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ROTORCRAFT FLIGHT SIMULATION, COMPUTER PROGRAM C81
Volume III - Programmer's Manual

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October 1979

Final Report for Period November 1976 - August 1977

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This report documents an engineering analysis and resulting computer programs for the evaluation of rotary-wing aircraft performance, handling qualities, rotor blade loads, maneuvering characteristics, and rotor system aeroelastic stability through application of the modal technique to the rotor blade equations of motion and stepwise integration of the time domain equations for the rotor, hub, aircraft and control system. The primary computer programs associated with the current effort are the Mykestad Program, for computing rotor blade natural frequencies and mode shapes; and the Rotorcraft Flight Simulation, Computer Program C81, for computing the wide variety of flight characteristics listed above.

The version of C81 developed under this contract is designated version AGAJ77. The immediately preceding version in the public domain is designated version AGAJ76. AGAJ77 differs from AGAJ76 in the following respects: an improved autopilot; more comprehensive elastic rotor analysis; an improved engine/governor model; an improved wake analysis; and enhanced output capabilities. While most of these improvements were successfully installed in the computer software, extensive difficulties were experienced in the implementation of the elastic rotor refinements. While the other improvements may make the AGAJ77 version preferable for many types of studies, AGAJ76 is recommended for the examination of rotor dynamics and loads. In using either program, some evaluation of the program's applicability to the problem under investigation through correlation with existing data is a judicious first step.

The Project Engineer for this contract was Mr. Edward E. Austin, Aeromechanics Technical Area, Aeronautical Technology Division.

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report consists of three volumes and documents the current version in the C81 family of rotorcraft flight simulation programs developed by Bell Helicopter Textron. This current version of the digital computer program is referred to as AGAJ77. The accompanying program for calculating fully coupled rotor blade mode shapes is called DNAM05, and the rotor wake program is called AR9102.

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20. Continued

The new or revised mathematical models or documentation incorporated into this report are listed below:

(1) The maneuver autopilot was modified to accept four more time history commands (pitch, roll, yaw, and climb rates) in addition to the normal load factor. A digital filter is used to process the airframe response signal in order to reduce the b-per-rev component and to smooth the autopilot-generated control commands.

(2) The effects of an offset pitch change axis have been incorporated in DNAM05 and C81.

(3) A first-order lag has been introduced into the engine power available calculations.

(4) The rotor-induced velocity distribution tables have been modified to be functions of advance ratio and wake-plane angle of attack. An average induced velocity table has been added to the analysis. In addition, the digital filter is used in the calculations to reduce the oscillation of the induced velocity experienced in previous versions of C81.

(5) A rotor contour plot option has been added.

(6) Time-history plots may now be made after time-variant trim.

(7) The rotorcraft flightpath stability analysis (STAB) has been modified to output the numerators of more transfer functions.

The first volume, the Engineer's Manual, presents an overview of the computer program capabilities plus discussions for the background and development of the principal mathematical models in the program. The models discussed include all those currently in the program.

Volume II, the User's Manual, contains the detailed information necessary for setting up an input data deck and interpreting the computed data. Volume III, the Programmer's Manual, includes a catalog of subroutines and a discussion of programming considerations. The source tapes and related software for the computer programs documented in this report are unpublished data on file at the Applied Technology Laboratory, U. S. Army Research and Technology Laboratories (AVRADCOM), Fort Eustis, Virginia.

PREFACE

This report and its accompanying computer program were developed under Contract DAAJ02-77-C-0003 awarded in 1976 by the Eustis Directorate of the U. S. Army Air Mobility Research and Development Laboratory (USAAMRDL)*. This report supersedes all previous versions of the program and documentation, including USAAMRDL-TR-76-41A, B, C. A042 462, 907, 908

Technical program direction was provided by Mr. E. E. Austin of ATL. The principal Bell Helicopter personnel associated with the current contract were Messrs. J. R. Van Gaasbeek, T. T. McLarty, P. Y. Hsieh, and Dr. S. G. Sadler.

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TABLE OF CONTENTS

	Page
PREFACE	3
LIST OF ILLUSTRATIONS	6
LIST OF TABLES	6
1.0 INTRODUCTION	7
2.0 OPERATING ENVIRONMENT AND PROCEDURES	8
2.1 Program Installation	8
2.2 Data Library	17
3.0 GENERAL PROGRAMMING AIDS	20
3.1 Macro Flow Charts	20
3.2 FORTRAN Subroutines in AGAJ77	20
3.3 Assembly Language Subprogram in AGAJ77	37
3.4 FORTRAN Subroutines in GDAJ77	38
3.5 Labeled Commons in AGAJ77	39
3.6 Labeled Commons in GDAJ77	42
4.0 DETAILED PROGRAMMING AIDS	43
4.1 Control Section Cross-Reference	43
4.2 Layout of Maneuver Variables	70
4.3 Program Delivery	70
4.4 AGAJ77 Dictionary	73
4.5 Switch for Diagnostic Data From STAB	73

LIST OF ILLUSTRATIONS

Figure		Page
1	Execution of AGAJ77 and GDAJ77	16
2	AGAJ77 Input Data Decks.	19
3	Flow Chart of System Structure	21
4	Flow Chart of Trim Process	22
5	Flow Chart of Flightpath Stability Analysis.	23
6	Flow Chart of Maneuver	24
7	Flow Chart of GDAJ77	25

LIST OF TABLES

Table		Page
1	Linkage Editor Control Cards for OVERLAY of AGAJ77 (the 400K version)	9
2	Linkage Editor Control Cards for OVERLAY of AGAJ77 (the 520K version)	10
3	Linkage Editor Control Cards for OVERLAY of GDAJ77.	12
4	Job Control Language to Run AGAJ77 and GDAJ77.	13
5	Input/Output Units Used in AGAJ77.	14
6	Input/Output Units Used in GDAJ77.	15
7	Control Section Cross-Reference for AGAJ77	44
8	Control Section Cross-Reference for GDAJ77	65
9	Layout of Maneuver Variables	71
10	Sample Output from Global Cross-Reference.	72
11	AGAJ77 Dictionary.	74
12	STAB Diagnostic Switch in AGAJ77	90

1.0 INTRODUCTION

This manual documents the Rotorcraft Flight Simulation Program, designated AGAJ77, and its postprocessor for data reduction, designated GDAJ77. To the user, this system appears as a single program; to the programmer, the two programs are very different. This documentation is for the programs as they were written for, and are being used on, an IBM System/370 Model 168 computer at Bell Helicopter Textron.

The information in this volume is of two types. Section 2 contains the information necessary to get the programs operational on a computer compatible with the installation at Bell Helicopter Textron. If the programs are to be modified in any way, the programmer will need the information in Sections 3 and 4 of this volume.

2.0 OPERATING ENVIRONMENT AND PROCEDURES

2.1 PROGRAM INSTALLATION

The System/370 environment under which this program is maintained is IBM 370/168 OS/VS2, Release 1.7. It has 16 megabytes of virtual storage and five megabytes of real storage. Input on the system reader is controlled by the Houston Automatic Spooling Program (HASP) II, as is system output destined for an on-line printer or card punch. Scratch data sets are directed to IBM 3330 direct access storage devices. Tape data sets are recorded by Storage Technology Corporation 3430 tape drives, which are 9-track, 1600 bpi. The CalComp 900 plotting controller reads the IBM standard label, 9-track, 1600-bpi tape. It controls a 36-inch CalComp 763 incremental plotter.

The program has been maintained with the IBM System/370 FORTRAN IV H Extended Compiler, which is compatible with the Control Data Corporation (CDC) FTN-4 Compiler. Some of the options of the H-Extended Compiler used by this program are SOURCE, EBCDIC, NOLIST, NODECK, OBJECT, MAP, NOFORMAT, GOSTMT, XREF, and OPTIMIZE(2). Among these, OBJECT, NOFORMAT, GOSTMT, and OPTIMIZE(2) are equivalent to the options of LOAD, NOEDIT, ID, and OPT=2, respectively, on the IBM FORTRAN IV H Compiler. Some special features that are available on the H Extended Compiler but not on the H Compiler have been avoided so that the H Extended Compiler will not constitute a restriction in getting this program operational. Since the compiler performs essential optimization functions, compilation of this program by using an optimization level less than "2" will result in decreased speed. This program requires a region of 320K* for the compilation step.

AGAJ77 can be link-edited in several different ways. The entire program can be loaded to main memory either with or without OVERLAY structure. It can also be loaded to main and/or extended memories with the HIARCHY support structures. The OVERLAY structures developed under this contract for AGAJ77 are shown in Table 1 and Table 2. The 400K version of AGAJ77 uses the OVERLAY structure given in Table 1. The 520K version of AGAJ77 utilizes the OVERLAY structure of Table 2. Section 4.3 describes the differences between the two versions. Without overlay the two versions would require 750K and 850K, respectively. The best way to link-edit this program depends upon the facilities available at the local installation. At

---

*"1K" is the abbreviation for kilobyte. On an IBM machine, 1K is 1024 bytes.

TABLE 1. LINKAGE EDITOR CONTROL CARDS FOR OVERLAY OF AGAJ77 (THE 400K VERSION).

```
OVERLAY ONE0  INITIALIZATION SEGMENT    ...THE FIRST REGION...          00000100
   INSERT PDSRED,REDID,REDRWK,REDSWK,START,WKTABN                       00000200
   INSERT IHONAMEL                                                      00000300
   INSERT ERRCHK,JSTRED,LGCINT,LIZE,MANTYP,MNEM,NPUTOT                  00000400
   INSERT READIN,REDATB,REDBMS,REDCL,TABFIX,TABOUT,TURN                 00000500
   INSERT YRINIT,YSINIT,XSTINT,ZERO                                     00000600
   INSERT BMSINT,ENGINT,FSMINT,FUSINT,INBLD,INBMSS,INRO,INRTR           00000700
   INSERT INSCAS,JFBGIN,MAXHP,MODAL,PYLINT,RTINIT,SHKINT                00000800
   INSERT STBZIN,WRMODE,XCONIN                                          00000900
   INSERT INONLY                                                        00001000
OVERLAY ONE0  HARMONIC ANALYSIS                                         00001100
   INSERT HARM,LOADT                                                    00001200
OVERLAY ONE0  STABILITY ANALYSIS SEGMENT                                00001300
   INSERT ALLMAT,ALSTAB,IMFRMP,INVERS,IOMAT                             00001400
   INSERT MDRDRS,MODES,PUNCH,SWAP,WRMS,WRTFUN                           00001500
   INSERT STBCOM,STBFRQ                                                 00001600
OVERLAY ONE0  GENERAL PURPOSE SEGMENT                                   00001700
   INSERT ANAL,AZMINT,AZMOUT,AZMUTH,BDPFDD,BLACC,BUNDER,BUTFLT          00001800
   INSERT CDCL,CLCD,CMCALC,DIFFER,DOTX,FILTER,FOCUS,FORCMC              00001900
   INSERT FPYLAC,FRCGOF,FUSFNM,HRESP,INTFRO,ITROT,MBAL,PDPFDD           00002000
   INSERT PYLACC,RADBGN,RADIAL,RADOUT,RGUST,ROTAN                       00002100
   INSERT RTWAKE,RVRGST,SHKCTL,SHRPYL,SOLVE,STBTAK                      00002200
   INSERT STBFNM,SWSRAT,TABINT,TFRTWK,TIMEQQ,TRMANU                     00002300
   INSERT UNSDER,UNSTED,WING,WRFM,WRTMNV,WSHDUF,XSTORE                  00002400
   OVERLAY ONE1  MANEUVER AND STABILITY ANALYSIS SEGMENTS               00002500
      INSERT AJACOB,NCDAMP,JACOBI,WRVP                                  00002600
      OVERLAY ONE2  STABILITY ANALYSIS SEGMENT                          00002700
         INSERT INSTAB,STAB,WRINST,WRPERT,WRSTAB                        00002800
      OVERLAY ONE2  TRIM SEGMENT                                        00002900
         INSERT TRIM,TVTRIM                                             00003000
         OVERLAY ONE3                                                   00003100
            INSERT ITRIM,PDZERO,PRETVT                                  00003200
         OVERLAY ONE3                                                   00003300
            INSERT WRTRIM                                               00003400
         OVERLAY ONE3                                                   00003500
            INSERT RPTPG                                                00003600
   OVERLAY ONE1  MANEUVER SEGMENT                                       00003700
      INSERT DERIV,FUSACC,MANU,QSBDPF,QUAN,SCASIT,VARI                  00003800
      OVERLAY ONE2                                                      00003900
         INSERT CNTM,MOMB                                               00004000
      OVERLAY ONE2                                                      00004100
         INSERT EXTORS,SUPERP                                           00004200
      OVERLAY ONE2                                                      00004300
         INSERT GUST,VORGST                                             00004400
      OVERLAY ONE2                                                      00004500
         INSERT MTLT,WAG,VGUNS,VSCAS                                    00004600
OVERLAY TWO0(REGION)  MANEUVER SEGMENT  ...THE SECOND REGION...         00004700
   INSERT TIMLP                                                         00004800
   OVERLAY TWO1                                                         00004900
      INSERT WRMANU                                                     00005000
   OVERLAY TWO1                                                         00005100
      INSERT RESTRT                                                     00005200
      OVERLAY TWO2                                                      00005300
         INSERT SIVAR                                                   00005400
      OVERLAY TWO2                                                      00005500
         INSERT TIVAR                                                   00005600
ENTRY MAIN                                                              00005700
```

TABLE 2. LINKAGE EDITOR CONTROL CARDS FOR OVERLAY OF AGAJ77 (THE 520K VERSION).

```
OVERLAY ONE0  INITIALIZATION SEGMENT   ...THE FIRST REGION...          00000100
   INSERT PDSRED,REDID,REDRWK,REDSWK,START,WKTABN                      00000200
   INSERT IHONAMEL                                                     00000300
   INSERT ERRCHK,JSTRED,LGCINT,LIZE,MANTYP,MNEM,NPUTOT                 00000400
   INSERT READIN,REDATB,REDBMS,REDCL,TABFIX,TABOUT,TURN                00000500
   INSERT YRINIT,YSINIT,XSTINT,ZERO                                    00000600
   INSERT BMSINT,ENGINT,FSMINT,FUSINT,INBLD,INBMSS,INRO,INRTR          00000700
   INSERT INSCAS,JFBGIN,MAXHP,MODAL,PYLINT,RTINIT,SHKINT               00000800
   INSERT STBZIN,WRMODE,XCONIN                                         00000900
   INSERT INONLY                                                       00001000
OVERLAY ONE0  HARMONIC ANALYSIS                                        00001100
   INSERT HARM,LOADT                                                   00001200
OVERLAY ONE0  STABILITY ANALYSIS SEGMENT                               00001300
   INSERT ALLMAT,ALSTAB,IMFRMP,INVERS,IOMAT                            00001400
   INSERT MDRDRS,MODES,PUNCH,SWAP,WRMS,WRTFUN                          00001500
   INSERT STBCOM,STBFRQ                                                00001600
OVERLAY ONE0  GENERAL PURPOSE SEGMENT                                  00001700
   INSERT ANAL,AZMINT,AZMOUT,AZMUTH,BDPFDD,BLACC,BUNDER,BUTFLT         00001800
   INSERT CDCL,CLCD,CMCALC,DIFFER,DOTX,FILTER,FOCUS,FORCMC             00001900
   INSERT FPYLAC,FRCGOF,FUSFNM,HRESP,INTERQ,ITROT,MBAL,PDPFDD          00002000
   INSERT PYLACC,RADBGN,RADIAL,RADOUT,RGUST,ROTAN                      00002100
   INSERT RTWAKE,RVRGST,SHKCTL,SHRPYL,SOLVE,STBWAK                     00002200
   INSERT STBFNM,SWSRAT,TABINT,TERTWK,TIMEQQ,TRMANU                    00002300
   INSERT UNSDER,UNSTED,WING,WRFM,WRTMNV,WSHDUF,XSTORE                 00002400
   OVERLAY ONE1  MANEUVER AND STABILITY ANALYSIS SEGMENTS              00002500
      INSERT AJACOB,NCDAMP,JACOBI,WRVP                                 00002600
      OVERLAY ONE2  STABILITY ANALYSIS SEGMENT                         00002700
         INSERT INSTAB,STAB,WRINST,WRPERT,WRSTAB                       00002800
      OVERLAY ONE2  TRIM SEGMENT                                       00002900
         INSERT TRIM,TVTRIM                                            00003000
         OVERLAY ONE3                                                  00003100
            INSERT ITRIM,PDZERO,PRETVT                                 00003200
            INSERT WRTRIM                                              00003300
         OVERLAY ONE3                                                  00003400
            INSERT RPTPG                                               00003500
   OVERLAY ONE1  MANEUVER SEGMENT                                      00003600
      INSERT DERIV,FUSACC,MANU,QSBDPF,QUAN,SCASIT,VARI                 00003700
      OVERLAY ONE2                                                     00003800
         INSERT CNTM,MOMB                                              00003900
         INSERT EXTORS,SUPERP                                          00004000
      OVERLAY ONE2                                                     00004100
         INSERT GUST,VORGST                                            00004200
         INSERT MTLT,WAG,VGUNS,VSCAS                                   00004300
OVERLAY TWO0(REGION)  MANEUVER SEGMENT  ...THE SECOND REGION...        00004400
   INSERT TIMLP                                                        00004500
   OVERLAY TWO1                                                        00004600
      INSERT WRMANU                                                    00004700
   OVERLAY TWO1                                                        00004800
      INSERT RESTRT                                                    00004900
      OVERLAY TWO2                                                     00005000
         INSERT SIVAR                                                  00005100
      OVERLAY TWO2                                                     00005200
         INSERT TIVAR                                                  00005300
ENTRY MAIN                                                             00005400
```

Bell Helicopter, this program uses an OVERLAY structure which differs from those shown in this volume. The major purpose of the overlay at Bell is to reduce the paging rate of a virtual storage system. The OVERLAY structures documented in this volume are indented and commented to improve readability. The indentation is based on the levels of the overlay tree.

The input data to the linkage editor for GDAJ77 are listed in Table 3. The OVERLAY structure results in a program whose longest segment is less than 340K.

As shown on Table 1, the OVERLAY structure of the 400K version uses many levels as well as multiple regions. Since a CDC computer allows only three levels on an overlay structure, the required region (core) size would differ considerably if the 400K version is loaded on a CDC computer. In addition, the accuracy, buffer size, number of buffers, FORTRAN library routines, I/O handling routines, and error handling routine are all different. Since the definition of 1K is also different, it is extremely difficult to determine the required region size for the 400K version on a CDC computer. However, based on past experience, it is estimated that the 400K version can run on a CDC computer under 300K with $1K=(1000)_8$ words.

The Job Control Language (JCL) used to run a typical set of data is shown in Table 4. The major portion of Table 4 depicts an instream PROCEDURE named C8177. The first step, C81STEP1, of C8177 executes AGAJ77, and the second step, C81STEP2, executes GDAJ77. As shown in Table 4, the second step has EVEN as one of the subparameters of COND. This will ensure that post processing is performed in the second step even if the first step abends.

Table 5 and Table 6 list the input/output units used by AGAJ77 and GDAJ77, respectively. Figure 1 shows the input/ output allocations of Tables 5 and 6. Under the INPUT column in Figure 1, CARD represents the instream input to AGAJ77, TAPE represents the restart tape input to AGAJ77, and DISK represents either the data library, disk storage of all arrays that can be changed by the namelist option, or disk storage of the instream input. DISK provides the capability of backing up (BACKSPACE). Under the OUTPUT/INPUT column, PRINT is for the printout from AGAJ77, TAPE for the output of a new restart tape from AGAJ77, DISK for disk storage of maneuver time-histories, disk storage of trim conditions for a maneuver perturbation case, disk storage of maneuver J-cards, disk storage of contour plot data from trim and maneuver, and disk storage of time histories from time-variant trims of AGAJ77.

TABLE 3. LINKAGE EDITOR CARDS FOR OVERLAY OF GDAJ77.

```
OVERLAY ONE                                                                    00000100
   INSERT PLOT,SCLFIX                                                          00000200
   OVERLAY TWO                                                                 00000300
      INSERT CNTPLT,CONTUR,CURVET,CSIL,HEADS,LHEAD,MOVBLK,RANGE                00000400
   OVERLAY TWO                                                                 00000500
      INSERT BUFF,LINE,NUMBER,SYMBOL                                           00000600
      OVERLAY THREE                                                            00000700
         INSERT AXIS,FSET,HARM,PLOTER,SCALE#                                   00000800
      OVERLAY THREE                                                            00000900
         INSERT CALCS1,INPLOT,PPLOT,SCALIT                                     00001000
OVERLAY ONE                                                                    00001100
   INSERT ALLMAT,DLLSQ,EXPON,PRONY,VSRTPM,YNORP                                00001200
ENTRY MAIN                                                                     00001300
```

TABLE 4. JOB CONTROL LANGUAGE TO RUN AGAJ77 AND GDAJ77.

```
//ESAP7  JOB (AGAJ77,G38,676515,DP91,T5),'PY                    2841',          00000010
//     NOTIFY=ESAP,MSGLEVEL=1,CLASS=X,MSGCLASS=A                                 00000020
//C8177   PROC PRUG=AGAJ77,LIB='ESAP.C81.LUAD',                                  00000030
//             GRAPH=GDAJ77,LIB1='ESAP.C81.LUAD',                                00000040
//             LRL=9504,BLK=9508,SIZE1=520K,SIZE2=340K,                          00000050
//             RESTI=NULLFILE,RESTO=NULLFILE,THIN=NULLFILE,                      00000060
//             THOUT=NULLFILE,THSER=0,SYSPLOT=NULLFILE,                          00000070
//             DAYMAN=98010,DAYPLT=98003,DAYRST=99000                            00000080
//*                                                                              00000090
//*            PARAMETERS ON THE EXEC STATEMENT:                                 00000100
//*       NAME      DEFAULT        USAGE                                        00000110
//*       -----     ---------      ---------------------------------------      00000120
//*       PRUG      AGAJ77         PROGRAM NAME                                 00000130
//*       GRAPH     GDAJ77         POSTPROCESSOR NAME                           00000140
//*       LIB       ESAP.C81.LUAD  LIBRARY WHERE PROGRAM RESIDES                00000150
//*       LIB1      ESAP.C81.LUAD  LIBRARY WHERE POSTPROCESSOR RESIDES          00000160
//*       BLK       6048           BLOCKSIZE OF C81STEP1.FT03F001               00000170
//*                                           C81STEP2.FT03F001                  00000180
//*                                           C81STEP2.FT04F001                  00000190
//*                                           C81STEP2.FT09F001                  00000200
//*       RESTI     NULLFILE       DSNAME FOR RESTART TAPE INPUT                00000210
//*       RESTO     NULLFILE       DSNAME FOR RESTART TAPE OUTPUT               00000220
//*       THIN      NULLFILE       DSNAME FOR TIME HISTORY INPUT                00000230
//*       THOUT     NULLFILE       DSNAME FOR TIME HISTORY OUTPUT               00000240
//*       THSER     0              VOL=SER FOR TIME HISTORY INPUT TAPE          00000250
//*       TPS                      ANY TAPE DRIVE                               00000260
//*       SYSPLOT   NULLFILE       DSNAME FOR PLOT TAPE                         00000270
//*       DAYMAN    98010          RETAIN MANU TAPE FOR 10 DAYS                 00000280
//*       DAYPLT    98003          RETAIN PLOT TAPE FOR 3 DAYS                  00000290
//*       DAYRST    99000          RETAIN RESTART TAPE TILL UNCATLG             00000300
//*                                                                              00000310
//C81STEP1 EXEC PGM=&PROG,REGION=&SIZE1                                          00000320
//STEPLIB  DD   DISP=SHR,DSN=&LIB                                                00000330
//FT01F001 DD   DSN=C81L1B72,LABEL=(,,,IN),DISP=SHR                              00000340
//*             DCB=(RECFM=FB,LRECL=80,BLKSIZE=3120)                             00000350
//FT02F001 DD   UNIT=(TPS,,DEFER),DISP=(,CATLG,DELETE),DSN=&RESTO,               00000360
// LABEL=EXPDT=&DAYRST,DCB=(ENGR,MODEL,RECFM=VS,BLKSIZE=32760),                  00000370
// VOL=(,,,10)                                                                  00000380
//FT03F001 DD   UNIT=(SYSDA,2),SPACE=(CYL,(8,10)),DSN=&MANU,                     00000390
//              DCB=(RECFM=VBS,LRECL=&LRL,BLKSIZE=&BLK),                         00000400
//              DISP=(NEW,PASS)                                                  00000410
//FT04F001 DD   UNIT=(TPS,,DEFER),DISP=OLD,DSN=&RESTI,VOL=(,,,10)                00000420
//FT05F001 DD   DDNAME=IN                                                        00000430
//FT06F001 DD   SYSOUT=A                                                         00000440
//FT07F001 DD   SYSOUT=B,DCB=FUNC=I                                              00000450
//FT08F001 DD UNIT=SYSDA,SPACE=(CYL,(2,10)),DSN=&MANPTB,                         00000460
//              DCB=(RECFM=VBS,LRECL=3996,BLKSIZE=4000),                         00000470
//              DISP=(NEW,DELETE)                                                00000480
//FT10F001 DD   UNIT=SYSDA,SPACE=(CYL,(1,1)),DSN=&SYSIN1,                        00000490
//              DCB=(RECFM=FB,LRECL=80,BLKSIZE=3120),                            00000500
//              DISP=(NEW,PASS)                                                  00000510
//FT11F001 DD   DSN=&SYSIN2,UNIT=SYSDA,SPACE=(CYL,(1,1)),                        00000520
//              DCB=(RECFM=F,BLKSIZE=80),DISP=(NEW,PASS)                         00000530
//FT12F001 DD   DSN=&ROTOR,UNIT=SYSDA,SPACE=(CYL,(2,2)),                         00000540
//              DCB=(RECFM=VBS,LRECL=212,BLKSIZE=4032),                          00000550
//              DISP=(NEW,PASS)                                                  00000560
//FT14F001 DD UNIT=(SYSDA,2),SPACE=(CYL,(20,5)),DSN=&HARM,                       00000570
//              DCB=(RECFM=VBS,LRECL=4628,BLKSIZE=4632),                         00000580
//              DISP=NEW                                                         00000590
//SYSUDUMP DD SYSOUT=A                                                           00000600
//C81STEP2 EXEC PGM=&GRAPH,COND=((4,LE,C81STEP1),EVEN),REGION=&SIZE2             00000610
//STEPLIB  DD   DISP=SHR,DSN=&LIB1                                               00000620
//FT03F001 DD DISP=(NEW,DELETE),DSN=&MANEUVR,UNIT=(SYSDA,2),                     00000630
//              SPACE=(CYL,(8,4)),                                               00000640
//              DCB=(RECFM=VBS,LRECL=&LRL,BLKSIZE=&BLK)                          00000650
//FT04F001 DD DISP=(OLD,DELETE),DSN=&MANU                                        00000660
//FT06F001 DD   SYSOUT=A                                                         00000670
//FT08F001 DD   UNIT=(TPS,,DEFER),DISP=OLD,DSN=&THIN,VOL=SER=&THSER              00000680
//FT09F001 DD   UNIT=(TPS,,DEFER),DISP=(,KEEP,DELETE),DSN=&THOUT,                00000690
//              DCB=(RECFM=VBS,LRECL=&LRL,BLKSIZE=&BLK),                         00000700
//              LABEL=EXPDT=&DAYMAN                                              00000710
//FT10F001 DD   DISP=(OLD,DELETE),DSN=&SYSIN2                                    00000720
//FT12F001   DD   DSN=&ROTOR,DISP=(OLD,DELETE)                                   00000730
//FT12F002   DD DUMMY                                                            00000740
//FT15F001 DD DSN=&&CONTPLOT,UNIT=SYSDA,SPACE=(CYL,(2,2)),                       00000750
//              DCB=(RECFM=VBS,LRECL=212,BLKSIZE=4032),                          00000760
//              DISP=(NEW,DELETE)                                                00000770
//PLOTTAPE DD   UNIT=(TPS,,DEFER),DSN=&SYSPLOT,VOL=PRIVATE,                      00000780
//              LABEL=EXPDT=&DAYPLT                                              00000790
//SYSUDUMP DD SYSOUT=A                                                           00000800
//     PEND     THIS IS THE END OF THE IN-STREAM PROCEDURE                       00000810
//C77   EXEC C8177,TIME=10                                                       00000820
//IN DD *                                                                        00000830
/*                                                                             00000840
//                                                                             00000850
```

TABLE 5. INPUT/OUTPUT UNITS USED IN AGAJ77

UNIT NO.	TYPE	USED FOR	USED BY SUBROUTINE
1	Direct access	Permanent data storage of the data library	JSTRED, REDATB, REDBMS, REDCL, REDID, REDRWK, REDSWK
2	Tape	New restart tape	RESTRT
3	Direct access	Utility storage of maneuver time history to pass to GDAJ77	INIT, MAIN, MANU, RESTRT
4	Tape	Old restart tape	RESTRT
5	Card reader	Input data	MAIN
6	Printer	Printed output	**
7	Card punch	Punched output	PUNCH
8	Direct access	Utility storage of trim condition	TIMEQ0
		Utility storage of maneuver J-cards	MANU, READIN
		Utility storage of namelist arrays	READIN
10	Direct access	Utility storage of AGAJ77 input data	JSTRED, MAIN, READIN, REDATB, REDBMS, REDCL, REDID, REDRWK, REDSWK
11	Direct access	Passing input data to GDAJ77	MAIN, READIN
12	Direct access	Utility storage of trim and maneuver data for contour plots	DERIV, MAIN, RADOUT
14	Direct access	Utility storage of trim history	LOADT, TVTRIM

** ALSTAB, AZMOUT, AZMUTH, CDCL, CLCD, ERRCHK, EXTORS, FUSACC, FUSINT, HRESP, INBLD, INBMSS, INRO, INSTAB, INVERS, IOMAT, ITRIM, ITROT, JFBGIN, LGCINT, LOADT, MAIN, MANTYP, MANU, MAXHP, MBAL, MNEM, MODAL, NCDAMP, NPUTOT, RADOUT, READIN, REDID, REDRWK, REDSWK, RPTPG, SHKINT, SIVAR, SOLVE, STAB, START, TABOUT, TIVAR, TRIM, TURN, TVTRIM, VIND, WAG, WRFM, WRINST, WRMANU, WRMODE, WRMS, WROT, WRTFUN, WRTMNV, WRTRIM, WRVP, XCONIN, YRINIT, YSINIT

TABLE 6. INPUT/OUTPUT UNITS USED IN GDAJ77

UNIT NO.	TYPE	USED FOR	USED BY SUBROUTINE
3	Direct access	Utility storage of maneuver time history	CURVET, C81L, FSFT, MAIN, MOVBLK, PRONY, SCALIT
4	Direct access	Maneuver time history from AGAJ77 or Tape 8	C81L, MAIN
6	Printer	Printed output	CALC81, CNTPLT, CONPLT, CONTUR, CURVET, C81L, EXPON, FSFT, HEADS, MAIN, MOVBLK, PPLOT, PRONY, WROT
8	Tape	Old time-history tape	C81L, MAIN
9	Tape	New time-history tape	C81L, MAIN
10	Direct access	Input data from AGAJ77	CONTUR, CURVET, C81L, FSFT, MAIN, MOVBLK, PRONY, SCALIT
12	Direct access	Utility storage of trim and maneuver data for contour plots	CONTUR, MAIN
15	Direct access	Utility storage for contour plot data	CONTUR
PLOT-TAPE	Tape	Plot maneuver time history in GDAJ77	CALC81, PLOTER

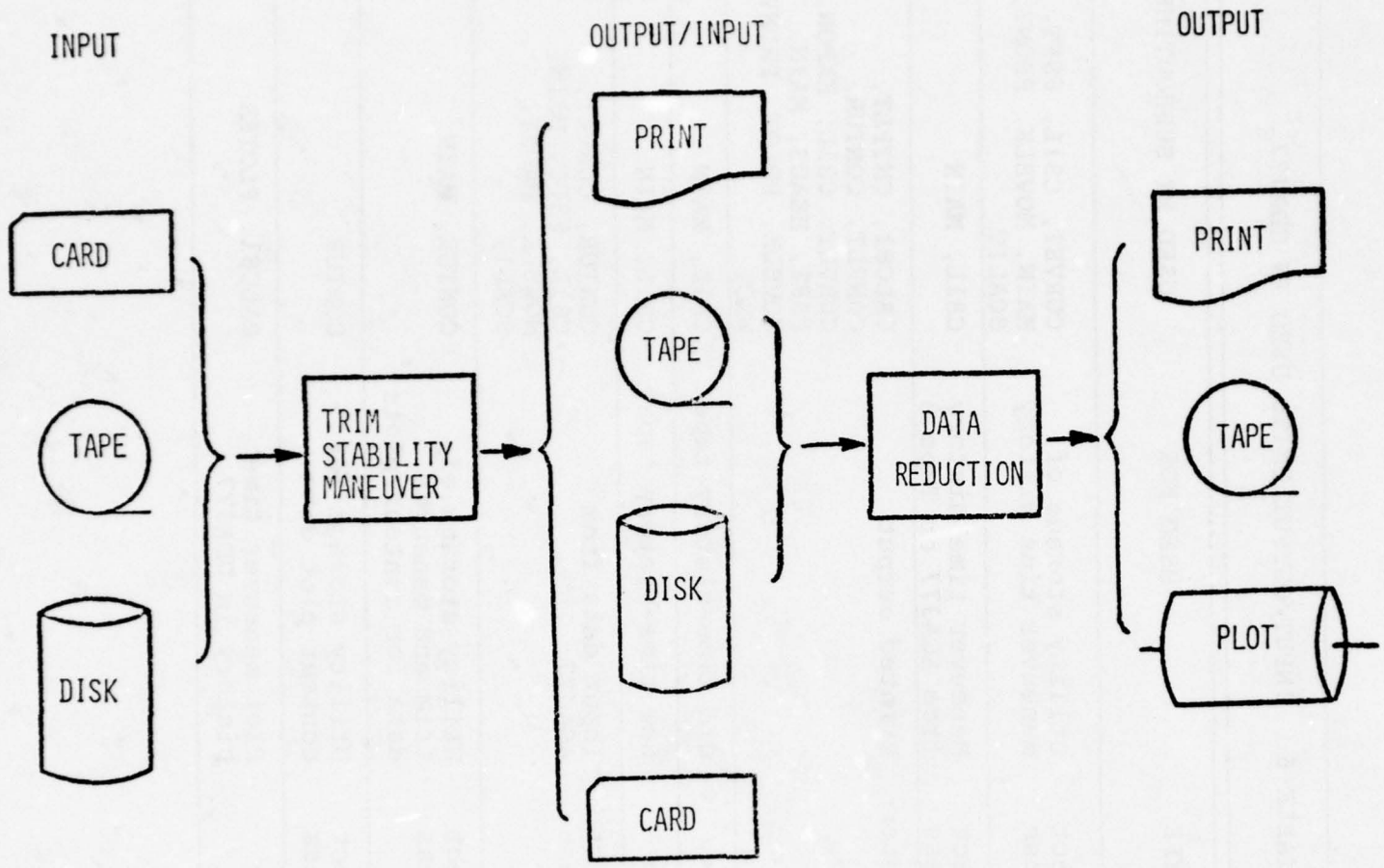


Figure 1. Execution of AGAJ77 and GDAJ77.

Under this column, TAPE also represents the input of a time-history tape that was created by an earlier run, and DISK represents maneuver time histories, input data, and contour plot data that are passed to GDAJ77 from AGAJ77. Under the OUTPUT column, PRINT is for printout from GDAJ77, TAPE for the output of a new time-history tape from GDAJ77, and PLOT for plotting of maneuver time histories from GDAJ77.

2.2 DATA LIBRARY

The Data Library can be a sequential or a partitioned data set. This documentation discusses sequential organization.

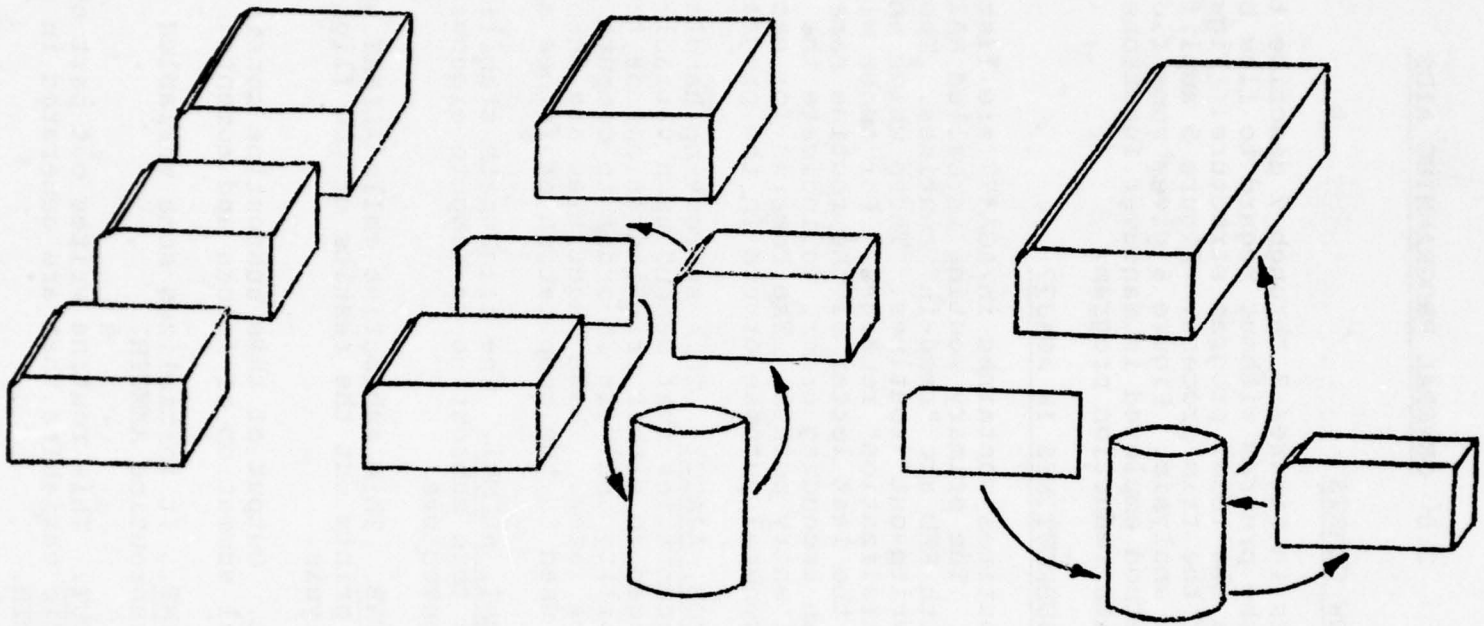
The Data Library can be created by an IBM utility routine such as IEBGENER. The input to this routine is the data to be stored on the Data Library as discussed in Section 3.1.2 of Volume II. The Data Library can reside either on a disk pack as a cataloged/kept data set or on a magnetic tape as a kept data set. A cataloged data set which resides on a disk pack can be maintained easily through the IBM Time Sharing Option (TSO).

Figure 2 shows the applications of the Data Library. Figure 2(a) indicates that all the input data are on cards with no data from the Data Library. Figure 2(b) shows a deck using a combination of cards and the Data Library. In this case, a Group Data Set is read from the Data Library. Figure 2(c) shows an input deck using the Data Library only, except message cards which are not shown. In this case, a Model Data Set is read. Since each element of the MODEL array is a Group Data Set Identification Card, the program in turn reads each group sequentially.

The Data Library consists of Group Data Sets and Model Data Sets. A Group Data Set contains all the data for one C81 input group, e.g., the Main Rotor Group. The unique alphameric name of the particular Group Data Set must be left-justified in the first eight columns of the first card of the data set. Columns 9 through 72 of the first card are reserved for descriptive information, such as the name of the person responsible for the data set, the date the data set was last updated, and a reference to a document or documents describing the sources of the data. The second card in the Group Data Set is the Group ID card (CARD 30, page 54, Volume II, for example). The remaining cards contain the numerical data required for the group, such as CARDs 31 through 38 (pages 54 and 55 of Volume II) for a simple main rotor group.

A Model Data Set is used to provide a one-card reference for all the inputs for a rotorcraft. The first card of this type of data set contains the alphameric name of the data set, left-justified in Columns 1 through 8. The name must start with the characters MODL, with the remaining four characters designating the specific Model Data Set. Columns 9 through 72 of this first card are reserved for descriptive information. Column 1 through 8 of the second card in the data set must be blank, while Columns 9 through 72 are reserved for additional descriptive information. The 43 remaining cards in the Model Data Set contain the names of Group Data Sets already on the Data Library, according to the order given in Table I of Volumn II, (pages 39 and 40). The Group Data Set names must be left-justified in Columns 1 through 8, with Columns 9 through 72 available for commentary. If a particular group is not used in a model of the rotorcraft, a blank card must still be placed in the appropriate place in the Model Data Set. For example, the mathematical model of a UH-1H would not need a wing group, so the 28th data card (30th card overall) of the Model Data Set for the UH-1H would be a blank card.

