,PD,EC,DYNRDB                             RADA3760
      NLINE = NLINE + 1                                                 RADA3770
  135 RC = RC - DX                                                      RADA3780
      XNSCAN=XNSCAN+1.                                                  RADA3790
      IF(RC.LT.RCMIN) GO TO 50                                          RADA3800
   20 CONTINUE                                                          RADA3810
   50 CONTINUE                                                          RADA3820
      DO 400 I = 1, IRNG                                                RADA3830
  400 TRAD(I) = TRAD(I) / 3600.                                         RADA3840
      IF(XNSCAN.GT.0.) PDA(IRNG+1)=PDSUM/XNSCAN                         RADA3850
      H2=H2TEMP                                                         RADA3860
      PWR = PRTEMP                                                      RADA3870
      TAU = TAUTMP                                                      RADA3880
      RETURN                                                            RADA3890
      END                                                               RADA3900


      SUBROUTINE FFACT                                                  FFCT0010
C                                                                       FFCT0020
C MODS.1140,1580,1810.                                  VER.2   11-25-74 FFCT0030
C THIS SUBROUTINE CALCULATES PATTERN PROPOGATION FACTORS USING ROUTINES  FFCT0040
C FROM NRL REPORT 7098.                                                 FFCT0050
C                                                                       FFCT0060
C MODIFICATIONS MADE BY G H COLBY  15 AUG 1972                          FFCT0070
C                                                                       FFCT0080
C                                                                       FFCT0090
C***********************************************************************FFCT0100
C                                                                       FFCT0110
C          REQUIRED INPUTS VIA NAMELIST INPUT ARE                       FFCT0120
C                                                                       FFCT0130
C                    H1        = RADAR HEIGHT (FT)                    FFCT0140
C                    H2        = TARGET HEIGHT (FT)                   FFCT0150
C                    XLAMDA    = WAVE LENGTH (CM)                     FFCT0160
C                    ISS       = SEA STATE NUMBER                     FFCT0170
C                    BWE       = BEAM WIDTH (DEG)                     FFCT0180
C                    TILT      = MAIN BEAM ELEVATION ANGLE (DEG)      FFCT0190
C     PHIZER = MINIMUM ANGLE OFF ANTENNA BORESIGHT AXIS AT              FFCT0200
C              WHICH THE PATTERN FUNCTION BECOMES A CSC SQUARED         FFCT0210
C              FUNCTION                                                 FFCT0220
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C      ITYPE= TYPE OF NORMALIZED ANTENNA GAIN FUNCTION.                          EECT0230
C      ITYPE = 1 IS SYMMETRICAL SINX/X PATTERN                                  EECT0240
C      ITYPE = 2 IS A CSC SQUARED FUNCTION                                      EECT0250
C      NMODE = 1 FOR RADAR OPERATING IN SURVEILLANCE(SEARCH) MODE               EECT0260
C      NMODE = 2 FOR RADAR OPERATING IN TRACK MODE (TILTR=ELVA)                 EECT0270
C                                                                               EECT0280
C*******************************************************************************EECT0290
C                                                                               EECT0300
       IMPLICIT REAL*8(A-H,O-Z)                                                 EECT0310
       REAL*4 BETA,ALFA,XLAMDA,PWR,GTDB,GRDB,SNRODB,XNEDB,BR,XLTDB,XLRDB,       EECT0320
      1XLSDB,AMOD,TAU,PRF,FAN,PCRAT,PHIMAX,TYPE,PHIZER,RATE1,BWA,BWE,           EECT0330
      2TILT,TA,EINSTR,TI,AZ,EL,TF,XK,AISS,RATE,ELPHA,ANSW,PFA,HR,H1,SOR,        EECT0340
      3AJAM,ANMODE,ALTGT,SIGMAT,H2,VRELK,DR,AK20,PJ,GJDB,BJ,XLJDB,RH,FF,        EECT0350
      4DX,RC,ELVA,CE,RANGE,TC,FDIR,TILTR,BWDR,PHORAD,FREF,DEPA,SIN,SIM,         EECT0360
      5S1,S,VREL,T,TT                                                           EECT0370
       COMMON /BLK0/BETA,ALFA,XLAMDA,PWR,GTDB,GRDB,SNRODB,XNEDB,BR,XLTDB,       EECT0380
      1XLRDB,XLSDB,AMOD,TAU,PRF,FAN,PCRAT,PHIMAX,TYPE,PHIZER,RATE1,BWA,         EECT0390
      2BWE,TILT,TA,EINSTR,TI,AZ,EL,TF,XK,AISS,RATE,ELPHA,ANSW,PFA,HR,H1,        EECT0400
      3SOR,AJAM,ANMODE,ALTGT,SIGMAT,H2,VRELK,DR,AK20,PJ,GJDB,BJ,XLJDB,          EECT0410
      4ISS,ITYPE,NMODE,VREL                                                     EECT0420
       COMMON /BLK1/  XX(4), YY(4), AC, BC, CC, DC                              EECT0430
       COMMON /BLK2/  T, TT                                                     EECT0440
       COMMON /BLK3/ FF, RC, DX, IHACK, ELVA, CE, RANGE, TC                     EECT0450
       DIMENSION     WHET(7), RANGE(10)                                         EECT0460
       DATA  WHET  /0.0,0.5,2.0,4.0,6.5,10.,16./                                EECT0470
C                                                                               EECT0480
       IF (IHACK .GT. 0)        GO TO 100                                       EECT0490
       INDX     =  0                                                           EECT0500
       PI       =  3.14159270D0                                                EECT0510
       RDN      =  57.2957795D0                                                EECT0520
       TUPI     =  6.2818531D0                                                 EECT0530
       PI2      =  1.5707963D0                                                 EECT0540
       FPNM     =  6076.115D0                                                  EECT0550
       FTPM     =  3.2808E3D0                                                  EECT0560
       RE       =  4.D0 * 3440.D0 / 3.D0                                       EECT0570
       C        =  29977.6D0                                                   EECT0580
       AJ       =  0.0D0                                                       EECT0590
       D1       =  0.0D0                                                       EECT0600
C                                                                               EECT0610
       TILTR    =  TILT /  RDN                                                 EECT0620
       BWDR = BWE / RDN                                                       EECT0630
       PHORAD = PHIZER/RDN                                                    EECT0640
C                                                                               EECT0650
C SET WAVE FREIGHT                                                             EECT0660
C                                                                               EECT0670
       IT       =  ISS     + 1                                                 EECT0680
       WF       =  WHET(IT)  *  .3535533D0                                     EECT0690
C                                                                               EECT0700
C SET RADAR FREQUENCY                                                          EECT0710
C                                                                               EECT0720
       FMHZ     =  C  /  XLAMDA                                                EECT0730
C                                                                               EECT0740
C SET T                                                                        EECT0750
C                                                                               EECT0760
       T        =  SQRT(H1 / H2)                                               EECT0770
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      IF (T .GT. 1.0D0)        T  =  1.0D0 / T                          EFCT0780
      TT       =  T * T                                                 EFCT0790
C                                                                       EFCT0800
C TOTAL HORIZON DISTANCE                                                EFCT0810
C                                                                       EFCT0820
      RE       = 1.2289 * (SQRT(H1) + SQRT(H2))                        EFCT0830
      DX = TC * VREL / 6076.116                                         EFCT0840
C                                                                       EFCT0850
C QUARTER WAVELENGTH                                                    EFCT0860
    2 W        = (XLAMDA / 100.D0) * FTPM                               EFCT0870
      W4       =  W * .25D0                                             EFCT0880
C                                                                       EFCT0890
C FACTORS                                                               EFCT0900
C                                                                       EFCT0910
      FAC      = (2.0D0 * H1 * H2) / FPNM                               EFCT0920
      TEMP     = (H2 - H1)  /  FPNM                                     EFCT0930
      HH       =  TEMP   *  TEMP                                        EFCT0940
      R        = (FAC / W4) *  1.2D0                                    EFCT0950
      IF (R .GT. RH)    R  =  RH  *  .999D0                            EFCT0960
   10 IF  ((AJ .GE. 0.999D0) .AND. (D1.GE. 0.999D0))  GO TO 20          EFCT0970
C                                                                       EFCT0980
C USE ROUND EARTH BACK                                                  EFCT0990
C                                                                       EFCT1000
      S        =  R  /  RH                                              EFCT1010
      SIN      =  S                                                     EFCT1020
      SIM      =  S  *  1.2D0                                           EFCT1030
      CALL  INVERT(SIN,SIM,S1,S)                                        EFCT1040
      S1 = AMIN1(S1,.999)                                               EFCT1050
      SS1      =  S1 * S1                                               EFCT1060
      SQ1      =((1.D0 - SS1)**2) + (4.D0 * SS1 * TT)                   EFCT1070
      S2       = (DSQRT(SQ1)  -  1.D0  +  SS1) / (2.D0 * S1 * T)        EFCT1080
      SS2      =  S2 * S2                                               EFCT1090
      TEMP1    =  4.D0 * SS1 * S2 * T                                   EFCT1100
      TEMP2    =  S  * (1.D0 - SS1) * (1.D0 + T)                        EFCT1110
      SQ2      =  1.D0  +  (TEMP1 / TEMP2)                              EFCT1120
      D1       =  1.D0  /  DSQRT(SQ2)                                   EFCT1130
      AJ       = (1.D0  -  SS1 ) * (1.D0  -  SS2)                       EFCT1140
      AK = ((1.D0-SS1) + TT*(1.D0-SS2))/(1.D0 + TT)                     EFCT1150
      GO TO 30                                                          EFCT1160
C FOR FLAT EARTH                                                        EFCT1170
   20 AJ       =  1.D0                                                  EFCT1180
      D1       =  1.D0                                                  EFCT1190
      AK       =  1.D0                                                  EFCT1200
C                                                                       EFCT1210
   30 DELTA    = (FAC     /  R)      *  AJ                             EFCT1220
      RSLANT   =  DSQRT((R*R)  +  HH)                                   EFCT1230
      IF (DELTA .LT. W4)       GO TO 130                                EFCT1240
   70 INDX     =  INDX  +  1                                            EFCT1250
      IF (INDX .EQ. 2)         RTEST  =  RSLANT                         EFCT1260
   90 PSI      =  DATAN(((H1+H2) / (FPNM * R)) * AK)                    EFCT1270
      CALL SEARCH(EMHZ,PSI,RHO,PHI)                                     EFCT1280
      RATIO    = (DELTA / W)  +  (PHI / TUPI)                           EFCT1290
      ITEMP    =  IDINT(RATIO)                                          EFCT1300
      WHOLES   =  DFLOAT(ITEMP)                                         EFCT1310
      RATIO1   =  RATIO - WHOLES                                        EFCT1320
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      ALPHA    =  TUPI  * RATIO1                                          EFCT1330
      TEMP1    = (PI  *  WH  *  DSIN(PSI))/  W                            EFCT1340
      TEMP1    =  TEMP1 * TEMP1                                           EFCT1350
      RUF = 0.D0                                                          EFCT1360
      AX = 8.D0*TEMP1                                                     EFCT1370
      IF(AX.LT.58.)RUF = DEXP(-AX)                                        EFCT1380
C                                                                         EFCT1390
C CALCULATE ELEVATION ANGLE TO THE TARGET                                 EFCT1400
C                                                                         EFCT1410
      TEMP1    =  H2  -  H1                                               EFCT1420
      TEMP2    =  .6624D0  *  R *R                                        EFCT1430
      ELVA     =  DATAN2 ((TEMP1-TEMP2),(R*FPNM))                         EFCT1440
      IF(NMODE.GT.1) TILTR = ELVA                                         EFCT1450
C GAIN FACTOR DIRECT PATH                                                 EFCT1460
   55 IF (ITYPE .EQ. 1) CALL FGAIN(FDIR,ELVA,TILTR,BWDR)                  EFCT1470
      IF (ITYPE .EQ. 2) CALL FGCSC(FDIR,ELVA,TILTR,PHORAD)                EFCT1480
C                                                                         EFCT1490
C CALCULATE DEPRESSION ANGLE TO REFLECTION POINT                          EFCT1500
C                                                                         EFCT1510
      H        =  H1     / FPNM                                           EFCT1520
      TEMP1    =  DARSIN (RE * DCOS(PSI) / (RE + H))                      EFCT1530
      DEPA     =  PI2  -  TEMP1                                           EFCT1540
C GAIN FACTOR REFLECTED PATH                                              EFCT1550
      IF (ITYPE .EQ. 1) CALL FGAIN(FREF,DEPA,-TILTR,BWDR)                 EFCT1560
      IF (ITYPE .EQ. 2) CALL FGCSC(FREF,DEPA,-TILTR,PHORAD)               EFCT1570
      D        =  D1  *  RHO  *  RUF  *  FREF  /  FDIR                    EFCT1580
C                                                                         EFCT1590
      FF       =  DSQRT (1.D0 +(D*D) + (2.D0 * D* DCOS(ALPHA)))           EFCT1600
      FF       =   ABS(FDIR)  *  FF                                       EFCT1610
      IF ( INDX .GT. 2)          GO TO 200                                EFCT1620
      ISUB     =  INDX  +  2                                              EFCT1630
      XX( ISUB )      =  RSLANT                                          EFCT1640
      YY(ISUB)        =  FF                                              EFCT1650
      IF ( INDX .EQ. 1)          GO TO 130                                EFCT1660
      RNM      =  2.D0   *  RH                                            EFCT1670
      CALL DFRACT (H1, H2, RNM, FMHZ, FDB)                               EFCT1680
      FF       = (10.D0) ** (FDB * .05D0)                                 EFCT1690
      XX(2)    =  RNM                                                     EFCT1700
      YY(2)    =  FF                                                      EFCT1710
      RNM      =  1.1D0  *  RNM                                           EFCT1720
      CALL DFRACT (H1, H2, RNM, FMHZ, FDB)                               EFCT1730
      FF       = (10.D0) ** (FDB * .05D0)                                 EFCT1740
      XX(1)    =  RNM                                                     EFCT1750
      YY(1)    =  FF                                                      EFCT1760
      CALL CURVIT                                                         EFCT1770
      RC = RANGE(1)                                                       EFCT1780
      RETURN                                                              EFCT1790
  100 IF (RC  .LT.  RTEST)     GO TO 120                                  EFCT1800
      FF       =  DC + RC * ( CC + RC * ( BC + RC * AC ))                 EFCT1810
C                                                                         EFCT1820
      IF (FF .LE.1.E-6) FF = 1.E-6                                        EFCT1830
      RETURN                                                              EFCT1840
C                                                                         EFCT1850
C SET VALUE OF R FOR INTERFERENCE ZONE HACK                               EFCT1860
C                                                                         EFCT1870
```