If the Data Library is stored sequentially (instead of random access), all Model Data Sets must come after all Group Data Sets.



a) Cards b) Cards and Data Library c) Data Library

Figure 2. AGAJ77 Input Data Decks.

3.0 GENERAL PROGRAMMING AIDS

3.1 MACRO FLOW CHARTS

The flow charts in Figures 3 through 7 describe the functional structure of the program without regard to flow by subroutine. Figure 3 shows the total program structure. Figure 4 provides some detail of the trim process. Figure 5 amplifies the flight-path stability analysis. Figure 6 gives some flow logic of the Runge-Kutta Method employed in maneuver functions. Figure 7 details the data reduction program.

3.2 FORTRAN SUBROUTINES IN AGAJ77

The FORTRAN routines contained in AGAJ77 are listed in alphabetical order. The primary routine is called MAIN. Those which start with RED are "read-in" routines. Those which begin with WR are "write-out" routines. Those which end with INT or INIT are "initialization" routines. For those with multiple entry points, the last letter of the routine name is replaced by a number, in ascending order, to indicate the sequence of the additional entry points. The remarks for each routine indicate its general purpose or use in the program.

(1) AJACOB, AJACO1. This subroutine handles computation of quantities that depend upon variables that are changed in either trim iterations or the flightpath stability analysis in order to compute partial derivatives later. These quantities are then calculated and used in the computation of forces and moments.

(2) ALLMAT, ALLMA1. The flightpath stability analysis uses this subroutine to compute eigenvalues and eigenvectors.

(3) ALSTAB. This subroutine calls ALLMAT and processes and prints out the results of the flightpath stability analysis.

(4) ANAL. Output of this subroutine consists of the total summation of forces and moments.

(5) AZMINT. It initializes some variables that are used by subroutine AZMUTH.

(6) AZMOUT. This routine writes out part of the diagnostic variables that are generated in subroutine AZMUTH.

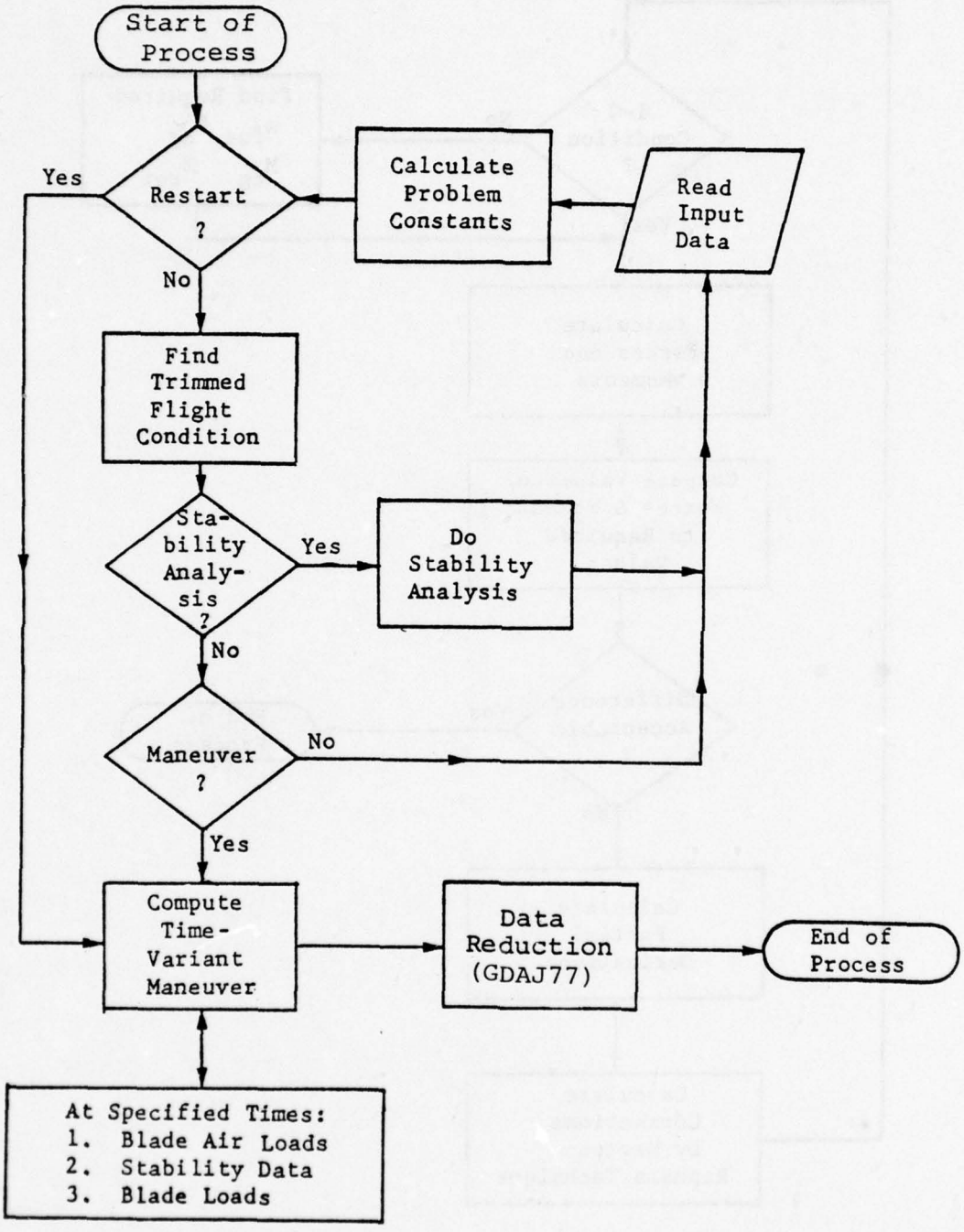


Figure 3. Flow Chart of System Structure.

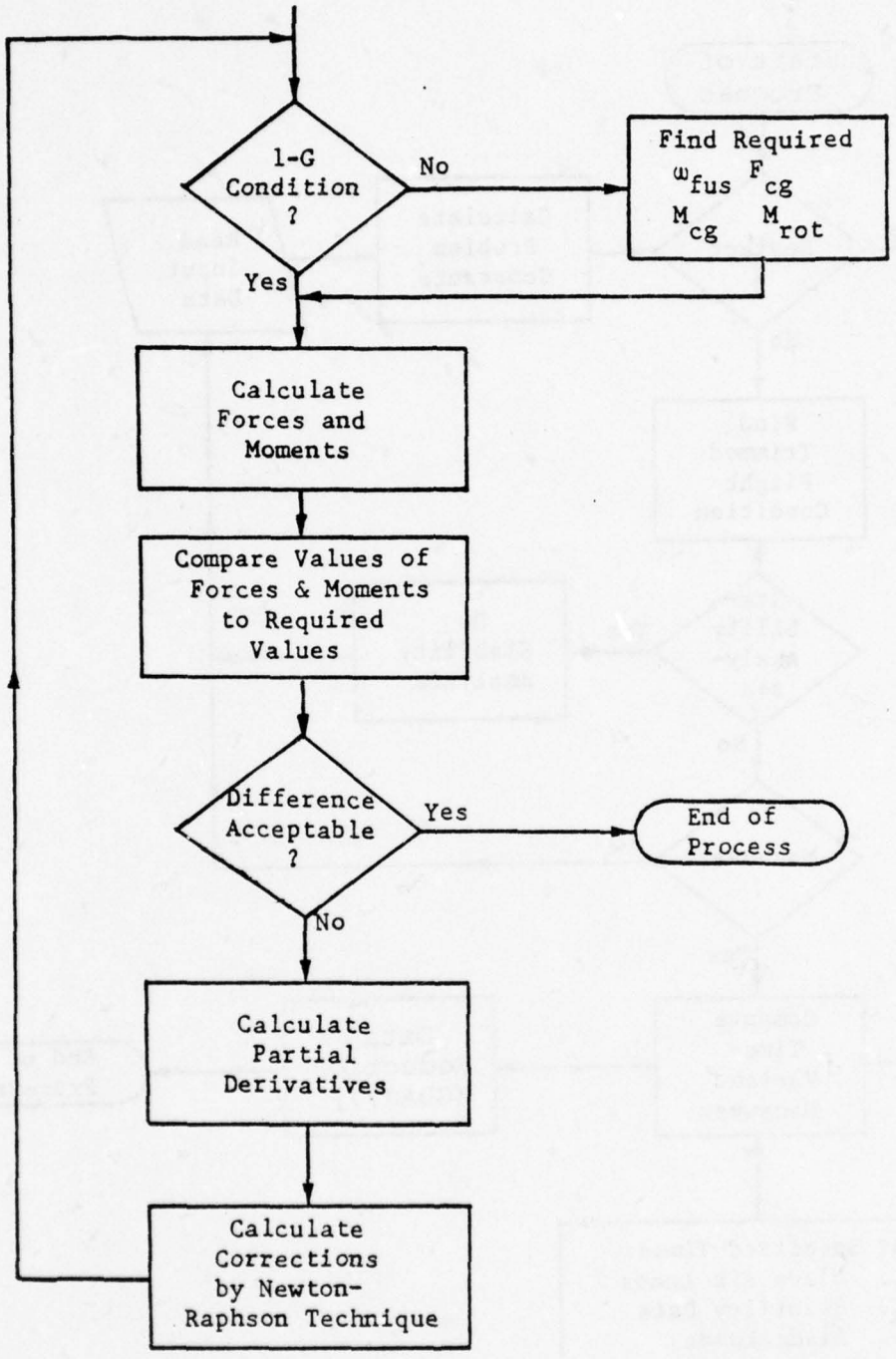


Figure 4. Flow Chart of Trim Process.

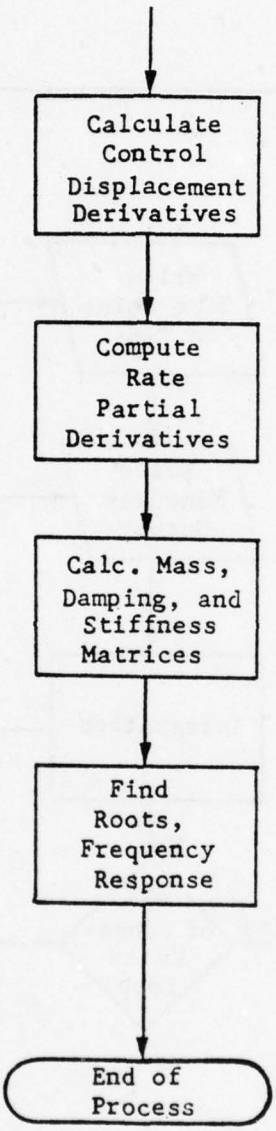


Figure 5. Flow Chart of Flight Path Stability Analysis.

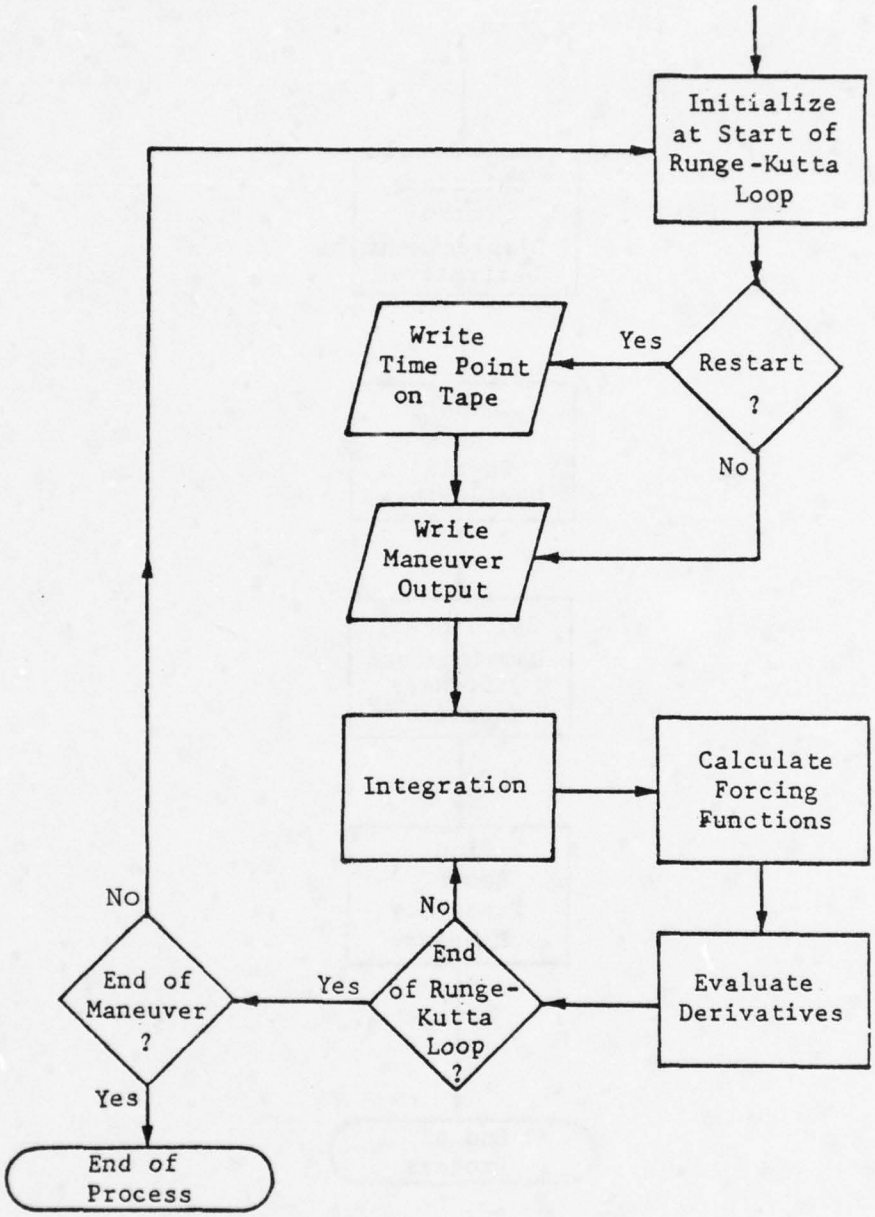


Figure 6. Flow Chart of Maneuver.

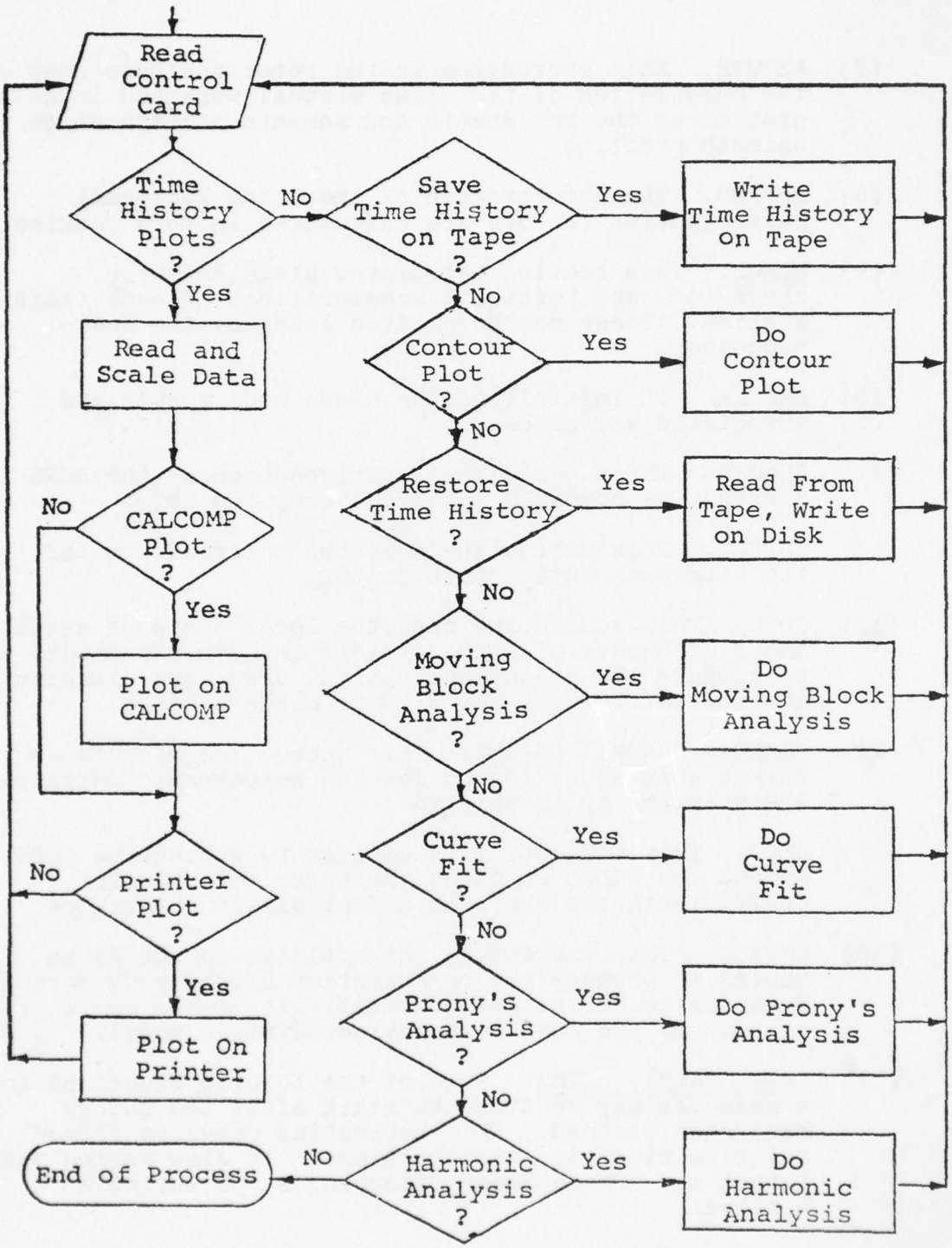


Figure 7. Flow Chart of GDAJ77.

(7) AZMUTH. This subroutine in the rotor analysis does the calculation of the blade virtual work and integration of the hub shears and moments at each blade azimuth position.

(8) BDPFDD. The acceleration of the blade dependent participation factors are calculated in this routine.

(9) BLACC. This routine calculates blade beamwise, chordwise, and torsional accelerations at each radial station. These can be plotted later by the post-processor.

(10) BMSINT. It initializes the blade mode shapes and associated variables.

(11) BUNDER. The numerical derivatives used by the BUNS unsteady aerodynamic model are computed here.

(12) BUTFLT. This subroutine computes coefficients for the band-pass Butterworth filter.

(13) CDCL. This subroutine uses the local angle of attack and Mach number plus the airfoil aerodynamic inputs to compute the steady-state lift, drag, and pitching moment coefficients for a rotor blade element.

(14) CGARMS, CGARM1, CGARM2. This subroutine calculates moment arms about the cg for the aerodynamic surfaces whenever the cg is shifted.

(15) CLCD. This subroutine is similar to subroutine CDCL except that CLCD computes the three aerodynamic coefficients for the wing and stabilizing surfaces.

(16) CMCALC. This subroutine interpolates on the Carta tables to produce the contribution of unsteady aerodynamics to the pitching moment. It is the major section of the BUNS unsteady aerodynamic model.

(17) CNTM, CNTM1, CNTM2. Some of the forcing functions in a maneuver may be timed to start after the rotors have been stopped. This subroutine converts those relative times to absolute times. It also varies jet thrust and RPM-dependent flapping stops during a maneuver.

(18) CONSTB. This is the control program for the flight-path stability analysis.

(19) CONTRM. This is the control program of the trim segment.

(20) DAT1. This block data subroutine contains C_L, C_D, and C_M tables for the NACA 0012 airfoil.

(21) DAT2. This block data subroutine sets all variables in COMMON to zero.

(22) DAT3. This block data subroutine contains the Carta tables used in subroutine CMCALC.

(23) DERIV. This subroutine evaluates the highest derivatives of all maneuver variables.

(24) DIFFER. This function subprogram performs numerical differentiation.

(25) DOTX. This routine computes a vector inner product.

(26) ENGINT. This subroutine initializes the engine/governor group.

(27) ERRCHK. This subroutine checks possible input errors in the program logic group.

(28) EXTORS. It recalculates cg location, inertias, and gross weight when any external store is dropped. It also updates aerodynamic brake locations if a brake is deployed during a maneuver.

(29) FILTER. This routine filters a variable by using the trapezoidal rule to approximate the convolution integral.

(30) FOCUS. This subroutine calculates rotor longitudinal and lateral cyclic pitch angles and also stores rotor forces.

(31) FPYLAC. This subroutine calculates the vibrations at a point that is not at a rotor hub.

(32) FRCGOF. This routine computes forces and moments due to blade cg and/or pitch-change-axis offsets.

(33) FSMINT. This subroutine initializes the pylon mode shape components for a point that is not at a rotor hub.

(34) FUSACC. It calculates the linear and angular accelerations, in body axis, of the entire rotorcraft.

(35) FUSFNM. This subroutine computes fuselage aerodynamic forces and moments and rotor nacelle drag.

(36) FUSINT. This subroutine converts the fuselage inputs to the units used internally and stores the data in internal, non-NAMELIST, arrays. It also calculates cg location and inertias if external stores are included.

(37) GETFLP. This routine calculates a coefficient matrix for the computation of blade flapping angles during maneuvers.

(38) GUST. This subroutine is entered only during a maneuver in which a gust is being generated. It calculates the distance of each part of the rotorcraft from the start of the gust and then calculates the magnitude of the gust velocity at each point on the ship.

(39) HARM, HARM1. The harmonic analysis for blade loads, hub shears and pylon dependent participation factors at the trim point is performed by this subroutine.

(40) HRESP. The elastic modes are processed by this subroutine during the quasi-static trim procedure.

(41) IMFRMP. Parts of the mass matrix that are contributed from pylons are computed here for use in the flightpath stability analysis.

(42) INBLD, INBLD1, INBLD2, INBLD3, INBLD4, INBLD5. This subroutine converts input blade-related data to the units used internally, and stores the data in internal, non-NAMELIST, arrays.

(43) INBMSS. This routine computes a blade mass distribution if that data is not input.

(44) INIT. This subroutine fills the arrays for the printout during a maneuver and also writes those arrays on disk for later plotting.

(45) INRO. The function of this subroutine is the initialization and calculation of problem constants from the rotor inputs.

(46) INRTR. This subroutine initializes some of the rotor-related data that are not initialized in subroutine INRO.

(47) INSCAS. Initialization of the SCAS inputs is done here.

(48) INSTAB. This subroutine initializes the data for a flightpath stability analysis. It calculates the partial derivatives needed for later computation of the frequency response.

(49) INTFRQ. It interpolates blade natural frequency as a function of rotor rotational speed and blade collective pitch.

(50) INVERS. This subroutine calculates the inverse of the mass matrix before the call to ALLMAT.

(51) IOMAT. This subroutine prints the mass, damping, and stiffness matrices used in the flightpath stability analysis.

(52) ITRIM. Included in this subroutine is the iteration loop of the trim section of the program. The function here is to iterate to a trimmed flight condition.

(53) ITROT. This subroutine initializes variables for subroutine AZMUTH and, when specified by the input parameters, controls the iteration loops to balance the rotor flapping moments.

(54) JACOBI. This subroutine calculates the Jacobian for use in the Newton-Raphson iteration method in TRIM or calculates the displacement derivatives for use in the flightpath stability analysis.

(55) JFBGIN, JFBGIl. This subroutine converts input data for the jets, flight constants, bobweight, and weapons groups to the units used internally, and stores the data in internal, non-NAMELIST, arrays.

(56) JSTRED. This subroutine reads most of the input data groups.

(57) LGCINT. The program logic group input array is processed in this subroutine, and the value of internal logic variables set.

(58) LIZE. Initialization of some numerical constants is done in this subroutine.

(59) LOADT. This subroutine computes and prints out the loads on an elastic blade.

(60) MAIN. This routine reads the control cards that direct the flow of the whole problem. The path is selected, and calls are initiated to begin working the problem. Upon return, possible errors are checked for. If an error is detected, an error message may be printed out. Then the program either terminates execution or starts the next problem, depending on the severity of the error.

(61) MANTYP. This routine checks any inconsistency of maneuver types.

(62) MANU. This subroutine controls the time-variant maneuver segment. It handles the integration of the differential equations and the calling of the other subroutines necessary to a maneuver.

(63) MATRIX. The function of this subroutine is to calculate the transformation matrix for a set of input Euler angles.

(64) MAXHP. This routine computes the maximum available horsepower from the engine.

(65) MBAL. This subroutine calculates rotor flapping or cyclic increments during each iteration.

(66) MDRDRS. Damping and stiffness matrices for a flightpath stability analysis are calculated here.

(67) MNEM. The function of this subroutine is to initialize all variables.

(68) MODAL. The variables which are functions only of mode shape, frequency, and mass and inertia distributions are computed in this subroutine.

(69) MODES. This subroutine calculates most of the mass matrix for a flightpath stability analysis.

(70) MOMB, MOMB1, MOMB2. This subroutine simulates a servo-mechanism controlling the swashplate while the main rotor is being folded horizontally.

(71) MTLT. This subroutine handles mast tilt during a maneuver.

(72) NCDAMP, NCDAM1. This is the variable damper for TRIM. The purpose of this is to gradually damp out oscillations of the trim iterations. This is accomplished by checking the errors generated in TRIM against an upper limit and, whenever all errors are less than this limit, reducing both the partial derivative increment and the maximum amount that one of the TRIM variables can change in one iteration. The second entry to this subroutine, NCDAM1, limits and applies the corrections to the TRIM variables.

(73) NOPS, NOPS1. The inputs to this subroutine are the number of azimuth locations used in the rotor analysis. The outputs are quantities that are functions of the number of azimuth locations.

(74) NPUTOT. This subroutine prints most of the input data.

(75) PDPFDD. The acceleration of the pylon dependent participation factor is calculated in this subroutine.

(76) PDSRED. This routine is used to find a member of the data library and to make it accessible to a FORTRAN routine through normal sequential READ statements.

(77) PDZERO, PDZER1. The inputs to this subroutine are a trim partial derivative matrix (i.e., the Jacobian) and an indicator for the type of helicopter or rotorcraft being flown. This subroutine then changes the partial derivative matrix to conditions which are known to hold. Essentially, this subroutine attempts to filter numerical "noise" in the matrix.

(78) PRETVT. The primary function of this routine is to initialize variables used in the time-variant trim.

(79) PUNCH. It punches nonzero elements of mass, damping, and stiffness matrices used in the flightpath stability analysis. The form of the punched output cards is explained in Volume II.

(80) PYLACC. Pylon acceleration, velocity, and displacement are computed here.

(81) PYLINT. It converts input arrays to the units used internally for the dynamic pylon group and stores the data in internal, non-NAMELIST, arrays.

(82) QSBDPF. It calculates the acceleration of the blade dependent participation factor for a quasi-static maneuver case.

(83) QUAN. This subroutine sets the values of internal variables from the integration array at the beginning of each Runge-Kutta cycle.

(84) RADBGN. It calculates several variables used by subroutine RADIAL.

(85) RADIAL. This subroutine in the rotor analysis does the calculations and integrations along the blade radius.

(86) RADOUT, RADOU1, RADOU2. It prints output from subroutine RADIAL.

(87) READIN. This subroutine contains the logic for reading and printing the input data.

(88) REDATB. It handles the read-in of airfoil data tables.

(89) REDBMS. It handles the read-in of blade mode shape data.

(90) REDCL. It reads the coefficients of lift, drag, and pitching moment of each airfoil data table.

(91) REDID. It handles the read-in of group ID cards.

(92) REDRWK, REDRW1. It performs the read-in and print-out of rotor-induced velocity distribution (RIVD) tables.

(93) REDSWK, REDSW1. It performs the read-in and print-out of rotor-wake-at-aerodynamic-surface (RWAS) tables.

(94) RESTRT, RESTR1, RESTR2, RESTR3. Restart tapes are written or copied by this subroutine.

(95) RGUST. This subroutine computes the gust velocities at the blade elements based on the values at the hub.

(96) ROTAN. This subroutine may be considered to be the outer section of the rotor analysis.

(97) RPTPG. It controls the optional trim page output.

(98) RTINIT. This is the control routine that handles the initialization of the rotor.

(99) RTWAKE. This routine calculates the blade local induced velocity when the rotor wake table option is used.

(100) RVRGST. This routine computes the velocity components at the rotor that are contributed by the trailing vortex system of a fixed-wing aircraft.

(101) SCASIT. The highest derivatives in the differential equations for the SCAS are calculated here.

(102) SHKCTL. This subroutine provides a harmonic control input to the rotor blades.

(103) SHKINT. This routine initializes variables for the blade shaker.

(104) SHRPYL. It calculates hub shears contributed by the pylon.

(105) SIVAR. This subroutine handles the initialization of the maneuver inputs for subroutine VARI which are not a function of the trim point.

(106) SOLVE. This subroutine solves systems of linear equations by Gaussian elimination.

(107) STAB. This subroutine computes the rate derivatives used in the flightpath stability analysis.

(108) START. The function of this subroutine is to change units of the input arrays, to store the values in internal arrays and to control the initialization segment.

(109) STBWAK. This subroutine calculates the effect of rotor wakes on each stabilizing surface when a surface uses RWAS tables.

(110) STBFNM. It calculates aerodynamic forces and moments at all stabilizing surfaces.

(111) STBZIN. The function of this routine is the initialization and calculation of problem constants for wing and stabilizing surfaces.

(112) SUPERP. This subroutine simulates an autopilot.

(113) SWAP. In computing eigenvalues in a flightpath stability analysis, if a singularity exists in ALLMAT or the solution does not converge within a reasonable number of iterations, this subroutine conditions the mass, damping and stiffness matrices by interchanging zero rows and columns with nonzero rows and columns.

(114) SWAS. This subroutine performs the function of linking the controls to the swashplates with the appropriate linkage factors and phase factors.

(115) SWSRAT. It calculates some intermediate velocities and accelerations used in the rotor analysis.

(116) TABFIX. This subroutine calculates arrays to be used in the method of calculated entry in subroutine TABINT.

(117) TABINT. This subroutine does a table interpolation for C_L, C_D, and C_M tables.

(118) TABOUT. This subroutine prints the airfoil C_L, C_D, and C_M tables.

(119) TFRTWK. When a rotor-induced velocity distribution table is used, this routine computes thrust factor, wake plane flapping angles, and phase angle.

(120) TILT, TILT1, TILT2. This subroutine controls cg shift calculations for several different manners of shifting cg. The primary function is in a mast tilt maneuver. It provides not only for cg shift but also for changes in control phasing as a function of the mast tilt angle. Secondary entries handle cg shift with folding of a rotor either when it is being folded aft after being tilted forward and stopped or when being folded horizontally after a stop.

(121) TIMEQ0. This routine resets every variable back to the trim condition after each perturbation of a maneuver perturbation run.

(122) TIMLP. This subroutine performs the initialization necessary at the start of each time step.

(123) TIVAR. This subroutine handles the initialization of the maneuver inputs for subroutine VARI that are a function of the trim point.

(124) TRIM, TRIM1. This subroutine is the primary section of the program for finding the trimmed flight condition.

(125) TRMANU. This routine sets up arrays for the output of trim as well as maneuver pages.

(126) TURN. This subroutine handles a banked turn. Secondarily, it handles pushovers or pull ups. It does so by checking input data, picking up proper inputs, and doing the appropriate initialization to find a trimmed flight condition.

(127) TVTRIM. This subroutine controls the time-variant trim procedure.

(128) UNSDER. The numerical derivatives used by the UNSAN unsteady aerodynamic model are computed here.

(129) UNSTED. This is the major section of the UNSAN unsteady aerodynamic model discussed in Volumes I and II.

(130) VARI. This subroutine produces the effects of input disturbances during a time-variant maneuver. The inputs to this subroutine are the user-supplied forcing functions. The values of these functions are the output from this subroutine.

(131) VGUNS. During a time-variant maneuver, this routine calculates the applied loads due to weapon fire.

(132) VIND. This subroutine calculates the average induced velocity of a rotor.

(133) VORGST. During a time-variant maneuver, this routine computes the aerodynamic disturbance due to an aircraft trailing vortex system.

(134) VSCAS. During a time-variant maneuver, this routine calculates the control motions due to SCAS.

(135) WAG. The time-dependent lift change by the Wagner and Kussner Method is computed in this subroutine.

(136) WING. This routine computes aerodynamic forces and moments on wings.

(137) WKTABN. If the blade radial stations input to the rotor wake table are not the same as those in the rotor group, this subroutine interpolates those missing stations. This is done outside the iteration loops so that a three-way interpolation can be reduced to two-way.

(138) WRFM. This is an output subroutine that writes the rotor force and moment summary in the shaft reference coordinate system and the aircraft force and moment summary in the body axis coordinate system.

(139) WRINST, WRINS1. This subroutine prints output during the computation of partial derivatives for a flight-path stability analysis.

(140) WRMANU. This subroutine produces part of the maneuver printout.

(141) WRMODE. This routine prints out the blade mode shapes and blade bending moment coefficients.

(142) WRMS. It prints out mode shapes associated with the rotorcraft characteristic roots determined in the flightpath stability analysis.

(143) WROT, WROT1. This is another output subroutine that produces the heading for the printout of the input data and the trim page.

(144) WRPERT. This routine prints out the values of the perturbed and nonperturbed independent variables used in the computation of partial derivatives for a flightpath stability analysis.

(145) WRSTAB. This subroutine prints the rate derivatives used in the flightpath stability analysis.

(146) WRTFUN. The transfer functions calculated in a flight-path stability analysis are written out by this routine.

(147) WRTMNV. This subroutine defines the output arrays for trim as well as maneuver pages.

(148) WRTRIM. This routine writes the trim page.

(149) WRVP. This is another output subroutine which produces the printouts of the partial derivative matrices calculated and the independent variables used in the calculation of those derivatives.

(150) WSHDUF. It calculates fuselage effects on downwash and sidewash angles at wings and other stabilizing surfaces.

(151) XCONIN. Initialization of all control linkages is performed by this subroutine.

(152) XSTINT. This subroutine converts input arrays to internal arrays for the external stores/aerodynamic brakes model.

(153) XSTORE. It calculates aerodynamic forces and moments at each external store/aerodynamic brake.

(154) YRINIT. This subroutine conditions the aerodynamic inputs for the rotors.

(155) YSINIT. This subroutine conditions the aerodynamic inputs for the wing and stabilizing surfaces.

(156) ZERO. This is part of the initialization segment. Every variable in this routine is set to zero.

(157) ZLLCAL. This subroutine computes zero lift line increments at wings and other stabilizing surfaces.

3.3 ASSEMBLY LANGUAGE SUBPROGRAM IN AGAJ77

DATE. This routine returns the current system date, as argument NDATE, in Gregorian form: mm/dd/yy. NDATE must be at least eight bytes long. The routine is coded in Assembler Language. It was prepared at Bell Helicopter and is in the public domain. It contains the following entry points:

ENTRY SETIME(TINT). This entry establishes an operating time interval against which to check program operation. This interval (TINT) is in minutes in floating point form. The routine does not cause execution to terminate at the end of the designated interval. This entry initializes TIMEX.

ENTRY TIMEX (TU, DT, TL). This entry checks the central processor time since the last call to SETIME or TIMEX. It returns three argument values in floating point minutes:

TU - Time since initial call to SETIME.

DT - Time since last call to TIMEX or SETIME.

TL - Time remaining in the SETIME interval.

Subroutine DATE and its entry points may be replaced by a dummy routine with no adverse effect on the engineering calculations.

3.4 FORTRAN SUBROUTINES IN GDAJ77

The FORTRAN subroutines contained in GDAJ77 are listed in alphabetical order including the main program, which is called MAIN. The remarks for each subroutine indicate its general use or purpose in the program.

(1) ALLMAT. Prony's method uses this routine to solve for eigenvalues.

(2) CALC81. This subroutine is the interface between subroutine SCALIT and the CALCOMP plot routines.

(3) CNTPLT. This routine interpolates an input array and presents it in contour plot format.

(4) CONPLT. This routine controls the logic of the program at one level below that of the main program.

(5) CONTUR. This subroutine reads in data to be contour plotted and prints it out in tabular form.

(6) CURVET. This subroutine analyzes the time history of selected variables during a maneuver. This analysis is accomplished by a least-square curve fit followed by comparison of both the amplitude and phase angle of different variables. Then one variable is expressed as a linear function of two others.

(7) C81L. The function of this subroutine is the transfer to a disk of maneuver time-history data that have been stored on a tape or disk.

(8) DAT1. This first block data subroutine contains part of the headings for plotted time histories.

(9) DAT2. This second block data subroutine contains part of the headings for plotted time histories.

(10) DAT3. This third block data subroutine contains the headings for contour plots.

(11) DLLSQ. This routine does the least-squares curve fit required by Prony's method.

(12) EXPON. This is the primary computational routine for Prony's method. It also prints out the result of these calculations.

(13) FSFT. This subroutine controls the harmonic analysis of a time history.

(14) HARM. This is the harmonic analysis subroutine used by subroutine FSFT.

(15) HEADS. This routine prints out part of the plot headings.

(16) HEDING. This subroutine generates the labels for the time-history plots using the data stored in DAT1 or DAT2.

(17) MAIN. This is the control program for GDAJ77.

(18) MOVBLK. This routine uses a moving block analysis method to estimate the damping associated with a given frequency.

(19) PLOTER. This subroutine does the CALCOMP plotting of the results of the harmonic analysis.

(20) PPLOT. This is the printer plot routine that produces plots of time histories.

(21) PRONY. This is the control routine used when Prony's curve-fit method is chosen to analyze aeroelastic stability.

(22) RANGE. This routine searches through the data in an array and returns a relative maximum and minimum value after excluding points that deviate too far from the bulk of the data.

(23) SCALIT. This subroutine sets up the arrays for the time-history plots.

(24) SCLFIX. This subroutine calculates scale factors for the time-history plots.

(25) VSRTPM. This routine sorts arrays by absolute value.

(26) WROT, WROT1. This subroutine prints the headings on the printer plots.

3.5 LABELED COMMONS IN AGAJ77

There are 26 labeled COMMONS, but no blank COMMON, in AGAJ77. Each of the COMMONS is listed below. Any special order of variables and the reasons for this order are given, along with some general comments.

(1) ANDOIT. The first 9 variables in this COMMON, HFRC through YSHRN, are double precision.

(2) FLEX. It contains most of the variables used in the elastic blade modal analysis.

(3) FLTRCM. Those arrays that are specifically used by the digital filter are contained in this COMMON.

(4) FORCMC. This COMMON contains the Carta tables used by subroutine CMCALC.

(5) FORWK. This COMMON contains most of the variables used in computing the rotor-induced velocity distribution from the table stored in FORWK1.

(6) FORWK1. This is the set of rotor-induced velocity distribution (RIVD) tables used by subroutine RTWAKE.

(7) FORY. There is no special order to variables in this COMMON. It consists of the array "Y" operated upon by the Runge-Kutta integration technique and is used in the initialization, trim, and maneuver segments.

(8) FORYD. This contains the first and second derivatives of the integrated variables in maneuver.

(9) FOSWK. This COMMON contains most of the variables used in computing the effects of the rotor wake at the aerodynamic surfaces from the tables stored in FOSWK1.

(10) FOSWK1. The arrays of rotor-wake-at-the-aerodynamic-surface (RWAS) tables used in subroutine STBWAK are in this COMMON.

(11) INONLY. This block contains most of the input. It is used in the initialization segment.

(12) INSTAR. This COMMON contains the array for the program logic group.

(13) MANAL. The first 59 variables in this COMMON, XF through NQTR, are ordered to allow I/O and other manipulations to be done on an equivalent array. The next 11 variables, COLSTK through BlT, are ordered for equivalencing to an array. Not more than 10 of these variables are used, and the array KVAR is used as a pointer vector to choose which ones are used and the

order of their use. The next 14 variables, AlM through AYD, are ordered for equivalencing to the array VAR in subroutine STAB for the calculation of derivatives. The variables TAXL and TAXR are equivalenced to an array in subroutine CNTM.

(14) NORSET. This COMMON contains variables that are not to be reset to the trim condition when the maneuver perturbation option is activated.

(15) PYLON. Most of the variables that are associated with the pylons are in this COMMON.

(16) STAMAN. Variables in this block are mostly used in the initialization and maneuver segments. The first six arrays, SCASPF through SCASYC, are ordered for equivalencing in subroutine INSCAS. Arrays SHPGRP through SFTGRP are ordered to allow I/O and other manipulations to be done on an equivalenced array.