```
  120 TEMP1   = (RC *RC)  -  HH                                          FFCT1880
      IBACK   =  2                                                       FFCT1890
      IF (TEMP1 .LE. 0.D0)    GO TO 300                                  FFCT1900
      P       =  DSQRT(TEMP1)                                            FFCT1910
      GO TO 10                                                           FFCT1920
C                                                                        FFCT1930
C                                                                        FFCT1940
  130 R       =  R  *  .999D0                                            FFCT1950
      GO TO 10                                                           FFCT1960
C                                                                        FFCT1970
  200 RETURN                                                             FFCT1980
  300 IBACK   =  3                                                       FFCT1990
      RETURN                                                             FFCT2000
      END                                                                FFCT2010


      SUBROUTINE MARSWR (SNDB,N,FA,KASE,PN)                              MARS0010
C                                                                        MARS0020
C     INPUTS ARE -- SNDB, SIGNAL-TO-NOISE POWER RATIO IN DECIBELS --     MARS0030
C     N, NUMBER OF PULSES INTEGRATED --                                  MARS0040
C     FA, FALSE ALARM PROBABILITY, EXPRESSED AS ABSOLUTE VALUE OF POWER  MARS0050
C     OF TEN (E.G., FA = 8. MEANS 10.**(-8.) FALSE ALARM PROBABILITY --  MARS0060
C     KASE, SWERLING FLUCTUATION MODEL, WITH KASE = 0 FOR NONFLUCTUATING MARS0070
C     OUTPUT PN IS PROBABILITY OF DETECTION                              MARS0080
C                                                                        MARS0090
C     BASED ON PROGRAM WRITTEN ATJHU APPLIED PHYSICS LABORATORY, NAMED   MARS0100
C     SUBROUTINE MARCUM.  MODIFIED AT NRL BY L. V. BLAKE.  THIS VERSION  MARS0110
C     DATED APRIL 1971                                                   MARS0120
C     API VERSION DEFINED FA AS FALSE ALARM NUMBER (MARCUM CONCEPT).     MARS0130
C     NRL MOD CHANGED THIS TO FALSE ALARM PROBABILITY (AS DEFINED ABOVE) MARS0140
C     SOME OTHER CHANGES ALSO.                                           MARS0150
C                                                                        MARS0160
      DOUBLE PRECISION EXPR,YBPR,GAMPR,PYB,H,Y0,E0,Y1,E1,STEP,YB         MARS0170
      DOUBLE PRECISION DGAM, DEVAL, SUMLOG, SUML, EAN, EA                MARS0180
C                                                                        MARS0190
C     COMPUTE MARCUM-SWERLING DETECTION PROBABILITIES                    MARS0200
C                                                                        MARS0210
      DATA NPREV,EAPREV/0,0./                                            MARS0220
C     CONVERT S/N IN DB TO NUMERICAL S/N RATIO                           MARS0230
C                                                                        MARS0240
      SNR  = 10.**( SNDB*.1)                                             MARS0250
C                                                                        MARS0260
C     MODE=1                                                             MARS0270
C     IF MODE IS 1, CONVERT FA  TO MEAN EXPONENT OF FALSE-ALARM          MARS0280
C     PROBABILITY RATHER THAN MARCUM FALSE-ALARM NUMBER                  MARS0290
C                                                                        MARS0300
C     IF (MODE) 800, 800, 900                                            MARS0310
  900 EAN = DLOG10(DLOG(.500)/DLOG(1.00 - (10.00)**(-EA)))               MARS0320
C     GO TO 905                                                          MARS0330
C 800 EAN = EA                                                           MARS0340
C                                                                        MARS0350
C     TEST INPUTS                                                        MARS0360
C                                                                        MARS0370
  905 IF(N ) 99,99,2                                                     MARS0380
```

```
    2 IF(FA)99,99,3                                                    MARS0390
    3 IF(KASE) 99,4,4                                                  MARS0400
    4 IF(KASE-4) 5,5,99                                                MARS0410
C                                                                      MARS0420
C     ESTIMATE BIAS LEVEL                                              MARS0430
C                                                                      MARS0440
    5 ENPR = 0.                                                        MARS0450
    6 ENPP = FAN                                                       MARS0460
      EN = N                                                           MARS0470
      YBPR = 0.                                                        MARS0480
      IF (NPREV .EQ. N .AND. FAPREV .EQ. FA) GO TO 777                 MARS0490
      IF(N-12) 7,7,8                                                   MARS0500
    7 YBPR = EN*(1.D0 + 2.2D0*ENPR/EN**((2.D0/3.D0) + .015D0*ENPR))    MARS0510
      GO TO 11                                                         MARS0520
    8 YBPR = EN*(1.+1.3*ENPR/EN**(.5+.011*ENPR))                       MARS0530
C                                                                      MARS0540
C     COMPUTE BIAS LEVEL                                               MARS0550
C                                                                      MARS0560
   11 ENPR = 10.**ENPR                                                 MARS0570
      GAMPR = DGAM(YBPR,N-1)                                           MARS0580
      PYB = .5**(1./ENPR)                                              MARS0590
      SUML = SUMLOG(N-1)                                               MARS0600
      IF(GAMPR-PYB) 10,12,12                                           MARS0610
   10 H=.1                                                             MARS0620
      GO TO 14                                                         MARS0630
   12 H=-.1                                                            MARS0640
   14 Y0 = YBPR                                                        MARS0650
      E0 = DEVAL(Y0,N-1,SUML)                                          MARS0660
   16 Y1 = Y0+H                                                        MARS0670
      E1 = DEVAL(Y1,N-1,SUML)                                          MARS0680
      STEP = GAMPR + H*(E0+E1)/2.                                      MARS0690
      IF(DSIGN(1.D0,STEP-PYB)-DSIGN(1.D0,H)) 18,20,18                  MARS0700
   18 Y0 = Y1                                                          MARS0710
      E0 = E1                                                          MARS0720
      GAMPR = STEP                                                     MARS0730
      GO TO 16                                                         MARS0740
   20 IF(H) 22,24,24                                                   MARS0750
   22 YB = Y1 - H*(PYB-STEP)/(GAMPR-STEP)                              MARS0760
      GO TO 30                                                         MARS0770
   24 YB = Y0 + H*(PYB-GAMPR)/(STEP-GAMPR)                             MARS0780
   30 BIAS = YB                                                        MARS0790
  777 YB = BIAS                                                        MARS0800
      Y0 = YB                                                          MARS0810
      NPREV = N                                                        MARS0820
      FAPREV = FA                                                      MARS0830
C                                                                      MARS0840
C     SELECT M-S CASE                                                  MARS0850
C                                                                      MARS0860
      X = SNR                                                          MARS0870
      K = KASE+1                                                       MARS0880
      GO TO (100,200,300,400,500), K                                   MARS0890
C                                                                      MARS0900
C     CASE 0                                                           MARS0910
C                                                                      MARS0920
  100 SUM = 0.                                                         MARS0930
```

```
      P = EN*X                                                          MARS0940
      IF(YB-P-EN) 150,102,102                                           MARS0950
  102 KS = -(EN + 1.DO)/2.DO + DSQRT(((EN-1.DO)/2.DO)**2 +P*YB)         MARS0960
      KS =  MAXO (KS,0)                                                 MARS0970
      GS = 1.-GAM(YC,KS+N-1,TN)                                         MARS0980
      TS = EVAL(P,KS)*GS                                                MARS0990
      G = GS                                                            MARS1000
      K = KS                                                            MARS1010
      TERM = TS                                                         MARS1020
      TL = TN                                                           MARS1030
  110 TEMP = SUM+TERM                                                   MARS1040
      IF(SUM-TEMP) 112,116,116                                          MARS1050
  112 SUM = TEMP                                                        MARS1060
      IF(K) 116,116,114                                                 MARS1070
  114 TERM = TERM*FLOAT (K)*(G-TL)/(P*G)                                MARS1080
      G = G-TL                                                          MARS1090
      K = K-1                                                           MARS1100
      TL = TL*FLOAT (K+N)/YB                                            MARS1110
      GO TO 110                                                         MARS1120
  116 TL = TN*YB/FLOAT (KS+N)                                           MARS1130
      K = KS+1                                                          MARS1140
      G = GS+TL                                                         MARS1150
      TERM = TS*P*G/(GS*FLOAT (K))                                      MARS1160
  120 TEMP = SUM+TERM                                                   MARS1170
      IF(SUM-TEMP) 122,190,190                                          MARS1180
  122 SUM = TEMP                                                        MARS1190
      TL = TL*YB/FLOAT (K+N)                                            MARS1200
      K = K+1                                                           MARS1210
      TERM = TERM*P*(G+TL)/(G*FLOAT (K))                                MARS1220
      G = G+TL                                                          MARS1230
      GO TO 120                                                         MARS1240
  150 KS = -1.DO - EN/2.DO + DSQRT(EN**2/4.DO +P*YB)                    MARS1250
      KS = MAXO (KS,0)                                                  MARS1260
      GS = GAM(YC,KS+N-1,TN)                                            MARS1270
      IF(GS) 174,174,155                                                MARS1280
  155 TS = EVAL(P,KS)*GS                                                MARS1290
      G = GS                                                            MARS1300
      TERM = TS                                                         MARS1310
      K = KS                                                            MARS1320
      TL = TN                                                           MARS1330
  160 TEMP = SUM+TERM                                                   MARS1340
      IF(SUM-TEMP) 162,166,165                                          MARS1350
  162 SUM = TEMP                                                        MARS1360
      IF(K) 166,166,164                                                 MARS1370
  164 TERM = TERM*FLOAT (K)*(G+TL)/(P*G)                                MARS1380
      G = G+TL                                                          MARS1390
      TL = TL*FLOAT (K+N-1)/YB                                          MARS1400
      K = K-1                                                           MARS1410
      GO TO 160                                                         MARS1420
  166 TL = TN*YB/FLOAT (KS+N)                                           MARS1430
      K = KS+1                                                          MARS1440
      G = GS-TL                                                         MARS1450
      TERM = TS*P*G/(GS*FLOAT (K))                                      MARS1460
  170 TEMP = SUM + TERM                                                 MARS1470
      IF(SUM-TEMP) 172,174,174                                          MARS1480
```

```
  172 SUM = TEMP                                                        MARS1490
      TL = TL*YB/FLOAT (K+N)                                            MARS1500
      TERM = TERM*P*(G-TL)/(G*FLOAT (K+1))                              MARS1510
      G = G-TL                                                          MARS1520
      K = K+1                                                           MARS1530
      GO TO 170                                                         MARS1540
  174 SUM = 1.-SUM                                                      MARS1550
  180 PN = SUM                                                          MARS1560
      GO TO 90                                                          MARS1570
C                                                                       MARS1580
C     CASE 1                                                            MARS1590
C                                                                       MARS1600
  200 IF(N-1) 210,210,220                                               MARS1610
  210 PN = DEXP(-YB/(1.D0 +X))                                          MARS1620
      GO TO 90                                                          MARS1630
  220 TEMP = 1. + 1./(EN*X)                                             MARS1640
      PN = 1.D0 -GAM(YC,N-2,DUM) +DEXP((EN-1.D0)*ALOG(TEMP)             MARS1650
     1 -YB/(1.D0+EN *X))                                                MARS1660
     1                              *GAM(YC/TEMP,N-2,DUM)               MARS1670
      GO TO 90                                                          MARS1680
C                                                                       MARS1690
C     CASE 2                                                            MARS1700
C                                                                       MARS1710
  300 IF(N-1) 310,310,320                                               MARS1720
  310 PN = DEXP(-YB/1.D0+X)                                             MARS1730
      GO TO 90                                                          MARS1740
  320 PN = 1. - GAM(YC/(1.+X),N-1,DUM)                                  MARS1750
      GO TO 90                                                          MARS1760
C                                                                       MARS1770
C     CASE 3                                                            MARS1780
C                                                                       MARS1790
  400 IF(N-2) 410,420,430                                               MARS1800
  410 PN = (1.D0 + 2.D0*X*YB/(X+2.D0)**2)*DEXP(-2.D0*YB/(2.D0+X))       MARS1810
      GO TO 90                                                          MARS1820
  420 PN = (1.D0+YB/(1.D0+X))*DEXP(-YB/(1.D0+X))                        MARS1830
      GO TO 90                                                          MARS1840
  430 C = 2./(2.+EN*X)                                                  MARS1850
      C = 1.-C                                                          MARS1860
      IF(YB*C-EN) 440,450,450                                           MARS1870
  440 SUM = 0.                                                          MARS1880
      TERM = 1.                                                         MARS1890
      J = N                                                             MARS1900
  442 TEMP = SUM+TERM                                                   MARS1910
      IF(SUM-TEMP) 444,446,446                                          MARS1920
  444 SUM = TEMP                                                        MARS1930
      TERM = TERM*YB*D/FLOAT (J)                                        MARS1940
      J = J+1                                                           MARS1950
      GO TO 442                                                         MARS1960
  446 PN = 1. - GAM(YC,N-2,DUM) + C*YB*EVAL(YC,N-2)                     MARS1970
     1          + D*EVAL(YC,N-1)*(1.+C*YB-(EN-2.)*C/D)*SUM             MARS1980
      GO TO 90                                                          MARS1990
  450 PN = 1.D0-GAM(YC,N-3,DUM) + YB*EVAL(YC,N-3)*C/D                   MARS2000
     1   +DEXP(-C*YB-(EN-2.D0)*ALOG(D))*(1.D0+C*YB-(EN-2.D0)*C/D)       MARS2010
     2          *GAM(YC*D,N-3,DUM)                                     MARS2020
      GO TO 90                                                          MARS2030
```