(17) STARAD. Most of the variables here are used in the initialization and general-purpose segments.

(18) STARAN. The variables in this COMMON are used in the initialization and general-purpose segments.

(19) STBCOM. This is one of the two COMMON blocks that are specifically used in the flightpath stability analysis segment.

(20) STBD. This COMMON block is used primarily by the flightpath stability analysis.

(21) STBFRQ. The output from the frequency response in the flightpath stability analysis is contained in this COMMON.

(22) STRIAB. This COMMON is used in the initialization, trim, and flightpath stability analysis segments.

(23) STRIMA. The first 16 variables, TZM through TCLOCK, are ordered for equivalencing in subroutine MOMB.

(24) TAB. This COMMON contains the C_D table for the NACA 0012 airfoil.

(25) TAB1. This COMMON contains C_L and C_M tables for the NACA 0012 airfoil.

(26) TOPLOT. This COMMON is used in all segments.

3.6 LABELED COMMONS IN GDAJ77

There are nine labeled COMMONS, but no blank COMMONS, in GDAJ77. Each of the COMMONS is listed below, together with pertinent comments.

(1) INPLOT. This COMMON is used by subroutine SCALIT and the other subroutines in the segment for plotting time histories.

(2) LHEAD. This COMMON contains the data in the third block data subroutine, DAT3, that are used for contour plot headings.

(3) MAXMIN. It contains the maximum and minimum values of the specified variable. It is primarily used to determine the scale of the plot.

(4) PLOTD. This COMMON contains the data in the block data subroutine DAT1 which are used by subroutine HEDING to furnish alphanumeric headings for time history plots.

(5) PLOTD1. It contains the data in the second block data subroutine, DAT2, which are used by subroutine HEDING to supply headings for time history plots.

(6) TIMPTS. This COMMON primarily contains maneuver time history data.

(7) TOPLOT. This COMMON contains control variables and is not the same as COMMON TOPLOT in AGAJ77.

(8) WRKCOM. This COMMON is a work area. It contains several big arrays and is shared by four subroutines.

(9) YNORP. This is the primary working area for Prony's method.

4.0 DETAILED PROGRAMMING AIDS

4.1 CONTROL SECTION CROSS-REFERENCE

The Control Section Cross-Reference List for AGAJ77, Table 7, shows most of the control sections, including COMMONS, which are referenced by another control section, with the exception of system routines, whose inclusion would not contribute to the usefulness of the list. Table 7 contains the control sections in alphabetical order in a column on the left side of the page. To the right of each control section name is the cross-reference information. LENGTH is the size of the subroutine or COMMON in hexadecimal bytes. CALLED BY gives the name of each control section referencing the control section whose name is in the column on the left. IS USED BY gives the name of control sections that reference the control sections in the CALLED BY list or by another control section in the IS USED BY list. CALLS gives the name of each control section referenced by the control section whose name is in the column on the left. USES gives the name of each control section referenced by a control section in the CALLS list or by another control section in the USES list.

The information in the Control Section Cross-Reference List is sufficient to construct the sequence of subroutine calls from which an overlay structure can be made.

As noted in Section 3.2, several subroutines have multiple entry points. However, the Control Section Cross-Reference List (Table 7) includes only the primary names of subroutines; it does not include the names of any of these additional entry points. In the case where a call to a subroutine is actually a call to an additional entry point, the primary name of the subroutine that contains the specified entry point is used in the Cross-Reference List. For example, Table 7 indicates that subroutine START calls REDRWK when START actually calls REDRW1 (a second entry point to REDRWK). For a multiple-entry subroutine, the subsequent entry points are named by a convention in which a numerical digit either follows or replaces the last letter of that subroutine name, in ascending order; for example, INBLD1 and INBLD2 are the first and second additional entry points to subroutine INBLD.

Table 8 contains the Control Section Cross-Reference List for GDAJ77. It is read and used in exactly the same manner as Table 7.

TABLE 7. CONTROL SECTION CROSS-REFERENCE FOR AGAJ77.

CONTROL SECTION CROSS-REFERENCE LIST

AJACOB	LENGTH 810												
	CALLED BY -	INSTAB	ITRIM	JACOBI									
	IS USED BY -	CONSTB	CONTRM	INSTAB	ITRIM	MAIN	TRIM						
	CALLS -	ANAL	FORY	FORYD	INSTAR	MANAL	MATRIX	STAMAN	STARAN	STRIAB	STRIMA	SWAS	TOPLOT
		WRFM	WRVP	ZLLCAL									
	USES -	ANDOIT	AZMINT	AZMOUT	AZMUTH	BDPFDD	BLACC	BUNDER	BUTFLT	CDCL	CLCD	CMCALC	DIFFER
		DUTX	FILTER	FLEX	FLTRCM	FOCUS	FORCMC	FORWK	FORWK1	FORY	FORYD	FOSWK	FOSWK1
		FPYLAC	FRCGDF	FUSFNM	GETFLP	HRESP	INIT	INSTAR	INTFRQ	ITROT	MANAL	MATRIX	MBAL
		PDPFDD	PYLACC	PYLON	RADBGN	RADIAL	RADOUT	RGUST	ROTAN	RTWAKE	RVRGST	SHKCTL	SHRPYL
		SOLVE	STAMAN	STARAD	STARAN	STBFNM	STBWAK	STRIAB	STRIMA	SWSRAT	TAB	TABINT	TAB1
		TFRTWK	TOPLOT	TRMANU	TVTRIM	UNSDER	UNSTED	VIND	WAG	WING	WSHDUF	XSTORE	
ALLMAT	LENGTH 57F0												
	CALLED BY -	ALSTAB											
	IS USED BY -	CONSTB	MAIN										
	CALLS -	STBCOM											
ALSTAB	LENGTH 31A0												
	CALLED BY -	CONSTB											
	IS USED BY -	MAIN											
	CALLS -	ALLMAT	INVERS	MANAL	STBCOM	STBD	STBFRQ	STRIAB	SWAP	TOPLOT	WRMS	WRTFUN	
	USES -	INVERS	STBCOM	STBD	STBFRQ								
ANAL	LENGTH 8C8												
	CALLED BY -	AJACOB	DERIV	STAB									
	IS USED BY -	CONSTB	CONTRM	INSTAB	ITRIM	JACOBI	MAIN	MANU	TRIM				
	CALLS -	ANDOIT	FILTER	FUSFNM	INSTAR	MANAL	PYLON	ROTAN	STARAN	STBFNM	STRIMA	TOPLOT	WING
		XSTORE											
	USES -	ANDOIT	AZMINT	AZMOUT	AZMUTH	BDPFDD	BLACC	BUNDER	BUTFLT	CDCL	CLCD	CMCALC	DIFFER
		DUTX	FILTER	FLEX	FLTRCM	FOCUS	FORCMC	FORWK	FORWK1	FORY	FORYD	FOSWK	FOSWK1
		FPYLAC	FRCGDF	GETFLP	HRESP	INIT	INSTAR	INTFRQ	ITROT	MANAL	MATRIX	MBAL	PDPFDD
		PYLACC	PYLON	RADBGN	RADIAL	RADOUT	RGUST	RTWAKE	RVRGST	SHKCTL	SHRPYL	SOLVE	STAMAN
		STARAD	STARAN	STBWAK	STRIAB	STRIMA	SWSRAT	TAB	TABINT	TAB1	TFRTWK	TOPLOT	TRMANU
		TVTRIM	UNSDER	UNSTED	VIND	WAG	WSHDUF						
ANDOIT	LENGTH 730												
	CALLED BY -	ANAL	AZMINT	AZMOUT	AZMUTH	BDPFDD	BLACC	BMSINT	BUNDER	CDCL	CLCD	CMCALC	DERIV
		FOCUS	FRCGDF	FUSFNM	GETFLP	HRESP	INBLD	INRO	INRTR	INTFRQ	ITROT	LOADT	MBAL
		MODAL	PDPFDD	QSBDPF	RADBGN	RADIAL	RADOUT	RESTRT	RGUST	ROTAN	RPTPG	RTWAKE	RVRGST
		SHKCTL	SHRPYL	STBFNM	SWSRAT	TABINT	TIMEQO	TRIM	TRMANU	TVTRIM	UNSDER	UNSTED	WING

TABLE 7. Continued.

CONTROL SECTION CROSS-REFERENCE LIST

ANDOIT	IS USED BY -	AJACOB	ANAL	AZMINT	AZMUTH	CDCL	CLCD	CONSTB	CONTRM	DERIV	FOCUS	INIT	INRO
CONTINUED		INSTAB	ITRIM	ITROT	JACOBI	MAIN	MANU	MNEM	RADBGN	RADIAL	RGUST	ROTAN	RTINIT
		STAB	START	STBFNM	TIMLP	TRIM	TVTRIM	UNSTED	WING	WRTRIM			
AZMINT	LENGTH 1258												
	CALLED BY -	AZMUTH											
	IS USED BY -	AJACOB	ANAL	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM	ITROT	JACOBI	MAIN	MANU
		ROTAN	STAB	TRIM	TVTRIM								
	CALLS -	ANDOIT	FLEX	FORWK	FORWK1	MANAL	MATRIX	SHKCTL	STAMAN	STARAD	STARAN	STRIMA	
	USES -	ANDOIT	MANAL	STARAN									
AZMOUT	LENGTH 3E8												
	CALLED BY -	AZMUTH											
	IS USED BY -	AJACOB	ANAL	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM	ITROT	JACOBI	MAIN	MANU
		ROTAN	STAB	TRIM	TVTRIM								
	CALLS -	ANDOIT	MANAL	STARAD	STARAN								
AZMUTH	LENGTH 1438												
	CALLED BY -	ITROT											
	IS USED BY -	AJACOB	ANAL	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM	JACOBI	MAIN	MANU	ROTAN
		STAB	TRIM	TVTRIM									
	CALLS -	ANDOIT	AZMINT	AZMOUT	FLEX	INSTAR	INTFRQ	MANAL	RADIAL	STAMAN	STARAD	STARAN	TOPLOT
	USES -	ANDOIT	BLACC	BUNDER	CDCL	CMCALC	DIFFER	DOTX	FLEX	FORCMC	FORWK	FORWK1	FRCGOF
		INSTAR	MANAL	MATRIX	RADBGN	RADOUT	RGUST	RTWAKE	RVRGST	SHKCTL	STAMAN	STARAD	STARAN
		STRIMA	TAB	TABINT	TABI	TOPLOT	UNSDER	UNSTED					
BDPFDD	LENGTH 488												
	CALLED BY -	DERIV	FOCUS										
	IS USED BY -	AJACOB	ANAL	CONSTB	CONTRM	DERIV	INSTAB	ITRIM	JACOBI	MAIN	MANU	ROTAN	STAB
		TRIM	TVTRIM										
	CALLS -	ANDOIT	DOTX	FLEX	FORY	FORYD	MANAL	PYLON	STARAD				
BLACC	LENGTH 968												
	CALLED BY -	RADIAL											
	IS USED BY -	AJACOB	ANAL	AZMUTH	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM	ITROT	JACOBI	MAIN
		MANU	ROTAN	STAB	TRIM	TVTRIM							
	CALLS -	ANDOIT	MANAL	STARAN	STRIMA								
BMSINT	LENGTH 680												
	CALLED BY -	INRO											
	IS USED BY -	MAIN	RTINIT	START									
	CALLS -	ANDOIT	FLEX	INONLY	MANAL	STAMAN	STARAD	STARAN	STRIMA				
BUNDER	LENGTH 390												
	CALLED BY -	RADIAL											
	IS USED BY -	AJACOB	ANAL	AZMUTH	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM	ITROT	JACOBI	MAIN
		MANU	ROTAN	STAB	TRIM	TVTRIM							
	CALLS -	ANDOIT	DIFFER	STARAN									
BUTFLT	LENGTH AC8												
	CALLED BY -	MANU	TVTRIM										
	IS USED BY -	AJACOB	ANAL	CONSTB	CONTRM	DERIV	INSTAB	ITRIM	JACOBI	MAIN	MANU	ROTAN	STAB
		TRIM											
	CALLS -	FLTRCM											
CDCL	LENGTH 8F0												
	CALLED BY -	RADIAL	UNSTED										
	IS USED BY -	AJACOB	ANAL	AZMUTH	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM	ITROT	JACOBI	MAIN

TABLE 7. Continued.

CONTROL SECTION CROSS-REFERENCE LIST

CDCL	IS USED BY	MANU	RADIAL	ROTAN	STAB	TRIM	TVTRIM						
CONTINUED	CALLS -	ANDOIT	MANAL	STARAD	STARAN	TABINT							
	USES -	ANDOIT	TAB	TAB1									
CGARMS	LENGTH	480											
	CALLED BY -	EXTORS	TILT										
	IS USED BY -	DERIV	MAIN	MANU	MNEM	MOMB	MTLT	START	VARI				
	CALLS -	INSTAR	MANAL	STAMAN	STRIMA								
CLCD	LENGTH	EF8											
	CALLED BY -	STBFNM	WING										
	IS USED BY -	AJACOB	ANAL	CONSTB	CONTRM	DERIV	INSTAB	ITRIM	JACOBI	MAIN	MANU	STAB	TRIM
	CALLS -	ANDOIT	MANAL	STARAN	STRIAB	TABINT	TOPLOT						
	USES -	ANDOIT	TAB	TAB1									
CMCALC	LENGTH	650											
	CALLED BY -	RADIAL											
	IS USED BY -	AJACOB	ANAL	AZMUTH	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM	ITROT	JACOBI	MAIN
		MANU	ROTAN	STAB	TRIM	TVTRIM							
	CALLS -	ANDOIT	FORCMC										
CNTM	LENGTH	540											
	CALLED BY -	VARI											
	IS USED BY -	DERIV	MAIN	MANU									
	CALLS -	MANAL	STAMAN	STRIMA									
CONSTB	LENGTH	270											
	CALLED BY -	MAIN											
	CALLS -	ALSTAB	INSTAB	MANAL	MODES	STAB	STARAN	STBD	STRIMA	TOPLOT			
	USES -	AJACOB	ALLMAT	ANAL	ANDOIT	AZMINT	AZMOUT	AZMUTH	BDPFDD	BLACC	BUNDER	BUTFLT	CDCL
		CLCD	CMCALC	DATE	DIFFER	DOTX	FILTER	FLEX	FLTRCM	FOCUS	FORCMC	FORWK	FORWK1
		FORY	FORYD	FOSWK	FOSWK1	FPYLAC	FRCGOF	FUSFNM	GETFLP	HRESP	IMFRMP	INIT	INSTAR
		INTFRQ	INVERS	IOMAT	ITROT	JACOBI	MANAL	MATRIX	MBAL	MDRDRS	NCDAMP	PDPFDD	PUNCH
		PYLACC	PYLON	RADBGN	RADIAL	RADOUT	RGUST	ROTAN	RTWAKE	RVRGST	SHKCTL	SHRPYL	SOLVE
		STAMAN	STARAD	STARAN	STBCOM	STBD	STBFNM	STBFRQ	STBWAK	STRIAB	STRIMA	SWAP	SWAS
		SWSRAT	TAB	TABINT	TAB1	TFRTWK	TOPLOT	TRMANU	TVTRIM	UNSDER	UNSTED	VIND	WAG
		WING	WRFM	WRINST	WRMS	WRPERT	WRSTAB	WRTFUN	WRVP	WSHDUF	XSTORE	ZLLCAL	
CONTRM	LENGTH	118											
	CALLED BY -	MAIN											
	CALLS -	LOADT	STRIAB	TOPLOT	TRIM								
	USES -	AJACOB	ANAL	ANDOIT	AZMINT	AZMOUT	AZMUTH	BDPFDD	BLACC	BUNDER	BUTFLT	CDCL	CLCD
		CMCALC	DATE	DIFFER	DOTX	FILTER	FLEX	FLTRCM	FOCUS	FORCMC	FORWK	FORWK1	FORY
		FORYD	FOSWK	FOSWK1	FPYLAC	FRCGOF	FUSFNM	GETFLP	HARM	HRESP	INIT	INSTAR	INTFRQ
		ITRIM	ITROT	JACOBI	MANAL	MATRIX	MBAL	NCDAMP	NOPS	NORSET	PDPFDD	PDZERO	PRETVT
		PYLACC	PYLON	RADBGN	RADIAL	RADOUT	RGUST	ROTAN	RPTPG	RTWAKE	RVRGST	SHKCTL	SHRPYL
		SOLVE	STAMAN	STARAD	STARAN	STBD	STBFNM	STBWAK	STRIAB	STRIMA	SWAS	SWSRAT	TAB
		TABINT	TAB1	TFRTWK	TIMEQO	TIVAR	TOPLOT	TRMANU	TVTRIM	UNSDER	UNSTED	VIND	WAG
		WING	WRFM	WROT	WRTMNV	WRTRIM	WRVP	WSHDUF	XSTORE	ZLLCAL			
DATE	LENGTH	1F0											
	CALLED BY -	ITRIM	MAIN	PUNCH	WRMANU	WROT	WRTRIM						
	IS USED BY -	CONSTB	CONTRM	MAIN	MANU	MODES	READIN	RPTPG	START	TIMLP	TRIM	WRTRIM	
DERIV	LENGTH	050											
	CALLED BY -	MANU											
	IS USED BY -	MAIN											
	CALLS -	ANAL	ANDOIT	BDPFDD	FORY	FORYD	FUSACC	MANAL	PDPFDD	PYLON	QSBDPF	QUAN	SCASIT

TABLE 7. Continued.

CONTROL SECTION CROSS-REFERENCE LIST

DERIV	CALLS -	SHRPYL	STAMAN	STARAN	STRIAB	STRIMA	SWSRAT	TOPLOT	VARI				
CONTINUED	USES -	ANDQIT	AZMINT	AZMOUT	AZMUTH	BDPFDD	BLACC	BUNDER	BUTFLT	CDCL	CGARMS	CLCD	CMCALC
		CNTM	DIFFER	DOTX	EXTORS	FILTER	FLEX	FLTRCM	FOCUS	FORCMC	FORWK	FORWK1	FORY
		FORYD	FOSWK	FOSWK1	FPYLAC	FRCGOF	FUSFNM	GETFLP	GUST	HRESP	INIT	INSTAR	INTFRQ
		ITROT	MANAL	MATRIX	MBAL	MOMB	MTLT	NOPS	PDPFDD	PYLACC	PYLON	RADBGN	RADIAL
		RADOUT	RGUST	ROTAN	RTWAKE	RVRGST	SHKCTL	SHRPYL	SOLVE	STAMAN	STARAD	STARAN	STBFNM
		STBWAK	STRIAB	STRIMA	SUPERP	SWAS	SWSRAT	TAB	TABINT	TABI	TFRTWK	TILT	TOPLOT
		TRMANU	TVTRIM	UNSDER	UNSTED	VGUNS	VIND	VORGST	VSCAS	WAG	WING	WSHDUF	XSTORE
		ZLLCAL											
DIFFER	LENGTH 3A8												
	CALLED BY -	BUNDER	UNSDER										
	IS USED BY -	AJACOB	ANAL	AZMUTH	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM	ITROT	JACOBI	MAIN
		MANU	RADIAL	ROTAN	STAB	TRIM	TVTRIM						
DOTX	LENGTH 58												
	CALLED BY -	BDPFDD	GETFLP	HRESP	RTWAKE	STBWAK	TRIM						
	IS USED BY -	AJACOB	ANAL	AZMUTH	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM	ITROT	JACOBI	MAIN
		MANU	RADBGN	RADIAL	ROTAN	STAB	STBFNM	TIMLP	TRIM	TVTRIM	WING		
ENGINT	LENGTH 308												
	CALLED BY -	START											
	IS USED BY -	MAIN											
	CALLS -	INONLY	MAXHP	STAMAN	STARAN	STRIMA							
	USES -	INONLY	INSTAR	STARAN	STRIMA	TOPLOT							
ERRCHK	LENGTH 6E8												
	CALLED BY -	READIN											
	IS USED BY -	MAIN	START										
	CALLS -	INSTAR	TOPLOT										
EXTORS	LENGTH 860												
	CALLED BY -	VARI											
	IS USED BY -	DERIV	MAIN	MANU									
	CALLS -	CGARMS	INSTAR	MANAL	STAMAN	STRIMA	TOPLOT						
	USES -	INSTAR	MANAL	STAMAN	STRIMA								
FILTER	LENGTH 1AD8												
	CALLED BY -	ANAL	FUSACC	ITROT	MANU	TVTRIM							
	IS USED BY -	AJACOB	ANAL	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM	JACOBI	MAIN	MANU	ROTAN
		STAB	TRIM	TVTRIM									
	CALLS -	FLTRCM											
FLEX	LENGTH 2A88												
	CALLED BY -	AZMINT	AZMUTH	BDPFDD	BMSINT	FRCGOF	GETFLP	INBLD	INBMSS	INIT	INRO	INRTR	LOADT
		MNEM	MODAL	QUAN	RADBGN	RADIAL	RESTRT	RPTPG	SHKINT	SWSRAT	TIMEQ0	TRIM	TRMANU
		TVTRIM	ZERO										
	IS USED BY -	AJACOB	ANAL	AZMUTH	CONSTB	CONTRM	DERIV	FOCUS	INBLD	INIT	INRO	INSTAB	ITRIM
		ITROT	JACOBI	LIZE	MAIN	MANU	MNEM	RADIAL	ROTAN	RTINIT	STAB	START	TIMLP
		TRIM	TVTRIM	WRTRIM									
FLTRCM	LENGTH 38C0												
	CALLED BY -	BUTFLT	FILTER	RESTRT	TIMEQ0								
	IS USED BY -	AJACOB	ANAL	CONSTB	CONTRM	DERIV	FOCUS	FUSACC	INSTAB	ITRIM	ITROT	JACOBI	MAIN
		MANU	MNEM	ROTAN	STAB	START	TIMLP	TRIM	TVTRIM				
FOCUS	LENGTH 3C0												
	CALLED BY -	ROTAN	TVTRIM										

TABLE 7. Continued.

CONTROL SECTION CROSS-REFERENCE LIST

FOCUS CONTINUED	IS USED BY -	AJACOB	ANAL	CONSTB	CONTRM	DERIV	INSTAB	ITRIM	JACOBI	MAIN	MANU	ROTAN	STAB
		TRIM											
	CALLS -	ANDOIT	BDPFDD	ITROT	MANAL	SHRPYL	STARAN	STRIMA	TOPLOT				
	USES -	ANDOIT	AZMINT	AZMOUT	AZMUTH	BLACC	BUNDER	CDCL	CMCALC	DIFFER	OUTX	FILTER	FLEX
		FLTRCM	FORCMC	FORWK	FORWK1	FORY	FORYD	FRCGOF	HRESP	INSTAR	INTERU	MANAL	MATRIX
		MBAL	POPFDD	PYLACC	PYLON	RADBGN	RADIAL	RADOUT	RGUST	RTWAKE	RVRGST	SHKCTL	SOLVE
		STAMAN	STARAD	STARAN	STRIAB	STRIMA	SWSRAT	TAB	TABINT	TABI	TFRTWK	TOPLOT	UNSDER
		UNSTED	VIND										
FORCMC	LENGTH 15A6												
	CALLED BY -	CMCALC											
	IS USED BY -	AJACOB	ANAL	AZMUTH	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM	ITROT	JACOBI	MAIN
		MANU	RADIAL	ROTAN	STAB	TRIM	TVTRIM						
FORWK	LENGTH 3F0												
	CALLED BY -	AZMINT	ITROT	LIZE	RADBGN	REDRWK	RESTRT	RTWAKE	START	STBWAK	SWSRAT	TFRTWK	TIMEQ0
		UNSDER	ZERO										
	IS USED BY -	AJACOB	ANAL	AZMUTH	CONSTB	CONTRM	DERIV	FOCUS	INIT	INSTAB	ITRIM	ITROT	JACOBI
		JSTRED	LIZE	MAIN	MANU	MNEM	RADBGN	RADIAL	READIN	ROTAN	STAB	START	STBFNM
		TIMLP	TRIM	TRMANU	TVTRIM	WING	WRTRIM						
FORWK1	LENGTH 128E0												
	CALLED BY -	AZMINT	ITROT	LIZE	RADBGN	REDRWK	RESTRT	RTWAKE	START	STBWAK	SWSRAT	TFRTWK	UNSDER
		ZERO											
	IS USED BY -	AJACOB	ANAL	AZMUTH	CONSTB	CONTRM	DERIV	FOCUS	INIT	INSTAB	ITRIM	ITROT	JACOBI
		JSTRED	LIZE	MAIN	MANU	MNEM	RADBGN	RADIAL	READIN	ROTAN	STAB	START	STBFNM
		TIMLP	TRIM	TRMANU	TVTRIM	WING	WRTRIM						
FORY	LENGTH 828												
	CALLED BY -	AJACOB	BDPFDD	DERIV	FPYLAC	FUSACC	GETFLP	INIT	LIZE	MANU	MNEM	MOMB	PRETVT
		QSBDPF	QUAN	RESTRT	ROTAN	SCASIT	STBFNM	TIMEQ0	TIMLP	TRIM	TRMANU	TVTRIM	VARI
		VSCAS	WRMANU										
	IS USED BY -	AJACOB	ANAL	CONSTB	CONTRM	DERIV	FOCUS	INIT	INSTAB	ITRIM	JACOBI	MAIN	MANU
		MNEM	ROTAN	STAB	START	TIMLP	TRIM	TRMANU	TVTRIM	VARI	WRTRIM		
FORYD	LENGTH 1040												
	CALLED BY -	AJACOB	BDPFDD	DERIV	FPYLAC	FUSACC	GETFLP	INIT	LIZE	MANU	MNEM	MOMB	PRETVT
		QSBDPF	QUAN	RESTRT	ROTAN	SCASIT	STBFNM	TIMEQ0	TIMLP	TRIM	TRMANU	TVTRIM	VARI
		VSCAS	WRMANU										
	IS USED BY -	AJACOB	ANAL	CONSTB	CONTRM	DERIV	FOCUS	INIT	INSTAB	ITRIM	JACOBI	MAIN	MANU
		MNEM	ROTAN	STAB	START	TIMLP	TRIM	TRMANU	TVTRIM	VARI	WRTRIM		
FOSWK	LENGTH 790												
	CALLED BY -	LIZE	REDSWK	RESTRT	STBFNM	STBWAK	STBZIN	TIMEQ0	WING				
	IS USED BY -	AJACOB	ANAL	CONSTB	CONTRM	DERIV	INSTAB	ITRIM	JACOBI	JSTRED	MAIN	MANU	MNEM
		READIN	STAB	START	STBFNM	TIMLP	TRIM	WING					
FOSWK1	LENGTH 180												
	CALLED BY -	LIZE	REDSWK	RESTRT	STBFNM	STBWAK	STBZIN	WING					
	IS USED BY -	AJACOB	ANAL	CONSTB	CONTRM	DERIV	INSTAB	ITRIM	JACOBI	JSTRED	MAIN	MANU	MNEM
		READIN	STAB	START	STBFNM	TIMLP	TRIM	WING					
FPYLAC	LENGTH 278												
	CALLED BY -	TRMANU	TVTRIM										
	IS USED BY -	AJACOB	ANAL	CONSTB	CONTRM	DERIV	INIT	INSTAB	ITRIM	JACOBI	MAIN	MANU	ROTAN
		STAB	TIMLP	TRIM	TVTRIM	WRTRIM							
	CALLS -	FORY	FORYD	INSTAR	MANAL	PYLON							

TABLE 7. Continued.

CONTROL SECTION CROSS-REFERENCE LIST

```
FRCGDF   LENGTH    5C0
         CALLED BY   - RADIAL
         IS USED BY  - AJACOB   ANAL     AZMUTH   CONSTB   CONTRM   DERIV    FOCUS    INSTAB   ITRIM    ITROT    JACOBI   MAIN
                       MANU     ROTAN    STAB     TRIM     TVTRIM
               CALLS - ANDOIT   FLEX     MANAL    STAMAN   STARAD   STARAN   STRIMA

FSMINT   LENGTH    2A8
         CALLED BY   - START
         IS USED BY  - MAIN
               CALLS - INONLY   INSTAR   MANAL    PYLON

FUSACC   LENGTH    5F0
         CALLED BY   - DERIV
         IS USED BY  - MAIN     MANU
               CALLS - FILTER   FORY     FORYD    MANAL    STAMAN   STRIAB   STRIMA   TOPLOT
               USES  - FLTRCM

FUSFNM   LENGTH    DD0
         CALLED BY   - ANAL
         IS USED BY  - AJACOB   CONSTB   CONTRM   DERIV    INSTAB   ITRIM    JACOBI   MAIN     MANU     STAB     TRIM
               CALLS - ANDOIT   MANAL    STAMAN   STARAN   WSHDUF
               USES  - STARAN   STRIMA

FUSINT   LENGTH    DA0
         CALLED BY   - START
         IS USED BY  - MAIN
               CALLS - INONLY   INSTAR   MANAL    STAMAN   STARAN   STRIMA

GETFLP   LENGTH    398
         CALLED BY   - TIMLP    TVTRIM
         IS USED BY  - AJACOB   ANAL     CONSTB   CONTRM   DERIV    INSTAB   ITRIM    JACOBI   MAIN     MANU     ROTAN    STAB
                       TRIM
               CALLS - ANDOIT   DOTX     FLEX     FORY     FORYD    MANAL    SOLVE    STRIMA   TOPLOT

GUST     LENGTH    940
         CALLED BY   - VARI
         IS USED BY  - DERIV    MAIN     MANU
               CALLS - MANAL    STAMAN   STARAN   STRIAB   STRIMA   VORGST
               USES  - MANAL    STAMAN   STARAN   STRIAB   STRIMA

HARM     LENGTH    350
         CALLED BY   - LOADT
         IS USED BY  - CONTRM   MAIN

HRESP    LENGTH    960
         CALLED BY   - ITROT
         IS USED BY  - AJACOB   ANAL     CONSTB   CONTRM   DERIV    FOCUS    INSTAB   ITRIM    JACOBI   MAIN     MANU     ROTAN
                       STAB     TRIM     TVTRIM
               CALLS - ANDOIT   DOTX     MANAL    STARAD   STARAN

IMFRMP   LENGTH    6D8
         CALLED BY   - MODES
         IS USED BY  - CONSTB   MAIN
               CALLS - MANAL    PYLON    STBCOM

INBLD    LENGTH   1568
         CALLED BY   - INRO
         IS USED BY  - MAIN     RTINIT   START
```

TABLE 7. Continued.

CONTROL SECTION CROSS-REFERENCE LIST

INBLD CONTINUED	CALLS - ANDOIT	FLEX	INBMSS	INONLY	INSTAR	MANAL	STARAD	STARAN	STRIMA	TOPLOT			
	USES - FLEX	INONLY	INSTAR	MANAL	STARAD	TOPLOT							
INBMSS	LENGTH 348												
	CALLED BY - INBLD												
	IS USED BY - INRO	MAIN	RTINIT	START									
	CALLS - FLEX	INONLY	INSTAR	MANAL	STARAD	TOPLOT							
INIT	LENGTH 608												
	CALLED BY - TIMLP	TVTRIM											
	IS USED BY - AJACOB	ANAL	CONSTB	CONTRM	DERIV	INSTAB	ITRIM	JACOBI	MAIN	MANU	ROTAN	STAB	
	TRIM												
	CALLS - FLEX	FORY	FORYD	MANAL	PYLON	STAMAN	STARAN	STRIMA	TOPLOT	TRMANU			
	USES - ANDOIT	FLEX	FORWK	FORWK1	FORY	FORYD	FPYLAC	INSTAR	MANAL	PYLON	STAMAN	STARAD	
	STARAN	STRIMA	TFRTWK	TOPLOT	VIND								
INONLY	LENGTH 3990												
	CALLED BY - BMSINT	ENGINT	FSMINT	FUSINT	INBLD	INBMSS	INRO	JFBGIN	JSTRED	LIZE	MAXHP	MNEM	
	MODAL	NPUTOT	PYLINT	READIN	REDATB	REDID	REDRWK	REDSWK	RESTRT	RTINIT	SHKINT	START	
	STBZIN	TABOUT	TURN	WRMODE	XCONIN	XSTINT							
	IS USED BY - ENGINT	INBLD	INRO	JSTRED	MAIN	MANU	MNEM	MODAL	READIN	REDATB	REDRWK	REDSWK	
	RTINIT	START	TIMLP										
INRO	LENGTH F28												
	CALLED BY - RTINIT												
	IS USED BY - MAIN	START											
	CALLS - ANDOIT	BMSINT	FLEX	INBLD	INONLY	INRTR	INSTAR	MANAL	MODAL	PYLINT	PYLON	STAMAN	
	STARAD	STARAN	STRIMA	TOPLOT									
	USES - ANDOIT	FLEX	INBMSS	INONLY	INSTAR	MANAL	MATRIX	PYLON	STAMAN	STARAD	STARAN	STRIMA	
	TOPLOT	WRMODE											
INRTR	LENGTH 460												
	CALLED BY - INRO												
	IS USED BY - MAIN	RTINIT	START										
	CALLS - ANDOIT	FLEX	MANAL	MATRIX	STARAD	STARAN							
INSCAS	LENGTH 308												
	CALLED BY - JFBGIN												
	IS USED BY - MAIN	START											
	CALLS - STAMAN	STRIMA											
INSTAB	LENGTH C20												
	CALLED BY - CONSTB												
	IS USED BY - MAIN												
	CALLS - AJACOB	JACOBI	MANAL	NCDAMP	PYLON	STARAD	STARAN	STBD	STRIAB	STRIMA	TOPLOT	WRINST	
	USES - AJACOB	ANAL	ANDOIT	AZMINT	AZMOUT	AZMUTH	BDPFDD	BLACC	BUNDER	BUTFLT	CDCL	CLCD	
	CMCALC	DIFFER	DOTX	FILTER	FLEX	FLTRCM	FOCUS	FORCMC	FORWK	FORWK1	FORY	FORYD	
	FOSWK	FOSWK1	FPYLAC	FRCGOF	FUSFNM	GETFLP	HRESP	INIT	INSTAR	INTFRQ	ITROT	MANAL	
	MATRIX	MBAL	PDPFDD	PYLACC	PYLON	RADBGN	RADIAL	RADOUT	RGUST	ROTAN	RTWAKE	RVRGST	
	SHKCTL	SHRPYL	SOLVE	STAMAN	STARAD	STARAN	STBD	STBFNM	STBWAK	STRIAB	STRIMA	SWAS	
	SWSRAT	TAB	TABINT	TABI	TFRTWK	TOPLOT	TRMANU	TVTRIM	UNSDER	UNSTED	VIND	WAG	
	WING	WRFM	WRVP	WSHOUF	XSTORE	ZLLCAL							
INSTAR	LENGTH 188												
	CALLED BY - AJACOB	ANAL	AZMUTH	CGARMS	ERRCHK	EXTORS	FPYLAC	FSMINT	FUSINT	INBLD	INBMSS	INRO	
	ITRIM	ITROT	JFBGIN	JSTRED	LGCINT	LIZE	MANU	MAXHP	MNEM	MODAL	NPUTOT	PYLACC	
	PYLINT	READIN	REDATB	REDID	REDRWK	REDSWK	RESTRT	RPTPG	RTINIT	SIVAR	START	STBZIN	
	SUPERP	SWSRAT	TABOUT	TIMEQO	TRIM	TRMANU	TURN	TVTRIM	UNSTED	VARI	WRFM	WRMODE	

TABLE 7. Continued.

CONTROL SECTION CROSS-REFERENCE LIST

INSTAR	CALLED BY	- XSTINT											
CONTINUED	IS USED BY	- AJACOB	ANAL	AZMUTH	CONSTB	CONTRM	DERIV	ENGINT	EXTORS	FOCUS	INBLD	INIT	INRD
		INSTAB	ITRIM	ITROT	JACOBI	JSTRED	MAIN	MANTYP	MANU	MNEM	MODAL	MOMB	MTLT
		PDPFDD	RADIAL	READIN	REDATB	REDRWK	REDSWK	RESTRT	ROTAN	RTINIT	STAB	START	TILT
		TIMLP	TRIM	TRMANU	TVTRIM	VARI	WRINST	WRMANU	WRPERT	WRTRIM			
INTFRQ	LENGTH 238												
	CALLED BY	- AZMUTH											
	IS USED BY	- AJACOB	ANAL	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM	ITROT	JACOBI	MAIN	MANU
		ROTAN	STAB	TRIM	TVTRIM								
	CALLS	- ANDOIT	MANAL	STARAN									
INVERS	LENGTH 720												
	CALLED BY	- ALSTAB	SWAP										
	IS USED BY	- ALSTAB	CONSTB	MAIN									
IOMAT	LENGTH 1020												
	CALLED BY	- MODES											
	IS USED BY	- CONSTB	MAIN										
	CALLS	- STBCOM	STBD										
ITRIM	LENGTH 980												
	CALLED BY	- TRIM											
	IS USED BY	- CONTRM	MAIN										
	CALLS	- AJACOB	DATE	INSTAR	JACOBI	MANAL	NCDAMP	PDZERO	SOLVE	STAMAN	STARAN	STRIAB	STRIMA
		TOPLOT	WRVP										
	USES	- AJACOB	ANAL	ANDOIT	AZMINT	AZMOUT	AZMUTH	BDPFDD	BLACC	BUNDER	BUTFLT	CDCL	CLCD
		CMCALC	DIFFER	DOTX	FILTER	FLEX	FLTRCM	FOCUS	FORCMC	FORWK	FORWK1	FORY	FORYD
		FOSWK	FOSWK1	FPYLAC	FRCGOF	FUSFNM	GETFLP	HRESP	INIT	INSTAR	INTFRQ	ITROT	MANAL
		MATRIX	MBAL	PDPFDD	PYLACC	PYLON	RADBGN	RADIAL	RADOUT	RGUST	ROTAN	RTWAKE	RVRGST
		SHKCTL	SHRPYL	SOLVE	STAMAN	STARAD	STARAN	STBFNM	STBWAK	STRIAB	STRIMA	SWAS	SWSRAT
		TAB	TABINT	TAB1	TFRTWK	TOPLOT	TRMANU	TVTRIM	UNSDER	UNSTED	VIND	WAG	WING
		WRFM	WRVP	WSHDUF	XSTORE	ZLLCAL							
ITROT	LENGTH 1580												
	CALLED BY	- FOCUS											
	IS USED BY	- AJACOB	ANAL	CONSTB	CONTRM	DERIV	INSTAB	ITRIM	JACOBI	MAIN	MANU	ROTAN	STAB
		TRIM	TVTRIM										
	CALLS	- ANDOIT	AZMUTH	FILTER	FORWK	FORWK1	HRESP	INSTAR	MANAL	MBAL	PDPFDD	PYLON	STAMAN
		STARAD	STARAN	STRIAB	STRIMA	SWSRAT	TFRTWK	TOPLOT	VIND				
	USES	- ANDOIT	AZMINT	AZMOUT	BLACC	BUNDER	CDCL	CMCALC	DIFFER	DOTX	FLEX	FLTRCM	FORCMC
		FORWK	FORWK1	FRCGOF	INSTAR	INTFRQ	MANAL	MATRIX	PYLACC	PYLON	RADBGN	RADIAL	RADOUT
		RGUST	RTWAKE	RVRGST	SHKCTL	SOLVE	STAMAN	STARAD	STARAN	STRIMA	TAB	TABINT	TAB1
		TOPLOT	UNSDER	UNSTED	VIND								
JACOBI	LENGTH 400												
	CALLED BY	- INSTAB	ITRIM										
	IS USED BY	- CONSTB	CONTRM	MAIN	TRIM								
	CALLS	- AJACOB	MANAL	STARAN	STRIAB	STRIMA	TOPLOT						
	USES	- ANAL	ANDOIT	AZMINT	AZMOUT	AZMUTH	BDPFDD	BLACC	BUNDER	BUTFLT	CDCL	CLCD	CMCALC
		DIFFER	DOTX	FILTER	FLEX	FLTRCM	FOCUS	FORCMC	FORWK	FORWK1	FORY	FORYD	FOSWK
		FOSWK1	FPYLAC	FRCGOF	FUSFNM	GETFLP	HRESP	INIT	INSTAR	INTFRQ	ITROT	MANAL	MATRIX
		MBAL	PDPFDD	PYLACC	PYLON	RADBGN	RADIAL	RADOUT	RGUST	ROTAN	RTWAKE	RVRGST	SHKCTL
		SHRPYL	SOLVE	STAMAN	STARAD	STARAN	STBFNM	STBWAK	STRIAB	STRIMA	SWAS	SWSRAT	TAB
		TABINT	TAB1	TFRTWK	TOPLOT	TRMANU	TVTRIM	UNSDER	UNSTED	VIND	WAG	WING	WRFM
		WRVP	WSHDUF	XSTORE	ZLLCAL								
JFBGIN	LENGTH A40												

TABLE 7. Continued.

CONTROL SECTION CROSS-REFERENCE LIST

JFBGIN	CALLED BY - START											
CONTINUED	IS USED BY - MAIN											
	CALLS - INONLY	INSCAS	INSTAR	MANAL	MATRIX	STAMAN	STARAD	STARAN	STRIAB	STRIMA	TOPLOT	
	USES - STAMAN	STRIMA										
JSTRED	LENGTH F48											
	CALLED BY - READIN											
	IS USED BY - MAIN	START										
	CALLS - INONLY	INSTAR	MANAL	REDATB	REDBMS	REDID	REDRWK	REDSWK	STAMAN	STARAD	STRIMA	
	USES - FORWK	FORWK1	FOSWK	FOSWK1	INONLY	INSTAR	MANAL	PDSRED	REDCL	REDID	STARAN	TAB
	TAB1	TOPLOT	WKTABN									
LGCINT	LENGTH 588											
	CALLED BY - READIN											
	IS USED BY - MAIN	START										
	CALLS - INSTAR	MANAL	STAMAN	STARAD	STARAN	STRIAB						
LIZE	LENGTH 7D0											
	CALLED BY - START											
	IS USED BY - MAIN											
	CALLS - FORWK	FORWK1	FORY	FORYD	FOSWK	FOSWK1	INONLY	INSTAR	MANAL	PYLON	STAMAN	STARAN
	STBD	STRIAB	STRIMA	TOPLOT	ZERO							
	USES - FLEX	FORWK	FORWK1	MANAL	PYLON	STARAN	STRIAB	STRIMA				
LOADT	LENGTH 126C8											
	CALLED BY - CONTRM											
	IS USED BY - MAIN											
	CALLS - ANDOIT	FLEX	HARM	MANAL	PYLON	STAMAN	STARAD	STARAN	STRIAB			
MAIN	LENGTH 698											
	CALLS - CONSTB	CONTRM	DATE	MANU	READIN	RESTRT	START	TOPLOT	WROT			
	USES - AJACOB	ALLMAT	ALSTAB	ANAL	ANDOIT	AZMINT	AZMOUT	AZMUTH	BDPFDD	BLACC	BMSINT	BUNDER
	BUTFLT	CDCL	CGARMS	CLCD	CMCALC	CNTM	DATE	DERIV	DIFFER	DOTX	ENGINT	ERRCHK
	EXTORS	FILTER	FLEX	FLTRCM	FUCUS	FORCMC	FORWK	FORWK1	FORY	FORYD	FOSWK	FOSWK1
	FPYLAC	FRCGOF	FSMINT	FUSACC	FUSFNM	FUSINT	GETFLP	GUST	HARM	HRESP	IMFRMP	INBLD
	INBMSS	INIT	INONLY	INRO	INRTR	INSCAS	INSTAB	INSTAR	INTFRQ	INVERS	IOMAT	ITRIM
	ITROT	JACOBI	JFBGIN	JSTRED	LGCINT	LIZE	LOADT	MANAL	MANTYP	MATRIX	MAXHP	MBAL
	MDRDRS	MNEM	MODAL	MODES	MOMB	MTLT	NCDAMP	NOPS	NORSET	NPUTOT	PDPFDD	PDSRED
	PDZERO	PRETVT	PUNCH	PYLACC	PYLINT	PYLON	QSBDPF	QUAN	RADBGN	RADIAL	RADOUT	READIN
	REDATB	REDBMS	REDCL	REDID	REDRWK	REDSWK	RESTRT	RGUST	ROTAN	RPTPG	RTINIT	RTWAKE
	RVRGST	SCASIT	SHKCTL	SHKINT	SHRPYL	SIVAR	SOLVE	STAB	STAMAN	STARAD	STARAN	STBCOM
	STBD	STBFNM	STBFRQ	STBWAK	STBZIN	STRIAB	STRIMA	SUPERP	SWAP	SWAS	SWSRAT	TAB
	TABFIX	TABINT	TABOUT	TAB1	TFRTWK	TILT	TIMEQ0	TIMLP	TIVAR	TOPLOT	TRIM	TRMANU
	TURN	TVTRIM	UNSDER	UNSTED	VARI	VGUNS	VIND	VORGST	VSCAS	WAG	WING	WKTABN
	WRFM	WRINST	WRMANU	WRMODE	WRMS	WROT	WRPERT	WRSTAB	WRTFUN	WRTMNV	WRTRIM	WRVP
	WSHDUF	XCONIN	XSTINT	XSTORE	YRINIT	YSINIT	ZERO	ZLLCAL				
MANAL	LENGTH 1D80											
	CALLED BY - AJACOB	ALSTAB	ANAL	AZMINT	AZMOUT	AZMUTH	BDPFDD	BLACC	BMSINT	CDCL	CGARMS	CLCD
	CNTM	CONSTB	DERIV	EXTORS	FUCUS	FPYLAC	FRCGOF	FSMINT	FUSACC	FUSFNM	FUSINT	GETFLP
	GUST	HRESP	IMFRMP	INBLD	INBMSS	INIT	INRO	INRTR	INSTAB	INTFRQ	ITRIM	ITROT
	JACOBI	JFBGIN	JSTRED	LGCINT	LIZE	LOADT	MANTYP	MANU	MBAL	MDRDRS	MNEM	MODAL
	MODES	MOMB	MTLT	NOPS	NPUTOT	PDPFDD	PRETVT	PYLACC	PYLINT	QSBDPF	QUAN	RADBGN
	RADIAL	RADOUT	READIN	REDRWK	RESTRT	RGUST	ROTAN	RPTPG	RTINIT	RTWAKE	RVRGST	SCASIT
	SHKCTL	SHKINT	SHRPYL	SIVAR	STAB	START	STBFNM	STBWAK	STBZIN	SUPERP	SWAS	SWSRAT
	TFRTWK	TILT	TIMEQ0	TIMLP	TIVAR	TRIM	TRMANU	TVTRIM	UNSDER	UNSTED	VARI	VGUNS
	VIND	VORGST	WING	WRFM	WRINST	WRMANU	WRMODE	WRPERT	WRTMNV	WRTRIM	WRVP	XCONIN
	XSTORE	ZERO	ZLLCAL									

TABLE 7. Continued.

CONTROL SECTION CROSS-REFERENCE LIST

MANAL	IS USED BY -	AJACOB	ANAL	AZMINT	AZMUTH	CONSTB	CONTRM	DERIV	EXTORS	FOCUS	GUST	INBLD	INIT
CONTINUED		INRO	INSTAB	ITRIM	ITROT	JACOBI	JSTRED	LIZE	MAIN	MANTYP	MANU	MNEM	MODAL
		MODES	MOMB	MTLT	PDPFDD	PRETVT	RADBGN	RADIAL	READIN	RESTRT	RGUST	ROTAN	RTINIT
		STAB	START	STBFNM	TFRTWK	TILT	TIMLP	TRIM	TRMANU	TVTRIM	UNSTED	VARI	WING
		WRINST	WRMANU	WRPERT	WRTRIM								
MANTYP	LENGTH 308												
	CALLED BY -	MNEM											
	IS USED BY -	MAIN	START										
	CALLS -	MANAL	NORSET	SIVAR	STRIMA	TOPLOT							
	USES -	INSTAR	MANAL	STAMAN	STARAN	STRIMA	TOPLOT						
MANU	LENGTH 880												
	CALLED BY -	MAIN											
	CALLS -	BUTFLT	DERIV	FILTER	FORY	FORYD	INSTAR	MANAL	NORSET	PYLON	QUAN	RESTRT	STAMAN
		STRIMA	TIMEQQ	TIMLP	TOPLOT								
	USES -	ANAL	ANDOIT	AZMINT	AZMOUT	AZMUTH	BDPFDD	BLACC	BUNDER	BUTFLT	CDCL	CGARMS	CLCD
		CMCALC	CNTM	DATE	DIFFER	DOTX	EXTORS	FILTER	FLEX	FLTRCM	FOCUS	FORCMC	FORWK
		FORWK1	FORY	FORYD	FOSWK	FOSWK1	FPYLAC	FRCGOF	FUSACC	FUSFNM	GETFLP	GUST	HRESP
		INIT	INONLY	INSTAR	INTFRQ	ITROT	MANAL	MATRIX	MBAL	MOMB	MTLT	NOPS	NORSET
		PDPFDD	PYLACC	PYLON	QSBDPF	QUAN	RADBGN	RADIAL	RADOUT	RESTRT	RGUST	ROTAN	RTWAKE
		RVRGST	SCASIT	SHKCTL	SHRPYL	SIVAR	SOLVE	STAMAN	STARAD	STARAN	STBD	STBFNM	STBWAK
		STRIAB	STRIMA	SUPERP	SWAS	SWSRAT	TAB	TABINT	TAB1	TFRTWK	TILT	TIVAR	TOPLOT
		TRMANU	TVTRIM	UNSDER	UNSTED	VARI	VGUNS	VIND	VORGST	VSCAS	WAG	WING	WRFM
		WRMANU	WRTMNV	WSHDUF	XSTORE	ZLLCAL							
MATRIX	LENGTH 2D8												
	CALLED BY -	AJACOB	AZMINT	INRTR	JFBGIN	MNEM	MTLT	QUAN	SWSRAT				
	IS USED BY -	AJACOB	ANAL	AZMUTH	CONSTB	CONTRM	DERIV	FOCUS	INRO	INSTAB	ITRIM	ITROT	JACOBI
		MAIN	MANU	ROTAN	RTINIT	STAB	START	TRIM	TVTRIM	VARI			
MAXHP	LENGTH 3A0												
	CALLED BY -	ENGINT											
	IS USED BY -	MAIN	START										
	CALLS -	INONLY	INSTAR	STARAN	STRIMA	TOPLOT							
MBAL	LENGTH 688												
	CALLED BY -	ITROT											
	IS USED BY -	AJACOB	AMAL	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM	JACOBI	MAIN	MANU	ROTAN
		STAB	TRIM	TVTRIM									
	CALLS -	ANDOIT	MANAL	PYLON	STARAN	TOPLOT							
MDRDRS	LENGTH 960												
	CALLED BY -	MODES											
	IS USED BY -	CONSTB	MAIN										
	CALLS -	MANAL	PYLON	STBCOM	STBD	STRIAB	STRIMA						
MNEM	LENGTH 830												
	CALLED BY -	START											
	IS USED BY -	MAIN											
	CALLS -	FLEX	FORY	FORYD	INONLY	INSTAR	MANAL	MANTYP	MATRIX	NOPS	RESTRT	STAMAN	STARAN
		STRIAB	STRIMA	SWAS	TILT	TOPLOT	TURN	VIND					
	USES -	ANDOIT	CGARMS	FLEX	FLTRCM	FORWK	FORWK1	FORY	FORYD	FOSWK	FOSWK1	INONLY	INSTAR
		MANAL	NORSET	PYLON	SIVAR	STAMAN	STARAD	STARAN	STBD	STRIAB	STRIMA	TAB	TAB1
		TIVAR	TOPLOT	ZLLCAL									
MODAL	LENGTH 1208												
	CALLED BY -	INRO											

TABLE 7. Continued.

CONTROL SECTION CROSS-REFERENCE LIST

MODAL CONTINUED	IS USED BY - MAIN	RTINIT	START										
	CALLS - ANDOIT	FLEX	INONLY	INSTAR	MANAL	STAMAN	STARAD	STARAN	WRMODE				
	USES - INONLY	INSTAR	MANAL	STARAN									
MODES	LENGTH 8A0												
	CALLED BY - CONSTB												
	IS USED BY - MAIN												
	CALLS - IMFRMP	IOMAT	MANAL	MDRDRS	PUNCH	STARAN	STBCOM	STBD	STRIAB	STRIMA			
	USES - DATE	MANAL	PYLON	STBCOM	STBD	STRIAB	STRIMA	TOPLOT					
MOMB	LENGTH 790												
	CALLED BY - VARI												
	IS USED BY - DERIV	MAIN	MANU										
	CALLS - FORY	FORYD	MANAL	NOPS	SOLVE	STAMAN	STRIMA	TILT	TOPLOT				
	USES - CGARMS	INSTAR	MANAL	STAMAN	STRIMA	ZLLCAL							
MTLT	LENGTH 480												
	CALLED BY - VARI												
	IS USED BY - DERIV	MAIN	MANU										
	CALLS - MANAL	MATRIX	STAMAN	STRIMA	TILT								
	USES - CGARMS	INSTAR	MANAL	STAMAN	STRIMA	ZLLCAL							
NCDAMP	LENGTH 3C8												
	CALLED BY - INSTAB	ITRIM	TRIM										
	IS USED BY - CONSTB	CONTRM	MAIN	TRIM									
	CALLS - STARAN	STRIAB	STRIMA										
NOPS	LENGTH 4F8												
	CALLED BY - MNEM	MOMB	PRETVT										
	IS USED BY - CONTRM	DERIV	MAIN	MANU	START	TRIM	VARI						
	CALLS - MANAL												
NORSET	LENGTH 18												
	CALLED BY - MANTYP	MANU	RESTRT	TIMEQQ	TRIM								
	IS USED BY - CONTRM	MAIN	MANU	MNEM	START	TIMLP	TRIM						
NPUTOT	LENGTH DA8												
	CALLED BY - READIN												
	IS USED BY - MAIN	START											
	CALLS - INONLY	INSTAR	MANAL	STAMAN	STARAD	STRIMA							
PDPFDQ	LENGTH FC8												
	CALLED BY - DERIV	ITROT											
	IS USED BY - AJACOB	ANAL	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM	JACOBI	MAIN	MANU	ROTAN	
	STAB	TRIM	TVTRIM										
	CALLS - ANDOIT	MANAL	PYLACC	PYLON	SOLVE	STARAN							
	USES - INSTAR	MANAL	PYLON	STARAN									
PDSRED	LENGTH 268												
	CALLED BY - REDID												
	IS USED BY - JSTRED	MAIN	READIN	REDATB	REDRWK	REDSWK	START						
PDZERO	LENGTH 380												
	CALLED BY - ITRIM	TRIM											
	IS USED BY - CONTRM	MAIN	TRIM										
PRETVT	LENGTH 788												
	CALLED BY - TRIM												

TABLE 7. Continued.

CONTROL SECTION CROSS-REFERENCE LIST

PRETVT	IS USED BY - CONTRM	MAIN											
CONTINUED	CALLS - FORY	FORYD	MANAL	NOPS	PYLON	STARAN	STRIAB	STRIMA	TOPLOT				
	USES - MANAL												
PUNCH	LENGTH 648												
	CALLED BY - MODES												
	IS USED BY - CONSTB	MAIN											
	CALLS - DATE	STBCOM	STRIMA	TOPLOT									
PYLACC	LENGTH 368												
	CALLED BY - PDPFDD	STAB											
	IS USED BY - AJACOB	ANAL	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM	ITROT	JACOBI	MAIN	MANU	
	ROTAN	STAB	TRIM	TVTRIM									
	CALLS - INSTAR	MANAL	PYLON	STARAN									
PYLINT	LENGTH 328												
	CALLED BY - INRO												
	IS USED BY - MAIN	RTINIT	START										
	CALLS - INONLY	INSTAR	MANAL	PYLON	STARAN								
PYLON	LENGTH 620												
	CALLED BY - ANAL	BDPFDD	DERIV	FPYLAC	FSMINT	IMFRMP	INIT	INRO	INSTAB	ITROT	LIZE	LOADT	
	MANU	MBAL	MDRDRS	PDPFDD	PRETVT	PYLACC	PYLINT	QUAN	RESTRT	ROTAN	RPTPG	SHRPYL	
	STAB	SWSRAT	TIMEQD	TRMANU	TVTRIM	WRMANU	WRPERT	WRSTAB	ZERO				
	IS USED BY - AJACOB	ANAL	CONSTB	CONTRM	DERIV	FOCUS	INIT	INRO	INSTAB	ITRIM	ITROT	JACOBI	
	LIZE	MAIN	MANU	MNEM	MODES	PDPFDD	ROTAN	RTINIT	STAB	START	TIMLP	TRIM	
	TRMANU	TVTRIM	WRTRIM										
QSBDPF	LENGTH 348												
	CALLED BY - DERIV												
	IS USED BY - MAIN	MANU											
	CALLS - ANDOIT	FORY	FORYD	MANAL	STARAN								
QUAN	LENGTH 770												
	CALLED BY - DERIV	MANU											
	IS USED BY - MAIN	MANU											
	CALLS - FLEX	FORY	FORYD	MANAL	MATRIX	PYLON	STAMAN	STARAN	STRIMA				
RADBGN	LENGTH 758												
	CALLED BY - RADIAL												
	IS USED BY - AJACOB	ANAL	AZMUTH	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM	ITROT	JACOBI	MAIN	
	MANU	ROTAN	STAB	TRIM	TVTRIM								
	CALLS - ANDOIT	FLEX	FORWK	FORWK1	MANAL	RGUST	RTWAKE	STARAD	STARAN				
	USES - ANDOIT	DOTX	FORWK	FORWK1	MANAL	RVRGST	STARAD	STARAN	STRIMA				
RADIAL	LENGTH 1110												
	CALLED BY - AZMUTH												
	IS USED BY - AJACOB	ANAL	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM	ITROT	JACOBI	MAIN	MANU	
	ROTAN	STAB	TRIM	TVTRIM									
	CALLS - ANDOIT	BLACC	BUNDER	CDCL	CMCALC	FLEX	FRCGOF	MANAL	RADBGN	RADOUT	STAMAN	STARAD	
	STARAN	STRIMA	TOPLOT	UNSDER	UNSTED								
	USES - ANDOIT	CDCL	DIFFER	DOTX	FLEX	FORCMC	FORWK	FORWK1	INSTAR	MANAL	RGUST	RTWAKE	
	RVRGST	STAMAN	STARAD	STARAN	STRIMA	TAB	TABINT	TABI	TOPLOT				
RADOUT	LENGTH 680												
	CALLED BY - RADIAL												
	IS USED BY - AJACOB	ANAL	AZMUTH	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM	ITROT	JACOBI	MAIN	
	MANU	ROTAN	STAB	TRIM	TVTRIM								
	CALLS - ANDOIT	MANAL	STARAN	TOPLOT									

TABLE 7. Continued.

CONTROL SECTION CROSS-REFERENCE LIST

READIN	LENGTH 1010												
	CALLED BY -	MAIN	START										
	IS USED BY -	MAIN											
	CALLS -	ERRCHK	INONLY	INSTAR	JSTRED	LGCINT	MANAL	NPUTOT	STAMAN	STARAD	STRIAB	STRIMA	TOPLOT
		WROT											
	USES -	DATE	FORWK	FORWK1	FOSWK	FOSWK1	INONLY	INSTAR	MANAL	PDSRED	REDATB	REDBMS	REDCL
		REDID	REDRWK	REDSWK	STAMAN	STARAD	STARAN	STRIAB	STRIMA	TAB	TAB1	TOPLOT	WKTABN
REDATB	LENGTH 2A8												
	CALLED BY -	JSTRED											
	IS USED BY -	MAIN	READIN	START									
	CALLS -	INONLY	INSTAR	REDCL	REDID	TAB	TAB1						
	USES -	INONLY	INSTAR	PDSRED									
REDBMS	LENGTH 220												
	CALLED BY -	JSTRED											
	IS USED BY -	MAIN	READIN	START									
REDCL	LENGTH 2C0												
	CALLED BY -	REDATB											
	IS USED BY -	JSTRED	MAIN	READIN	START								
REDID	LENGTH 668												
	CALLED BY -	JSTRED	REDATB	REDRWK	REDSWK								
	IS USED BY -	JSTRED	MAIN	READIN	START								
	CALLS -	INONLY	INSTAR	PDSRED									
REDRWK	LENGTH 1508												
	CALLED BY -	JSTRED	START										
	IS USED BY -	MAIN	READIN	START									
	CALLS -	FORWK	FORWK1	INONLY	INSTAR	MANAL	REDID	STARAN	TOPLOT	WKTABN			
	USES -	INONLY	INSTAR	PDSRED									
REDSWK	LENGTH AF8												
	CALLED BY -	JSTRED	START										
	IS USED BY -	MAIN	READIN	START									
	CALLS -	FOSWK	FOSWK1	INONLY	INSTAR	REDID	TOPLOT						
	USES -	INONLY	INSTAR	PDSRED									
RESTRT	LENGTH 1118												
	CALLED BY -	MAIN	MANU	MNEM	TIMLP								
	IS USED BY -	MAIN	MANU	START									
	CALLS -	ANDOIT	FLEX	FLTRCM	FORWK	FORWK1	FORY	FORYD	FOSWK	FOSWK1	INONLY	INSTAR	MANAL
		NORSET	PYLON	SIVAR	STAMAN	STARAD	STARAN	STBD	STRIAB	STRIMA	TAB	TAB1	TIVAR
		TOPLOT											
	USES -	INSTAR	MANAL	STAMAN	STARAN	STRIMA	TOPLOT						
RGUST	LENGTH 420												
	CALLED BY -	RADBGN											
	IS USED BY -	AJACOB	ANAL	AZMUTH	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM	ITROT	JACOBI	MAIN
		MANU	RADIAL	ROTAN	STAB	TRIM	TVTRIM						
	CALLS -	ANDOIT	MANAL	RVRGST	STARAD	STARAN							
	USES -	ANDOIT	MANAL	STARAD	STRIMA								
ROTAN	LENGTH 490												
	CALLED BY -	ANAL	TRIM										
	IS USED BY -	AJACOB	CONSTB	CONTRM	DERIV	INSTAB	ITRIM	JACOBI	MAIN	MANU	STAB	TRIM	
	CALLS -	ANDOIT	FOCUS	FORY	FORYD	MANAL	PYLON	STARAN	TOPLOT	TVTRIM			

TABLE 7. Continued.

CONTROL SECTION CROSS-REFERENCE LIST

ROTAN	USES -	ANDOIT	AZMINT	AZMOUT	AZMUTH	BDPFDD	BLACC	BUNDER	BUTFLT	CDCL	CMCALC	DIFFER	DOTX
CONTINUED		FILTER	FLEX	FLTRCM	FOCUS	FORCMC	FORWK	FORWK1	FORY	FORYD	FPYLAC	FRCGOF	GETFLP
		HRESP	INIT	INSTAR	INTFRQ	ITROT	MANAL	MATRIX	MBAL	PDPFDD	PYLACC	PYLON	RADBGN
		RADIAL	RADOUT	RGUST	RTWAKE	RVRGST	SHKCTL	SHRPYL	SOLVE	STAMAN	STARAD	STARAN	STRIAB
		STRIMA	SWSRAT	TAB	TABINT	TABI	TFRTWK	TOPLOT	TRMANU	UNSDER	UNSTED	VIND	
RPTPG	LENGTH 1410												
	CALLED BY -	TRIM											
	IS USED BY -	CONTRM	MAIN										
	CALLS -	ANDOIT	FLEX	INSTAR	MANAL	PYLON	STAMAN	STARAD	STARAN	STRIAB	STRIMA	WROT	
	USES -	DATE	TOPLOT										
RTINIT	LENGTH 3C8												
	CALLED BY -	START											
	IS USED BY -	MAIN											
	CALLS -	INONLY	INRO	INSTAR	MANAL	SHKINT	STAMAN	STARAD	STARAN	STRIAB	TOPLOT		
	USES -	ANDOIT	BMSINT	FLEX	INBLD	INBMSS	INONLY	INRTR	INSTAR	MANAL	MATRIX	MODAL	PYLINT
		PYLON	STAMAN	STARAD	STARAN	STRIMA	TOPLOT	WRMODE					
RTWAKE	LENGTH 590												
	CALLED BY -	RADBGN											
	IS USED BY -	AJACOB	ANAL	AZMUTH	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM	ITROT	JACOBI	MAIN
		MANU	RADIAL	ROTAN	STAB	TRIM	TVTRIM						
	CALLS -	ANDOIT	DOTX	FORWK	FORWK1	MANAL							
RVRGST	LENGTH 3D0												
	CALLED BY -	RGUST											
	IS USED BY -	AJACOB	ANAL	AZMUTH	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM	ITROT	JACOBI	MAIN
		MANU	RADBGN	RADIAL	ROTAN	STAB	TRIM	TVTRIM					
	CALLS -	ANDOIT	MANAL	STARAD	STRIMA								
SCASIT	LENGTH 2D8												
	CALLED BY -	DERIV											
	IS USED BY -	MAIN	MANU										
	CALLS -	FORY	FORYD	MANAL	STAMAN								
SHKCTL	LENGTH 488												
	CALLED BY -	AZMINT											
	IS USED BY -	AJACOB	ANAL	AZMUTH	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM	ITROT	JACOBI	MAIN
		MANU	ROTAN	STAB	TRIM	TVTRIM							
	CALLS -	ANDOIT	MANAL	STARAN									
SHKINT	LENGTH 878												
	CALLED BY -	RTINIT											
	IS USED BY -	MAIN	START										
	CALLS -	FLEX	INONLY	MANAL	STARAN								
SHRPYL	LENGTH 280												
	CALLED BY -	DERIV	FOCUS										
	IS USED BY -	AJACOB	ANAL	CONSTB	CONTRM	DERIV	INSTAB	ITRIM	JACOBI	MAIN	MANU	ROTAN	STAB
		TRIM	TVTRIM										
	CALLS -	ANDOIT	MANAL	PYLON	STARAN								
SIVAR	LENGTH FC0												
	CALLED BY -	MANTYP	RESTRT										
	IS USED BY -	MAIN	MANU	MNEM	START	TIMLP							
	CALLS -	INSTAR	MANAL	STAMAN	STARAN	STRIMA	TOPLOT						

TABLE 7. Continued.

CONTROL SECTION CROSS-REFERENCE LIST

SOLVE	LENGTH 4C8												
	CALLED BY -	GETFLP	ITRIM	MOMB	PDPFDD	SUPERP							
	IS USED BY -	AJACOB	ANAL	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM	ITROT	JACOBI	MAIN	MANU
		ROTAN	STAB	TIMLP	TRIM	TVTRIM	VARI						
STAB	LENGTH 860												
	CALLED BY -	CONSTB											
	IS USED BY -	MAIN											
	CALLS -	ANAL	MANAL	PYLACC	PYLON	STARAN	STBD	STRIAB	STRIMA	SWAS	TOPLOT	WRINST	WRPERT
		WRSTAB											
	USES -	ANDOIT	AZMINT	AZMOUT	AZMUTH	BDPFDD	BLACC	BUNDER	BUTFLT	CDCL	CLCD	CMCALC	DIFFER
		DOTX	FILTER	FLEX	FLTRCM	FOCUS	FORCMC	FORWK	FORWK1	FORY	FORYD	FOSWK	FOSWK1
		FPYLAC	FRCGOF	FUSFNM	GETFLP	HRESP	INIT	INSTAR	INTFRQ	ITROT	MANAL	MATRIX	MBAL
		PDPFDD	PYLACC	PYLON	RADBGN	RADIAL	RADOUT	RGUST	ROTAN	RTWAKE	RVRGST	SHKCTL	SHRPYL
		SOLVE	STAMAN	STARAD	STARAN	STBD	STBFNM	STBWAK	STRIAB	STRIMA	SWSRAT	TAB	TABINT
		TABI	TFRTWK	TOPLOT	TRMANU	TVTRIM	UNSDER	UNSTED	VIND	WAG	WING	WRFM	WSHDUF
		XSTORE											
STAMAN	LENGTH 1E18												
	CALLED BY -	AJACOB	AZMINT	AZMUTH	BMSINT	CGARMS	CNTM	DERIV	ENGINT	EXTORS	FRCGOF	FUSACC	FUSFNM
		FUSINT	GUST	INIT	INRO	INSCAS	ITRIM	ITROT	JFBGIN	JSTRED	LGCINT	LIZE	LOADT
		MANU	MNEM	MODAL	MOMB	MTLT	NPUTOT	QUAN	RADIAL	READIN	RESTRT	RPTPG	RTINIT
		SCASIT	SIVAR	START	STBFNM	SWAS	TILT	TIMEQ0	TIMLP	TRIM	TRMANU	TURN	TVTRIM
		VARI	VGUNS	VORGST	WING	WRMANU	WRTMNV	XCONIN	ZLLCAL				
	IS USED BY -	AJACOB	ANAL	AZMUTH	CONSTB	CONTRM	DERIV	EXTORS	FOCUS	GUST	INIT	INRO	INSTAB
		ITRIM	ITROT	JACOBI	JFBGIN	MAIN	MANTYP	MANU	MNEM	MOMB	MTLT	RADIAL	READIN
		RESTRT	ROTAN	RTINIT	STAB	START	TILT	TIMLP	TRIM	TVTRIM	VARI	WRMANU	WRTRIM
STARAD	LENGTH 848												
	CALLED BY -	AZMINT	AZMOUT	AZMUTH	BDPFDD	BMSINT	CDCL	FRCGOF	HRESP	INBLD	INBMSS	INRO	INRTR
		INSTAB	ITROT	JFBGIN	JSTRED	LGCINT	LOADT	MODAL	NPUTOT	RADBGN	RADIAL	READIN	RESTRT
		RGUST	RPTPG	RTINIT	RVRGST	START	STBFNM	TIMEQ0	TRMANU	UNSTED	VIND	WING	WRTRIM
	IS USED BY -	AJACOB	ANAL	AZMUTH	CONSTB	CONTRM	DERIV	FOCUS	INBLD	INIT	INRO	INSTAB	ITRIM
		ITROT	JACOBI	MAIN	MANU	MNEM	RADBGN	RADIAL	READIN	RGUST	ROTAN	RTINIT	STAB
		START	TFRTWK	TIMLP	TRIM	TRMANU	TVTRIM	UNSTED	WRTRIM				
STARAN	LENGTH 8680												
	CALLED BY -	AJACOB	ANAL	AZMINT	AZMOUT	AZMUTH	BLACC	BMSINT	BUNDER	CDCL	CLCD	CONSTB	DERIV
		ENGINT	FOCUS	FRCGOF	FUSFNM	FUSINT	GUST	HRESP	INBLD	INIT	INRO	INRTR	INSTAB
		INTFRQ	ITRIM	ITROT	JACOBI	JFBGIN	LGCINT	LIZE	LOADT	MAXHP	MBAL	MNEM	MODAL
		MODES	NCDAMP	PDPFDD	PRETVT	PYLACC	PYLINT	QSBDPF	QUAN	RADBGN	RADIAL	RADOUT	REDRWK
		RESTRT	RGUST	ROTAN	RPTPG	RTINIT	SHKCTL	SHKINT	SHRPYL	SIVAR	STAB	START	STBFNM
		STBZIN	SWSRAT	TFRTWK	TIMEQ0	TRIM	TRMANU	TVTRIM	UNSDER	UNSTED	VIND	VORGST	WAG
		WING	WRINST	WRMODE	WRTRIM	WSHDUF	ZERO						
	IS USED BY -	AJACOB	ANAL	AZMINT	AZMUTH	CONSTB	CONTRM	DERIV	ENGINT	FOCUS	FUSFNM	GUST	INIT
		INRO	INSTAB	ITRIM	ITROT	JACOBI	JSTRED	LIZE	MAIN	MANTYP	MANU	MNEM	MODAL
		PDPFDD	RADBGN	RADIAL	READIN	RESTRT	ROTAN	RTINIT	STAB	START	STBFNM	TFRTWK	TIMLP
		TRIM	TRMANU	TVTRIM	UNSTED	VARI	WING	WRTRIM					
START	LENGTH A00												
	CALLED BY -	MAIN											
	CALLS -	ENGINT	FORWK	FORWK1	FSMINT	FUSINT	INONLY	INSTAR	JFBGIN	LIZE	MANAL	MNEM	READIN
		REDRWK	REDSWK	RTINIT	STAMAN	STARAD	STARAN	STBZIN	STRIAB	STRIMA	TABOUT	TOPLOT	XCONIN
		XSTINT	YRINIT	YSINIT									
	USES -	ANDOIT	BMSINT	CGARMS	DATE	ERRCHK	FLEX	FLTRCM	FORWK	FORWK1	FORY	FORYD	FOSWK
		FOSWK1	INBLD	INBMSS	INONLY	INRO	INRTR	INSCAS	INSTAR	JSTRED	LGCINT	MANAL	MANTYP
		MATRIX	MAXHP	MODAL	NOPS	NORSET	NPUTOT	PDSRED	PYLINT	PYLON	REDATB	REDBMS	REDCL
		REDID	REDRWK	REDSWK	RESTRT	SHKINT	SIVAR	STAMAN	STARAD	STARAN	STBD	STRIAB	STRIMA

TABLE 7. Continued.

CONTROL SECTION CROSS-REFERENCE LIST

START CONTINUED	USES	SWAS ZERO	TAB ZLLCAL	TABFIX	TAB1	TILT	TIVAR	TOPLOT	TURN	VIND	WKTABN	WRMODE	WROT
STBCOM	LENGTH 82C0												
	CALLED BY -	ALLMAT	ALSTAB	IMFRMP	IOMAT	MDRDRS	MODES	PUNCH	SWAP	WRMS	WRTFUN		
	IS USED BY -	ALSTAB	CONSTB	MAIN	MODES								
STBD	LENGTH 1DD0												
	CALLED BY -	ALSTAB	CONSTB	INSTAB	IOMAT	LIZE	MDRDRS	MODES	RESTRT	STAB	SWAP	TIMEQ0	WRINST
		WRMS	WRPERT	WRSTAB									
	IS USED BY -	ALSTAB	CONSTB	CONTRM	INSTAB	MAIN	MANU	MNEM	MODES	STAB	START	TIMLP	TRIM
STBFNM	LENGTH D78												
	CALLED BY -	ANAL											
	IS USED BY -	AJACOB	CONSTB	CONTRM	DERIV	INSTAB	ITRIM	JACOBI	MAIN	MANU	STAB	TRIM	
	CALLS -	ANDOIT	CLCD	FORY	FORYD	FOSWK	FOSWK1	MANAL	STAMAN	STARAD	STARAN	STBWAK	STRIMA
		TOPLOT											
	USES -	ANDOIT	DOTX	FORWK	FORWK1	FOSWK	FOSWK1	MANAL	STARAN	STRIAB	TAB	TABINT	TAB1
		TOPLOT											
STBFRQ	LENGTH 930												
	CALLED BY -	ALSTAB	WRTFUN										
	IS USED BY -	ALSTAB	CONSTB	MAIN									
STBWAK	LENGTH 7D8												
	CALLED BY -	STBFNM	WING										
	IS USED BY -	AJACOB	ANAL	CONSTB	CONTRM	DERIV	INSTAB	ITRIM	JACOBI	MAIN	MANU	STAB	TRIM
	CALLS -	DOTX	FORWK	FORWK1	FOSWK	FOSWK1	MANAL						
STBZIN	LENGTH 7D8												
	CALLED BY -	START											
	IS USED BY -	MAIN											
	CALLS -	FOSWK	FOSWK1	INONLY	INSTAR	MANAL	STARAN	STRIAB	STRIMA				
STRIAB	LENGTH AE8												
	CALLED BY -	AJACOB	ALSTAB	CLCD	CONTRM	DERIV	FUSACC	GUST	INSTAB	ITRIM	ITROT	JACOBI	JFBGIN
		LGCINT	LIZE	LOADT	MDRDRS	MNEM	MODES	NCDAMP	PRETVT	READIN	RESTRT	RPTPG	RTINIT
		STAB	START	STBZIN	TIMEQ0	TRIM	TVTRIM	VORGST	WRPERT	WRTRIM	WRVP	ZERO	
	IS USED BY -	AJACOB	ANAL	CONSTB	CONTRM	DERIV	FOCUS	GUST	INSTAB	ITRIM	JACOBI	LIZE	MAIN
		MANU	MNEM	MODES	READIN	ROTAN	STAB	START	STBFNM	TIMLP	TRIM	TVTRIM	VARI
		WING	WRTRIM										
STRIMA	LENGTH 1F38												
	CALLED BY -	AJACOB	ANAL	AZMINT	BLACC	BMSINT	CGARMS	CNTM	CONSTB	DERIV	ENGINT	EXTORS	FOCUS
		FRCGUF	FUSACC	FUSINT	GETFLP	GUST	INBLD	INIT	INRO	INSCAS	INSTAB	ITRIM	ITROT
		JACOBI	JFBGIN	JSTRED	LIZE	MANTYP	MANU	MAXMP	MDRDRS	MNEM	MODES	MOMB	MTLI
		NCDAMP	NPUTOT	PRETVT	PUNCH	QUAN	RADIAL	READIN	RESTRT	RPTPG	RVRGST	SIVAR	STAB
		START	STBFNM	STBZIN	SUPERP	SWAS	TFRTWK	TILT	TIMEQ0	TIMLP	TIVAR	TRIM	TRMANU
		TVTRIM	VARI	VGUNS	VORGST	VSCAS	WING	WRFM	WRINST	WRMANU	WRTMNV	WRTRIM	WRVP
		WSHDUF	XCONIN	XSTINT	XSTORE	ZERO	ZLLCAL						
	IS USED BY -	AJACOB	ANAL	AZMUTH	CONSTB	CONTRM	DERIV	ENGINT	EXTORS	FOCUS	FUSFNM	GUST	INIT
		INRO	INSTAB	ITRIM	ITROT	JACOBI	JFBGIN	LIZE	MAIN	MANTYP	MANU	MNEM	MODES
		MOMB	MTLT	RADBGN	RADIAL	READIN	RESTRT	RGUST	ROTAN	RTINIT	STAB	START	TILT
		TIMLP	TRIM	TRMANU	TVTRIM	VARI	WRINST	WRMANU	WRPERT	WRTRIM			
SUPERP	LENGTH 730												
	CALLED BY -	VARI											
	IS USED BY -	DERIV	MAIN	MANU									
	CALLS -	INSTAR	MANAL	SOLVE	STRIMA	TOPLOT							

TABLE 7. Continued.

CONTROL SECTION CROSS-REFERENCE LIST

S#AP	LENGTH 2208											
	CALLED BY -	ALSTAB										
	IS USED BY -	CONSTB	MAIN									
	CALLS -	INVERS	STBCOM	STBD								
S#AS	LENGTH 510											
	CALLED BY -	AJACOB	MNEM	STAB	VARI							
	IS USED BY -	CONSTB	CONTRM	DERIV	INSTAB	ITRIM	JACOBI	MAIN	MANU	START	TRIM	
	CALLS -	MANAL	STAMAN	STRIMA								
S#SRAT	LENGTH 808											
	CALLED BY -	DERIV	ITROT									
	IS USED BY -	AJACOB	ANAL	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM	JACOBI	MAIN	MANU ROTAN
		STAB	TRIM	TVTRIM								
	CALLS -	ANDOIT	FLEX	FOR#K	FOR#K1	INSTAR	MANAL	MATRIX	PYLON	STARAN		
TAB	LENGTH 6338											
	CALLED BY -	REDATB	RESTRT	TABINT	TABOUT							
	IS USED BY -	AJACOB	ANAL	AZMUTH	CDCL	CLCD	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM ITROT
		JACOBI	JSTRED	MAIN	MANU	MNEM	RADIAL	READIN	ROTAN	STAB	START	STBFNM TIMLP
		TRIM	TVTRIM	UNSTED	#ING							
TABFIX	LENGTH 3D8											
	CALLED BY -	TABOUT										
	IS USED BY -	MAIN	START									
TABINT	LENGTH 8D0											
	CALLED BY -	CDCL	CLCD									
	IS USED BY -	AJACOB	ANAL	AZMUTH	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM	ITROT	JACOBI MAIN
		MANU	RADIAL	ROTAN	STAB	STBFNM	TRIM	TVTRIM	UNSTED	#ING		
	CALLS -	ANDOIT	TAB	TAB1								
TABOUT	LENGTH 6D0											
	CALLED BY -	START										
	IS USED BY -	MAIN										
	CALLS -	INONLY	INSTAR	TAB	TABFIX	TAB1						
TAB1	LENGTH 5400											
	CALLED BY -	REDATB	RESTRT	TABINT	TABOUT							
	IS USED BY -	AJACOB	ANAL	AZMUTH	CDCL	CLCD	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM ITROT
		JACOBI	JSTRED	MAIN	MANU	MNEM	RADIAL	READIN	ROTAN	STAB	START	STBFNM TIMLP
		TRIM	TVTRIM	UNSTED	#ING							
TFRT#K	LENGTH 800											
	CALLED BY -	ITROT	TRMANU									
	IS USED BY -	AJACOB	ANAL	CONSTB	CONTRM	DERIV	FOCUS	INIT	INSTAB	ITRIM	JACOBI	MAIN MANU
		ROTAN	STAB	TIMLP	TRIM	TVTRIM	#RTRIM					
	CALLS -	FOR#K	FOR#K1	MANAL	STARAN	STRIMA	TOPLOT	VIND				
	USES -	MANAL	STARAD	STARAN								
TILT	LENGTH 510											
	CALLED BY -	MNEM	MOMB	MTLT	VARI							
	IS USED BY -	DERIV	MAIN	MANU	START	VARI						
	CALLS -	CGARMS	MANAL	STAMAN	STRIMA	ZLLCAL						
	USES -	INSTAR	MANAL	STAMAN	STRIMA							
TIMEQ0	LENGTH 18A8											
	CALLED BY -	MANU	TRIM									

TABLE 7. Continued.