```
C                                                                       MARS2040
C     CASE 4                                                            MARS2050
C                                                                       MARS2060
  500 SUM = 0.                                                          MARS2070
      C = 2./(2.+X)                                                     MARS2080
      D = 1.-C                                                          MARS2090
      Q = C/D                                                           MARS2100
      P = C*YB                                                          MARS2110
      KS = (3.D0*EN+(YB*D))/2.D0-DSQRT((EN-1.D0+(YB*D))**2/4.D0         MARS2120
     1 +(YB*D)*(EN+1.D0))                                               MARS2130
      KS =  MIND (KS,N)                                                 MARS2140
      KS =  MAXD (KS,0)                                                 MARS2150
      K = KS                                                            MARS2160
      J = N-KS                                                          MARS2170
      FKS = KS                                                          MARS2180
      K =  MIND (KS,N)                                                  MARS2190
      IF(YB-EN*(1.+D)) 550,501,501                                      MARS2200
  501 GS = 1. - GAM(P,2*N-1-KS,TN)                                      MARS2210
      IF(GS) 526,526,502                                                MARS2220
  502 TS = DEXP(FKS*ALOG(C)+(EN-FKS)*ALOG(D)+SUMLOG(N)-SUMLOG(KS)       MARS2230
     1           -SUMLOG(J)+ALOG(GS))                                   MARS2240
      G = GS                                                            MARS2250
      TERM = TS                                                         MARS2260
      TL = TN                                                           MARS2270
  510 TEMP = SUM+TERM                                                   MARS2280
      IF(SUM-TEMP) 512,516,516                                          MARS2290
  512 SUM = TEMP                                                        MARS2300
      IF(K) 516,516,514                                                 MARS2310
  514 TL = TL*P/FLOAT (2*N-K)                                           MARS2320
      TERM = TERM*FLOAT (K)*(G+TL)/(Q*FLOAT (N-K+1)*G)                  MARS2330
      G = G+TL                                                          MARS2340
      K = K-1                                                           MARS2350
      GO TO 510                                                         MARS2360
  516 IF(KS-N) 518,526,526                                              MARS2370
  518 TERM = TS*Q*FLOAT (N-KS)*(GS-TN)/(FLOAT (KS+1)*GS)                MARS2380
      G = GS-TN                                                         MARS2390
      TL = TN*FLOAT (2*N-1-KS)/P                                        MARS2400
      K = KS+1                                                          MARS2410
  520 TEMP = SUM+TERM                                                   MARS2420
      IF(SUM-TEMP) 522,526,526                                          MARS2430
  522 SUM = TEMP                                                        MARS2440
      IF(K-N) 524,526,526                                               MARS2450
  524 TERM = TERM*Q*FLOAT (N-K)*(G-TL)/(FLOAT (K+1)*G)                  MARS2460
      G = G-TL                                                          MARS2470
      TL = TL*FLOAT (2*N-1-K)/P                                         MARS2480
      K = K+1                                                           MARS2490
      GO TO 520                                                         MARS2500
  526 PN = SUM                                                          MARS2510
      GO TO 90                                                          MARS2520
  550 GS = GAM(P,2*N-1-KS,TN)                                           MARS2530
      IF(GS) 576,576,552                                                MARS2540
  552 TS = DEXP(FKS*ALOG(C)+(EN-FKS)*ALOG(D)+SUMLOG(N)-SUMLOG(KS)       MARS2550
     1           -SUMLOG(J)+ALOG(GS))                                   MARS2560
      G = GS                                                            MARS2570
      TERM = TS                                                         MARS2580
```

```
      TL = TN                                                          MARS2590
  560 TEMP = SUM+TERM                                                  MARS2600
      IF(SUM-TEMP) 562,566,566                                         MARS2610
  562 SUM = TEMP                                                       MARS2620
      IF(K) 566,566,564                                                MARS2630
  564 TL = TL*P/FLOAT (2*N-K)                                          MARS2640
      TERM = TERM*FLOAT (K)*(G-TL)/(Q*FLOAT (N-K+1)*G)                 MARS2650
      G = G-TL                                                         MARS2660
      K = K-1                                                          MARS2670
      GO TO 560                                                        MARS2680
  566 IF(KS-N) 568,576,576                                             MARS2690
  568 TERM = TS*Q*FLOAT (N-KS)*(GS+TN)/(FLOAT (KS+1)*GS)               MARS2700
      G = GS+TN                                                        MARS2710
      TL = TN*FLOAT (2*N-1-KS)/P                                       MARS2720
      K = KS+1                                                         MARS2730
  570 TEMP = SUM+TERM                                                  MARS2740
      IF(SUM-TEMP) 572,576,576                                         MARS2750
  572 SUM = TEMP                                                       MARS2760
      IF(K-N) 574,576,576                                              MARS2770
  574 TERM = TERM*Q*FLOAT (N-K)*(G+TL)/(FLOAT (K+1)*G)                 MARS2780
      G = G+TL                                                         MARS2790
      TL = TL*FLOAT (2*N-1-K)/P                                        MARS2800
      K = K+1                                                          MARS2910
      GO TO 570                                                        MARS2820
  576 PN = 1.-SUM                                                      MARS2830
      GO TO 90                                                         MARS2840
C                                                                      MARS2850
C     SET PROBABILITY                                                  MARS2860
C                                                                      MARS2870
   90 IF(PN) 91,94,92                                                  MARS2880
   91 PN = 0.                                                          MARS2890
      GO TO 94                                                         MARS2900
   92 IF(PN-1.) 94,94,93                                               MARS2910
   93 PN = 1.                                                          MARS2920
   94 RETURN                                                           MARS2930
C                                                                      MARS2940
C     ERROR MESSAGE FOR BAD INPUTS                                     MARS2950
C                                                                      MARS2960
   99 WRITE (6,.9)  N,FA ,SNR,KASE                                     MARS2970
    9 FORMAT (1H0 /50H UNREASONABLE CALL SEQUENCE TO MARCUM, ZERO RESULTMARS2980
     1               7HS GIVEN //4H N = I8,5X,5HFA  = E16.8,5X,5HSNR =  MARS2990
     2              E16.8,5X,6HKASE = I8)                               MARS3000
      PN = 0.                                                          MARS3010
      PIAS = 0.                                                        MARS3020
      RETURN                                                           MARS3030
      END                                                              MARS3040



      SUBROUTINE EGCSC(GNORM,ANG1,ANG2,PHORAD)                         EGCS0010
      PI2 = 1.57079300                                                 EGCS0020
      PHEE = ANG1 - ANG2                                               EGCS0030
      ANG3 = PHEE + PHORAD                                             EGCS0040
      IF(ANG3.GT.PHORAD) GO TO 10                                      EGCS0050
      T = SIN(PHORAD)                                                  EGCS0060
```

```
      PWP = .89*T                                                       FGCS0070
      X = (2.78345*SIN(PHEE))/BWR                                       FGCS0080
      AX = ABS(X)                                                       FGCS0090
      IF (AX .GE. .00001) GO TO 5                                       FGCS0100
      GNORM = 1.0                                                       FGCS0110
      GO TO 30                                                          FGCS0120
    5 GNORM = SIN(X)/X                                                  FGCS0130
      ARANG = ABS(PHEE)                                                 FGCS0140
      GO TO 20                                                          FGCS0150
   10 GNORM = SIN(PHORAD)/SIN(ANG3)                                     FGCS0160
      ARANG = ABS(ANG3)                                                 FGCS0170
   20 IF(ARANG.GT.PI2)  GNORM = .001                                    FGCS0180
   30 RETURN                                                            FGCS0190
      END                                                               FGCS0200


      FUNCTION DGAM(B,N)                                                DGAM0010
      DOUBLE PRECISION  SUM,  TERM,TEMP,FJ,DGAM, DEVAL, B, SUML,SUMLOG  DGAM0020
C             INTEGRAL = 1-(SUM, J=0 TO N, OF EXP (J*ALOG(B)-B-ALOG(NFACDGAM0030
      SUM = 0.                                                          DGAM0040
      K = B                                                             DGAM0050
      IF(K-N) 100,200,200                                               DGAM0060
  100 J = N+1                                                           DGAM0070
      SUML = SUMLOG(J)                                                  DGAM0080
      TERM = DEVAL(B,J,SUML)                                            DGAM0090
   10 TEMP = SUM+TERM                                                   DGAM0100
      IF(SUM-TEMP) 15,20,20                                             DGAM0110
   15 SUM = TEMP                                                        DGAM0120
      J = J+1                                                           DGAM0130
      FJ = J                                                            DGAM0140
      TERM = TERM*B/FJ                                                  DGAM0150
      GO TO 10                                                          DGAM0160
   20 DGAM = SUM                                                        DGAM0170
      RETURN                                                            DGAM0180
  200 J = N                                                             DGAM0190
      SUML = SUMLOG(J)                                                  DGAM0200
      TERM = DEVAL(B,J,SUML)                                            DGAM0210
   30 TEMP = SUM+TERM                                                   DGAM0220
      IF(SUM-TEMP) 35,40,40                                             DGAM0230
   35 SUM = TEMP                                                        DGAM0240
      IF(J-1) 40,36,36                                                  DGAM0250
   36 FJ = J                                                            DGAM0260
      TERM = TERM*FJ/B                                                  DGAM0270
      J = J-1                                                           DGAM0280
      GO TO 30                                                          DGAM0290
   40 DGAM = 1.-SUM                                                     DGAM0300
      RETURN                                                            DGAM0310
      END                                                               DGAM0320