CONTROL SECTION CROSS-REFERENCE LIST

TIMEQ0	IS USED BY -	CONTRM	MAIN										
CONTINUED	CALLS -	ANDUIT	FLEX	FLTRCM	FORWK	FORY	FORYD	FOSWK	INSTAR	MANAL	NORSET	PYLON	STAMAN
		STARAD	STARAN	STBD	STRIAB	STRIMA	TOPLOT						
TIMLP	LENGTH 2E0												
	CALLED BY -	MANU											
	IS USED BY -	MAIN											
	CALLS -	FORY	FORYD	GETFLP	INIT	MANAL	RESTRT	STAMAN	STRIMA	TOPLOT	WRMANU		
	USES -	ANDUIT	DATE	DUTX	FLEX	FLTRCM	FORWK	FORWK1	FORY	FORYD	FOSWK	FOSWK1	FPYLAC
		INONLY	INSTAR	MANAL	NORSET	PYLON	SIVAR	SOLVE	STAMAN	STARAD	STARAN	STBD	STRIAB
		STRIMA	TAB	TAB1	TFRTWK	TIVAR	TOPLOT	TRMANU	VIND	WRFM	WRTMNV		
TIVAR	LENGTH 290												
	CALLED BY -	RESTRT	TRIM										
	IS USED BY -	CONTRM	MAIN	MANU	MNEM	START	TIMLP						
	CALLS -	MANAL	STRIMA	TOPLOT									
TOPLOT	LENGTH 11B												
	CALLED BY -	AJACOB	ALSTAB	ANAL	AZMUTH	CLCD	CONSTB	CONTRM	DERIV	ERRCHK	EXTORS	FOCUS	FUSACC
		GETFLP	INBLD	INBMSS	INIT	INRO	INSTAB	ITRIM	ITROT	JACOBI	JFBGIN	LIZE	MAIN
		MANTYP	MANU	MAXMP	MBAL	MNEM	MOMB	PRETVT	PUNCH	RADIAL	RADOUT	READIN	REDRWK
		REDSWK	RESTRT	ROTAN	RTINIT	SIVAR	STAB	START	STBFNM	SUPERP	TFRTWK	TIMEQ0	TIMLP
		TIVAR	TRIM	TVTRIM	UNSTED	VARI	WING	WRMANU	WROT	WRTRIM	XCONIN		
	IS USED BY -	AJACOB	ANAL	AZMUTH	CONSTB	CONTRM	DERIV	ENGINT	FOCUS	INBLD	INIT	INRO	INSTAB
		ITRIM	ITROT	JACOBI	JSTRED	MAIN	MANTYP	MANU	MNEM	MODES	RADIAL	READIN	RESTRT
		ROTAN	RPTPG	RTINIT	STAB	START	STBFNM	TIMLP	TRIM	TRMANU	TVTRIM	VARI	WING
		WRTRIM											
TRIM	LENGTH 100B												
	CALLED BY -	CONTRM											
	IS USED BY -	MAIN											
	CALLS -	ANDUIT	DUTX	FLEX	FORY	FORYD	INSTAR	ITRIM	MANAL	NCDAMP	NORSET	PDZERO	PRETVT
		ROTAN	RPTPG	STAMAN	STARAN	STRIAB	STRIMA	TIMEQ0	TIVAR	TOPLOT	WRTRIM		
	USES -	AJACOB	ANAL	ANDUIT	AZMINT	AZMOUT	AZMUTH	BDPFDD	BLACC	BUNDER	BUTFLT	CDCL	CLCD
		CMCALC	DATE	DIFFER	DUTX	FILTER	FLEX	FLTRCM	FOCUS	FORCMC	FORWK	FORWK1	FORY
		FORYD	FOSWK	FOSWK1	FPYLAC	FRCGUF	FUSFNM	GETFLP	HRESP	INIT	INSTAR	INTFRQ	ITROT
		JACOBI	MANAL	MATRIX	MBAL	NCDAMP	NOPS	NORSET	PDPFDD	PDZERO	PYLACC	PYLON	RADBGN
		RADIAL	RADOUT	RGUST	ROTAN	RTWAKE	RVRGST	SHKCTL	SHRPYL	SOLVE	STAMAN	STARAD	STARAN
		STBD	STBFNM	STBWAK	STRIAB	STRIMA	SWAS	SWSRAT	TAB	TABINT	TAB1	TFRTWK	TOPLOT
		TRMANU	TVTRIM	UNSDER	UNSTED	VIND	WAG	WING	WRFM	WROT	WRTMNV	WRVP	WSHDUF
		XSTORE	ZLLCAL										
TRMANU	LENGTH 136B												
	CALLED BY -	INIT	WRTRIM										
	IS USED BY -	AJACOB	ANAL	CONSTB	CONTRM	DERIV	INSTAB	ITRIM	JACOBI	MAIN	MANU	ROTAN	STAB
		TIMLP	TRIM	TVTRIM									
	CALLS -	ANDUIT	FLEX	FORY	FORYD	FPYLAC	INSTAR	MANAL	PYLON	STAMAN	STARAD	STARAN	STRIMA
		TFRTWK											
	USES -	FORWK	FORWK1	FORY	FORYD	INSTAR	MANAL	PYLON	STARAD	STARAN	STRIMA	TOPLOT	VIND
TURN	LENGTH 23B												
	CALLED BY -	MNEM											
	IS USED BY -	MAIN	START										
	CALLS -	INONLY	INSTAR	STAMAN									
TVTRIM	LENGTH 1CA8												
	CALLED BY -	ROTAN											
	IS USED BY -	AJACOB	ANAL	CONSTB	CONTRM	DERIV	INSTAB	ITRIM	JACOBI	MAIN	MANU	STAB	TRIM

TABLE 7. Continued.

CONTROL SECTION CROSS-REFERENCE LIST

TVTRIM	CALLS -	ANDOIT	BUTFLT	FILTER	FLEX	FOCUS	FORY	FORYD	FPYLAC	GETFLP	INIT	INSTAR	MANAL
CONTINUED		PYLON	STAMAN	STARAN	STRIAB	STRIMA	TOPLOT						
	USES -	ANDOIT	AZMINT	AZMOUT	AZMUTH	BDPFDD	BLACC	BUNDER	CDCL	CMCALC	DIFFER	DOTX	FILTER
		FLEX	FLTRCM	FORCMC	FORWK	FORWK1	FORY	FORYD	FPYLAC	FRCGOF	HRESP	INSTAR	INTFRQ
		ITROT	MANAL	MATRIX	MBAL	PDPFDD	PYLACC	PYLON	RADBGN	RADIAL	RADOUT	RGUST	RTWAKE
		RVRGST	SHKCTL	SHRPYL	SOLVE	STAMAN	STARAD	STARAN	STRIAB	STRIMA	SWSRAT	TAB	TABINT
		TABI	TFRTWK	TOPLOT	TRMANU	UNSDER	UNSTED	VIND					
UNSDER	LENGTH 508												
	CALLED BY -	RADIAL											
	IS USED BY -	AJACOB	ANAL	AZMUTH	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM	ITROT	JACOBI	MAIN
		MANU	ROTAN	STAB	TRIM	TVTRIM							
	CALLS -	ANDOIT	DIFFER	FORWK	FORWK1	MANAL	STARAN						
UNSTED	LENGTH C30												
	CALLED BY -	RADIAL											
	IS USED BY -	AJACOB	ANAL	AZMUTH	CONSTB	CONTRM	DERIV	FOCUS	INSTAB	ITRIM	ITROT	JACOBI	MAIN
		MANU	ROTAN	STAB	TRIM	TVTRIM							
	CALLS -	ANDOIT	CDCL	INSTAR	MANAL	STARAD	STARAN	TOPLOT					
	USES -	ANDOIT	MANAL	STARAD	STARAN	TAB	TABINT	TABI					
VARI	LENGTH CA8												
	CALLED BY -	DERIV											
	IS USED BY -	MAIN	MANU										
	CALLS -	CNTM	EXTORS	FORY	FORYD	GUST	INSTAR	MANAL	MOMB	MTLT	STAMAN	STRIMA	SUPERP
		SWAS	TILT	TOPLOT	VGUNS	VSCAS	ZLLCAL						
	USES -	CGARMS	FORY	FORYD	INSTAR	MANAL	MATRIX	NOPS	SOLVE	STAMAN	STARAN	STRIAB	STRIMA
		TILT	TOPLOT	VORGST	ZLLCAL								
VGUNS	LENGTH 248												
	CALLED BY -	VARI											
	IS USED BY -	DERIV	MAIN	MANU									
	CALLS -	MANAL	STAMAN	STRIMA									
VIND	LENGTH 588												
	CALLED BY -	ITROT	MNEM	TFRTWK									
	IS USED BY -	AJACOB	ANAL	CONSTB	CONTRM	DERIV	FOCUS	INIT	INSTAB	ITRIM	ITROT	JACOBI	MAIN
		MANU	ROTAN	STAB	START	TIMLP	TRIM	TRMANU	TVTRIM	WRTRIM			
	CALLS -	MANAL	STARAD	STARAN									
VORGST	LENGTH A88												
	CALLED BY -	GUST											
	IS USED BY -	DERIV	MAIN	MANU	VARI								
	CALLS -	MANAL	STAMAN	STARAN	STRIAB	STRIMA							
VSCAS	LENGTH 220												
	CALLED BY -	VARI											
	IS USED BY -	DERIV	MAIN	MANU									
	CALLS -	FORY	FORYD	STRIMA									
WAG	LENGTH 6F8												
	CALLED BY -	WING											
	IS USED BY -	AJACOB	ANAL	CONSTB	CONTRM	DERIV	INSTAB	ITRIM	JACOBI	MAIN	MANU	STAB	TRIM
	CALLS -	STARAN											
WING	LENGTH C78												
	CALLED BY -	ANAL											
	IS USED BY -	AJACOB	CONSTB	CONTRM	DERIV	INSTAB	ITRIM	JACOBI	MAIN	MANU	STAB	TRIM	

TABLE 7. Continued.

CONTROL SECTION CROSS-REFERENCE LIST

WING	CALLS -	ANDOIT	CLCD	FOSWK	FOSWK1	MANAL	STAMAN	STARAD	STARAN	STBWAK	STRIMA	TOPLOT	WAG
CONTINUED	USES -	ANDOIT	DOTX	FORWK	FORWK1	FOSWK	FOSWK1	MANAL	STARAN	STRIAB	TAB	TABINT	TAB1
		TOPLOT											
WKTABN	LENGTH 578												
	CALLED BY -	REDRWK											
	IS USED BY -	JSTRED	MAIN	READIN	START								
WRFM	LENGTH 900												
	CALLED BY -	AJACOB	WRINST	WRMANU	WRPERT	WRTRIM							
	IS USED BY -	CONSTB	CONTRM	INSTAB	ITRIM	JACOBI	MAIN	MANU	STAB	TIMLP	TRIM		
	CALLS -	INSTAR	MANAL	STRIMA									
WRINST	LENGTH 8A0												
	CALLED BY -	INSTAB	STAB										
	IS USED BY -	*CONSTB*	*MAIN*										
	CALLS -	MANAL	STARAN	STBD	STRIMA	WRFM							
	USES -	INSTAR	MANAL	STRIMA									
WRMANU	LENGTH D60												
	CALLED BY -	TIMLP											
	IS USED BY -	MAIN	MANU										
	CALLS -	DATE	FURY	FORYD	MANAL	PYLON	STAMAN	STRIMA	TOPLOT	WRFM	WRTMNV		
	USES -	INSTAR	MANAL	STAMAN	STRIMA								
WRMODE	LENGTH 6C0												
	CALLED BY -	MODAL											
	IS USED BY -	INRD	MAIN	RTINIT	START								
	CALLS -	INONLY	INSTAR	MANAL	STARAN								
WRMS	LENGTH 750												
	CALLED BY -	ALSTAB											
	IS USED BY -	CONSTB	MAIN										
	CALLS -	STBCOM	STBD										
WROT	LENGTH 1F0												
	CALLED BY -	MAIN	READIN	RPTPG	WRTRIM								
	IS USED BY -	CONTRM	MAIN	START	TRIM								
	CALLS -	DATE	TOPLOT										
WRPERT	LENGTH 588												
	CALLED BY -	STAB											
	IS USED BY -	CONSTB	MAIN										
	CALLS -	MANAL	PYLON	STBD	STRIAB	WRFM							
	USES -	INSTAR	MANAL	STRIMA									
WRSTAB	LENGTH 810												
	CALLED BY -	STAB											
	IS USED BY -	CONSTB	MAIN										
	CALLS -	PYLON	STBD										
WRTFUN	LENGTH 6F0												
	CALLED BY -	ALSTAB											
	IS USED BY -	CONSTB	MAIN										
	CALLS -	STBCOM	STBFRQ										
WRTMNV	LENGTH 1570												
	CALLED BY -	WRMANU	WRTRIM										

TABLE 7. Concluded.

```
                                        CONTROL SECTION CROSS-REFERENCE LIST

WRTMNV     IS USED BY  - CONTRM    MAIN      MANU      TIMLP     TRIM
CONTINUED        CALLS - MANAL     STAMAN    STRIMA

WRTRIM     LENGTH    528
           CALLED BY   - TRIM
           IS USED BY  - CONTRM    MAIN
                CALLS  - DATE      MANAL     STARAD    STARAN    STRIAB    STRIMA    TOPLOT    TRMANU    WREM      WROT      WRTMNV    WRVP
                USES   - ANDOIT    DATE      FLEX      FORWK     FORWK1    FORY      FORYD     FPYLAC    INSTAR    MANAL     PYLON     STAMAN
                         STARAD    STARAN    STRIAB    STRIMA    TFRTWK    TOPLOT    VIND

WRVP       LENGTH    658
           CALLED BY   - AJACOB    ITRIM     WRTRIM
           IS USED BY  - CONSTB    CONTRM    INSTAB    ITRIM     JACOBI    MAIN      TRIM
                CALLS  - MANAL     STRIAB    STRIMA

WSHOUF     LENGTH    298
           CALLED BY   - FUSFNM
           IS USED BY  - AJACOB    ANAL      CONSTB    CONTRM    DERIV     INSTAB    ITRIM     JACOBI    MAIN      MANU      STAB      TRIM
                CALLS  - STARAN    STRIMA

XCONIN     LENGTH    828
           CALLED BY   - START
           IS USED BY  - MAIN
                CALLS  - INONLY    MANAL     STAMAN    STRIMA    TOPLOT

XSTINT     LENGTH    2F0
           CALLED BY   - START
           IS USED BY  - MAIN
                CALLS  - INONLY    INSTAR    STRIMA

XSTORE     LENGTH    598
           CALLED BY   - ANAL
           IS USED BY  - AJACOB    CONSTB    CONTRM    DERIV     INSTAB    ITRIM     JACOBI    MAIN      MANU      STAB      TRIM
                CALLS  - MANAL     STRIMA

YRINIT     LENGTH    898
           CALLED BY   - START
           IS USED BY  - MAIN

YSINIT     LENGTH    820
           CALLED BY   - START
           IS USED BY  - MAIN

ZERO       LENGTH    600
           CALLED BY   - LIZE
           IS USED BY  - MAIN      START
                CALLS  - FLEX      FORWK     FORWK1    MANAL     PYLON     STARAN    STRIAB    STRIMA

ZELCAL     LENGTH    380
           CALLED BY   - AJACOB    TILT      VARI
           IS USED BY  - CONSTB    CONTRM    DERIV     INSTAB    ITRIM     JACOBI    MAIN      MANU      MNEM      MOMB      MTLT      START
                         TRIM      VARI
                CALLS  - MANAL     STAMAN    STRIMA

 END OF CONTROL SECTION CROSS-REFERENCE LIST
```

TABLE 8. CONTROL SECTION CROSS-REFERENCE FOR GDAJ77.

CONTROL SECTION CROSS-REFERENCE LIST

$PLOT	LENGTH 20 THIS IS A 'COMMON' CONTROL SECTION												
	CALLED BY ~ PLOT	PLOTS	PLTIME	SYMBOL									
	IS USED BY ~ AXIS	CALC81	CONPLT	FACTOR	FSFT	LINE	MAIN	NUMBER	PLOTER	SCALIT	SYMBOL	WHERE	
$WRITE	LENGTH 288												
	CALLED BY ~ AXIS	BUFF	PLTIME	SYMBOL									
	IS USED BY ~ AXIS	CALC81	CONPLT	FACTOR	FSFT	LINE	MAIN	NUMBER	PLOT	PLOTER	PLOTS	SCALIT	
	SYMBOL	WHERE											
	CALLS ~ NEXTTIME												
ALLMAT	LENGTH 1680												
	CALLED BY ~ EXPON												
	IS USED BY ~ CONPLT	MAIN	PRONY										
	CALLS ~ YNORP												
AXIS	LENGTH 818												
	CALLED BY ~ PLOTER												
	IS USED BY ~ CONPLT	FSFT	MAIN										
	CALLS ~ $WRITE	NUMBER	PLOT	SYMBOL									
	USES ~ $PLOT	$WRITE	BUFF	NEXTTIME	PLOT	SYMBOL							
BUFF	LENGTH 728												
	CALLED BY ~ PLOT	PLOTS	SYMBOL										
	IS USED BY ~ AXIS	CALC81	CONPLT	FACTOR	FSFT	LINE	MAIN	NUMBER	PLOTER	SCALIT	SYMBOL	WHERE	
	CALLS ~ $WRITE												
	USES ~ NEXTTIME												
CALC81	LENGTH C78												
	CALLED BY ~ SCALIT												
	IS USED BY ~ CONPLT	MAIN											
	CALLS ~ HEDING	INPLOT	LINE	NUMBER	PLOT	SYMBOL	TOPLOT	WRKCOM					
	USES ~ $PLOT	$WRITE	BUFF	NEXTTIME	PLOT	PLOTD	PLOTD1	SYMBOL	WHERE				
CNTPLT	LENGTH AE0												
	CALLED BY ~ CONTUR												
	IS USED BY ~ CONPLT	MAIN											
	CALLS ~ RANGE												
	USES ~ INPLOT	MAXMIN	SCLFIX	TOPLOT									
CONPLT	LENGTH 258												
	CALLED BY ~ MAIN												
	CALLS ~ CONTUR	CURVET	C8IL	FSFT	MOVBLK	PLOTS	PRONY	SCALIT	TOPLOT				
	USES ~ $PLOT	$WRITE	ALLMAT	AXIS	BUFF	CALC81	CNTPLT	DATE	DLLSQ	EXPON	HARM	HEADS	
	HEDING	IHOLATN2	IHOLLOG	INPLOT	LHEAD	LINE	MAXMIN	NEXTTIME	NUMBER	PLOT	PLOTD	PLOTD1	
	PLOTER	PLOTS	PPLOT	RANGE	SCALE#	SCLFIX	SYMBOL	TIMPTS	TOPLOT	VSRTPM	WHERE	WRKCOM	
	WROT	YNORP											
CONTUR	LENGTH A4A8												
	CALLED BY ~ CONPLT												
	IS USED BY ~ MAIN												
	CALLS ~ CNTPLT	HEADS	TOPLOT										
	USES ~ INPLOT	LHEAD	MAXMIN	RANGE	SCLFIX	TOPLOT							
CURVET	LENGTH 1060												

TABLE 8. Continued.

```
                                        CONTROL SECTION CROSS-REFERENCE LIST

CURVET    CALLED BY   - CONPLT
CONTINUED IS USED BY  - MAIN
                CALLS - HEDING   IHOLATN2 TIMPTS   TOPLOT   WROT
                USES  - DATE     PLOTD    PLOTD1   TOPLOT

CdlL      LENGTH    3C0
          CALLED BY   - CONPLT
          IS USED BY  - MAIN
                CALLS - MAXMIN   TIMPTS   TOPLOT

DATE      LENGTH    1F0
          CALLED BY   - WROT
          IS USED BY  - CONPLT   CURVET   MAIN     MOVBLK   PPLOT    PRONY    SCALIT

DLLSQ     LENGTH    A38
          CALLED BY   - EXPON
          IS USED BY  - CONPLT   MAIN     PRONY

EXPON     LENGTH   B428
          CALLED BY   - PRONY
          IS USED BY  - CONPLT   MAIN
                CALLS - ALLMAT   DLLSQ    IHOLATN2 IHOLLOG  VSRTPM   YNORP
                USES  - YNORP

FACTOR    LENGTH     F0
                CALLS - PLOT
                USES  - $PLOT    $WRITE   BUFF     NEXTTIME

FSFT      LENGTH   F538
          CALLED BY   - CONPLT
          IS USED BY  - MAIN
                CALLS - HARM     HEDING   PLOTER   TIMPTS   TOPLOT   WRKCOM
                USES  - $PLOT    $WRITE   AXIS     BUFF     LINE     NEXTTIME NUMBER   PLOT     PLOTD    PLOTD1   SCALE#   SYMBOL
                        WHERE

HARM      LENGTH    350
          CALLED BY   - FSFT
          IS USED BY  - CONPLT   MAIN

HEADS     LENGTH    278
          CALLED BY   - CONTUR
          IS USED BY  - CONPLT   MAIN
                CALLS - LHEAD

HEDING    LENGTH   1280
          CALLED BY   - CALC81   CURVET   FSFT     MOVBLK   PPLOT    PRONY
          IS USED BY  - CONPLT   MAIN     SCALIT
                CALLS - PLOTD    PLOTD1

IHOLATN2  LENGTH    278
          CALLED BY   - CURVET   EXPON
          IS USED BY  - CONPLT   MAIN     PRONY

IHOLLOG   LENGTH    228
          CALLED BY   - EXPON
          IS USED BY  - CONPLT   MAIN     PRONY

INPLOT    LENGTH  13AE8     THIS IS A *COMMON* CONTROL SECTION
```

TABLE 8. Continued.

CONTROL SECTION CROSS-REFERENCE LIST

INPLOT	CALLED BY -	CALC81	PPLOT	RANGE	SCALIT	SCLFIX							
CONTINUED	IS USED BY -	CNTPLT	CONPLT	CONTUR	MAIN	RANGE	SCALIT						
LHEAD	LENGTH 9D8												
	CALLED BY -	HEADS											
	IS USED BY -	CONPLT	CONTUR	MAIN									
LINE	LENGTH 468												
	CALLED BY -	CALC81	PLOTER										
	IS USED BY -	CONPLT	FSFT	MAIN	SCALIT								
	CALLS -	PLOT	SYMBOL	WHERE									
	USES -	$PLOT	$WRITE	BUFF	NEXTTIME	PLOT							
MAIN	LENGTH 5F8												
	CALLS -	CONPLT	MAXMIN	PLOT	PLTIME	TIMPTS	TOPLOT	WROT					
	USES -	$PLOT	$WRITE	ALLMAT	AXIS	BUFF	CALC81	CNTPLT	CONTUR	CURVET	C81L	DATE	DLLSQ
		EXPON	FSFT	HARM	HEADS	HEDING	IHOLATN2	IHOLLOG	INPLOT	LHEAD	LINE	MAXMIN	MOVBLK
		NEXTTIME	NUMBER	PLOT	PLOTD	PLOTD1	PLOTER	PLOTS	PPLOT	PRONY	RANGE	SCALE#	SCALIT
		SCLFIX	SYMBOL	TIMPTS	TOPLOT	VSRTPM	WHERE	WRKCOM	WROT	YNORP			
MAXMIN	LENGTH 4A48	THIS IS A *COMMON* CONTROL SECTION											
	CALLED BY -	C81L	MAIN	RANGE	SCLFIX								
	IS USED BY -	CNTPLT	CONPLT	CONTUR	MAIN	RANGE	SCALIT						
MOVBLK	LENGTH D30												
	CALLED BY -	CONPLT											
	IS USED BY -	MAIN											
	CALLS -	HEDING	TIMPTS	TOPLOT	WRKCOM	WROT							
	USES -	DATE	PLOTD	PLOTD1	TOPLOT								
NEXTTIME	LENGTH 8												
	CALLED BY -	$WRITE											
	IS USED BY -	AXIS	BUFF	CALC81	CONPLT	FACTOR	FSFT	LINE	MAIN	NUMBER	PLOT	PLOTER	PLOTS
		PLTIME	SCALIT	SYMBOL	WHERE								
NUMBER	LENGTH 170												
	CALLED BY -	AXIS	CALC81	PLOTER									
	IS USED BY -	CONPLT	FSFT	MAIN	PLOTER	SCALIT							
	CALLS -	SYMBOL											
	USES -	$PLOT	$WRITE	BUFF	NEXTTIME	PLOT							
PLOT	LENGTH A58												
	CALLED BY -	AXIS	CALC81	FACTOR	LINE	MAIN	PLOTER	SYMBOL	WHERE				
	IS USED BY -	AXIS	CALC81	CONPLT	FSFT	LINE	MAIN	NUMBER	PLOTER	SCALIT			
	CALLS -	$PLOT	BUFF										
	USES -	$WRITE	NEXTTIME										
PLOTD	LENGTH 1AE0												
	CALLED BY -	HEDING											
	IS USED BY -	CALC81	CONPLT	CURVET	FSFT	MAIN	MOVBLK	PPLOT	PRONY	SCALIT			
PLOTD1	LENGTH F28												
	CALLED BY -	HEDING											
	IS USED BY -	CALC81	CONPLT	CURVET	FSFT	MAIN	MOVBLK	PPLOT	PRONY	SCALIT			
PLOTER	LENGTH 498												
	CALLED BY -	FSFT											
	IS USED BY -	CONPLT	MAIN										

TABLE 8. Continued.

CONTROL SECTION CROSS-REFERENCE LIST

PLOTER	CALLS -	AXIS	LINE	NUMBER	PLOT	SCALE#	SYMBOL						
CONTINUED	USES -	$PLOT	$WRITE	BUFF	NEXTTIME	NUMBER	PLOT	SYMBOL	WHERE				
PLOTS	LENGTH 220												
	CALLED BY -	CONPLT	SCALIT										
	IS USED BY -	CONPLT	MAIN										
	CALLS -	$PLOT	BUFF										
	USES -	$WRITE	NEXTTIME										
PLTIME	LENGTH 160												
	CALLED BY -	MAIN											
	CALLS -	$PLOT	$WRITE										
	USES -	NEXTTIME											
PPLOT	LENGTH 8A0												
	CALLED BY -	SCALIT											
	IS USED BY -	CONPLT	MAIN										
	CALLS -	HEDING	INPLOT	TOPLOT	WROT								
	USES -	DATE	PLOTD	PLOTD1	TOPLOT								
PRONY	LENGTH 520												
	CALLED BY -	CONPLT											
	IS USED BY -	MAIN											
	CALLS -	EXPON	HEDING	TIMPTS	TOPLOT	WROT							
	USES -	ALLMAT	DATE	DLLSQ	IHOLATN2	IHOLLOG	PLOTD	PLOTD1	TOPLOT	VSRTPM	YNORP		
RANGE	LENGTH 5C60												
	CALLED BY -	CNTPLT											
	IS USED BY -	CONPLT	CONTUR	MAIN									
	CALLS -	INPLOT	MAXMIN	SCLFIX									
	USES -	INPLOT	MAXMIN	TOPLOT									
SCALE#	LENGTH 510												
	CALLED BY -	PLOTER											
	IS USED BY -	CONPLT	FSFT	MAIN									
SCALIT	LENGTH 6D0												
	CALLED BY -	CONPLT											
	IS USED BY -	MAIN											
	CALLS -	CALC81	INPLOT	PLOTS	PPLOT	SCLFIX	TIMPTS	TOPLOT	WRKCOM				
	USES -	$PLOT	$WRITE	BUFF	DATE	HEDING	INPLOT	LINE	MAXMIN	NEXTTIME	NUMBER	PLOT	PLOTD
		PLOTD1	SYMBOL	TOPLOT	WHERE	WRKCOM	WROT						
SCLFIX	LENGTH 428												
	CALLED BY -	RANGE	SCALIT										
	IS USED BY -	CNTPLT	CONPLT	CONTUR	MAIN								
	CALLS -	INPLOT	MAXMIN	TOPLOT									
SYMBOL	LENGTH 540												
	CALLED BY -	AXIS	CALC81	LINE	NUMBER	PLOTER							
	IS USED BY -	AXIS	CALC81	CONPLT	FSFT	MAIN	PLOTER	SCALIT					
	CALLS -	$PLOT	$WRITE	BUFF	PLOT								
	USES -	$PLOT	$WRITE	BUFF	NEXTTIME								
TIMPTS	LENGTH 38A0	THIS IS A *COMMON* CONTROL SECTION											
	CALLED BY -	CURVET	C81L	FSFT	MAIN	MOVBLK	PRONY	SCALIT					
	IS USED BY -	CONPLT	MAIN										

TABLE 8. Concluded.

```
                                CONTROL SECTION CROSS-REFERENCE LIST

TOPLOT    LENGTH   4F40     THIS IS A *COMMON* CONTROL SECTION
          CALLED BY   - CALC81   CONPLT   CONTUR   CURVET   CoiL     FSFT     MAIN     MOVBLK   PPLOT    PRONY    SCALIT   SCLFIX
                        WROT
          IS USED BY  - CNTPLT   CONPLT   CONTUR   CURVET   MAIN     MOVBLK   PPLOT    PRONY    RANGE    SCALIT

VSRTPM    LENGTH    5C0
          CALLED BY   - EXPON
          IS USED BY  - CONPLT   MAIN     PRONY

WHERE     LENGTH    140
          CALLED BY   - LINE
          IS USED BY  - CALC81   CONPLT   FSFT     MAIN     PLOTER   SCALIT
               CALLS  - PLOT
               USES   - $PLOT    $WRITE   BUFF     NEXTTIME

WRKCOM    LENGTH  30040     THIS IS A *COMMON* CONTROL SECTION
          CALLED BY   - CALC81   FSFT     MOVBLK   SCALIT
          IS USED BY  - CONPLT   MAIN     SCALIT

WROT      LENGTH    200
          CALLED BY   - CURVET   MAIN     MOVBLK   PPLOT    PRONY
          IS USED BY  - CONPLT   MAIN     SCALIT
               CALLS  - DATE     TOPLOT

YNORP     LENGTH  1F680     THIS IS A *COMMON* CONTROL SECTION
          CALLED BY   - ALLMAT   EXPON
          IS USED BY  - CONPLT   EXPON    MAIN     PRONY

 END OF CONTROL SECTION CROSS-REFERENCE LIST
```

4.2 LAYOUT OF MANEUVER VARIABLES

COMMON blocks FORY and FORYD of AGAJ77 contain arrays Y, YD, and YDD. They are dimensioned as (4,130) with the first subscript indicating the Runge-Kutta cycle in which the value was computed, and the second subscript identifies the state variable that the array value represents.

The left column of Table 9 gives the order of each of the 121 state variables. A brief description appears along with them. Since the first mode of Rotor 2, Blade 1, is placed immediately after the last mode of Rotor 1, the dividing line between the two rotors is not given. In fact, the first mode of Rotor 2 is indicated as 1 plus the number of modes for Rotor 1. Each rotor mode has seven values. They are in the same order as the blades; i.e., first value for blade 1, second value for blade 2, and so on. If the number of blades is less than seven, the array locations for the higher numbered blades are not used.

4.3 PROGRAM DELIVERY

Three programs were delivered under this contract. They are AGAJ77 (400K version and 520K version), GADJ77, and DNAM05. The 400K and the 520K versions both use the same postprocessor, GDAJ77, and both read the same mode shapes generated by DNAM05. In order to make AGAJ77 run under 400K, an extremely tight overlay structure is employed and two program features have been modified. The RIVD table option has been removed, and the maximum number of airfoil tables has been reduced from 5 to 2. The built-in NACA 0012 table is stored as the second airfoil in the 400K version, while it is stored as the fifth table in the 520K version.

Two global cross reference outputs were also delivered. The first is a cross reference of all the variables that are used by the 520K version of AGAJ77. The second is a similar list for GDAJ77. The first column of the cross reference is labeled VAR for variable referenced. The second column is labelled SUB and gives the subroutine in which the variable is referenced. For references in main programs or block data sections this column is left blank. The third column is labelled COMMON and gives the name of the labelled COMMON in which the variable is stored. The remaining columns are labelled STATEMENT NUMBERS and contain the IBM FORTRAN Internal Statement Numbers (ISN) of the statements in which the variable is referenced. The statement numbers are tagged with TY if the statement is a type statement; an EQ for EQUIVALENCE statements; IO for input or output statements; or an asterisk (*) for statements in which a value is assigned to the variable. Table 10 is a sample page of the global cross reference.

TABLE 9. LAYOUT OF MANEUVER VARIABLES

NUMBER	DESCRIPTION
1	Integral of forward velocity, body axis, ft
2	Integral of lateral velocity, body axis, ft
3	Integral of vertical velocity, body axis, ft
4	Integral of yaw rate, body axis, rad
5	Integral of pitch rate, body axis, rad
6	Integral of roll rate, body axis, rad
7	Euler angle yaw, rad
8	Euler angle pitch, rad
9	Euler angle roll, rad
10	X-displacement, ground ref., ft
11	Y-displacement, ground ref., ft
12	Z-displacement, ground ref., ft
13	Rotor 1 azimuth location, rad
14	Rotor 2 azimuth location, rad
15	Incr. to coll. pitch due to bobweight displacement
16-22	Blade dependent participation factors, mode 1
23-29	Blade dependent participation factors, mode 2
30-36	Blade dependent participation factors, mode 3
37-43	Blade dependent participation factors, mode 4
44-50	Blade dependent participation factors, mode 5
51-57	Blade dependent participation factors, mode 6
58-64	Blade dependent participation factors, mode 7
65-71	Blade dependent participation factors, mode 8
72-78	Blade dependent participation factors, mode 9
79-85	Blade dependent participation factors, mode 10
86-92	Blade dependent participation factors, mode 11
93-99	Blade dependent participation factors, mode 12
100-103	Pylon 1 mode 1-4 participation factors
104-107	Pylon 2 mode 1-4 participation factors
108	SCAS feedback, pitch channel
109	Time derivative of (108)
110	SCAS feedforward, pitch channel
111	Time derivative of (110)
112-115	Same as (108-111), except for roll channel
116-119	Same as (108-111), except for yaw channel
120	Integral of engine angular speed, rad
121	Engine torque, ft-lb

TABLE 10. SAMPLE OUTPUT FROM GLOBAL CROSS-REFERENCE.

VAR	SUB	COMMON	STATEMENT NUMBERS						
UTGUST	RADBGN	STARAD	2 TY	19 CO	73				
UTGUST	RGUST	STARAD	13 CO	68 *					
UTOT	RADIAL		59 *	64	109				
U0	HARM		17 *	19					
U1	HARM		14 *	17	18	19 *	22	23	
U2	HARM		13 *	17	18 *	22			
V	AJACOB	MANAL	6 CO	67					
V	ALSTAB	MANAL	3 CO	114	115	116	117		
V	MDLINV	MANAL	3 CO	31					
V	MDRDRS	MANAL	3 CO	41	42				
V	MNEM	MANAL	6 CO	49 *	68	76			
V	QUAN	MANAL	7 CO	98 *	104				
V	TIMLP	MANAL	5 CO	64					
V	WRINST	MANAL	3 CO	50	51				
VAR	AJACOB		32 TY	33 EQ	109 SA				
VAR	ITRIM		30 TY	31 EQ	104 SA	111 SA	113		
VAR	JACOBI		24 TY	25 EQ	39 *	39	42 *	42	54 *
VAR	JACOBI		54						
VAR	NCDAMP		16 TY	25	36 *	36			
VAR	STAB		26 TY	27 EQ	52 *	52	56 *	56	
VAR	TRIM		40 TY	42 EQ	103	103	104 10		
VAR	WRPERT		13 TY	14 EQ	21				
VAR	WRTRIM		26 TY	27 EQ	30 SA				
VAR	WRVP		1	16 TY	24				
VARD	WRPERT		13 TY	14 EQ	14 EQ	14 EQ	21 *		
VARD	WRVP		17 TY	24 *	26 10				
VARDE2	AZMINT		132 *	133	136				
VARDE2	AZMUTH		2 TY						
VARFRQ	BMSINT	STARAN	27 CO	83 *	84 *	85 *	86 *		
VARFRQ	LIZE	STARAN	27 CO	108 *					
VARFRQ	MODAL	STARAN	28 CO	84 10	84 10	84 10	84 10		
VARFUS	WRPERT		13 TY	14 EQ	27 10				
VARI	DERIV		42 SN						
VARI	VARI		1						
VARL	STAB		171						
VARL	STAB		26 TY	27 EQ	60 *	60	63 *	63	171 *
VARL	WRPERT		13 TY	14 EQ	24	25			
VARPDS	WRPERT		13 TY	25 *	29 10				
VARPRT	WRPERT		13 TY	24 *	29 10				
VARSV	CONSTB	STBD	16 CO	45					
VARSV	INSTAB	STBD	19 CO	47 *					
VARTDS	WRPERT		13 TY	14 EQ	28 10				
VARTRT	WRPERT		13 TY	14 EQ	28 10				
VARI	CONSTB		23 TY	24 EQ	45 *				
VARI	INSTAB		30 TY	31 EQ	47				
VBS	STBFNM		101 *	122	125				
VBS	WING		56 *	78	81				
VCTMAX	ALSTAB		119 *	123	123 *	136			
VDISP	AZMINT	ANDOIT	3 CO	129 *					
VDISP	AZMUTH	ANDOIT	2 TY	5 CO	91 *	91	91	91	91
VDISP	AZMUTH	ANDOIT	106						
VDISP	RADBGN	ANDOIT	2 TY	5 CO	63 *				
VECT	ALLMAT		220	223 *	223	224	226	226 *	228
VECT	ALLMAT		210 *	210	210	213 *	213	220 *	220
VECT	ALLMAT		5 TY	165	201 *	207	208 *	208	209 *
VECT	ALLMAT		234 *	234	234	237	238 *	238	239 *
VECT	ALSTAB		117	121	128	128	132	132	136
VECT	ALSTAB		17 TY	87 SA	115 *	115	116 *	116	117 *
VECTMX	ALSTAB		122 *	123	123				
VEL	STBFNM		128 *	145 *	147	148	153		
VEL	WING		84 *	86 *	88	89	101	169	169
VEL	XSTORE		40 *	42	43	70			
VELIND	RADBGN	FORWK	2 TY	10 CO	31				
VELIND	RIWAKE	FORWK	2 CO	36 *					
VELKTS	JFBGIN	STRIMA	32 CO	86 *					
VELKTS	PUNCH	STRIMA	8 CO	15 10	37 10	47 10	68 10	75 10	
VELSQ	FUSFNM		30 *	32	33	100			
VELSQ	STBFNM		127 *	133	145	160			
VELSQ	WING		83 *	85	86	108	152	167	
VELSQ	XSTORE		38 *	39	40	59			
VELXZ	FUSFNM		29 *	30	34				
VELXZ	STBFNM		126 *	127	146				
VELXZ	WING		82 *	83	87				
VELXZ	XSTORE		37 *	38	41				
VGSTW	GUST	STRIMA	25 CO	96 *					
VGSTW	VORGST	STRIMA	25 CO	107 *	108 *				
VGSTW	WING	STRIMA	31 CO	55					
VGUNS	VARI		138 SN						
VGUNS	VGUNS		1						
VGUST	FUSFNM	STAMAN	13 CO	28					

4.4 AGAJ77 DICTIONARY

There are more than 1,000 variables in the common blocks of AGAJ77. Additionally, several hundred local variables are scattered among the routines. It is extremely difficult to remember the meanings of each of the variables. Table 11 gives a brief, one-line, description for most of the key analysis variables in C81. In this table, each line starts with three blank columns, with the variable or array name beginning in column 4. Columns 12 through 72 give the meaning of the associated name. If the name is an array, the description is led by the array dimensions. Column 74 displays an asterisk (*), blank ( ) or pound sign (#). An asterisk indicates that the name appearing is contained in a labeled common. That label immediately follows the asterisk. A blank means the related name is a local variable of a routine. That routine name follows the blank. A pound sign is the symbol for a local name which is used in more than one routine. Consequently, MISC is printed starting in column 75.

4.5 SWITCH FOR DIAGNOSTIC DATA FROM STAB

In Section 3.3 of Volume II, IPL(90) is defined as a switch for obtaining diagnostic data during the flightpath stability analysis (STAB). Since the data generated by this switch are not of general interest to the user, but can be useful to the programmer, the function of IPL(90) is discussed in this Programmer's Manual rather than in Volume II. The function of the switch is described below.

There are up to 30 independent variables in STAB that may be incremented in the process of computing the stability (partial) derivatives. The number of variables actually incremented depends on the number of degrees of freedom which the user has activated. (See IPL(86) and (88) in Section 3.3 of Volume II.) In each STAB case, IPL(90) can be used to print out the following data resulting from one of the variables being incremented:

(1) Blade element aerodynamic data (α, C_L, C_D, C_M, etc.) at each blade station and each azimuth location for each rotor (i.e., IPRINT in subroutine RADIAL does not equal zero, which calls RADOUT)

(2) Rotor and pylon moment data (i.e., COND1 in subroutine MBAL is greater than 1.5, which causes printout).

TABLE 11. AGAJ77 DICTIONARY.

AGAJ77 DICTIONARY

A	(59) FUSE_AGE F+M; EQUIV TO FIRST 59 VARIABLE IN COMMON MANAL	#MISC
ARYMCK	(38,38) ARRAY OF M-C-K MATRICES INPUT TO ALLMAT	*STBCOM
ABSVCT	(38,19,3) MAGN OF EIGENVECTORS (MODE SHAPES) (RTS,DOF,NORM)	*STBCOM
ACM	(7,9,22) CARTA DATA TABLES FOR BUNS CM	*FORCMC
ACOFF	(20,2) AERODYNAMIC CENTER OFFSET FOR ROTORS 1 AND2	*STARAD
ADDT	ANGULAR ACCELERATION IN TENNIS RACKET MOMENT EXPRESSION	*ANDOIT
ADT	THETA DOT FROM CYCLIC	*ANDOIT
AERCON	DRAG RISE COEFFICIENT (DEFAULT = 1.9/RAD)	CLCD
AGUST	(13) GUST VELOCITY AT CG. STAB. SURF., STORES, AND WING (FXD)	GUST
AGUSTR	GUST VELOCITY AT ROTOR HUB (FIXED REFERENCE SYSTEM)	RGUST
AGW	NOT REFERENCED	*STRIMA
AIB	(2) INERTIA PER ROTOR BLADE	*MANAL
AIBP	(2) BASELINE F/A ROTOR MOMENT WHEN STAB CALLED DURING MANU	*STARAN
AIBR	(2) BASELINE LAT ROTOR MOMENT WHEN STAB CALLED DURING MANU	*STARAN
AIR1	0.5*BAIB(1): 0.5*(# OF BLADES)*(INERTIA PER BLADE); M/R	*STBD
AIR2	0.5*BAIB(2): 0.5*(# OF BLADES)*(INERTIA PER BLADE); T/R	*STBD
AL	LIFT CURVE SLOPE (1/RAD)	*STARAN
ALAMDA	ANGLE OF YAWED FLOW ON BLADE SEGMENT; LIMITED TO < 60 DEG	*STARAN
ALB	ANGLE OF ATTACK FOR BREAKPOINT IN CL CURVE; =ALPH14 + 5 DEG	#MISC
ALD	ANGLE OF ATTACK (AMG) IN DEGREES	*ANDOIT
ALF	ANGLE OF ATTACK OF BLADE SECTION OR AERO SURF; -PI<ALF<PI	*ANDOIT
ALFDOT	RATE OF CHANGE OF BLADE SEGMENT ANGLE OF ATTACK (ALPHA-DOT)	*STARAN
ALFSTB	(4) ANGLE OF ATTACK OF STABILIZING SURFACE	*STRIMA
ALFWKP	(2) WAKE PLAN COMPLEX ANGLE-OF-ATTACK	*MANAL
ALI	INDUCED ANGLE OF ATTACK	CLCD
ALIN1	(5) ANGLE BETWEEN CHORD LINE AND ZERO LIFT LINE FOR BLD SEG	*STARAN
ALIN2	(5) COEF OF MACH NUMBER IN EQUN FOR ZLL ANGLE WRT CHORD LINE	*STARAN
ALIN3	(5) COEF OF (MACH NUMBER)**2 IN EQN FOR ZLL ANGLE WRT CHORD	*STARAN
ALIN4	(5) COEF OF (MACH NUMBER)**3 IN EQN FOR ZLL ANGLE WRT CHORD	*STARAN
ALLWG	ANGLE OF ATTACK OF LEFT WING PANEL	*MANAL
ALOADD	BLADE SEGMENTAL DRAG FORCE (LB)	RADIAL
ALOADL	BLADE SEGMENTAL LIFT FORCE (LB)	RADIAL
ALOADP	BLADE SEGMENTAL PITCHING MOMENT (FT-LB)	RADIAL
ALPH14	STALL ANGLE	*ANDOIT
ALRWG	ANGLE OF ATTACK OF RIGHT WING PANEL	*MANAL
ALSTBZ	(5) LIFT CURVE SLOPE OF AERODYNAMIC SURFACES (5=WING)	*STRIAB
ALSZLL	(5) INPUT ZERO LIFT LINE ANGLE (CONTROLS AT 50%; NO BRKPTS)	*STARAN
ALT	ALTITUDE OF CG ABOVE GROUND LEVEL	*STARAN
ALTD	DENSITY ALTITUDE	*STARAN
ALTP	PRESSURE ALTITUDE	*STARAN
ALWG	WING ANGLE OF ATTACK (AVERAGE OF LEFT AND RIGHT PANELS)	*STARAN
AMAST	(6,2) ACCELERATIONS AT TOP OF MAST (LINEAR,ANGULAR,ROTOR)	*MANAL
AMBTMP	AMBIENT TEMPERATURE; XFC(28)	*STRIMA
AMG	ANGLE OF ATTACK IN "CLCD" AND "CDCL"; 0 < AMG < PI/2 FOR EQNS	#MISC
AMGD	ANGLE OF ATTACK USED IN DATA TABLE INTERPOLATION	*ANDOIT
ANGD	ANGLE OF ATTACK USED IN DATA TABLE INTERPOLATION	*ANDOIT
ANGFLP	(6) FLAP ANGLE (CSDEFL) PLUS INCR. FROM CONTROL POS.& J-CARDS	*STRIMA
ANGLS	ANGLE BTWN WING WAKE C.L. AND LINE FROM WING T.E. TO STAB CP	STBFNM
ANGS	DOWNWASH ANGLE AT STABILIZER DUE TO WING	STBFNM
ANGZLL	(6) ZLL ANGLE (ALSZLL) PLUS INCR. FROM CONTROL POS.& J-CARDS	*STRIMA
AOR	(2) =((HUB EXTENT)/RADIUS)**2	*STARAN
AP	NOT REFERENCED	*MANAL
APCH	HIGH ANGLE IN PHASING FUSELAGE AERO EQNS TOGETHER	*STARAN
APCL	LOW ANGLE IN PHASING FUSELAGE AERO EQNS TOGETHER	*STARAN
APD	PITCH RATE (APE-DOT): BODY AXIS	*MANAL
APDD	PITCH ACCELERATION (APE-DOUBLE-DOT): BODY AXIS	*MANAL
APDDD	RATE OF CHANGE OF PITCH ACCEL (APE-TRIPLE-DOT): BODY AXIS	DERIV
APDM	MAST PITCH RATE	*ANDOIT
APDS	PITCH RATE IN SHAFT AXIS (INCL PYLON&MAST TILT) TIMES RADIUS	*ANDOIT
APE	EULER PITCH ANGLE	*MANAL
APFP	CLIMB ANGLE	*STRIMA
APWG	ANGLE BTWN BODY X-AXIS AND WING ZERO LIFT LINE (AVERAGE)	*STARAN
ARD	FUSELAGE ROLL RATE	*MANAL
ARDD	FUSELAGE ROLL ACCELERATION	*MANAL
ARDM	MAST ROLL RATE	*ANDOIT
ARDS	ROLL RATE IN SHAFT AXIS (INCLUDING PYLON) TIMES RADIUS	*ANDOIT
ARE	EULER ROLL ANGLE	*MANAL
ARFAC	ASPECT RATIO FACTOR IN CL-ALPHA CALC FOR AERO SURFACES	CLCD
AVECT	MAGNITUDE OF THETA EIGENVECTOR FOR A ROOT IN STAB	ALSTAB
AVP	HCU*ALDOT; FACTOR USED IN UNSTEADY AERO CALCULATIONS	*ANDOIT
AY	SIDESLIP ANGLE = ATAN2(-VYB,VXB)	*STRIMA

TABLE 11. Continued.

AYD	FUSELAGE YAW RATE	*MANAL
AYDD	FUSELAGE YAW ACCELERATION	*MANAL
AYE	EULER YAW ANGLLE	*MANAL
AYEFP	SIDESLIP INDICATOR	*STRIAB
AYFP	HEADING ANGLE	*STAMAN
AY1	SIDESLIP ANGLE FROM PREVIOUS TIME POINT DURING MANEUVER	*STAMAN
AZ	AZIMUTH ANGLE FOR ROTOR BLADE	INIT
AZETAR	(2) AZ	*MANAL
A1	F/A FLAPPING	*ANDOIT
A1BAL	(2) A1 SAVED DURING STABILITY ANALYSIS	*STARAN
A1D	F/A FLAPPING RATE	*ANDOIT
A1M	MAIN ROTOR F/A FLAPPING ANGLE	*MANAL
A1MD	MAIN ROTOR F/A FLAPPING RATE	*MANAL
A1T	TAIL ROTOR F/A FLAPPING ANGLE	*MANAL
A1TD	TAIL ROTOR F/A FLAPPING RATE	*MANAL
A1WKP	(2) WAKE PLAN F/A FLAPPING ANGLE	*STRIMA
B	(2) NUMBER OF BLADES (FOR FLOATING POINT CALCULATIONS)	*MANAL
BAIB	(2) NUMBER OF BLADES TIMES INERTIA PER BLADE (B*AIB)	*STARAN
BAP	HCU**2*ALDDOT; FACTOR USED IN UNSTEADY AERO CALCULATIONS	*ANDOIT
BASECG	(3) CG LOCATION WITH EXTERNAL STORES EXCLUDED (STT,BUTT,WTR)	*STRIMA
BASEGW	GROSS WEIGHT WITH EXTERNAL STORES EXCLUDED	*STRIMA
BB	TIP LOSS FACTOR (1.0 = NO LOSS)	VIND
BBCGOF	(20,2) BLADE BEAMWISE CG OFFSET DISTRIBUTION, FEET (TIP=1)	*STARAN
BCCGOF	(20,2) BLADE CHORDWISE CG OFFSET DISTRIBUTION, FEET (TIP=1)	*STARAN
BDOTRS	TIP SPEED FROM FLAPPING VELOCITY AT HUB	*ANDOIT
BETAB	ANGLE BTWN BLADE SEGMENT AND HUB PLANE = "FLAPPING ANGLE"	*ANDOIT
BETAH	HUB FLAPPING ANGLE = BETA1 + PRECONE	RADOUT
BETAK	(2) FLAPPING SPRING RATE	*MANAL
BETAX	(2) FLAPPING STOP LOCATION	*MANAL
BETAXK	(2) FLAPPING STOP SPRING RATE	*STARAN
BETAZ	(2) PRECONE ANGLE	*MANAL
BETAZD	(2) RATE OF CHANGE OF PRECONE,	*MANAL
BETA1	"FLAPPING ANGLE" OF BLADE SEGMENT #1 (0 TO 5% R); SEE "BETAB"	#MISC
BLCG	BUTTLINE OF CG (FEET); ALSO SEE "CGBL"	*INSTAR
BLCGX	(4) BUTTLINE OF CG OF EXTERNAL STORE (INCHES)	*STRIMA
BLDACC	(7,20,6) BLADE (BEAM,CHORD,TORS) ACC AT EACH RADIAL STATION	*MANAL
BLDMS	(2,2) BLADE MASS (BLDMSS) TIMES (PYLON FOCAL LENGTH)**2	*STARAN
BLDMSS	(2) TOTAL MASS OF EACH BLADE (SLUGS)	*STARAN
BLOAD	(4,3,40) BLADE LOAD OUTPUT DATA	*STRIAB
BMASS	(20,2) MASS OF EACH BLADE SEGMENT (SLUGS)	*STARAD
BNPSI	(2): BNPSIR(N)*HNPSIR(N)=.025*RHO*R*NB/NPSI	*MANAL
BNPSIR	(2): (NUMBER OF BLADES)/(NUMBER OF AZMUTH LOCATIONS)	*MANAL
BOTTOM	MIN VALUE OF COLLECTIVE PITCH AS A FUNCTION OF F/A MAST TILT	*STRIMA
BOUNCE	(2) *** DEFINED IN "ZERO" BUT NEVER USED ***	*STARAN
BTASTB	(4) SIDESLIP ANGLE AT THE I-TH STABILIZING SURFACE	*STRIMA
BTBL	BTASTB(I) CORRECTED FOR THE SIGN OF THE BUTTINE OF THE STAB	*ANDOIT
BUTSTB	(4) BUTTLINE OF STABILIZERS	*STRIMA
BVECT	MAGNITUDE OF PHI EIGENVECTOR FOR A ROOT IN STAB	ALSTAB
BWMS	RECIPROCAL OF BOBWEIGHT MASS TIMES 12 (1/SLUGS)	JFBGIN
BWTC	BOBWEIGHT DAMPER MULTIPLIED BY "BWMS"	*STAMAN
BWTK	BOBWEIGHT SPRING MULTIPLIED BY "BWMS"	*STAMAN
BWTM	BOBWEIGHT EFFECTIVITY COEFFICIENT	*STAMAN
B1	LATERAL FLAPPING	*ANDOIT
B1BAL	(2) B1 SAVED DURING STABILITY ANALYSIS	*STARAN
B1D	LAT FLAPPING RATE	*ANDOIT
B1M	MAIN ROTOR LAT FLAPPING ANGLE	*MANAL
B1MD	MAIN ROTOR LAT FLAPPING RATE	*MANAL
B1WKP	(2) WAKE PLAN LATERAL FLAPPING ANGLE	*STRIMA
CAPCH	COS(APCH)=COSINE OF HIGH PHASING ANGLE IN FUS AERO EQNS	*STARAN
CAPCL	COS(APCL)=COSINE OF LOW PHASING ANGLE IN FUS AERO EQNS	*STARAN
CBBM	(20,11,2) COEFFICIENT OF BEAM BENDING MOMENT	*FLEX
CBETA	COSINE OF BETAB ("FLAPPING ANGLE") PLUS PRECONE	*ANDOIT
CBETAZ	(2) COS (BETAZ).	*MANAL
CBZ	COSINE OF PRECONE ANGLE: =CBETAZ(N)=COS(BETAZ(N))	*ANDOIT
CCBM	(20,11,2) COEFFICIENT OF CHORD BENDING MOMENT	*FLEX
CD	DRAG COEFFICIENT	*ANDOIT
CDHB	(2) DRAG COEFFICIENT FOR HUB	*STARAD
CDLWG	DRAG COEFFICIENT FOR LEFT WING PANEL	*MANAL
CDMX	MAXIMUM NON-DIVERGENT DRAG IN "CLCD" AND "CDCL"	*ANDOIT
CDR	RADIAL DRAG COEF FOR BLADE SEGMENT FOR UNSAN OPTION	*STARAN
CDREF	REFERENCE VALUE OF CD IN UNSAN OPTION	*STAPAN
CDRWG	DRAG COEFFICIENT FOR RIGHT WING PANEL	*MANAL
CDSTB	(4) DRAG COEFFICIENT FOR STABILIZING SURFACE	*STARAN
CDWG	WING DRAG COEFFICIENT (AVERAGE OF LEFT AND RIGHT PANELS)	*STARAN
CDZ	DRAG COEFFICIENT AT ZERO ANGLE OF ATTACK	*ANDOIT
CD1	DRAG COEFFICIENT VARIATION WITH ANGLE OF ATTACK	*ANDOIT
CD2	DRAG COEFFICIENT VARIATION WITH ANGLE OF ATTACK SQUARED	*ANDOIT
CGBL	BUTTLINE OF CG (INCHES); ALSO SEE "BLCG"	*STAMAN
CGSTA	STATIONLINE OF CG (INCHES); ALSO SEE "STACG"	*STRIMA

TABLE 11. Continued.

CGWL	WATERLINE OF CG (INCHES); ALSO SEE "WLCG"	*STRIMA
CHDSTB	(5) MEAN AERODYNAMIC CHORD OF AERODYNAMIC SURFACES (5=WING)	*STARAN
CHORD	(20,2) BLADE CHORD DISTRIBUTION, TIP TO ROOT (FEET)	*STARAD
CL	LIFT COEFFICIENT	*ANDOIT
CLAMDA	COS(ALAMDA) = COSINE OF YAW FLOW ANGLE ON BLADE SEGMENT	*ANDOIT
CLBCL	WING MOMENT DERIVATIVE: SEE XWG(34) IN USER'S GUIDE	*STARAN
CLBO	WING MOMENT DERIVATIVE: SEE XWG(33) IN USER'S GUIDE	*STARAN
CLLWG	LIFT COEFFICIENT FOR LEFT WING PANEL	*MANAL
CLOCK	CONTROL LOCK FOR M/R COLLECTIVE PITCH (0=UNLOCKED)	*STRIMA
CLP	WING MOMENT DERIVATIVE: SEE XWG(36) IN USER'S GUIDE	*STARAN
CLR	WING MOMENT DERIVATIVE: SEE XWG(35) IN USER'S GUIDE	*STARAN
CLRADK	(2) SWITCH FOR UNSTEADY AERO (>0 FOR UNSAN; <0 FOR BUNS)	*STARAD
CLREF	REFERENCE VALUE OF CL IN UNSAN OPTION	*STARAN
CLRWR	LIFT COEFFICIENT FOR RIGHT WING PANEL	*MANAL
CLSTB	(4) LIFT COEFFICIENT FOR STABILIZING SURFACE	*STARAN
CLZ	MAXIMUM LIFT COEFFICIENT AT ZERO MACH NUMBER	*ANDOIT
CM	PITCHING MOMENT COEFFICIENT	*ANDOIT
CMLWG	PITCHING MOMENT COEFFICIENT FOR LEFT WING PANEL	*STARAN
CMRWG	PITCHING MOMENT COEFFICIENT FOR RIGHT WING PANEL	*STARAN
CMSTB	(4) PITCHING MOMENT COEFFICIENT FOR STABILIZING SURFACE	*STARAN
CNBCL	WING MOMENT DERIVATIVE: SEE XWG(38) IN USER'S GUIDE	*STARAN
CNBO	WING MOMENT DERIVATIVE: SEE XWG(37) IN USER'S GUIDE	*STARAN
CNPCD1	WING MOMENT DERIVATIVE: SEE XWG(42) IN USER'S GUIDE	*STARAN
CNPCL	WING MOMENT DERIVATIVE: SEE XWG(41) IN USER'S GUIDE	*STARAN
CNPSI	(16,2) COS(N*(PSI+PSIY)) OF BLADE L FOR WAKE TABLE	*FORWK
CNRCD	WING MOMENT DERIVATIVE: SEE XWG(40) IN USER'S GUIDE	*STARAN
CNRCL	WING MOMENT DERIVATIVE: SEE XWG(39) IN USER'S GUIDE	*STARAN
CNTGRP	(56) CONTROLS GROUP OF OUTPUT DATA FOR TRIM & MANU PAGES	*STAMAN
CNTLPH	(2) ROTOR'S CONTROL PHASING, DEG	*STRIMA
COEFDG	(2,5) COEFTS FOR CHANGE IN CD OF AERO SURF WITH FLAP DEFLECT	*STARAN
COEFDW	(3,5) COEFTS FOR DOWNWASH AT AERO SURFACE DUE TO FUSELAGE	*STARAN
COEFLT	(2,5) COEFTS FOR CHANGE IN CL OF AERO SURF WITH FLAP DEFLECT	*STARAN
COEFPT	(2,5) COEFTS FOR CHANGE IN CM OF AERO SURF WITH FLAP DEFLECT	*STARAN
COEFSW	(2,5) COEFTS FOR SIDEWASH AT AERO SURFACE DUE TO FUSELAGE	*STARAN
COEFXL	(2,5) COEFTS FOR CHANGE IN CL-MAX OF AERO SURF WITH FLAP DEFL	*STARAN
COLSTK	COLLECTIVE STICK POSITION	*MANAL
COND1	SWITCH FOR PRINTOUT OF TRIM ITERATION DATA	*STARAN
COND2	SWITCH FOR PRINTOUT OF BLADE ELEMENT DATA	*STARAN
COND3	SWITCH FOR PRINTOUT OF OPTIONAL TRIM PAGE	*STRIAB
CORIOL	(11) INTERMEDIATE VARIABLE (RELATED TO CORIOLIS ACCEL.).	*ANDOIT
COSDIH	(5) COSINE OF AERODYNAMIC SURFACE DIHEDRAL ANGLE	*STARAN
COSDWS	(5) COSINE OF DOWNWASH ANGLE AT AERO SURFACE DUE TO FUSELAGE	*STARAN
COSGAM	(2) COSINE OF TIP SWEEP ANGLE	*STARAD
COSIY	COS(PSI+PSIY): TOTAL BLADE AZIMUTH ANGLE W.R.T. WIND VECTOR	AZMINT
COSSWS	(5) COSINE OF SIDEWASH ANGLE AT AERO SURFACE DUE TO FUSELAGE	*STARAN
CPCYBG	COS (WEAPON ELEVATION ANGLE) * COS (WEAPON AZMUTH ANGLE).	*STAMAN
CPITCH	(4) PITCH ANGLE FOR CONTROL AT 0%	*STRIMA
CPLL	(11,2) COEFFICIENTS OF PITCH LINK LOAD	*STARAN
CPSI	COS(PSI): INNER LOOP STORAGE FOR CPSIL(L,N)	*ANDOIT
CPSIB	(2) COS(TWOPI / B)	*STARAN
CPSIL	(12,2) COS(PSI) FOR EACH BLADE L	*MANAL
CPSIY	COS(PSIY)	*STARAN
CPSQ	COSIY**2	AZMINT
CPSYBG	COS (WEAPON ELEVATION ANGLE) * SIN (WEAPON AZMUTH ANGLE).	*STAMAN
CRANGE	(4) LINKAGE BTWN PILOT CONTROL AND INTERMED CNTRL ANG (RAD/%)	*STRIMA
CRLN19	COEF FOR LINKING LAT CYC TO COLL PITCH AS A FCN OF MAST TILT	*STAMAN
CRM	NOT REFERENCED	*ANDOIT
CSDEFL	(5) CONTROL SURFACE (FLAP) DEFLECTION	*STARAN
CSH	(11,2) COEFFICIENT OF HORIZONTAL SHEAR	*STARAN
CSHG	(11,2) COEFFICIENT OF INPLANE SHEAR	*STARAN
CSHO	(11,2) COEFFICIENT OF INPLANE SHEAR	*STARAN
CSTO	(20,11,2) COEFFICIENT OF TORSIONAL MOMENT WITH RADIUS	*STRIMA
CSV	(11,2) COEFFICIENT OF VERTICAL SHEAR	*STARAN
CSVO	(11,2) COEFFICIENT OF VERTICAL SHEAR	*STARAN
CT	"THRUST" COEF. = T/(2*PI*RHO*R**2); NOTE: 2 & NO TIP SPEED$$$	*STARAN
CTPLOT	(42) CONTOUR PLOT I/O ARRAY	*ANDOIT
CURVED	(1100,5) TABLES FOR DRAG COEFFICIENTS	*TAB
CURVEL	(500,5) TABLES FOR LIFT COEFFICIENTS	*TAB1
CURVEM	(575,5) TABLES FOR PITCHING MOMENT COEFFICIENTS	*TAB1
CVFAC	(11) INTERMEDIATE VARIABLE (RELATED TO VIRTURAL WORK)	*ANDOIT
CWGZLL	COSINE OF WING ZERO LIFT LINE INCIDENCE ANGLE	*STARAN
CYCOLL	(11,2) MODE SWITCHES.	*STARAD
CYSK1D	RATE OF CHANGE OF FORE AND AFT CYCLIC STICK.	*STAMAN
CYSK2D	RATE OF CHANGE OF LATERAL CYCLIC STICK.	*STAMAN
CYSTK1	F/A CYCLIC STICK POSITION	*MANAL
CYSTK2	LATERAL CYCLIC STICK POSITION	*MANAL
CZET	COSINE OF ROTOR 1 F/A MAST TILT ANGLE	*MANAL
DALFST	CHANGE IN THE STALL ANGLE FROM HYSTERSIS.	*ANDOIT
DAMP	MAX VALUE FOR USE OF VARIABLE DAMPER FOR FUSELAGE F+M BALANCE	*STRIAB
DAMPLL	(2) LEAD-LAG DAMPER	*STARAN

TABLE 11. Continued.

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DAMPM    (11,2) DAMPING FACTORS                                                *STARAN
DAMPMW   (2) 2. * INPUT STRUCTURAL DAMPING IN MAST WIND UP.                    *STARAN
DAPC     DIFFENCE BETWEEN HIGH AND LOW PHASING ANGLES = APCH-APCL              *STARAN
DBEF     (2) PITCH CHANGE AXIS LOCATION (0 = 25% C; UNITS = .5*C)              *STARAD
DBEF1    (2) PITCH CHANGE AXIS LOCATION (0 = 75% C; UNITS = .25*C)             *STARAN
DBLCG    LATERAL DISTANCE C.G. HAS MOVED                                       *STAMAN
DCAFR    (2) COEFFICIENT IN TIP VORTEX MODEL                                   *STARAN
DCAFXK   DCAFR * XK                                                            *ANDOIT
DCDFP    INCREMENT TO AERO SURFACE DRAG COEF DUE TO FLAP DEFLECTION            *ANDOIT
DCL      INCREMENT TO LIFT COEFFICIENT DUE TO UNSTEADY AERODYNAMICS            *ANDOIT
DCLFP    INCREMENT TO AERO SURFACE LIFT COEF DUE TO FLAP DEFLECTION            *ANDOIT
DCLXFP   INCREMENT TO MAX LIFT COEF OF AERO SURFACE DUE TO FLAP DEFLCT         *ANDOIT
DCM      INCREMENT TO PITCHING MOMENT COEF DUE TO UNSTEADY AERO                *ANDOIT
DCMFP    INCREMENT TO AERO SURFACE PITCHING MOMENT COEF DUE TO FLAP             *ANDOIT
DELAC    (2) SHIFT IN AERODYNAMIC CENTER AT TIP CAUSED BY SWEEP                *STARAD
DELJT    (4) JET CONTROL LINKAGE (LB1%)                                        *STRIMA
DELTA3   (2) TANGENT OF PITCH-FLAP COUPLING ANGLE                              *STARAN
DELT2    DELTA TIME FOR RUNGE-KUTTA                                            *MANAL
DELT2R   1. / DELT2.                                                           *MANAL
DEL3DG   (2) PITCH-FLAP COUPLING ANGLE, DEG                                    *STRIMA
DEPD     (10) DELTA TO TRIM VARIABLE FOR PDM COMP; = EPD*EPDX(I)               *STRIAB
DEPLOY   (4) DEPLOYMENT OF DRAG BRAKE                                          *STRIMA
DESNLF   DESIRED NORMAL LOAD FACTOR FOR AUTOPILOT, G                           *MANAL
DESP     DESIRED ROLL RATE FOR AUTOPILOT, RAD/SEC                              *MANAL
DESPDG   DESIRED ROLL RATE FOR AUTOPILOT, DEG/SEC                              *MANAL
DESQ     DESIRED PITCH RATE FOR AUTOPILOT, RAD/SEC                             *MANAL
DESQDG   DESIRED PITCH RATE FOR AUTOPILOT, DEG/SEC                             *MANAL
DESR     DESIRED YAW RATE FOR AUTOPILOT, RAD/SEC                               *MANAL
DESRDG   DESIRED YAW RATE FOR AUTOPILOT, DEG/SEC                               *MANAL
DESRC    DESIRED RATE-OF-CLIMB FOR AUTOPILOT, FT/SEC                           *MANAL
DIS      DIST FROM WING WAKE TO STAB CP (PERP. TO WING WAKE)                    STBFNM
DIST     DISTANCE FROM ORIGIN TO CG IN GROUND X-Y PLANE                        *STRIMA
DIXIZ    IX - IZ:  DIFFERENCE BTWN TOTAL ROLL AND YAW INERTIAS                 *STRIMA
DIYIX    IY - IX:  DIFFERENCE BTWN TOTAL PITCH AND ROLL INERTIAS               *STRIMA
DIZIY    IZ - IY:  DIFFERENCE BTWN TOTAL YAW AND PITCH INERTIAS                *STRIMA
DL       INERTIAL CONTRIBUTION TO ROLLING MOMENT                               *STRIAB
DM       INERTIAL CONTRIBUTION TO PICTCHING MOMENT                             *STRIAB
DMS20    (11,2) OUT-OF-PLANE MODE SHAPE AT 5% MINUS THAT AT 0% (HUB)           *STARAN
DN       INERTIAL CONTRIBUTION TO YAWING MOMENT                                *STRIAB
DNSRTO   DENSITY RATIO                                                         *STARAN
DPF      (12,11,2) DEPENDENT PARTICIPATION FACTOR (BLADE,MODE,ROTOR)           *FLEX
DPFD     (12,11,2) FIRST TIME DERIVATIVE OF DPF (DPF-DOT)                      *FLEX
DPFDD    (12,11,2) SECOND TIME DERIVATIVE OF DPF (DPF-DOUBLE-DOT)              *FLEX
DPFP     (4,2) MODAL PYLON DEPNT PARTICIPATION FACTOR (MODE,ROTOR)             *PYLON
DPFPD    (4,2) FIRST TIME DERIVATIVE OF DPFP (DPFP-DOT)                        *PYLON
DPFPDD   (4,2) SECOND TIME DERIVATIVE OF DPFP (DPFP-DOUBLE-DOT)                *PYLON
DPIX     IX / (IX*IZ - IXZ**2)                                                 *STAMAN
DPIXZ    IXZ / (IX*IZ - IXZ**2)                                                *STAMAN
DPIZ     IZ / (IX*IZ - IXZ**2)                                                 *STAMAN
DPLD     (11) PRECONE EFFECTS IN VERTICAL SHEAR                                *ANDOIT
DPSI     (12,2) CHANGE IN PSI BETWEEN AZIMUTH POSITIONS                        *MANAL
DQDCOL   D TORQUE / D COLLECTIVE FROM TRIM SECTION.                            *STRIAB
DQL      .5 TIMES ROLLING MOMENT DUE ANGULAR RATES + SIDESLIP AT WING          *STARAN
DQN      0.5 TIMES YAWING MOMENT DUE ANGULAR RATES + SIDESLIP AT WING          *STARAN
DRB      (20,2) BLADE SEGMENTAL LENGTHS, FEET (TIP=1)                          *MANAL
DROT     (105,2)  XMW AND XTW COMBINED INTO ONE ARRAY                          *INONLY
DSTACG   FORE AND AFT DISTANCE C.G. HAS MOVE BECAUSE OF MAST TILT.             *STAMAN
DSTCGT   FORE AND AFT DISTANCE C.G. HAS MOVED BECAUSE OF HORIZ. FOLD           *STAMAN
DSTCGT   FORE AND AFT DISTANCE C.G. HAS MOVE BECAUSE OF FOLD AFT.              *STAMAN
DTBWT    CHANGE IN COLLECTIVE PITCH DUE TO BOBWEIGHT                           *STAMAN
DTHETO   (3) OLD VALUES OF DTHT.                                               *STAMAN
DTR      DEGREES TO RADIAN CONVERSION = 0.0174532925                           *MANAL
DTRR     RADIAN TO DEGREES CONVERSION = 57.2957795                             *MANAL
DTRRP    (5) FACTOR FOR CONVERTING FUSELAGE AERO INPUT TO "PER RADIAN"          FUSINT
DTRRSQ   DTRR * DTRR = 3282.80635                                              *INSTAR
DTRR1    DTRR/R(1)                                                             *STAMAN
DTRR2    DTRR/R(2)                                                             *STAMAN
DTZMT    NOT REFERENCED                                                        *STRIMA
DWGSTB   DIST FROM WING T.E. TO STAB CP NORMALIZED BY WING M.A.C.               STBFNM
DWLCG    VERTICAL DISIANCE C.G. HAS MOVED                                      *STAMAN
DX       INERTIAL CONTRIBUTION TO X-FORCE                                      *STRIAB
DXWGST   X-DISTANCE FROM WING T.E. TO STABILIZER CP                             STBZFM
DY       INERTIAL CONTRIBUTION TO Y-FORCE                                      *STRIAB
DZ       INERTIAL CONTRIBUTION TO Z-FORCE                                      *STRIAB
DZWGST   Z-DISTANCE FROM WING T.E. TO STABILIZER CP                             STBFNM

E        (135) BASELINE VALUES FOR FORCES AND MOMENTS                          *STBD
EACC     (3) ELASTIC ACCELERATION OF BLADE SEGMENT (1=OP,2=IP,3=TORS)           RADBGN
EDISP    (3) ELASTIC DIPLACEMENT OF BLADE SEGMENT  (1=OP,2=IP,3=TORS)          *ANDOIT
EFFRT    (2) TRANSMISSION EFFICIENCY FOR EACH ROTOR                            *STRIMA
EFFALL   DRIVE   SYSTEM OVERALL TRANSMISSION EFFICIENCY                        *STRIMA
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TABLE 11. Continued.

EIG	(38) LOCAL STORAGE FOR CURRENT EIGNENVALUES (COMPLEX)	*STBCOM
EIGN	(38,4) COMMON STORAGE FOR ALL EIGENVALUES (COMPLEX)	*STBCOM
ENGOMG	ENGINE ANGULAR SPEED, RAD/SEC	*STRIMA
ENGRPM	ENGINE RPM, NOT REFERENCED	*STRIAB
EPCOS	(2,11,2) FOURIER COEFFICIENTS OF DPF IN TRIM	*STARAN
EPD	BASIC INCREMENT FOR TRIM AND CONTROL PARTIAL DERIV. MATRICES	*STRIAB
EPDD	INCREMENT FOR COMPUTING ROTOR PARTIAL DERIVATIVES IN MBAL	*ANDOIT
EPDD	(22) INCREMENTS TO DEGREES OF FREEDOM IN STAB	STAB
EPDS	INPUT FOR STABILITY ANALYSIS INCREMENT (=XIT(4)/10.)	*STRIAB
EPDX	(10) ARRAY FOR PUTTING APPROPRIATE UNITS ON EPD	*STRIMA
EPSIN	(2,11,2) FOURIER COEFFICIENTS OF DPF IN TRIM	*STARAN
ER	(2) ROTOR ALLOWABLE FLAPPING MOMENT ERROR FOR TRIM	*STARAN
ERR	(10) INPUT ALLOWABLE ERRORS OR TRIM FORCES AND MOMENTS	*STRIAB
ERX	(2) MAX VALUE FOR USE OF VARIABLE DAMPER FOR RTR MOM BALANCE	*STARAN
ETAQ	DYNAMIC PRESSURE LOSS AT STAB DUE TO WING (0 = NO LOSS)	*STARAN
ETAQST	(5) DYNAMIC PRESSURE LOSS AT AERODYNAMIC SURF DUE TO FUSELAGE	*STARAN
ETAQXT	(4) DYNAMIC PRESSURE LOSS AT EXTERNAL STORE/AERO BRAKE	*STRIMA
EVEL	(3) ELASTIC VELOCITY OF BLADE SEGMENT (1=OP,2=IP,3=TORS)	RADBGN
EXH	(2) HUB EXTENT (FEET)	*STARAD
EXIT	ERROR INDICATOR: NOT ZERO INDICATES ERROR AND TERMINATES JCB	*TOPLOT
F	(18) FORCE AND MOMENT IMBALANCES	*STRIAB
FLOCK	CONTROL LOCK FOR M/R AND T/R F/A CYCLIC PITCH (0=UNLOCKED)	*STRIMA
FLPDUJ	(5) INCREMENT TO FLAP ANGLE OF AERO SURF DUE TO J-CARD INPUTS	*STAMAN
FLTGRP	(53) FLIGHT CONDITIONS GROUP OF OUTPUT DATA FOR TRIM&MANU PGS	*STAMAN
FMFILT	(6) FILTERED FORCES AND MOMENTS AT CG IN BODY-AXIS	*MANAL
FORTHA	(858) PART OF THE 2376 VARIABLES SAVED DURING MANEUVERS	#MISC
FQGI	(11,2) 1./(FREQ*GI)**2	*STARAN
FREQ	(11,2) NATURAL FREQUENCY	*ANDOIT
FREQMW	(2) NOT REFERENCED	*STARAN
FRG	(49,2,3) FREQ,RESP. WITH GAIN IN DB AND PHASE ANGLE IN DEGREES	*STBFRQ
FRP	(49,3) FREQUENCY RESPONSE OF TRANSFER FUNCTIONS (COMPLEX)	ALSTAB
FRQHZ	(49) FREQUENCY RANGE, IN HERTZ, FOR FREQ RESPONSE IN STAB	*STBFRQ
FTKTS	FT/SEC TO KNOTS CONVERSION FACTOR = .5925	*STRIMA
FUSGRP	(17) BODY AXIS GROUP OF OUTPUT DATA FOR TRIM & MANU PAGES	*STAMAN
FVIND	INDUCED VELOCITY CHANGER LIMITER (FT/SEC)	*STARAN
FXCGOF	BLADE ADDITIONAL INPLANE INERTIA FORCE DUE TO CG/PCA OFFSETS	*STARAN
FYCGOF	(12) BLADE ADDITIONAL RADIAL INERTIA FRC FROM CG/PCA OFFSETS	*STARAN
FZCGOF	BLADE ADDITIONAL OUT-OF-PLANE INERTIA FRC FROM CG/PCA OFFSETS	*STARAN
GAIN	(3) GAIN IN TRANSFER FUNCTIONS IN STABILITY ANALYSIS	*STBFRQ
GAMMA	(2) TIP SWEEP ANGLE	*STARAD
GCBBM	(11,2) COFFICIENTS OF BEAM BENDING MOMENTIM	*STARAN
GCCBM	(11,2) COFFICIENTS OF CHORD BENDING MOMENTIM	*STARAM
GEARAT	(2) RATIO OF ROTOR RPM TO ENGINE RPM	*STRIMA
GFILT	FILTERED VERTICAL ACCELERATION AT CG, G	*MANAL
GFWD	FORWARD LOAD FACTOR (G-LEVEL)	*MANAL
GI	(6,2) GENERALIZED BLADE INERTIA	*STARAN
GLAT	LATERAL LOAD FACTOR (G-LEVEL)	*MANAL
GMAXV	TOTAL GUST VELOCITY = GMAXV1 + GMAXV2	*MANAL
GMAXV1	FIRST MAXIMUM GUST VELOCITY.	*MANAL
GMAXV2	SECOND MAXIMUM CHANGE IN GUST VELOCITY.	*STAMAN
GMAXV3	INTERMEDIATE VARIABLE = GMAXV1 - START2*RATE2.	*MANAL
GMS	(18,12) BLADE GENERAL MODE SHAPE DATA	*INONLY
GOV	FLAG ON ENGINE TORSIONAL SYSTEM -NORMALLY = 0	*STAMAN
GPRELD	PRELOAD FOR BOBWEIGHT (IN G'S)	*STAMAN
GPULL	COMMANDED LOAD FACTOR (G-LEVEL) FOR PULL-UP/PUSH-OVER IN TRIM	*STAMAN
GRDGRP	(14) GROUND REFERENCE GROUP OF OUTPUT DATA FOR TRIM&MANU PAGE	*STAMAN
GSTF	VORTEX CIRCULATION DIVIDED BY TWOPI	*STRIMA
GTARGT	TARGET G-LEVEL FOR G-TRACTOR OPTION: CONVERTED TO QTARGT	*STAMAN
GTI	(20,2) GENERALIZED BLADE TORSIONAL INERTIA	*STARAD
GTURN	COMMANDED LOAD FACTOR (G-LEVEL) FOR COORD. TURN IN TRIM	*STAMAN
GUSTYP	INDICATOR FOR TYPE OF GUST = "J" VALUE OF GUST-TYPE	*MANAL
GVERT	VERTICAL LOAD FACTOR (G-LEVEL)	*MANAL
HALFG	0.5*ONEG = 16.08625 FT/SEC**2	*INSTAR
HALFPI	PI/2. = 1.570796327	*MANAL
HCU	0.5*CHORD/U	RADIAL
HDELT	.5 * TDELT	*MANAL
HFILT	(2) FILTERED H-FORCE, LB	*MANAL
HEADP	(5,12) PART OF STAB PRINTOUT HEADINGS	*STBD
HFORCE	(2) ROTOR FORCE // TO SHAFT X-AXIS (+AFT)	*MANAL
HFRC	SUMMATION VARIABLE USED TO COMPUTE H-FORCE	*ANDOIT
HGSTW	X-COMPONENT OF GUST AT WING (BODY AXIS)	*STRIMA
HGUST	X-COMPONENT OF GUST VELOCITY AT CG (BODY AXIS)	*STAMAN
HGUSTR	X-COMPONENT OF GUST VELOCITY AT HUB IN SHAFT REFERENCE	*STARAD
HGUSTS	(4) X-COMPONENT OF GUST AT STAB. SURFACES (BODY AXIS)	*MANAL
HGUSTX	(4) X-COMPONENT OF GUST AT EXTERNAL STORES (BODY AXIS)	*MANAL
HL	(2) MAST LENGTH (FROM SHAFT PIVOT POINT TO HUB - FEET)	*STAMAN
HLPYLD	(2) DIST. FROM SHAFT PIVOT TO NACELLE AC (ALONG MAST)	*STAMAN
HNPSIR	(2) NOT REFERENCED	*MANAL

TABLE 11. Continued.