      FUNCTION DEVAL (Y,N,SUML)                                         DEVL0010
      DOUBLE PRECISION  XPON,EN,DEVAL,  Y,SUML                          DEVL0020
      XPON = -Y                                                         DEVL0030
```

AD-A048 342 LTV AEROSPACE CORP DALLAS TEX VOUGHT SYSTEMS DIV F/G 15/7
SEATIDE ANALYSIS PROCESS. VOLUME IID. NAVAL ENGAGEMENT MODEL (N--ETC(U)
FEB 75 DAAB09-72-C-0062
UNCLASSIFIED VSD-00.1636-VOL-2D-REV-A NL

3 of 3
ADA048 342



END
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DDC

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      IF(N) 20,20,10                                                    DEVL0040
   10 EN = N                                                            DEVL0050
      XPON = XPON+EN*DLOG(Y)-SUML                                       DEVL0060
      IF (XPON .LT. -290.) GO TO 30                                     DEVL0070
   20 DEVAL = DEXP(XPON)                                                DEVL0080
      GO TO 40                                                          DEVL0090
   30 DEVAL = 0.                                                        DEVL0100
   40 RETURN                                                            DEVL0110
      END                                                               DEVL0120


      FUNCTION GAM(B,N,TN)                                              GAM 0010
C                    SINGLE PRECISION VERSION OF DGAM                   GAM 0020
      SUM = 0.                                                          GAM 0030
      K = B                                                             GAM 0040
      IF(K-N) 100,200,200                                               GAM 0050
  100 J = N+1                                                           GAM 0060
      TERM = EVAL(B,J)                                                  GAM 0070
      TN = TERM*FLOAT (J)/B                                             GAM 0080
   10 TEMP  = SUM+TERM                                                  GAM 0090
      IF(SUM-TEMP) 15,20,20                                             GAM 0100
   15 SUM = TEMP                                                        GAM 0110
      J = J+1                                                           GAM 0120
      FJ = J                                                            GAM 0130
      TERM = TERM*B/FJ                                                  GAM 0140
      GO TO 10                                                          GAM 0150
   20 GAM = SUM                                                         GAM 0160
      RETURN                                                            GAM 0170
  200 J = N                                                             GAM 0180
      TERM = EVAL(B,J)                                                  GAM 0190
      TN = TERM                                                         GAM 0200
   30 TEMP = SUM+TERM                                                   GAM 0210
      IF(SUM-TEMP) 35,40,40                                             GAM 0220
   35 SUM = TEMP                                                        GAM 0230
      IF(J-1) 40,36,36                                                  GAM 0240
   36 FJ = J                                                            GAM 0250
      TERM = TERM*FJ/B                                                  GAM 0260
      J = J-1                                                           GAM 0270
      GO TO 30                                                          GAM 0280
   40 GAM = 1.-SUM                                                      GAM 0290
      RETURN                                                            GAM 0300
      END                                                               GAM 0310


      FUNCTION EVAL(Y,N)                                                EVAL0010
      DOUBLE PRECISION SUMLOG                                           EVAL0020
      XPON = -Y                                                         EVAL0030
      IF(N) 20,20,10                                                    EVAL0040
   10 EN = N                                                            EVAL0050
      XPON = XPON+EN*ALOG(Y)-SUMLOG(N)                                  EVAL0060
      IF (XPON .LT. -290.) GO TO 30                                     EVAL0070
   20 EVAL = EXP (XPON)                                                 EVAL0080
      GO TO 40                                                          EVAL0090
```

```
   30 DEVAL = 0.                                                        EVAL0100
   40 RETURN                                                            EVAL0110
      END                                                               EVAL0120


      FUNCTION SUMLOG(N)                                                SMLG0010
      DOUBLE PRECISION A, B, SUMLOG                                     SMLG0020
      DIMENSION A(1000)                                                 SMLG0030
      DATA DUMA,DUMB/0.,0./                                             SMLG0040
      NMAX=1000                                                         SMLG0050
      IF(DUMA-DUMB) 20,10,20                                            SMLG0060
   10 DUMA = 1.                                                         SMLG0070
      DUMB = 0.                                                         SMLG0080
      NLAST = 1                                                         SMLG0090
      A(1) = 0.                                                         SMLG0100
   20 NN = IABS (N)                                                     SMLG0110
      IF(NN-1) 30,30,40                                                 SMLG0120
   30 SUMLOG = 0.                                                       SMLG0130
      RETURN                                                            SMLG0140
   40 IF(NN-NLAST) 50,50,60                                             SMLG0150
   50 SUMLOG = A(NN)                                                    SMLG0160
      RETURN                                                            SMLG0170
   60 K = NLAST+1                                                       SMLG0180
      IF(NN-NMAX) 70,70,80                                              SMLG0190
   70 DO 72 I=K,NN                                                      SMLG0200
   72 A(I) = A(I-1) + DLOG(DFLOAT(I))                                   SMLG0210
      NLAST = NN                                                        SMLG0220
      GO TO 50                                                          SMLG0230
   80 IF(NLAST-NMAX) 82,90,90                                           SMLG0240
   82 DO 84 I=K,NMAX                                                    SMLG0250
   84 A(I) = A(I-1) + DLOG(DFLOAT(I))                                   SMLG0260
      NLAST = NMAX                                                      SMLG0270
   90 B = A(NMAX)                                                       SMLG0280
      K = NMAX+1                                                        SMLG0290
      DO 92 I=K,NN                                                      SMLG0300
   92 B = B + DLOG(DFLOAT(I))                                           SMLG0310
      SUMLOG = B                                                        SMLG0320
      RETURN                                                            SMLG0330
      END                                                               SMLG0340


      SUBROUTINE INVERT(XMIN,XMAX,X,FT)                                 NVRT0010
      COMMON /BLK2/  T, TT                                              NVRT0020
C  THIS SUBROUTINE FINDS VALUE OF X THAT RESULTS IN F(X) = FT, BY       NVRT0030
C  ITERATION BASED ON LINEAR INTERPOLATION/EXTRAPOLATION FROM PREVIOUS  NVRT0040
C  TWO TRIALS.  FUNCTION F MUST BE MONOTONIC.                           NVRT0050
      TEST = 10000.                                                     NVRT0060
      FD = FT                                                           NVRT0070
      IF (FT .EQ. 0.) FD = 1.                                           NVRT0080
      NOI = 1                                                           NVRT0090
      X = (XMAX + XMIN) / 2.                                            NVRT0100
      F1 = FSS(X, T, TT)                                                NVRT0110
      X2 = X                                                            NVRT0120
```

```
      F2 = F1                                                          NVRT0130
      FN = F1                                                          NVRT0140
      GO TO 4                                                          NVRT0150
    1 F1 = ESS(X, T, TT)                                               NVRT0160
      IF (NOI .EQ. 15) GO TO 2                                         NVRT0170
    4 TEST1 = ABS((F1 - FT) / FD)                                      NVRT0180
      IF (TEST1 - TEST) 2, 2, 3                                        NVRT0190
    3 XM = X                                                           NVRT0200
      IF (NOI .GT. 1) GO TO 6                                          NVRT0210
      DELTA = (XMAX - XMIN) / 4.                                       NVRT0220
      IF (FT .LT. F1) DELTA = - DELTA                                  NVRT0230
      FMAX = ESS(XMAX, T, TT)                                          NVRT0240
      FMIN = ESS(XMIN, T, TT)                                          NVRT0250
      IF (FMAX .LT. FMIN) DELTA = - DELTA                              NVRT0260
      X = X + DELTA                                                    NVRT0270
      XN = XM                                                          NVRT0280
      NOI = 2                                                          NVRT0290
      GO TO 1                                                          NVRT0300
    6 X = (FT-FN)*(X-XN)/(F1-FN) + XN                                  NVRT0310
      NOI = NOI + 1                                                    NVRT0320
      IF (NOI - 3) 24, 21, 24                                          NVRT0330
   21 IF (ABS(F2-FT) - ABS(F1-FT)) 23, 23, 24                          NVRT0340
   23 XN = X2                                                          NVRT0350
      FN = F2                                                          NVRT0360
      GO TO 1                                                          NVRT0370
   24 XN = XM                                                          NVRT0380
      FN = F1                                                          NVRT0390
      GO TO 1                                                          NVRT0400
    2 RETURN                                                           NVRT0410
      END                                                              NVRT0420


      FUNCTION ESS(S1, T, TT)                                          ESS 0010
C     DEFINES PARAMETER S AS A FUNCTION OF S1 AND T.                   ESS 0020
C     (SEE RAD LAB SERIES VOL. 13, P115.)                              ESS 0030
      SS1 = S1 * S1                                                    ESS 0040
      TEMP1 = 1. - SS1                                                 ESS 0050
      TEMP1 = TEMP1 * TEMP1                                            ESS 0060
      TEMP2 = 4. * SS1 * TT                                            ESS 0070
      TEMP3 = 2. * S1                                                  ESS 0080
      TEMP4 = 1. + T                                                   ESS 0090
      ESS = (S1 + (SQRT(TEMP1+ TEMP2) - 1. + SS1) / TEMP3) / TEMP4     ESS 0100
      RETURN                                                           ESS 0110
      END                                                              ESS 0120


      SUBROUTINE SEAREF(FMHZ,PSI,RHO,PHI)                              SERF0010
      IMPLICIT REAL*8(A-H,O-Z)                                         SERF0020
C  MODS.121,440-470.                          VER.2   11-25-74       SERF0030
C     THIS SUBROUTINE COMPUTES COMPLEX REFLECTION COEFFICIENT OF       SERF0040
C     SEA WATER, AS A FUNCTION OF FREQUENCY, FMHZ  GRAZING ANGLE,      SERF0050
C     PSI,(RADIANS)  AND WAVE POLARIZATION (IPOL = 1 FOR VERTICAL      SERF0060
C     AND IPOL = 2 FOR HORIZONTAL POLARIZATION).                       SERF0070
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C     OUTPUT OF THIS ROUTINE IS MAGNITUDE RHO AND PHASE ANGLE          SERF0080
C     PHI(RADIANS) OF THE COMPLEX COEFFICIENT. COMPUTATION             SERF0090
C     IS BASED UPON EQUATIONS (1) AND (2) OF RAD LAB SERIES            SERF0100
C     VOL. 13, PAGE 396. THE SUBROUTINE WAS WRITTEN BY L.V.            SERF0110
C     BLAKE, NRL CODE 5370 SEPT 1969.                                  SERF0120
      COMPLEX*16 EPSC, GAM, SQTERM, TERM, GAMCC, DIFF1, DIFF2          SERF0130
      COMPLEX*8 GAMS                                                   SERF0140
      DATA  FLAST/0.0/                                                 SERF0150
      SINPSI  =  DSIN(PSI)                                             SERF0160
      CSPSI   =  DCOS(PSI) ** 2                                        SERF0170
      IF (FMHZ .EQ. FLAST) GO TO 200                                   SERF0180
C     IF SUBROUTINE HAS BEEN CALLED PREVIOUSLY DURING THE PROGRAM,     SERF0190
C     AND FREQUENCY IS THE SAME AS ON THE LAST PREVIOUS CALL,          SERF0200
C     PART OF THE COMPUTATION NEED NOT BE DONE, SINCE THE              SERF0210
C     REQUIRED VALUES HAVE BEEN STORED.                                SERF0220
      FLAST = FMHZ                                                     SERF0230
C COMPUTE WAVELENGTH                                                   SERF0240
      W       =  299.793D0 / FMHZ                                      SERF0250
      IF (FMHZ .GT. 1500.D0)  GO TO 151                                SERF0260
C     SIG IS CONDUCTIVITY(MHO/METER), EPSI IS THE REAL PART OF         SERF0270
C     THE DIELECTRIC CONSTANT. BOTH ARE DEPENDENT UPON FMHZ            SERF0280
  150 SIG     =  4.3D0                                                 SERF0290
      EPS1    =  80.D0                                                 SERF0300
      GO TO 155                                                        SERF0310
  151 IF (FMHZ .GT. 3000.D0)  GO TO 154                                SERF0320
      SIG     =  4.3D0 + (FMHZ - 1500.D0) * .00148D0                   SERF0330
  153 EPS1    =  80.D0 - (FMHZ - 1500.D0) * .00733D0                   SERF0340
      GO TO 155                                                        SERF0350
  154 EPS1    =  69.D0 - (FMHZ - 3000.D0) * .002429D0                  SERF0360
      SIG     =  6.52D0+ (FMHZ - 3000.D0) * .001314D0                  SERF0370
  155 EPSC    =  DCMPLX(EPS1,-60.D0*W*SIG)                             SERF0380
  200 SQTERM  =  CDSQRT(EPSC  -  CSPSI)                                SERF0390
C     IF (IPOL .GT. 1)          GO TO 161                              SERF0400
C 160 TERM =    EPSC * SINPSI                                          SERF0410
C     GAM = (TERM-SQTERM)/(TERM+SQTERM)                                SERF0420
C     GO TO 180                                                        SERF0430
  161 GAM = (SINPSI - SQTERM) / (SINPSI + SQTERM)                      SERF0440
  180 RHO     =  CDABS(GAM)                                            SERF0450
      GAMS = GAM                                                       SERF0460
      PHI = -ATAN2(AIMAG(GAMS), REAL(GAMS))                            SERF0470
C                                                                      SERF0480
C                                                                      SERF0490
      RETURN                                                           SERF0500
      END                                                              SERF0510


      SUBROUTINE DFRACT (AHFT,THFT,RNM,FMHZ,FDB)                       DFRC0010
      IMPLICIT REAL*8(A-H,O-Z)                                         DFRC0020
      REAL*4 AHFT, THFT                                                DFRC0030
C                                                                      DFRC0040
C     AHFT IS ANTENNA HEIGHT(FEET)  THFT IS TARGET HEIGHT(FEET).       DFRC0050
C     RNM IS RANGE IN NAUTICAL MILES, FMHZ IS FREQUENCY IN             DFRC0060
C     MEGAHERTZ.                                                       DFRC0070
C     THIS ROUTINE COMPUTES PROPAGATION FACTOR IN DB RELATIVE TO       DFRC0080
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C      FREE SPACE. BASIS IS EQUATION  463 OF  PROPAGATION OF SHORT      DERC0090
C      RADIO WAVES,  KERR, VOL 13 OF RAD LAB SERIES, PAGE 122          DERC0100
C      Z1 AND Z2 ARE  NATURAL HEIGHTS  AND X IS  NATURAL RANGE , SEE   DERC0110
C      EQUATIONS 351 AND 358, PAGES 96-97, KERR.                       DERC0120
C                                                                      DERC0130
       PWR      =  1.DO / 3.DO                                         DERC0140
       FACTOR   = (FMHZ **(2.DO * PWR)) / 6988.103DO                   DERC0150
       Z1 = AHFT * FACTOR                                             DERC0160
       Z2 = THFT * FACTOR                                             DERC0170
       X        = (RNM  * (FMHZ ** PWR))/ 102.715DO                   DERC0180
       CALL UECN (Z1,UDB1)                                            DERC0190
       CALL UECN (Z2,UDB2)                                            DERC0200
       EDB      = 10.992059664DO + 10.DO*DLOG1)(X) - 17.545497DO**    DERC0210
      1           + UDB1  + UDB2                                       DERC0220
       RETURN                                                         DERC0230
       END                                                            DERC0240


       SUBROUTINE UECN (Z, UDB)                                       UECN0010
       IMPLICIT REAL*8(A-H,O-Z)                                       UECN0020
C      THIS SUBROUTINE COMPUTES HEIGHT-GAIN FUNCTION,UDB, IN DECIBELS UECN0030
C      BY USING EMPIRICAL FORMULAS FOR DIFFERENT SEGMENTS OF FIG.     UECN0040
C      2.20, PAGE 128 OF   PROPAGATION OF SHORT RADIO WAVES , KERR,   UECN0050
C      VOL 13 OF RAD LAB SERIES.                                      UECN0060
C      NOTE  THIS CURVE IS VALID FOR HORIZONTAL POLARIZATION ONLY.    UECN0070
       IF (Z .GT. .6DO)         GO TO 2                               UECN0080
       UDB      =  20.DO * DLOG10(Z)                                  UECN0090
       RETURN                                                         UECN0100
     2 IF (Z .GE. 1.DO)         GO TO 4                               UECN0110
       UDB      = -4.3DO + 51.04DO*(DLOG10(Z/.6DO)) ** 1.4DO          UECN0120
       RETURN                                                         UECN0130
     4 UDB      =  19.8472BDO *((Z ** .47DO) - .9DO)                  UECN0140
       RETURN                                                         UECN0150
       END                                                            UECN0160


       SUBROUTINE CURVIT                                              CRVT0010
       IMPLICIT REAL*8(A-H,O-Z)                                       CRVT0020
C                                                                     CRVT0030
C THIS SUBROUTINE IS USED TO FIND THE COEFFICIENTS OF A CUBIC EQUATION CRVT0040
C FOR USE IN CALCULATING PATTERN FACTORS IN THE INTERMEDIATE ZONE.     CRVT0050
C                                                                     CRVT0060
       COMMON /BLK1/   XX(4), YY(4), A, B, C, D                       CRVT0070
       DIMENSION       AR(4,4), AY(4,4)                               CRVT0080
C                                                                     CRVT0090
       DO 5   I = 1,4                                                 CRVT0100
           AY(I,1)  =  YY(I)                                          CRVT0110
           AY(I,2)  =  0.DO                                           CRVT0120
           AY(I,3)  =  0.DO                                           CRVT0130
           AY(I,4)  =  0.DO                                           CRVT0140
           AR(I,1)  =  1.DO                                           CRVT0150
     5 CONTINUE                                                       CRVT0160
C                                                                     CRVT0170
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      DO 10  I = 1,4                                                    CRVT0180
      DO 10  J = 2,4                                                    CRVT0190
          K        =  J  -  1                                           CRVT0200
          AR(I,J)  =  AR(I,K)  *  XX(I)                                 CRVT0210
   10 CONTINUE                                                          CRVT0220
C                                                                       CRVT0230
      CALL MATALG(AR,AY)                                                CRVT0240
C                                                                       CRVT0250
C SET COEFFICIENTS                                                      CRVT0260
C                                                                       CRVT0270
      A        =  AY(4,1)                                               CRVT0280
      B        =  AY(3,1)                                               CRVT0290
      C        =  AY(2,1)                                               CRVT0300
      D        =  AY(1,1)                                               CRVT0310
C                                                                       CRVT0320
      RETURN                                                            CRVT0330
      END                                                               CRVT0340


      SUBROUTINE MATALG(A,X)                                            MTLG0010
      IMPLICIT REAL*8(A-H,O-Z)                                          MTLG0020
      DIMENSION A(4,4),X(4,4)                                           MTLG0030
C     IF(IDO) 1,2,1                                                     MTLG0040
C   1 DO 3 I=1,NR                                                       MTLG0050
C     DO 4 J=1,NR                                                       MTLG0060
C   4 X(I,J)=0.0                                                        MTLG0070
C   3 X(I,I)=1.0                                                        MTLG0080
C     NV=NR                                                             MTLG0090