HPACCS	DRIVE SYSTEM ACCESSORY HORSEPOWER	*STRIMA
HPGAIN	ENGINE GOVERNOR POWER GAIN	*STAMAN
HPMAX	MAX. TRANSMISSION HORSEPOWER	*STRIMA
HSHR	(2) FORE AND AFT SHEAR FORCE AT HUB	*MANAL
HSHRN	DOUBLE PRECISION ACCUMULTOR FOR HSHR	*ANDOIT
HTIPSG	(2) 1.-.5*(BLADE TIP SEGMENT), IN FRACTION	*STARAN
HUBM	(2) NOT REFERENCED	*MANAL
HWAKE	HALF WIDTH OF WING WAKE	STBFNM
IBMSAV	(3) PART OF HEADING INDICATORS FOR TRANSFER FUNCTIONS IN STAB	*STBFRQ
IBRAKE	ROTOR BRAKE SWITCH.	*STAMAN
ICAN	FLAG FOR ROTOR BRAKE	*STAMAN
ICOM	(49) COMMENTS	*TOPLOT
IDSTB	INDICATOR FOR AERODYNAMIC SURFACE WAKE TABLE	*FOSWK
IDTAB	(20,2) IDTABS(20,2) CONVERTED TO TIP TO ROOT	*STARAD
IDTABM	(20) DISTRIBUTION OF RAA SUBGROUPS ALONG SPAN OF M/R BLADE	READIN
IDTABS	(20,2) IDTABM AND IDTABT COMBINED INTO ONE ARRAY	*STARAD
IDTABT	(20) DISTRIBUTION OF RAA SUBGROUPS ALONG SPAN OF T/R BLADE	READIN
IND	SWITCH TYPE VARIABLE. USED IN RUNGE-KUTTA INTEGRATION	*MANAL
IPL	(98) PROGRAM LOGIC GROUP INPUTS	*INSTAR
IPLERR	(98) SWITCHES TO INDICATE ERRORS IN PROG LOGIC GROUP INPUTS	ERRCHK
IPL16	IPL(16); SWITCH FOR READING STABILIZING SURFACE GROUP #1	*INONLY
IPL17	IPL(17); SWITCH FOR READING STABILIZING SURFACE GROUP #2	*INONLY
IPL18	IPL(18); SWITCH FOR READING STABILIZING SURFACE GROUP #3	*INONLY
IPL19	IPL(19); SWITCH FOR READING STABILIZING SURFACE GROUP #4	*INONLY
IPRINT	BLADE ELEMENT AERO DATA PRINT INDICATOR	*ANDOIT
IPSN	IDENTIFICATION (SERIAL) NUMBER USED FOR LABELING TAPES, ETC.	*TOPLOT
IRUNG	CYCLE NUMBER FOR RUNGE-KUTTA INTEGRATION (=1,2,3, OR 4)	*MANAL
ISCASP	SWITCH FOR PITCH SCAS (1 = ON; 0 = OFF)	*STAMAN
ISCASR	SWITCH FOR ROLL SCAS (1 = ON; 0 = OFF)	*STAMAN
ISCASY	SWITCH FOR YAW SCAS (1 = ON; 0 = OFF)	*STAMAN
ISTOP	ROTOR STOP INDICATOR IN MANU	*STAMAN
ISWAKE	(6,2) SEQUENCE NUMBER OF WAKE TABLE TO BE USED (SURF.ROTOR)	*FOSWK
ITC	(2) MAX ITER TO TRIM ROTOR AT FIXED FLAPPING ANGLES	*STARAN
ITM	(2) MAX ITER TO TRIM ROTOR AT FIXED CYCLIC ANGLES	*STARAN
ITORS	EFFECTIVE TORSIONAL INERTIA OF M/R AND T/R COMBINED (REAL)	*STAMAN
IVUSER	SWITCH FOR SPECIFYING STATION FOR BLADE LOADS	*STAMAN
IWG	WING PANEL INDICATOR: 5 = RIGHT PANEL; 6 = LEFT PANEL	*ANDOIT
IX	R/C MOMENT OF INERTIA ABOUT BODY X-AXIS (ROLL)	*STRIMA
IXEXT	(4) MOMENT OF INERTIA OF EXTERNAL STORE ABOUT X-AXIS (ROLL)	*STRIMA
IXZ	R/C CROSSPRODUCT OF INERTIA (IN BODY X-Z PLANE)	*STRIMA
IXZEXT	(4) CROSS-PRODUCT OF INERTIA OF EXTERNAL STORE (X-Z PLANE)	*STRIMA
IY	R/C MOMENT OF INERTIA ABOUT BODY Y-AXIS (PITCH)	*STRIMA
IYEXT	(4) MOMENT OF INERTIA OF EXTERNAL STORE ABOUT Y-AXIX (PITCH)	*STRIMA
IZ	R/C MOMENT OF INERTIA ABOUT BODY Z-AXIS (YAW)	*STRIMA
IZEXT	(4) MOMENT OF INERTIA OF EXTERNAL STORE ABOUT Z-AXIS (YAW)	*STRIMA
JGO	INDICATOR FOR ROTOR AERO CALC; SEE DEF. IN SUB RADIAL	*STARAN
JPASS	INDICATOR FOR TRIM COMP (1=BASELINE;2=PARTIAL DERIVATIVES)	*STARAN
KCIT	(20) VALUE OF J ON J-CARDS 1 THRU 20	*STRIMA
KDOF	(30) INDICATOR FOR DEGREES OF FREEDOM IN STAB (1=ON;0=OFF)	*STBD
KEOF10	FLAG TO INDICATE END OF FILE 10 (INPUT DATA) HAS BEEN REACHED	*TOPLOT
KFLAG	(2) INDICATOR USED IN WAGNER FUNCTION CALCULATIONS	*STARAN
KM	SEQUENCE NUMBER OF INPUT GROUP IN THE "MODEL" OPTION ARRAY	*INONLY
KM1	NUMBER OF ROWS IN PD EXCLUDING ERROR ROW	*STRIMA
KM2	NUMBER OF COLUMNS IN PD	*STRIMB
KO	INDICATOR FOR INPUT GROUP TO BE READ IN	*INONLY
KONFIG	CONFIGURATION INDICATOR: 1=SINGLE MR; 2=TANDEM; 3=SIDE-BY-SIDE	*STRIMA
KOUNT	NUMBER OF ROWS IN PD INCLUDING ERROR ROW	ITRIM
KOUNTS	COUNTER FOR PROP ROTOR COLL. GOV ITERATIONS IN STAB	STAB
KPASS	INDICATOR FOR PDM COMP. (0=COMPUTE PDM; 1=DO NOT COMPUTE PDM)	ITRIM
KPD	COUNTER IN SUBROUTINE "SUBA"; *** IN COMMOM, BUT NEED NOT BE	*STAMAN
KPERTS	SWITCH FOR F+M PRINTOUT DURING PERTURBATION IN STAB (0=PRINT)	*STRIAB
KPYL	PYLON DEGREE OF FREEDOM SWITCH IN STABILITY ANALYSIS	*STBD
KREAD	NUMBER OF J-CARDS READ IN (MAXIMUM OF 20)	*STRIMA
KREVXX	NO. ROTOR REVS FOR TV ANAL (=3 FOR FTV BASE;=2 FOR FTV PDM)	*STARAN
KROT	ROTOR DEGREE OF FREEDOM SWITCH IN STABILITY ANALYSIS	*STBD
KTCTR	FLAG FOR TIME INCR IN MANU (0=FIRST;1=SECOND;2=FIRST;3=END)	*STAMAN
KTRIM	INDICATOR (0=START OF TRIM;1=QS TRIM;2=TVT OR FTV)	*STRIAB
KVAR	(22) POINTER VECTOR TO VARIABLE IN COMMON FOR PART.DERIV.COMP	*STRIAB
KVIND	(2) NUMBER OF BLADE STATIONS WHERE TIP-VORTEX AFFECTS (TIP=1)	*STARAN
KXD	(11,5) ARRAY TO SPEED UP MACH NO. IN CD INTERPOLATION	*TAB
KXL	(11,5) ARRAY TO SPEED UP MACH NO. IN CL INTERPOLATION	*TAB
KXM	(11,5) ARRAY TO SPEED UP MACH NO. IN CM INTERPOLATION	*TAB
KZD	(41,5) ARRAY TO SPEED UP BRACKETING ALFA IN CD INTERPOLATION	*TAB
KZL	(41,5) ARRAY TO SPEED UP BRACKETING ALFA IN CL INTERPOLATION	*TAB
KZM	(41,5) ARRAY TO SPEED UP BRACKETING ALFA IN CM INTERPOLATION	*TAB
L	FREQUENTLY INDICATES BLADE NUMBER	#MISC
LAMBDA	(2) INFLOW: VZS-VIR (NOT DIVIDED BY TIP SPEED)	*STARAD

TABLE 11. Continued.

LAPC	LOGIC SWITCH IN FUSELAGE AERO CALCULATIONS; NORMALLY = 0	*STARAN
LEXT	TOTAL ROLLING MOMENT ABOUT CG DUE TO EXTERNAL STORES	*MANAL
LEXTJ	TOTAL ROLLING MOMENT DUE TO JETTISON OF EXTERNAL STORES	*MANAL
LFUS	ROLLING MOMENT ABOUT CG DUE TO FUSELAGE AERODYN. (BODY AXIS)	*MANAL
LGUN	ROLLING MOMENT ABOUT CG DUE TO WEAPON (GUN) FORCE (BODY AXIS)	*MANAL
LINK	PORTION OF PROGRAM (2=TRIM; 3=STAB; 4=MANU)	*MANAL
LJTGN	ROLLING MOMENT DUE TO JETS AND GUN (BODY AXIS)	*MANAL
LJTSN	(4) ROLLING MOMENT DUE TO JETTISON OF EACH EXTERNAL STORE	*MANAL
LLJET	ROLLING MOMENT ABOUT CG DUE TO LEFT JET (BODY AXIS)	*MANAL
LLWG	ROLLING MOMENT ABOUT CG DUE TO LEFT WING PANEL (BODY AXIS)	*MANAL
LMR	X-COMPONENT OF MOMENT DUE TO MAIN ROTOR FORCES	*MANAL
LNGTH1	LENGTH OF FIRST RAMP OR BASE OF HUMP FOR SIN**2 GUST.	*MANAL
LOGF	LOGIC SWITCH FOR FUSELAGE AERODYNAMICS; NORMALLY = 0	*STARAN
LOSTIP	(2) TIP LOSS FACTOR SWITCH (0=USE EQ; 1=USE INPUT)	*STARAN
LPASS	FREQ OF PDM COMPUTATION IN TRIM (EVERY LPASS-TH ITERATION)	*STRIAB
LPHORN	(2) PCHORN(N) IN TERMS OF BLADE ITH STATION (TIP=1)	*STARAN
LQMR	ROLLING MOMENT FROM M/R DUE TO PMOM,RMOM,&TORQUE (BODY AXIS)	*MANAL
LQTR	ROLLING MOMENT FROM T/R DUE TO PMOM,RMOM,&TORQUE (BODY AXIS)	*MANAL
LRJET	ROLLING MOMENT ABOUT CG DUE TO RIGHT JET (BODY AXIS)	*MANAL
LRWG	ROLLING MOMENT ABOUT CG DUE TO RIGHT WING PANEL (BODY AXIS)	*MANAL
LSTBZ	TOTAL ROLLING MOMENT ABOUT CG DUE TO STAB SURFACES (BDY AXIS)	*MANAL
LSTZ	(4) ROLLING MOMENTS ABOUT CG FROM STABILIZING SURFACES	*MANAL
LTR	X-COMPONENT OF MOMENT DUE TO TAIL ROTOR FORCES	*MANAL
LWING	COUNTER FOR # OF TIME WAGNER FUNCTIONS CALLED FOR EACH PANEL	*STARAN
LXTR	(4) ROLLING MOMENT ABOUT CG DUE TO EACH EXTERNAL STORE	*MANAL
M	FREQUENTLY INDICATES MODE SHAPE NUMBER	#MIONLY
MASPYL	(2) INDICATOR FOR PYLON MODE SHAPES W/WO ROTOR MASS INCL'D	*PYLON
MASS	MASS OF ROTORCRAFT = W/32.1745	*STRIMA
MAXMOD	SUMMATION OF NUMBERS OF M/R AND T/R BLADE MODE SHAPES	ERRCHK
MDFYMS	SWITCH TO ACTIVATE MODAL INVERSE ANALYSIS IN STAB	*STRIAB
MEXT	TOTAL PITCHING MOMENT ABOUT CG DUE TO EXTERNAL STORES	*MANAL
MEXTJ	TOTAL PITCHING MOMENT DUE TO JETTISON OF EXTERNAL STORES	*MANAL
MFUS	PITCHING MOMENT ABOUT CG DUE TO FUSELAGE AERODYN. (BODY AXIS)	*MANAL
MGUN	PITCHING MOMENT ABOUT CG DUE TO WEAPON (GUN) FORCE (BDY AXIS)	*MANAL
MJTGN	PITCHING MOMENT DUE TO JETS AND GUN (BODY AXIS)	*MANAL
MJTSN	(4) PITCHING MOMENT DUE TO JETTISON OF EACH EXTERNAL STORE	*MANAL
MLJET	PITCHING MOMENT ABOUT CG DUE TO LEFT JET (BODY AXIS)	*MANAL
MLWG	PICTHING MOMENT ABOUT CG DUE TO LEFT WING PANEL (BODY AXIS)	*MANAL
MMR	Y-COMPONENT OF MOMENT DUE TO MAIN ROTOR FORCES	*MANAL
MQMR	PITCHING MOMENT FROM M/R DUE TO PMOM,RMOM,&TORQUE (BODY AXIS)	*MANAL
MQTR	PITCHING MOMENT FROM T/R DUE TO PMOM,RMOM,&TORQUE (BODY AXIS)	*MANAL
MRCP	COMPONENT OF VXSN & VYSN // TO BLADE REF. LINE (+INBOARD)	*ANDOIT
MRJET	PITCHING MOMENT ABOUT CG DUE TO RIGHT JET (BODY AXIS)	*MANAL
MRSP	COMPONENT OF VXSN & VYSN PERP. TO BLADE REF LINE (+FWD)	*ANDOIT
MRWG	PICTHING MOMENT ABOUT CG DUE TO RIGHT WING PANEL (BODY AXIS)	*MANAL
MS	(21,3,12) BLADE MODE SHAPES (STA,COMPONENT,ROTOR & MODE #)	*FLEX
MSAV	(3) PART OF HEADING INDICATOR FOR TRANSFER FUNCTION IN STAB	*STBFRQ
MSORD	BLADE MODE SHAPES COUNTER; =(N-1)*NMODE(1)+J	#MISC
MSTBZ	TOTAL PITCHING MOMENT ABOUT CG DUE TO STAB SURF (BODY AXIS)	*MANAL
MSTZ	(4) PITCHING MOMENTS ABOUT CG FROM STABILIZING SURFACES	*MANAL
MTR	Y-COMPONENT OF MOMENT DUE TO TAIL ROTOR FORCES	*MANAL
MXPASS	MAX VALUE FOR NPASS; NORMALLY = XIT(1)	*STRIAB
MXPMOD	MAX. NO. OF PYLON MODES	*PYLON
MXSTBD	MAX. NO. OF EQUS OF MOTION ALLOWED IN STAB; = 18	*STBD
MXSTBP	MAX. NO. OF PERTURBATIONS IN STAB; = 30	*STBD
MXSTB2	(MXSTBD+1)*2; = 38; SIZE OF M-C-K MATRIX IN STAB	*STBD
MXTR	(4) PITCHING MOMENT ABOUT CG DUE TO EACH EXTERNAL STORE	*MANAL
N	FREQUENTLY INDICATES ROTOR NUMBER (I.E., =1 OR 2)	#MISC
NB	(2) NUMBER OF BLADES (FOR FIXED POINT CALCULATIONS)	*MANAL
NBS	(2) NUMBER OF BLADE SEGMENTS	*MANAL
NBSG	NUMBER OF BLADE SEGMENTS; =NBS(N)	*MANAL
NCNTUR	SWITCH TO STORE CONTOUR PLOT DATA	*STRIAB
NDA	=NDF FOR DENOM OF TRANS. FUNCT (M=1);=NDF+1 FOR NUMERATOR	ALSTAB
NDECK	NOT REFERENCED	*TOPLOT
NDF	NUMBER OF DEGREES OF FREEDOM IN STABILITY ANALYSIS	*STBCOM
NDFT	ARRAY SIZE FOR MATRIX A INPUT TO ALLMAT FROM ALSTAB (=2*NDA)	ALSTAB
NDIAG	OUTPUT CONTROL FOR STAB DIAGNOSTICS	*STRIAB
NDIM	NO. OF VARIABLES INTEGRATED IN MANEUVER	*FORY
NEXT	TOTAL YAWING MOMENT ABOUT CG DUE TO EXTERNAL STORES	*MANAL
NEXTJ	TOTAL YAWING MOMENT DUE TO JETTISON OF EXTERNAL STORES	*MANAL
NFUS	YAWING MOMENT ABOUT CG DUE TO FUSELAGE AERODYN. (BODY AXIS)	*MANAL
NGUN	YAWING MOMENT ABOUT CG DUE TO WEAPON (GUN) FORCE (BODY AXIS)	*MANAL
NJET	NUMBER OF CONTROLLABLE JETS	*STARAN
NJTGN	YAWING MOMENT DUE TO JETS AND GUN (BODY AXIS)	*MANAL
NJTSN	(4) YAWING MOMENT DUE TO JETTISON OF EACH EXTERNAL STORE	*MANAL
NLJET	YAWING MOMENT ABOUT CG DUE TO LEFT JET	*MANAL
NLWG	YAWING MOMENT ABOUT CG DUE TO LEFT WING PANEL (BODY AXIS)	*MANAL
NMLST	(20) CARD IMAGE (20A4) USED TO CHECK FOR "$CHANGE" CARDS	*INONLY
NMOD	STORAGE FOR NMODE(N) WITHIN ROTOR ANALYSIS LOOP (ALSO LOCAL)	*ANDOIT

TABLE 11. Continued.

NMODE	(2) NUMBER OF BLADE MODE SHAPES	*MANAL
NMR	Z-COMPONENT OF MOMENT DUE TO MAIN ROTOR FORCES	*MANAL
NOPSI	UNSUBSCRIPTED STORAGE FOR NPSI(N),= # OF ROTOR AZIMUTH ANGLES	*ANDOIT
NOTRIM	TV TRIM AFTER QS TRIM INDICATOR (0=DO TVT; 1= NO TVT)	*STRIAB
NPART	PRIMARY PROGRAM FLOW CONTROL (1=TRIM,2=MANU,7=T+S,10=SWP,ETC)	*TOPLOT
NPASS	ITERATION COUNTER	*STPIAB
NPMOD	NO. OF MODAL PYLON MODES	*PYLON
NPMODE	(2) NO. OF MODAL PYLON MODES	*PYLON
NPRINT	INDICATOR FOR PRINTING MANEUVER PAGE (EACH NPRINT-TH TIME PT)	*TOPLOT
NPSI	(2) NUMBER OF AZIMUTH LOCATIONS	*MANAL
NQMR	YAWING MOMENT FROM M/R DUE TO PMOM,RMOM,& TORQUE (BODY AXIS)	*MANAL
NQTR	YAWING MOMENT FROM T/R DUE TO PMOM,RMOM,& TORQUE (BODY AXIS)	*MANAL
NQUAS	(2) SWITCH FOR TYPE OF ROTOR ANALYSIS (0 = QS; 1 = TV)	*MANAL
NQUASS	(2) TEMPORARY STORAGE FOR NQUAS	*STRIAB
NRJET	YAWING MOMENT ABOUT CG DUE TO RIGHT JET	*MANAL
NRSTAB	SWITCH FOR PREVENTING ROTOR REBALANCE WHEN NSTABR=0	*STRIAB
NRT	NUMBER OF ROOTS TO STABILITY ANALYSIS	*STBCOM
NRTT	(4) ROOT INDICATOR IN STAB FOR PRINTOUT PURPOSE ONLY	*STBFRQ
NRWG	YAWING MOMENT ABOUT CG DUE TO RIGHT WING PANEL (BODY AXIS)	*MANAL
NSCALE	SCALE FACTOR FOR PLOTS.	*TOPLOT
NSTABF	SWITCH TO COUPLE STAB MATRICES	*STRIAB
NSTABO	OUTPUT CONTROL FOR STAB MATRICES	*STRIAB
NSTABP	SWITCH FOR PYLON DEGREES OF FREEDOM IN STAB (0=OFF)	*STRIAB
NSTABR	SWITCH FOR ROTOR DEGREES OF FREEDOM IN STAB (0=OFF)	*STRIAB
NSTBZ	TOTAL YAWING MOMENT ABOUT CG DUE TO STAB SURFACES (BODY AXIS)	*MANAL
NSTZ	(4) YAWING MOMENTS ABOUT CG FROM STABILIZING SURFACES	*MANAL
NTIME	COUNTER SWITCH FOR PRINTING MANEUVER PAGE (0 = PRINT PAGE)	*TOPLOT
NTR	Z-COMPONENT OF MOMENT DUE TO TAIL ROTOR FORCES	*MANAL
NTREVA	NO. OF REV IN TVT TO BE ANALYZED	*STRIMA
NTREVP	NO. OF REV IN TVT TO BE PLOTTED	*STRIMA
NTRIM	NUMBER OF TRIM POINTS FOR CONTOUR PLOTS	*TOPLOT
NUMTF	(4,8) SELECTOR FOR TRANSFER FUNCTIONS IN STAB	*STBD
NUMSTB	TRANSFER FUNCTION SELECTOR IN STAB, FROM -1 TO +4	*STRIAB
NVARA	SECONDARY PROGRAM FLOW CONTROL (FUNCTION OF VALUE OF "NPART")	*TOPLOT
NVARB	SECONDARY PROGRAM FLOW CONTROL (FUNCTION OF VALUE OF "NPART")	*TOPLOT
NVARC	SECONDARY PROGRAM FLOW CONTROL (FUNCTION OF VALUE OF "NPART")	*TOPLOT
NVARD	SECONDARY PROGRAM FLOW CONTROL (FUNCTION OF VALUE OF "NPART")	*TOPLOT
NVARS	INDICATOR FOR STABILITY ANALYSIS (0=DON'T DO STAB;1=DO STAB)	*TOPLOT
NWAG	INDICATOR- 1=USE WAGNER-BUETTIKER FUNCTION 0=DON'T	*MANAL
NXD	NUMBER OF MACH NUMBER ENTRIES IN THE ROTOR CD TABLE	*TAB
NXL	NUMBER OF MACH NUMBER ENTRIES IN THE ROTOR CL TABLE	*TAB
NXM	NUMBER OF MACH NUMBER ENTRIES IN THE ROTOR CM TABLE	*TAB
NXTR	(4) YAWING MOMENT ABOUT CG DUE TO EACH EXTERNAL STORE	*MANAL
NZD	NUMBER OF ANGLE OF ATTACK ENTRIES IN THE ROTOR CD TABLE	*TAB
NZL	NUMBER OF ANGLE OF ATTACK ENTRIES IN THE ROTOR CL TABLE	*TAB
NZM	NUMBER OF ANGLE OF ATTACK ENTRIES IN THE ROTOR CM TABLE	*TAB
OMEGA	(2) REDUCED ROTOR FREQUENCY FOR UNSAN OPTION	*STARAN
OMEGM	MAIN ROTOR ROTATIONAL SPEED (RAD/SEC)	*STAMAN
OMEGMD	RATE OF CHANGE OF MAIN ROTOR SPEED (TARGET) RAD/SEC**2.	*STAMAN
ONEG	32.1745 FT/SEC**2	*INSTAR
OR	(2) TIP SPEED (FT/SEC)	*MANAL
ORN	TIP SPEED - YAWRATE*RADIUS	*ANDOIT
PAN	(2) PITCH CHANGE AXIS LOCATION (0 = L.E.; UNITS = CHORDS)	*STARAN
PARM	(1120) PART OF THE 2376 VARIABLES SAVED DURING MANEUVERS	*STAMAN
PCHCN1	(2) INTERMEDIATE VARIABLE FOR PITCH-CONE COUPLING	*STARAN
PCHCN2	(2) INTERMEDIATE VARIABLE FOR PITCH-CONE COUPLING	*STARAN
PCHCON	(2) INTERMEDIATE VARIABLE FOR PITCH-CONE COUPLING	*STARAN
PCHLAG	(2) PITCH-LAG COUPLING RATIO (RAD/DEG)	*STARAN
PCHORN	(2) DISTANCE FROM HUB TO PITCH-HORN ATTACH POINT, FEET	*STARAN
PD	(18,19) PARTIAL DERIVATIVE MATRIX FOR TRIM AND CONTROL POWER	*STRIMA
PDPHI	(10,11) PARTIAL DERIVATIVE MATRIX USED IN "SOLVE"	*STRIMA
PDS	(19,5) CONTROL DERIVATIVES FOR STABILITY ANALYSIS	*STBD
PED	NOT REFERENCED	*STRIMA
PEDAL	PEDAL POSTION	*MANAL
PEDALD	RATE OF PEDAL.	*STAMAN
PHASE	(38,18,3) PHASE ANGLE OF EIGENVECTORS (RTS,DOF,NORMILZ)	*STBCOM
PHIUND	(2) UNDERSLING OF FEATHERING AXIS BELOW FLAPPING AXIS	*STAMAN
PHIWKP	(2) WAKE PLAN PHASE ANGLE	*MANAL
PI	3.1415926536	*MANAL
PILGH1	INTERMEDIATE GUST VARIABLE = PI / LNGTH1.	*MANAL
PILGH2	INTERMEDIATE GUST VARIABLE = PI / LNGTH2.	*MANAL
PIU30	30/PI = 9.54929658	*STAMAN
PMOM	(2) F/A MOMENT TRANSMITTED FROM ROTOR TO SHAFT	*ANDOIT
PMOMN	SUMMATION VARIABLE FOR F/A ROTOR MOMENT; SEE PMOM(N)	*ANDOIT
PMREXT	(4,2) DOWNWASH FACTOR FOR EACH STORE FROM EACH ROTOR	*STRIMA
PRP	(64) OUTPUT ARRAY FOR OPTIONAL TRIM PAGE	RPTPG
PRSTBZ	(2,5) COEFTS FOR ROTOR DOWNWASH ON AERODYAMIC SURF (RTR,SURF)	*STARAN
PRWING	(2,2) COEFTS FOR ROTOR DOWNWASH ON WING (ROTOR,PANEL)	*STARAN
PRWSTB	DYN PRESSURE REDUCTION AT STABILIZERS DUE TO WING	*STRIMA

TABLE 11. Continued.

PSDD	(2) RATE OF CHANGE OF PSID	*MANAL
PSDDMW	(2) NOT REFERENCED	*STARAN
PSDSQZ	ROTOR ANGULAR SPEED SQUARE * SINE OF PRECONE.	*ANDOIT
PSD30P	M/R RPM (=M/R GEAR RATIO TIMES ENGINE RPM)	*STRIAB
PSD550	PSID(1)*R550 = OMEGM/550.	*STRIMA
PSI	BLADE AZIMUTH ANGLE FOR PRINTOUT IN "AZMOUT": **USED BFR DEF*	*ANDOIT
PSID	(2) ROTOR ANGULAR SPEED -PSI DOT=OMEGA	*MANAL
PSIDMW	(2) NOT REFERENCED	*MANAL
PSIDSQ	PSIDS ** 2.	*ANDOIT
PSIMW	(2) NOT REFERENCED	*MANAL
PSIREF	(2) AZIMUTH ANGLE OF BLADE 1 IN ROTOR CALCULATIONS	*MANAL
PSISTP	PSIREF(1) MUST EQUAL PSISTP WHEN ROTORS HAVE BEEN STOPPED.	*STAMAN
PSIY	SIDESLIP ANGLE IN SHAFT X-Y PLANE BTW X-AXIS AND WIND VECTOR	AZMUTH
PWGSTB	(4) COEF. FOR DOWNWASH AT STABILIZER AS A FUNCT. OF CL-WING	*STARAN
PWGWKI	COEF. FOR WING WAKE DEFLECTION AS A FUNCT. OF CL-WING	*STARAN
PYACC	(6,2) PYLON ACC. IN SHAFT-AXIS (3-LINEAR,3-ANGULAR,ROTOR)	*PYLON
PYDISP	(6,2) PYLON DISP. IN SHAFT-AXIS (3-LINEAR,3-ANGULAR,ROTOR)	*PYLON
PYHUBG	(3,2) HUB LINEAR ACC. (X-,Y-,Z-,ROTOR) IN BODY-AXIS	*PYLON
PYLCR0	(4,2) PYLON COUPLING RATIO: COLLECTIVE TO PYLON MOTION	*PYLON
PYLCR1	(4,2) PYLON COUPLING RATIO: F/A CYLIC TO PYLON MOTION	*PYLON
PYLCR2	(4,2) PYLON COUPLING RATIO: LAT CYLIC TO PYLON MOTION	*PYLON
PYLDMP	(4,2) MODAL PYLON DAMPING RATIO	*PYLON
PYLDRG	(2) ROTOR NACELLE ("PYLON") FLAT PLATE DRAG AREA	*STARAN
PYLRGI	(4,2) RECIPROCAL OF PYLON GENERALIZED INERTIA	*PYLON
PYLFRQ	(4,2) MODAL PYLON NATURAL FREQUENCY	*PYLON
PYLGRP	(20) PYLON OUTPUT ARRAY DURING MANEUVERS	*PYLON
PYLMOM	(4,2) MOMENTS ABOUT PYLON FOCAL POINT	*STARAN
PYLMS	(6,4,2) PYLON MODE SHAPES IN BODY-AXIS	*PYLON
PYVEL	(6,2) PYLON VELOCITY IN SHAFT-AXIS (3-LINEAR,3-ANGULAR,ROTOR)	*PYLON
PY2DMP	(4,2) 2*PYLDMP*PYLFRQ	*PYLON
P01DTR	0.000174532925 (CONVERTS DEG/100% TO RAD/%)	*STAMAN
Q	0.5*RHO	*MANAL
QBRAKE	ROTOR BRAKE TORQUE APPLIED.	*STAMAN
QBSGA	(20,2) 0 TIMES BLADE SEGMENTAL AREAS (TIP=1)	*MANAL
QL	TOTAL ROLL MOMENT (X-COMPONENT - BODY REFERENCE)	*MANAL
QLS	QL FROM PREVIOUS TIME POINT	*STAMAN
QM	TOTAL PITCHING MOMENT (Y-COMPONENT - BODY REFERENCE)	*MANAL
QMAX	MAX. AVAILABLE M/R TORQUE = 500/550 OF INPUT MAXIMUM	*STRIMA
QMR	TORQUE REQUIRED TO MAINTAIN CONSTANT PRM ON MAIN ROTOR	*STRIMA
QMRS	ENGINE TORQUE SUPPLIED - TOTAL	*STRIMA
QMRSA	MAXIMUM ENGINE TORQUE SUPPLIED BY THROTTLE	*STAMAN
QMS	QM FROM PREVIOUS TIME POINT	*STAMAN
QN	TOTAL YAW MOMENT (Z-COMPONENT - BODY REFERENCE)	*MANAL
QNS	QN FROM PREVIOUS TIME POINT	*STAMAN
QQQ	COEFFICIENT FOR CALCULATING ENGINE TORQUE AVAILABLE	*STAMAN
QREACT	M/R TORQUE PLUS INERTIAL TORQUE (MOMENT) DUE TO PSI-DOT	ANAL
QREATT	T/R TORQUE PLUS INERTIAL TORQUE (MOMENT) DUE TO PSI-DOT	ANAL
QSTBZ	(5) 0.5*RHO*(SURFACE AREA) (5=WING)	*STRIMA
QSV1	TORQUE AT TRIM POINT	*STRIAB
QTARGT	TARGET PITCH RATE FOR G-TRACKER OPTION	VARI
QTRIM	LOGICAL VARIABLE (.TRUE.=QS TRIM;.FALSE.=TIME VARIANT TRIM)	*STRIAB
QUAD1	TIME VARIABLE IN MANEUVER	*STAMAN
QXBRAK	MAXIMUM ROTOR BRAKE TORQUE (FT-LB)	*STAMAN
R	(2) ROTOR RADIUS (FEET)	*MANAL
RAERO	(35,5) ROTOR AERO INPUTS (YRR) AFTER INITIALIZATION BY YRINIT	*STARAD
RANGE	RANGE OF M/R COLLECTIVE PITCH AS A FUNCTION OF F/A MAST TILT	*STRIMA
RANGES	(4) RANGE OF PILOT CONTROL MOTION (INCHES)	*STRIMA
RATE1	RAMP GUST = GMAXV1/LNGTH1	*MANAL
RATE2	RAMP GUST = GMAXV2/LNGTH2	*MANAL
RC	RATIO OF WEIGHT OF MAIN ROTOR TO AIRCRAFT GROSS WEIGHT	*STAMAN
RCRF	RECIPROCAL OF CORE-SIZE FACTOR FOR VORTEX GUSTS (J=37)	*STRIMA
RCWING	RECIPROCAL OF WING M.A.C. =1./CHDSTB(5)	*STARAN
RD	(19,19) DAMPING MATRIX IN STAB	*STBCOM
RDELT1	1. / TDELT.	*MANAL
RDELT2	1. / HDELT.	*MANAL
RENTR	RADIUS FROM CENTER OF VORTEX SYSTEM TO ENTRANCE TO SYSTEM	*STRIMA
RENTSQ	RENTR**2	*STRIMA
RETARD	(2) TANGENT OF (DELTA3 ANGLE MINUS PHASING ANGLE)	*STARAN
RGI	(11,2) RECIPROCAL OF GENERALIZED BLADE INERTIA	*STARAN
RHO	AIR DENSITY AT ALTITUDE = 0.002378*DNSRTO	*INSTAR
RFILT	(2) RESULTANT FILTERED FORCE FOR EACH ROTOR, LB	*MANAL
RIGID	(2) HUB TYPE INDICATOR (0=TEET. OR GIMB.; 1=RIGID OR ARTIC.)	*MANAL
RIN	RADIUS FROM CENTER OF VORTEX SYSTEM TO POINT IN SYSTEM	*STRIMA
RINSQ	RIN**2	*STRIMA
RITORS	1. / ITORS.	*STAMAN
RIY	1. / IY	*STAMAN
RLNK	(29) SUPPLEMENTAL ROTOR CONTROL LINKAGES	*STAMAN
RM	(19,19) MASS MATRIX IN STAB	*STBCOM
RMASS	1. / MASS	*STRIMA

TABLE 11. Continued.

RMOM	(2) LAT MOMENT TRANSMITTED FROM ROTOR TO SHAFT	*ANDOIT
RMOMN	SUMMATION VARIABLE FOR LAT ROTOR MOMENT; SEE RMOM(N)	*ANDOIT
RMOMN	DOUBLE PRECISION ACCUMULATOR FOR ROLL MOM. FROM ROTOR TO MAST	*ANDOIT
ROTJ	SIGN CHANGER: = +1. FOR MAIN ROTOR; = -1. FOR TAIL ROTOR	*ANDOIT
RPD	(14,6,2) ROTOR PARTIAL DERIVATIVE MATRIX IN STAB	*STBD
RPIST	FACTOR FOR WING STALL IN WING WAKE MODEL	*STARAN
RR	RRK FOR STATION K AND ROTOR N	*ANDOIT
RRK	(20,2) LOCATION OF BLADE STATIONS WRT HUB, TIP TO ROOT (FEET)	*FLEX
RS	(19,19) STIFFNESS MATRIX IN STAB	*STBCOM
RTRCON	SWITCH FOR READING SUPP. ROTOR CONT. GROUP (0=DON'T READ)	*STAMAN
RTRGRP	(24) ROTOR GROUP OF OUTPUT DATA FOR TRIM & MANU PAGES	*STAMAN
RTRP	(2): 1/(2*PI*RHO*R**2)	*STARAN
RUSER	(2) IVUSER CONVERTED TO INCHES FROM ROTOR HUB	*STAMAN
RW	1. / W	*MANAL
R12	1./12.	*INSTAR
R144	1./144.	*INSTAR
R550	1/550 = .00181 81 81 81 8	*STAMAN
SAMP	(38,3) DAMPING TERM IN TRANSFER FUNCTIONS IN STAB	*STBFRQ
SAPBG	SIN (WEAPON ELEVATION ANGLE)	*STAMAN
SAPFM	SIN (EULAR ANGLE PITCH, GROUND TO MAST)	*STAMAN
SBETA	SINE OF BETAB ("FLAPPING ANGLE") PLUS PRECONE	*ANDOIT
SBETAZ	(2) SIN (BETAZ).	*MANAL
SBRKPT	(4,5) BREAKPOINTS FOR AERO SURFACE CONTROL LINKAGES	*STAMAN
SBZ	SINE OF PRECONE ANGLE: = SBETAZ(N)=SIN(BETAZ(N))	*ANDOIT
SCASPF	(6) COEFFICIENTS FOR FEED-FORWARD LOOP OF PITCH SCAS	*STAMAN
SCASPF	(6) COEFFICIENTS FOR FEED-BACK LOOP OF PITCH SCAS	*STAMAN
SCASRC	(4) COEFFICIENTS FOR FEED-FORWARD LOOP OF ROLL SCAS	*STAMAN
SCASRF	(6) COEFFICIENTS FOR FEED-BACK LOOP OF ROLL SCAS	*STAMAN
SCASYC	(4) COEFFICIENTS FOR FEED-FORWARD LOOP OF YAW SCAS	*STAMAN
SCASYF	(6) COEFFICIENTS FOR FEED-BACK LOOP OF YAW SCAS	*STAMAN
SECNDA	(68) PART OF THE 2376 VARIABLES SAVED DURING MANEUVERS	#MISC
SETGRP	(26) ROTOR SHAFT GROUP OF OUTPUT DATA FOR MANU PAGE	*STAMAN
SHPGRP	(28) MISC GROUP OF OUTPUT DATA FOR TRIM & MANU PAGES	*STAMAN
SHRD	INTERMEDIATE VARIABLE (RELATED TO BLADE DRAG)	*ANDOIT
SHRIP	(7,2) INPLANE SHEAR FORCE OF EACH BLADE	*MANAL
SHRL	INTERMEDIATE VARIABLE (RELATED TO BLADE LIFT)	*ANDOIT
SHRR	INTERMEDIATE VARIABLE (RELATED TO BLADE RADIAL FORCE)	*ANDOIT
SHRV	(7,2) VERTICAL SHEAR FORCE OF EACH BLADE	*MANAL
SINDIH	(5) SINE OF AERODYNAMIC SURFACE DIHEDRAL ANGLE	*STARAN
SINDWS	(5) SINE OF DOWNWASH ANGLE AT AERO SURF DUE TO FUSELAGE	*STARAN
SINGAM	(2) SINE OF TIP SWEEP ANGLE	*STARAD
SINIY	SIN(PSI+PSIY): TOTAL BLADE AZIMUTH ANGLE W.R.T. WIND VECTOR	AZMINT
SINSWS	(5) SINE OF SIDEWASH ANGLE AT AERO SURFACE DUE TO FUSELAGE	*STARAN
SLNK	(8,5) AERO SURFACE CONTROL LINKAGES (5=WING)	*STAMAN
SLNKMT	(5) COEF FOR RIGGING ZLL INCIDENCE OF AERO SURF TO MAST TILT	*STAMAN
SNPSI	(16,2) SIN(N*(PSI+PSIY)) OF BLADE L FOR WAKE TABLE	*FORWK
SPD	(30,18) STABILITY PARTIAL DERIVATIVE MATRIX	*STBD
SPNSTB	(5) SPAN OF AERODYNAMIC SURFACES	*STARAN
SPSI	SIN(PSI): INNER LOOP STORAGE FOR SPSIL(L,N)	*ANDOIT
SPSIB	(2) SIN(TWOPI / B)	*STARAN
SPSIL	(12,2) SIN(PSI) FOR EACH BLADE L	*MANAL
SPSIY	SIN(PSIY)	*STARAN
SPSQ	SINIY**2	AZMINT
SRLN20	COEF FOR LINKING PEDAL TO COLL PITCH AS A FCN OF F/A MAST TLT	*STAMAN
SRTETQ	SQUARE ROOT OF EFFECTIVE DYNAMIC PRESSURE AT STAB DUE TO WING	STBFNM
SSMM	SUPERSONIC MACH NUMBER	*ANDOIT
STACG	STATIONLINE OF CG (FEET); ALSO SEE "CGSTA"	*INSTAR
STACGX	(4) STATIONLINE OF CG OF EXTERNAL STORE (INCHES)	*STRIMA
STALLW	AVERAGE WING STALL ANGLE	*STARAN
START2	DISTANCE FOR 2ND RAMP OR HUMP FROM END OF 1ST GUST.	*MANAL
STGAIN	(3) STATIC GAIN IN TRANSFER FUNCTIONS OF STABILITY ANALYSIS	*STBFRQ
STICKS	(4) COLSTK, CYSTK1, CYSTK2, AND PEDAL, RESPECTIVELY	JFBGIN
STKS	(4) VALUES OF STICKS FROM PREVIOUS ITERATION OR TIME POINT	*STARAN
STOP2	END DISTANCE FOR 2ND RAMP OR HUMP = START2 + LNGTH2	*MANAL
SUMMS	(20,6,2) INTERMEDIATE VALUE IN VIRTURAL WORK EQUATION	*STARAD
SUMMSB	(20,6,2) INTERMEDIATE VALUE IN CORIOLIS CALCULATION.	*STARAD
SVFAC	(11) COEFFICIENT OF ONE GRAVITY TERM IN VWRK EQUATION	*ANDOIT
SWC	(2) SIDEWASH COEF (ALWAYS ZERO FOR ROTOR 1; USED ONLY FOR TR)	*STARAN
SWGZLL	SINE OF WING ZERO LIFT LINE INCIDENCE ANGLE	*STARAN
SWINGH	WING SEMI-SPAN	*STARAN
SWSCOL	(4,2) CONTRIBUTIONS TO COLLECTIVE PITCH (CONTROL,ROTOR)	*STRIMA
SWSFA	(4,2) CONTRIBUTIONS TO F/A CYCLIC PITCH (CONTROL,ROTOR)	*STRIMA
SWSLAT	(4,2) CONTRIBUTIONS TO LAT CYCLIC PITCH (CONTROL,ROTOR)	*STRIMA
SZET	SINE OF ROTOR 1 F/A MAST TILT ANGLE	*MANAL
T	MANEUVER TIME	*MANAL
TAIR	(14) TIMES OR AZIMUTH ANGLES FOR BLADE ELEMENT AERO DATA	*MANAL
TAMB	AMBIENT TEMPERATURE	*STARAN
TANT1	TAN(F&A + RETARD*LAT) = "F&A" CONTRIBUTION TO BLADE PITCH	*ANDOIT
TANT2	TAN(LAT + RETARD*F&A) = "LAT" CONTRIBUTION TO BLADE PITCH	*ANDOIT

TABLE 11. Continued.