   2  DET      =  1.DO                                                  MTLG0100
      NR1 = 3                                                           MTLG0110
      DO 5 K = 1, 3                                                     MTLG0120
      IR1=K+1                                                           MTLG0130
      PIVOT    =  0.0DO                                                 MTLG0140
      DO 6 I = K, 4                                                     MTLG0150
      Z        =  DABS(A(I,K))                                          MTLG0160
      IF(Z-PIVOT) 6,6,7                                                 MTLG0170
   7  PIVOT=Z                                                          MTLG0180
      IPR=I                                                             MTLG0190
   6  CONTINUE                                                         MTLG0200
      IF(PIVOT) 8,9,8                                                   MTLG0210
   9  DET      =  0.0DO                                                 MTLG0220
      RETURN                                                            MTLG0230
   8  IF(IPR-K) 10,11,10                                               MTLG0240
  10  DO 12 J = K, 4                                                   MTLG0250
      Z=A(IPR,J)                                                        MTLG0260
      A(IPR,J)=A(K,J)                                                   MTLG0270
  12  A(K,J)=Z                                                         MTLG0280
      Z = X(IPR,1)                                                      MTLG0290
      X(IPR,1) = X(K,1)                                                 MTLG0300
      X(K,1) = Z                                                        MTLG0310
      DET=-DET                                                          MTLG0320
  11  DET=DET*A(K,K)                                                   MTLG0330
      PIVOT    =  1.0DO / A(K,K)                                        MTLG0340
      DO 14 J = IR1, 4                                                  MTLG0350
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      A(K,J)=A(K,J)*PIVOT                                              MTLG0360
      DO 14 I = IP1, 4                                                 MTLG0370
   14 A(I,J)=A(I,J)-A(I,K)*A(K,J)                                      MTLG0380
      IF (X(K,1)) 15, 5, 15                                            MTLG0390
   15 X(K,1) = X(K,1) * PIVOT                                          MTLG0400
      DO 16 I = IP1, 4                                                 MTLG0410
   16 X(I,1) = X(I,1) - A(I,K) * X(K,1)                                MTLG0420
    5 CONTINUE                                                         MTLG0430
      IF (A(4,4)) 17, 5, 17                                            MTLG0440
   17 DET = DET * A(4,4)                                               MTLG0450
      PIVOT = 1. / A(4,4)                                              MTLG0460
      X(4,1) = X(4,1) * PIVOT                                          MTLG0470
      DO 18 K = 1, 3                                                   MTLG0480
      I = 4 - K                                                        MTLG0490
      SUM       =  C.000                                               MTLG0500
      DO 19 L = I, 3                                                   MTLG0510
   19 SUM = SUM + A(I,L+1)*X(L+1,1)                                    MTLG0520
   18 X(I,1) = X(I,1) - SUM                                            MTLG0530
      RETURN                                                           MTLG0540
      END                                                              MTLG0550


      SUBROUTINE ANGER(VAR,SNRI,ANG3,CON1,CON2)                        ANGR0010
      XNUM = ANG3*CON1                                                 ANGR0020
      DEN = CON2*SQRT(SNRI)                                            ANGR0030
      RMS = XNUM/DEN                                                   ANGR0040
      RMS = RMS*1000.                                                  ANGR0050
      VAR = RMS**2                                                     ANGR0060
      RETURN                                                           ANGR0070
      END                                                              ANGR0080


      SUBROUTINE EGAIN( GNORM , ANG1, ANG2, BWDR )                     EGAN0010
C     THIS SUBROUTINE COMPUTES NORMALIZED GAIN,GNORM, FOR SINX/X       EGAN0020
C       ANTENNA FOR VARIOUS ANGLES OFF BORESIGHT                       EGAN0030
C     THIS GAIN FUNCTION IS BASED ON A RECTANGULAR APERTURE WITH       EGAN0040
C       UNIFORM ILLUMINATION (BARTON &WARD,PAGE 24)                    EGAN0050
      PI2 = 1.5707963                                                  EGAN0060
      PHEE = ANG1 - ANG2                                               EGAN0070
      X = (2.783451*SIN(PHEE))/BWDR                                    EGAN0080
      AX = ABS(X)                                                      EGAN0090
      IF(AX.LT.1.E-5) GO TO 10                                         EGAN0100
      GNORM =  SIN(X)/X                                                EGAN0110
      ABPHEE = ABS(PHEE)                                               EGAN0120
      IF(ABPHEE.GT.PI2)  GNORM = .001                                  EGAN0130
      RETURN                                                           EGAN0140
   10 GNORM = 1.0                                                      EGAN0150
      RETURN                                                           EGAN0160
      END                                                              EGAN0170


      SUBROUTINE SIGOS(ISS,XLAMDA,PSI,SIGODB)                          SIG 0010
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      DIMENSION STOR(8,9,6)                                                  SIG 0020
      DIMENSION S1(8,9),S2(8,9),S3(8,9),S4(8,9),S5(8,9),S6(8,9)              SIG 0030
      EQUIVALENCE (STOR(1,1,1),S1(1)), (STOR(1,1,2),S2(1)),                  SIG 0040
     1 (STOR(1,1,3),S3(1)),(STOR(1,1,4),S4(1)),(STOR(1,1,5),S5(1)),          SIG 0050
     2 (STOR(1,1,6),S6(1))                                                   SIG 0060
      DATA S1 / 809.,1.765,3.226,5.357,10.,24.,60.,150.,                     SIG 0070
     1 .0017453,-62.,-80.,-87.,-90.,-108.,-99.,-103.,                        SIG 0080
     2 .0052359,-56.,-73.,-79.,-83.,-95.,-93.,-97.,                          SIG 0090
     3 .0174532,-49.,-66.,-70.,-73.,-80.,-86.,-90.,                          SIG 0100
     4 .0523598,-49.,-58.,-68.,-68.,-72.,-75.,-79.,                          SIG 0110
     5 .1745329,-41.,-56.,-67.,-67.,-60.,-62.,-66.,                          SIG 0120
     6 .5235987,-32.,-57.,-62.,-52.,-50.,-49.,-53.,                          SIG 0130
     7 1.0471975,-22.,-34.,-25.,-32.,-32.,-32.,-36.,                         SIG 0140
     8 1.5707962,-18.,-11.,-3.,-7.,-10.,-15.,-19./                           SIG 0150
      DATA S2 / 809.,1.765,3.226,5.357,10.,24.,60.,150.,                     SIG 0160
     1 .0017453,-58.,-68.,-75.,-80.,-99.,-97.,-101.,                         SIG 0170
     2 .0052359,-52.,-59.,-71.,-74.,-87.,-91.,-95.,                          SIG 0180
     3 .0174532,-45.,-51.,-56.,-65.,-73.,-84.,-88.,                          SIG 0190
     4 .0523598,-45.,-48.,-54.,-59.,-62.,-70.,-74.,                          SIG 0200
     5 .1745329,-38.,-51.,-53.,-58.,-56.,-57.,-61.,                          SIG 0210
     6 .5235987,-30.,-51.,-48.,-44.,-46.,-45.,-49.,                          SIG 0220
     7 1.0471975,-20.,-26.,-26.,-25.,-24.,-22.,-26.,                         SIG 0230
     8 1.5707962,-16.,-11.,-2.,-5.,-10.,-11.,-15./                           SIG 0240
      DATA S3/ 809.,1.765,3.226,5.357,10.,24.,60.,150.,                      SIG 0250
     1 .0017453,-54.,-61.,-67.,-75.,-90.,-95.,-99.,                          SIG 0260
     2 .0052359,-48.,-53.,-60.,-66.,-78.,-89.,-93.,                          SIG 0270
     3 .0174532,-41.,-46.,-48.,-55.,-65.,-82.,-86.,                          SIG 0280
     4 .0523598,-41.,-42.,-48.,-53.,-59.,-66.,-70.,                          SIG 0290
     5 .1745329,-35.,-43.,-46.,-51.,-53.,-53.,-57.,                          SIG 0300
     6 .5235987,-28.,-44.,-42.,-40.,-41.,-42.,-46.,                          SIG 0310
     7 1.0471975,-19.,-23.,-22.,-23.,-21.,-22.,-26.,                         SIG 0320
     8 1.5707962,-15.,-11.,-1.,-4.,-9.,-11.,-15./                            SIG 0330
      DATA S4/ 809., 1.765,3.226,5.357,10.,24.,60.,150.,                     SIG 0340
     1 .0017453,-50.,-53.,-60.,-68.,-82.,-90.,-94.,                          SIG 0350
     2 .0052359,-44.,-46.,-50.,-58.,-72.,-82.,-86.,                          SIG 0360
     3 .0174532,-37.,-40.,-43.,-48.,-60.,-76.,-80.,                          SIG 0370
     4 .0523598,-37.,-39.,-42.,-46.,-55.,-61.,-65.,                          SIG 0380
     5 .1745329,-33.,-37.,-40.,-46.,-48.,-50.,-54.,                          SIG 0390
     6 .5235987,-27.,-34.,-37.,-38.,-39.,-40.,-44.,                          SIG 0400
     7 1.0471975,-17.,-21.,-20.,-22.,-20.,-21.,-25.,                         SIG 0410
     8 1.5707962,-13.,-11.,-1.,-4.,-8.7,-11.,-15./                           SIG 0420
      DATA S5/ 809.,1.765,3.226,5.357,10.,24.,60.,150.,                      SIG 0430
     1 .0017453,-47.,-48.,-55.,-58.,-73.,-88.,-92.,                          SIG 0440
     2 .0052359,-41.,-42.,-45.,-50.,-63.,-78.,-82.,                          SIG 0450
     3 .0174532,-34.,-36.,-39.,-42.,-52.,-69.,-53.,                          SIG 0460
     4 .0523598,-34.,-35.,-38.,-41.,-48.,-57.,-61.,                          SIG 0470
     5 .1745329,-31.,-34.,-36.,-41.,-45.,-48.,-52.,                          SIG 0480
     6 .5235987,-24.,-33.,-35.,-37.,-37.,-39.,-43.,                          SIG 0490
     7 1.0471975,-15.,-20.,-15.,-21.,-18.,-21.,-25.,                         SIG 0500
     8 1.5707962,-11.,-11.,0.,-2.,-8.,-11.,-15./                             SIG 0510
      DATA S6/809.,1.765,3.226,5.357,10.,24.,60.,150.,                       SIG 0520
     1 .0017453,-44.,-42.,-48.,-53.,-65.,-84.,-88.,                          SIG 0530
     2 .0052359,-38.,-39.,-41.,-44.,-58.,-75.,-79.,                          SIG 0540
     3 .0174532,-31.,-33.,-35.,-42.,-50.,-65.,-69.,                          SIG 0550
     4 .0523598,-30.,-32.,-34.,-37.,-46.,-53.,-57.,                          SIG 0560
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     5 .1745329,-29.,-31.,-33.,-38.,-43.,-46.,-50.,                    SIG 0570
     6 .5235987,-22.,-30.,-33.,-32.,-34.,-38.,-42.,                    SIG 0580
     7 1.0471975,-8.,-19.,-13.,-20.,-18.,-20.,-24.,                    SIG 0590
     8 1.5707962,-9.,-11.,+1.,-1.,-8.,-11.,-15./                       SIG 0600
      JZ = ISS + 1                                                     SIG 0610
      CALL TAU23(STOR,8,9,6,JZ,XLAMDA,PSI,SIGOCB,INDY,INDX,IN,INC)     SIG 0620
C     IF(INY.NE.0.OR.INX.NE.0) STOP                                    SIG 0630
      RETURN                                                           SIG 0640
      END                                                              SIG 0650
```

3.0 SUBPROGRAM FUNCTIONAL INDEX

The following index references each subprogram in the same order as the appendix listing. Comments added pertain to the function of subprograms.

Page	Subprogram	Comments
N-5	MAIN	NEM Executive main program; controls all functions.
N-7	PAGE	Pages all output with page numbers, classification, etc.
N-8	WCBD11	Writes basic tables on disk 11.
N-10	WMAT3	Writes matrices.
N-10	WRITRX	Writes matrices.
N-11	SORT	Rank orders a list of values from smallest to largest.
N-11	KORDER	Orders an array of integers from smallest to largest.
N-12	TBASIC	Basic table processing executive routine.
N-16	WBASIC	Writes basic tables.
N-17	UPDA	Namelist update of basic tables.
N-20	STRING	Manipulates strings of data on a sequential data set.
N-22	CARD	Read and list input data cards.
N-22	UNIQUE	Lists the unique values found in a general array of values.
N-23	SETUPA	Sets up group routes from basic table inputs.
N-28	NAVIT	Sets up group routes and initial positions.
N-30	UNISET	Sets up units from basic table inputs.
N-32	SETUPB	Sets up platforms vs subsystems from basic table inputs.
N-37	SETUPC	Sets up ASM-SSM subsystem data from basic table inputs.
N-45	STTRAJ	Sets up missile trajectory velocity-altitude profiles.
N-46	SETUPD	Sets up misc. weapon & SAM subsystem data.
N-54	SETUPE	Sets up Radar, Sonar and Jammer subsystem data.
N-61	SETUPF	Sets up cruise missile homing radars and other general data.
N-65	UCHEK	Utility driver for checking Navigation and Radar models.
N-65	RADCK	NEM Radar model checker.

Page	Subprogram	Comments
N-67	XECUTE	Begins engagement model. Defines and allocates dynamic storage.
N-69	SETDS	Dynamic storage monitor.
N-72	ENGAGE	Engagement executive routine.
N-77	TILOOP	Engagement logic.
N-81	HVTGT	High value target designation and priorities.
N-82	GCDATA	Initializes group center data.
N-83	SONARM	Computes ranges for sonar systems.
N-83	SYSTEM	Sets up subsystems for each unit prior to engagement.
N-92	SYSTST	Tests for specific subsystem in platform-subsystem matrix.
N-93	ALLXYZ	Computes and outputs position, velocity and status for units on routes.
N-96	BLUXYZ	Interpolates position-velocity of group centers.
N-98	GRPMOV	Fast interpolation of group center position-velocity.
N-99	TUXYZ	Computes position-velocity of units on intercept trajectories.
N-102	GRTEST	Computes time for a specified range between units.
N-102	GUID	Computes guidance errors.
N-104	INCEPT	Computes time and position of intercept between units.
N-105	RELATE	Determines interaction intervals between units.
N-109	NQUIRE	Checks the information matrix for existing data between units.
N-110	ADDSEG	Adds data to the information matrix.
N-111	UPSEG	Updates existing data in the information matrix.
N-111	DETECT	Governs detection between units. Calls Radar Model.
N-117	SHIPXS	Adjusts radar cross-section of ships for horizon masking.
N-118	ALLOCA	Governs weapon allocation between units.
N-132	SAMLT	Computes launch and flight times for SAM intercepts.
N-138	CONINT	Interpolates SAM launch envelope data.
N-139	WPNTRM	Governs weapon termination of SAM's, torpedoes, ASW, etc.

Page	Subprogram	Comments
N-141	KILLEX	Evaluates terminal effects for all weapon-target combinations.
N-151	KILLHE	Evaluates ship damage due to HE and nuclear weapons.
N-153	DELSEG	Deletes obsolete data from the information matrix.
N-153	STATE	Computes the state code for ship targets.
N-154	URN	Uniformly distributed random number generators.
N-154	XNRN	Normally distributed random number generator.
N-154	ACMTRM	Governs termination of attack A/C and cruise missiles.
N-156	TLU23	Table look-up interpolation utility.
N-157	WRAD	Computes weapon radii for nuclear weapons.
N-159	STATUS	Updates engagement status at end of each time step.
N-162	USTAT	Updates unit status at end of each time step.
N-164	SNAP	Outputs position, velocity and status for units on intercept trajectories.
N-166	SUMOUT	Outputs engagement results in summary format.
N-168	BLOCK DATA-A	Data initialization, default values.
N-169	BLOCK DATA-B	Data initialization, default values.
N-170	RADAR	Radar model executive routine.
N-177	FFACT	Pattern propagation factor due to multipath and sidelobe.
N-181	MARSWR	Single look probability of detection using Swerling Case No., S/N, number of pulses integrated, and false alarm exponent.
N-186	FGCSC	Cosecant squared antenna gain vs. angle off boresight.
N-187	DGAM	Function supporting MARSWR.
N-187	DEVAL	" " "
N-188	GAM	" " "
N-188	EVAL	" " "
N-189	SUMLOG	" " "

Page	Subprogram	Comments
N-189	INVERT	Function supporting FFACT.
N-190	ESS	" " "
N-190	SEAREF	" " "
N-191	DFRACT	" " "
N-192	UFCN	" " "
N-192	CURVIT	" " "
N-193	MATALG	" " "
N-194	ANGER	Variance of track angle error.
N-194	FGAIN	Sin x/x antenna gain vs. angle off boresight.
N-194	SIGOS	Backscatter coefficient of sea clutter in db.

4.0 SUBPROGRAM ALPHABETICAL INDEX

Subprogram	Page	Subprogram	Page	Subprogram	Page
ACMTRM	N-154	GRTEST	N-102	SETUPD	N-46
ADDSEG	N-110	GUID	N-102	SETUPE	N-54
ALLOCA	N-118			SETUPF	N-61
ALLXYZ	N-93	HVTGT	N-81	SHIPXS	N-117
ANGER	N-194			SIGOS	N-194
		INCEPT	N-104	SNAP	N-164
BLOCK DATA-A	N-168	INVERT	N-189	SONARM	N-83
BLOCK DATA-B	N-169			SORT	N-11
BLUXYZ	N-96	KILLEX	N-141	STATE	N-153
		KILLHE	N-150	STATUS	N-159
CARD	N-22	KORDER	N-11	STRING	N-20
CONINT	N-138			STTRAJ	N-45
CURVIT	N-192	MAIN	N-5	SUMLOG	N-189
		MARSWR	N-181	SUMOUT	N-166
DELSEG	N-153	MATALG	N-193	SYSTEM	N-83
DETECT	N-111			SYSTST	N-93
DEVAL	N-187	NAVIT	N-28		
DFRACT	N-191	NQUIRE	N-109	TBASIC	N-12
DGAM	N-187			TILOOP	N-77
		PAGE	N-7	TLU23	N-156
ENGAGE	N-72			TUXYZ	N-99
ESS	N-190	RADAR	N-170		
EVAL	N-188	RADCK	N-65	UCHEK	N-65
		RELATE	N-105	UFCN	N-192
FFACT	N-177			UNIQUE	N-22
FGAIN	N-194	SAMLT	N-132	UNISET	N-30
FGCSC	N-186	SEAREF	N-190	UPDA	N-17
		SETDS	N-69	UPSEG	N-111
GAM	N-188	SETUPA	N-23	URN	N-154
GCDATA	N-82	SETUPB	N-32	USTAT	N-162
GRPMOV	N-98	SETUPC	N-37		

Subprogram	Page
WBASIC	N-16
WCBD11	N-8
WMAT3	N-10
WPNTRM	N-139
WRAD	N-157
WRITRX	N-10
XECUTE	N-67
XNRN	N-154