TARSPD	TRUE AIRSPEED (FT/SEC)	*STAMAN
TAXL	THRUST OF LEFT JET	*MANAL
TAXR	THRUST OF RIGHT JET	*MANAL
TCDECR	TIME CONSTANT FOR ENGINE POWER DECREASE	*STAMAN
TCD3	BLADE PITCH DUE TO SWASHPLATE ANGLES AND PITCH-FLAP COUPLING	*ANDOIT
TCINCR	TIME CONSTANT FOR ENGINE POWER INCREASE	*STAMAN
TCLOCK	CONTROL LOCK FOR T/R COLLECTIVE PITCH (0=UNLOCKED)	*STRIMA
TDELT	TIME INCREMENT FOR MANEUVER SECTION	*MANAL
TENRAC	"TENNIS RACKET" MOMENT EFFECT	MODAL
TEST	IF .FALSE.. INPT GRP FRM DATA LIB; IF .TRUE.. FROM CARDS	*INONLY
TESTM	IF .TRUE.. MODEL OPTION FOR DATA READIN IS IN EFFECT	*INONLY
TFACTR	THRUST FACTOR USED BY RIVD TABLES	*FORWK
TFILT	(2) FILTERED THRUST OF EACH ROTOR, LB	*MANAL
THIRDA	(218) PART OF THE 2376 VARIABLES SAVED DURING MANEUVERS	#MISC
THRST	SUMMATION VARIABLE USED TO COMPUTE THRUST	*ANDOIT
THRSTS	(2) ROTOR THRUST.	*STARAN
THRUST	(2) ROTOR FORCE // TO SHAFT Z-AXIS (+UP)	*MANAL
TIME	T - 0.05*TDELT USED IN COMPARISONS INSTEAD OF T	*STRIMA
TIPLFT	(2) INTERMEDIATE VALUE FOR BLADE TIP SEGMENT LIFT	*STARAN
TIPLOS	(2) TIP LOSS FACTOR; INPUT OR INTERNALLY CALCULATED FROM EQ	*STARAN
TITLE	(8) TITLE OF CL,CD,CM DATA TABLES	*TAB
TLBOOM	(4) TAILBOOM BENDING COEFFICIENT (RAD/LB)	*STARAN
TMATBM	(3,3,2) TRANSFORMATION MATRIX: BODY TO MAST (SHAFT) AXIS	*MANAL
TMATFB	(3,3) TRANSFORMATION MATRIX: FIXED TO BODY	*ANDOIT
TMATFM	(3,3) TRANSFORMATION MATRIX: FIXED TO MAST (SHAFT) AXIS	*ANDOIT
TMATJB	(3,3) TRANSFORMATION MATRIX: JET TO BODY AXIS	*STARAN
TMAX	STOP TIME FOR USING CORRESPONDING TIME INCREMENT IN MANEUVER	*MANAL
TMRS	PREVIOUS VALUE OF MAIN ROTOR THRUST	*STRIAB
TMRSAV	SAVED VALUE OF THRUST(1).	*STBD
TORQ	SUMMATION VARIABLE USED TO COMPUTE TORQUE	*ANDOIT
TORQUE	(2) ROTOR TORQUE (FT-LB)	*MANAL
TPSIDD	MOMENT FORCING MAST WIND-UP.	*ANDOIT
TRACKR	(5) SWITCH FOR AUTOPILOT TRACKERS (P,Q,R,G,R/C)	*MANAL
TRALT	TAIL ROTOR ALTITUDE	*STAMAN
TRIND	T/R INDICATOR: = 0 FOR LAT MAST TILT <45 DEG; =1 IF > 45 DEG	*MANAL
TRIND1	IF T/R LAT TILT <45 AND ROTOR HUBS <5 FT APART = 1; ELSE =0	*INSTAR
TRIND2	1.-TRIND	*STAMAN
TRMTYP	TYPE OF TRIM (0=QS OR QS-TV; 1=F-TV)	*STRIAB
TSTAB	(14) TIMES OR AZMUTH ANGLES FOR STAB IN MANEUVER	*STRIMA
TSVJN	(11) INTERMEDIATE TERM IN ROTOR GYROSCOPICS	*ANDOIT
TTRS	PREVIOUS VALUE OF TAIL ROTOR THRUST	*STRIAB
TTRSAV	SAVED VALUE OF THRUST(2).	*STBD
TWIST	(20,2) DISTRIBUTION OF BUILT-IN BLADE TWIST, TIP TO ROOT; RAD	*MANAL
TWOPI	2*PI = 6.283185307	*MANAL
TZERO	START TIME FOR MANEUVER	*STRIAB
TZM	M/R COLLECTIVE DUE TO CONTROLS (=TZMS OR SWSCOL(I,1),I=1,4)	*STRIMA
TZMS	LOCKED VALUE FOR M/R COLLECTIVE PITCH	*STRIMA
TZPDT	TOTAL BLADE PITCH AT ROOT (TZR-TCD3+THFUS+RLAT*PCHLAG)	*ANDOIT
TZR	(2) COLLECTIVE PITCH (=TZM AND TZT, RESPECTIVELY)	*MANAL
TZT	T/R COLLECTIVE DUE TO CONTROLS (=TZTS OR SWSCOL(I,2),I=1,4)	*STRIMA
TZTS	LOCKED VALUE FOR T/R COLLECTIVE PITCH	*STRIMA
TZTW	TZPDT PLUS BUILT-IN AND ELASTIC TWIST AT BLADE SEGMENT	*STARAN
T1	(2) F/A CYCLIC PITCH (=T1M AND T1T, RESPECTIVELY)	*MANAL
T1M	M/R F/A CYCLIC DUE TO CONTROLS (=T1MS OR SWSFA(I,1),I=1,4)	*STRIMA
T1MS	LOCKED VALUE FOR M/R F/A CYCLIC PITCH	*STRIMA
T1T	T/R F/A CYCLIC DUE TO CONTROLS (=T1TS OR SWSFA(I,2),I=1,4)	*STRIMA
T1TS	LOCKED VALUE FOR T/R F/A CYCLIC PITCH (=T1MS*TKIND)	*STRIMA
T2	(2) LAT CYCLIC PITCH (=T2M AND T2T, RESPECTIVELY)	*MANAL
T2M	M/R LAT CYCLIC DUE TO CONTROLS (=T2MS OR SWSLAT(I,1),I=1,4)	*STRIMA
T2MS	LOCKED VALUE FOR M/R LAT CYCLIC PITCH	*STRIMA
T2T	T/R LAT CYCLIC DUE TO CONTROLS (=T2TS OR SWSLAT(I,2),I=1,4)	*STRIMA
T2TS	LOCKED VALUE FOR T/R LAT CYCLIC PITCH (= -T2MS*TRIND)	*STRIMA
U	VELOCITY IN BLADE X-Z PLANE	*STARAN
UHS	SQUARE OF VELOCITY AT CG IN THE SHAFT REFERENCE X-Y PLANE	*STARAN
UP	PERPENDICULAR (Z) COMPONENT OF VELOCITY AT BLADE SEGMENT	*STARAN
UPGUST	COMPONENT OF GUST VELOCITY IN UP (BLADE REFERENCE)	*STARAD
UQBSGA	U*QBSGA	RADIAL
URGUST	COMPONENT OF GUST VELOCITY IN UR (BLADE REFERENCE)	*STARAD
UT	TANGENTIAL (X) COMPONENT OF VELOCITY AT BLADE SEGMENT	*STARAN
UTGUST	COMPONENT OF GUST VELOCITY IN UT (BLADE REFERENCE)	*STARAD
V	AIRSPEED	*MANAL
VAR	ARRAY OF INDEPENDENT VARIABLES USED IN TRIM+STAB PD MATRICES	#MISC
VARSV	(4) STORAGE FOR BASELINE CONTROL POSITION FOR STAB	*STBD
VCTMAX	MAGNITUDE OF LARGEST EIGENVECTOR FOR A ROOT IN STAB	ALSTAB
VECT	(38) LOCAL STORAGE FOR MAGNITUDE OF EIGENVECTORS	ALSTAB
VECTMX	TEMPORARY STORAGE FOR LARGEST EIGENVECTOR	ALSTAB
VELIND	LOCAL INDUCED VELOCITY ON ROTOR (FT/SEC)	*FORWK
VELKTS	FORWARD VELOCITY (GROUND REF), IN KT	*STRIMA
VGSTW	Z-COMPONENT OF GUST VELOCITY AT WING (BODY AXIS)	*STRIMA

TABLE 11. Continued.

VGUST	Z-COMPONENT OF GUST VELOCITY AT CG (BODY AXIS)	*STAMAN
VGUSTR	Z-COMPONENT OF GUST VELOCITY AT HUB IN SHAFT REFERENCE	*STARAD
VGUSTS	(4) X-COMPONENT OF GUST AT STAB. SURFACES (BODY AXIS)	*MANAL
VGUSTX	(4) X-COMPONENT OF GUST AT EXTERNAL STORES (BODY AXIS)	*MANAL
VH	GROUND SPEED (FT/SEC)	*STRIMA
VHS	(2) SQRT(UHS); VELOCITY AT CG IN SHAFT X-Y PLANE	*ANDOIT
VIER	NOT REFERENCED	*STARAN
VIMRS	SAVED VALUE OF VIR(1)	*STBD
VIR	(2) ROTOR INDUCED VELOCITY	*MANAL
VIRSTB	(2) DOWNWASH VELOCITY AT AERO SURFACE DUE TO ROTOR	*FOSWK
VIR1	INDUCED VELOCITY AT AERO SURFACE DUE TO MAIN (#1) ROTOR	STBFNM
VIR2	INDUCED VELOCITY AT AERO SURFACE DUE TO TAIL (#2) ROTOR	STBFNM
VITRS	SAVED VALUE OF VIR(2)	*STBD
VIW	NOT REFERENCED	*STARAN
VI2	.5*VROT**2	*ANDOIT
VI4	VI2**2	*ANDOIT
VMAST	(6,2) SHAFT VELOCITY IN NON-ROTATING SHAFT-AXIS	*MANAL
VMAXST	(2,4) VELOCITY AT WHICH STAB SURFACE IS TOTAL WITHIN DOWNWASH	*STARAN
VNTER	(2,4) VELOCITY AT WHICH STAB SURFACE ENTERS DOWNWASH (FT/SEC)	*STARAN
VROOT	(6,7,2) BLADE ROOT VELOCITY IN ROTATING BLADE-AXIS	*STRIMA
VROT	(2) VELOCITY OF ROTOR HUB	*STARAN
VSHR	(2) VERTICAL SHEAR FORCE AT HUB	*MANAL
VSHRD	DOUBLE PRECISION ACCUMULATOR FOR VERTICAL SHEAR	*ANDOIT
VSND	RECIPROCAL OF SPEED OF SOUND	*STARAD
VWORK	(11) VIRTUAL WORK, INDEPENDENT OF AZIMUTH	*ANDOIT
VWRK	(12,11) VIRTUAL WORK ON EACH BLADE FOR EACH MODE SHAPE	*ANDOIT
VXB	X-VELOCITY AT CG IN BODY AXIS	*MANAL
VXBD	X-ACCELERATION OF CG (BODY AXIS) = VXB-DOT	*MANAL
VXFUS	X-VELOCITY AT FUS DATA REF POINT (INCLUDING GUSTS)	*STAMAN
VXMVNR	(2,4) SLOPE OF ROTOR DOWNWASH CURVE FOR STAB SURF. 1/(FT/SEC)	*STARAN
VXOR	FACTOR IN LOCAL INDUCED VELOCITY CALCULATION	*ANDOIT
VXR	FORWARD VELOCITY OF HUB (BODY AXIS)	*ANDOIT
VXRD	X-ACCELERATION AT ROTOR HUB (BODY AXIS) = VXR-DOT	*ANDOIT
VXS	(2) X-VELOCITY AT HUB IN SHAFT REFERENCE	*MANAL
VXSD	X-ACCELERATION AT ROTOR HUB (SHAFT AXIS) = VXS-DOT	*ANDOIT
VXSN	VXS PLUS PYLON VELOCITY	AZMUTH
VYB	Y-VELOCITY AT CG IN BODY AXIS	*MANAL
VYBD	Y-ACCELERATION OF CG (BODY AXIS) = VYB-DOT	*MANAL
VYFUS	Y-VELOCITY AT FUS DATA REF POINT (INCLUDING GUSTS)	*STAMAN
VYR	LATERAL VELOCITY OF HUB (BODY AXIS)	*ANDOIT
VYRD	Y-ACCELERATION AT ROTOR HUB (BODY AXIS) = VYR-DOT	*ANDOIT
VYS	(2) Y-VELOCITY AT HUB IN SHAFT REFERENCE	*MANAL
VYSD	Y-ACCELERATION AT ROTOR HUB (SHAFT AXIS) = VYS-DOT	*ANDOIT
VYSN	VYS PLUS PYLON VELOCITY	AZMUTH
VZB	Z-VELOCITY AT CG IN BODY AXIS	*MANAL
VZBD	Z-ACCELERATION OF CG (BODY AXIS) = VZB-DOT	*MANAL
VZETAR	(2) RATE OF M/R F/A MAST TILT (LAT & T/R RATES = 0)	*MANAL
VZFUS	Z-VELOCITY AT FUS DATA REF POINT (INCLUDING GUSTS)	*STAMAN
VZR	VERTICAL VELOCITY OF HUB (BODY AXIS)	*ANDOIT
VZRD	Z-ACCELERATION AT ROTOR HUB (BODY AXIS) = VZR-DOT	*ANDOIT
VZS	(2) Z-VELOCITY AT HUB IN SHAFT REFERENCE	*MANAL
VZSD	Z-ACCELERATION AT ROTOR HUB (SHAFT AXIS) = VZS-DOT	SWSRAT
W	GROSS WEIGHT	*MANAL
WEXT	(4) WEIGHT OF EXTERNAL STORE	*STRIMA
WKRTR	(19,20,50) COEFS OF ROTOR RIVD TABLES	*FORWKI
WKSTB	(3,6,6) COEFS OF ROTOR WAKE AT STABILIZERS TABLES	*FOSWKI
WLCG	WATERLINE OF CG (FEET); ALSO SEE "CGWL"	*INSTAR
WLCGX	(4) WATERLINE OF CG OF EXTERNAL STORE (INCHES)	*STRIMA
WRK	(11) VIRTUAL WORK FROM AIRLOADS	*ANDOIT
WRKPCA	(11,2) VIRTUAL WORK FROM PITCH-CHANGE-AXIS OFFSET	*STARAN
WROTOR	WEIGHT OF MAIN ROTOR	*STARAN
X	(10) COMPUTED CORRECTIONS IN TRIM	*STRIMA
XA	SUMMATION VARIABLE FOR F/A AERO MOM ON ROTOR; SEE XMA(N)	ITROT
XAELE	NOT REFERENCED	*MANAL
XAEXT	(4) X-ARMS FROM CG TO EXTERNAL STORES (BODY AXIS)	*STRIMA
XAFIN	NOT REFERENCED	*MANAL
XAFUS	X-ARM FROM CG TO AERO DATA REF POINT (BODY AXIS)	*MANAL
XAGUN	X-ARM FROM CG TO WEAPON (GUN) (BODY AXIS)	*STAMAN
XAJET	X-ARM FROM CG TO JET (AUX. PROPULSION) (BODY AXIS)	*MANAL
XAPYL	(2) X-ARM FROM SHAFT PIVOT TO ROTOR NACELLE CG (+FWD)	*STAMAN
XAPYLD	(2) X-ARM FROM CG TO AC OF ROTOR NACELLE (BODY AXIS)	*MANAL
XAR	X-ARM FROM CG TO ROTOR HUB (BODY AXIS)	*MANAL
XARSP	(2) X-ARM FROM CG TO SHAFT PIVOT POINT (+FWD)	*STAMAN
XASTBZ	(4) X-ARMS FROM CG TO STABILIZING SURFACES	*MANAL
XASTWG	(4) X-DISTANCE FROM WING CP TO STABILIZING SURFACE CP	*STRIAB
XAWG	X-ARM FROM CG TO WING AERODYNAMIC CENTER (BODY AXIS)	*MANAL
XB	SUMMATION VARIABLE FOR LAT AERO MOM ON ROTOR; SEE XMB(N)	ITROT
XBW	(7) BODWEIGHT GROUP INPUTS	*INONLY
XCIT	(20,6) EXCITATIONS FOR MANEUVERS (J-CARD INPUTS)	*STRIMA

TABLE 11. Continued.

XCON	(28) ROTOR CONTROLS GROUP INPUTS (BASIC)	*INONLY
XCOR1	X-DISTANCE FROM ORIGIN TO FIRST VORTEX CORE (J=37)	*STRIMA
XCOR2	X-DISTANCE FROM ORIGIN TO SECOND VORTEX CORE (J=37)	*STRIMA
XCREF	X-DISTANCE FROM ORIGIN TO MID POINT BTWN VORTICES (J=37)	*STRIMA
XCRT	(49) SUPPLEMENTAL ROTOR CONTROLS SUBGROUP INPUTS	*INONLY
XCST	(14,5) AERO SURFACE CONTROL INPUTS (5=WING)	*INONLY
XCSW	(14) WING GROUP INPUTS (CONTROLS)	READIN
XCS1	(14) STABILIZING SURFACE #1 INPUTS (CONTROLS)	READIN
XCS2	(14) STABILIZING SURFACE #2 INPUTS (CONTROLS)	READIN
XCS3	(14) STABILIZING SURFACE #3 INPUTS (CONTROLS)	READIN
XCS4	(14) STABILIZING SURFACE #4 INPUTS (CONTROLS)	READIN
XD	DXWGST MODIFIED FOR WING STALL AT POSITIVE ALPHA-WING	STBZFM
XF	TOTAL X-FORCE (BODY REFERENCE)	*MANAL
XFC	(28) FLIGHT CONSTANT GROUP INPUTS	*INONLY
XFEXT	TOTAL X-FORCE DUE TO EXTERNAL STORES (BODY AXIS)	*MANAL
XFEXTJ	TOTAL X-FORCE DUE TO JETTISON OF EXTERNAL STORES	*MANAL
XFFUS	X-FORCE AT CG DUE TO FUSELAGE + RTR NACELLE AERO (BODY AXIS)	*MANAL
XFGUN	X-FORCE AT CG DUE TO WEAPON, OR GUN (BODY AXIS)	*MANAL
XFGW	X-FORCE AT CG DUE TO GROSS WEIGHT	*MANAL
XFJTGN	X-FORCE DUE TO JETS AND GUN (BODY AXIS)	*MANAL
XFJTSN	(4) X-FORCE DUE TO JETTISON OF EACH EXTERNAL STORE	*MANAL
XFLJET	X-FORCE DUE TO LEFT JET (BODY AXIS)	*STARAN
XFLWG	X-FORCE AT CG DUE TO LEFT WING PANEL AERODYNAMICS (BODY AXIS)	*MANAL
XFMR	X-FORCE AT CG DUE TO FORCES FROM MAIN ROTOR (BODY AXIS)	*MANAL
XFN	NOT REFERENCED	*INSTAR
XFRJET	X-FORCE DUE TO RIGHT JET (BODY AXIS)	*STARAN
XFRWG	X-FORCE AT CG DUE TO RIGHT WING PANEL AERO (BODY AXIS)	*MANAL
XFS	(98) FUSELAGE GROUP INPUTS	*INONLY
XFSTBZ	TOTAL X-FORCE DUE TO STABILIZING SURFACES (BODY AXIS)	*MANAL
XFSTZ	(4) X-FORCES ON STABILIZING SURFACES (BODY AXIS)	*MANAL
XFTHR	(2) INPLANE DEFLECTION AT FEATHERING BEARING	*STARAN
XPCA	(20,2) INPLANE DEFLECTION OF PITCH-CHANGE-AXIS	*STARAN
YAWFMX	(2) MAX, YAW FLOW AT BLADE TIP	*STRIMA
XFTR	X-FORCE AT CG DUE TO FORCES FROM TAIL ROTOR (BODY AXIS)	*MANAL
XFXTR	(4) X-FORCE DUE TO EACH EXTERNAL STORE (BODY AXIS)	*MANAL
XGN	(7) WEAPONS GROUP INPUTS	*INONLY
XGUST	DISTANCE FROM ORIGIN TO START OF GUST (X-Y GROUND REF PLANE)	*MANAL
XI	DIST FROM WING T.E. TO STAB CP (PARALLEL TO WING WAKE)	STBFNM
XIT	(21) ITERATION LIMITS GROUP INPUTS	*INONLY
XJET	(14) JET (OR AUXILARY PROPULSION) GROUP INPUTS	*INONLY
XK	FACTOR PROPORTIONAL TO ADVANCE RATIO IN INDUCED VELOCITY DIST	SWSRAT
XKLAM	FACTOR IN EQN FOR LOCAL INDUCED VELOCITY = 1.3333*XK43*COSIY	*ANDOIT
XK43	1.333333*XK	*ANDOIT
XLAM	(2) INFLOW RATIO (SHAFT REFERENCE)	*FORWK
XLAMR	INFLOW RATIO FOR INPUT TO TABLE; LAM(1)<XLAMR<LAM(NLAM)	*FORWK
XLIM	MIN/MAX CHANGE OF FLAPPING ANGLES IN ROTOR BALANCE ROUTINE	*ANDOIT
XLIMAX	(2) MAX (STARTING) VALUE FOR FLAP ANGLE CORR LIMIT; =8*XLIMIT	*STARAN
XLIMIN	(2) MINIMUM VALUE FOR FLAPPING ANGLE CORRECTION LIMIT	*STARAN
XLIMIT	CORRECTION LIMIT FOR TRIM ITERATION	*STRIAB
XLIMS	TEMPORARY STORAGE FOR "XLIMIT"	*STRIAB
XLG	(14,5) LANDING GEAR GROUP INPUTS	*INONLY
XLG1	(14) LANDING GEAR SUBGROUP #1 INPUTS	READIN
XLG2	(14) LANDING GEAR SUBGROUP #2 INPUTS	READIN
XLG3	(14) LANDING GEAR SUBGROUP #3 INPUTS	READIN
XLG4	(14) LANDING GEAR SUBGROUP #4 INPUTS	READIN
XLG5	(14) LANDING GEAR SUBGROUP #5 INPUTS	READIN
XLOCK	CONTROL LOCK FOR M/R AND T/R LAT CYCLIC PITCH (0=UNLOCKED)	*STRIMA
XMA	(2) F/A AERO FLAP MOM = VIRTUAL WORK ON RIGID BODY MODE SHAPE	*MANAL
XMAC	MACH NUMBER	*ANDOIT
XMACF	(21) MAIN ROTOR AERODYNAMIC OFFSET INPUTS	READIN
XMB	(2) LAT AERO FLAP MOM = VIRTUAL WORK ON RIGID BODY MODE SHAPE	*MANAL
XMC	(21) MAIN ROTOR CHORD DISTRIBUTION (ROOT TO TIP)	READIN
XMD	SUMMATION VARIABLE FOR SEGMENT DRAG TIMES ITS RADIUS = TORQUE	*ANDOIT
XMIN	MINIMUM VALUE FOR TRIM CORRECTION LIMIT (RADIANS)	*STRIAB
XMP	(14) MAIN ROTOR DYNAMIC PYLON INPUTS	READIN
XMR	(48) MAIN ROTOR GROUP INPUTS	READIN
XMS20	(2) OUT-OF-PLANE MS @ 5% MINUS THAT AT 0% TIMES 20.0 (MODE 1)	*STARAD
XMT	(21) MAIN ROTOR TWIST DISTRIBUTION (ROOT TO TIP)	READIN
XMU	(2) ADVANCE RATIO (SHAFT REFERENCE)	*FORWK
XMUR	ADVANCE RATIO FOR INPUT TO TABLE; MU(1)<XMUR<MU(NMU)	*FORWK
XMW	(63) MAIN ROTOR BLADE WEIGHT AND INERTIA INPUTS,ROOT TO TIP	READIN
XNG	(28) ENGINE GROUP INPUTS	*INONLY
XRK	(20,2) RRK/R(N)	*STARAN
XRMS	(132,12) BLADE MODE SHAPE DATA	*INONLY
XGMS	GMS UNDER NAMELIST CHANGES	READIN
XRR	(238,2) BASIC, PYLON, CHORD, AC, & TWIST INPUTS FOR ROTORS	*INONLY
XRMS	(132,12) BLADE MODE SHAPE DATA	*INSTAR
XRTR	X-DISTANCE FROM ROTOR HUB TO BLADE SEGMENT (SHAFT AXIS)	*STARAD
XSCAS	(28) STABILIY AND CONTROL AUGMENTATION SYSTEM GROUP INPUTS	*STAMAN
XST	(21,4) EXTERNAL STORES GROUP INPUTS	*INONLY
XSTAH	(2) X-LOCATION OF ROTOR HUB (GROUND REFERENCE) (FEET)	*MANAL

TABLE 11. Continued.

XSTBZ	(42,5) BASIC AERO SURFACE INPUTS (5=WING)	*INONLY
XSTB1	(35) STABILIZING SURFACE #1 INPUTS (BASIC)	#MISC
XSTB2	(35) STABILIZING SURFACE #2 INPUTS (BASIC)	#MISC
XSTB3	(35) STABILIZING SURFACE #3 INPUTS (BASIC)	#MISC
XSTB4	(35) STABILIZING SURFACE #4 INPUTS (BASIC)	#MISC
XST1	(21) INPUTS FOR STORE/BRAKE #1	READIN
XST2	(21) INPUTS FOR STORE/BRAKE #2	READIN
XST3	(21) INPUTS FOR STORE/BRAKE #3	READIN
XST4	(21) INPUTS FOR STORE/BRAKE #4	READIN
XTACF	(21) TAIL ROTOR AERODYNAMIC OFFSET INPUTS	READIN
XTC	(21) TAIL ROTOR CHORD DISTRIBUTION (ROOT TO TIP)	READIN
XTP	(14) TAIL ROTOR DYNAMIC PYLON INPUTS	READIN
XTR	(48) TAIL ROTOR GROUP INPUTS	READIN
XTT	(21) TAIL ROTOR TWIST DISTRIBUTION (ROOT TO TIP)	READIN
XTW	(63) TAIL ROTOR BLADE WEIGHT AND INERTIA INPUTS, ROOT TO TIP	READIN
XWG	(42) WING GROUP INPUTS (BASIC)	READIN
XX	GROUND REFERENCE X-COMPONENT OF DISTANCE FLOWN	*STAMAN
XXD	X-VELOCIY IN GROUND REFERENCE	*STRIMA
XY	FACTOR IN INDUCED VELOCITY DISTRIBUTION EQN; FUNCTION OF VIR	*ANDOIT
Y	(4,130) VARIABLES INTEGRATED DURING MANEUVERS	*FORY
YAELE	NOT REFERENCED	*MANAL
YAERO	(35,5) LOCAL NAME FOR YSAERO ARRAY	YSINIT
YAEXT	(4) Y-ARMS FROM CG TO EXTERNAL STORES (BODY AXIS)	*STRIMA
YAFIN	NOT REFERENCED	*MANAL
YAFUS	Y-ARM FROM CG TO AERO DATA REF POINT (BODY AXIS)	*MANAL
YAGUN	Y-ARM FROM CG TO WEAPON (GUN) (BODY AXIS)	*STAMAN
YALJET	Y-ARM FROM CG TO LEFT JET (BODY AXIS)	*MANAL
YALWG	Y-ARM FROM CG TO AC OF LEFT WING PANEL (BODY AXIS)	*MANAL
YAPYL	(2) Y-ARM FROM SHAFT PIVOT TO ROTOR NACELLE CG (+RIGHT)	*STAMAN
YAPYLD	(2) Y-ARM FROM CG TO AC OF ROTOR NACELLE (BODY AXIS)	*MANAL
YAR	Y-ARM FROM CG TO ROTOR HUB (BODY AXIS)	*MANAL
YARJET	Y-ARM FROM CG TO RIGHT JET (BODY AXIS)	*MANAL
YARSP	(2) Y-ARM FROM CG TO SHAFT PIVOT POINT (+RIGHT)	*STAMAN
YARWG	Y-ARM FROM CG TO AC OF RIGHT WING PANEL (BODY AXIS)	*MANAL
YASTBZ	(4) Y-ARMS FROM CG TO STABILIZING SURFACES	*MANAL
YAWFLO	(5) SWITCH FOR UNSAN YAWED FLOW (0=OFF;1=LIFT;2=DRAG;3=BOTH)	*STARAN
YD	(4,130) FIRST DERIVATIVES OF VARIABLES INTEGRATED (Y-DOT)	*FORYD
YDD	(4,130) SECOND DERIVATIVES OF VARIABLES INTEGRATED	*FORYD
YEXT	(7,2) STORE/BRAKE AERODYNAMIC COEFFICIENTS	*STRIMA
YF	TOTAL Y-FORCE (BODY REFERENCE)	*MANAL
YFEXT	TOTAL Y-FORCE DUE TO EXTERNAL STORES (BODY AXIS)	*MANAL
YFEXTJ	TOTAL Y-FORCE DUE TO JETTISON OF EXTERNAL STORES	*MANAL
YFFUS	Y-FORCE AT CG DUE TO FUSELAGE + RTR NACELLE AERO (BODY AXIS)	*MANAL
YFGUN	Y-FORCE AT CG DUE TO WEAPON, OR GUN (BODY AXIS)	*MANAL
YFGW	Y-FORCE AT CG DUE TO GROSS WEIGHT	*MANAL
YFILT	(2) FILTERED Y-FORCE, LB	*MANAL
YFJTGN	Y-FORCE DUE TO JETS AND GUN (BODY AXIS)	*MANAL
YFJTSN	(4) Y-FORCE DUE TO JETTISON OF EACH EXTERNAL STORE	*MANAL
YFLJET	Y-FORCE DUE TO LEFT JET (BODY AXIS)	*STARAN
YFLWG	Y-FORCE AT CG DUE TO LEFT WING PANEL AERODYNAMICS (BODY AXIS)	*MANAL
YFMR	Y-FORCE AT CG DUE TO FORCES FROM MAIN ROTOR (BODY AXIS)	*MANAL
YFORCE	(2) ROTOR FORCE // TO SHAFT Y-AXIS (+RT FOR M/R; +LT FOR T/R)	*MANAL
YFRC	SUMMATION VARIABLE USED TO COMPUTE Y-FORCE	*ANDOIT
YFRJET	Y-FORCE DUE TO RIGHT JET (BODY AXIS)	*STARAN
YFRWG	Y-FORCE AT CG DUE TO RIGHT WING PANEL AERO (BODY AXIS)	*MANAL
YFS	(25) NOT REFERENCED	*MANAL
YFSD	(15) COEFFICIENTS FOR FUSELAGE NOMINAL ANGLE DRAG EQUATION	*STARAN
YFSL	(15) COEFFICIENTS FOR FUSELAGE NOMINAL ANGLE LIFT EQUATION	*STARAN
YFSL1	COEFFICIENT IN FUSELAGE HIGH ANGLE LIFT EQUATION	*STARAN
YFSL2	COEFFICIENT IN FUSELAGE HIGH ANGLE LIFT EQUATION	*STARAN
YFSL3	COEFFICIENT IN FUSELAGE HIGH ANGLE LIFT EQUATION	*STARAN
YFSP	(15) COEFFICIENTS FOR FUSELAGE NOMINAL ANGLE PITCHING MOM EQN	*STARAN
YFSP1	COEFFICIENT IN FUSELAGE HIGH ANGLE PITCHING MOMENT EQUATION	*STARAN
YFSP2	COEFFICIENT IN FUSELAGE HIGH ANGLE PITCHING MOMENT EQUATION	*STARAN
YFSP3	COEFFICIENT IN FUSELAGE HIGH ANGLE PITCHING MOMENT EQUATION	*STARAN
YFSR	(14) COEFFICIENTS FOR FUSELAGE NOMINAL ANGLE ROLLING MOM EQN	*STARAN
YFSR2	COEFFICIENT IN FUSELAGE HIGH ANGLE ROLLING MOMENT EQUATION	*STARAN
YFSS	(14) COEFFICIENTS FOR FUSELAGE NOMINAL ANGLE SIDE FORCE EQN	*STARAN
YFSS2	COEFFICIENT IN FUSELAGE HIGH ANGLE SIDE FORCE EQUATION	*STARAN
YFSTBZ	TOTAL Y-FORCE DUE TO STABILIZING SURFACES (BODY AXIS)	*MANAL
YFSTZ	(4) Y-FORCES ON STABILIZING SURFACES (BODY AXIS)	*MANAL
YFSY	(14) COEFFICIENTS FOR FUSELAGE NOMINAL ANGLE YAWING MOM EQN	*STARAN
YFSY2	COEFFICIENT IN FUSELAGE HIGH ANGLE YAWING MOMENT EQUATION	*STARAN
YFTR	Y-FORCE AT CG DUE TO FORCES FROM TAIL ROTOR (BODY AXIS)	*MANAL
YFXTR	(4) Y-FORCE DUE TO EACH EXTERNAL STORE (BODY AXIS)	*MANAL
YGSTW	Y-COMPONENT OF GUST AT WING (BODY AXIS)	*STRIMA
YGUST	Y-COMPONENT OF GUST VELOCITY AT CG (BODY AXIS)	*STAMAN
YGUSTR	Y-COMPONENT OF GUST VELOCITY AT HUB IN SHAFT REFERENCE	*STARAD
YGUSTS	(4) Y-COMPONENT OF GUST AT STAB. SURFACES (BODY AXIS)	*MANAL
YGUSTX	(4) Y-COMPONENT OF GUST AT EXTERNAL STORES (BODY AXIS)	*MANAL

TABLE 11. Concluded.

YRR	(35,5) ROTOR AIRFOIL AERODYNAMIC SUBGROUP INPUTS	*INONLY
YRRMS	(36,2) BLADE LEAD-LAG MODE SHAPE DATA	*INSTAR
YRTR	Y-DISTANCE FROM ROTOR HUB TO BLADE SEGMENT (SHAFT AXIS)	*STARAD
YSAERO	(36,5) AERO SURFACE AERO INPUTS AFTER INIT. BY YSINIT	*STARAN
YSHR	(2) LATERAL SHEAR FORCE AT HUB	*MANAL
YSHRN	DOUBLE PRECISION ACCUMULATOR FOR LATERAL SHEAR	*ANDOIT
YSTAH	(2) Y-LOCATION OF ROTOR HUB (GROUND REFERENCE) (FEET)	*MANAL
YSTBZ	(28,5) AERO SURFACE AERODYNAMIC INPUTS (5=WING)	*INONLY
YSTB1	(28) STABILIZING SURFACE #1 INPUTS (AERODYNAMICS)	#MISC
YSTB2	(28) STABILIZING SURFACE #2 INPUTS (AERODYNAMICS)	#MISC
YSTB3	(28) STABILIZING SURFACE #3 INPUTS (AERODYNAMICS)	#MISC
YSTB4	(28) STABILIZING SURFACE #4 INPUTS (AERODYNAMICS)	#MISC
YWG	(28) WING GROUP INPUTS (AERODYNAMICS)	READIN
YY	GROUND REFERENCE Y-COMPONENT OF DISTANCE FLOWN	*STAMAN
YYD	Y-VELOCIY IN GROUND REFERENCE	*STRIMA
ZAELE	NOT REFERENCED	*MANAL
ZAEXT	(4) Z-ARMS FROM CG TO EXTERNAL STORES (BODY AXIS)	*STRIMA
ZAFIN	NOT REFERENCED	*MANAL
ZAFUS	Z-ARM FROM CG TO AERO DATA REF POINT (BODY AXIS)	*MANAL
ZAGUN	Z-ARM FROM CG TO WEAPON (GUN) (BODY AXIS)	*STAMAN
ZAJET	Z-ARM FROM CG TO JET (AUX. PROPULSION) (BODY AXIS)	*MANAL
ZAPYL	(2) Z-ARM FROM SHAFT PIVOT TO ROTOR NACELLE CG (+DOWN)	*STAMAN
ZAPYLD	(2) Z-ARM FROM CG TO AC OF ROTOR NACELLE (BODY AXIS)	*MANAL
ZAR	Z-ARM FROM CG TO ROTOR HUB (BODY AXIS)	*MANAL
ZARSP	(2) Z-ARM FROM CG TO SHAFT PIVOT POINT (+DOWN)	*STAMAN
ZASTBZ	(4) Z-ARMS FROM CG TO STABILIZING SURFACES	*MANAL
ZAWG	Z-ARM FROM CG TO WING AERODYNAMIC CENTER (BODY AXIS)	*MANAL
ZDELT1	FIRST TIME OR AZIMUTH INCREMENT FOR MANEUVER	*STRIMA
ZDELT2	SECOND TIME OR AZIMUTH INCREMENT FOR MANEUVER	*STAMAN
ZETAR	(2,2) MAST TILT ANGLES: (DIRECTION,ROTOR)	*MANAL
ZF	TOTAL Z-FORCE (BODY REFERENCE)	*MANAL
ZFEXT	TOTAL Z-FORCE DUE TO EXTERNAL STORES (BODY AXIS)	*MANAL
ZFEXTJ	TOTAL Z-FORCE DUE TO JETTISON OF EXTERNAL STORES	*MANAL
ZFFUS	Z-FORCE AT CG DUE TO FUSELAGE + RTR NACELLE AERO (BODY AXIS)	*MANAL
ZFGUN	Z-FORCE AT CG DUE TO WEAPON, OR GUN (BODY AXIS)	*MANAL
ZFGW	Z-FORCE AT CG DUE TO GROSS WEIGHT	*MANAL
ZFJTGN	Z-FORCE DUE TO JETS AND GUN (BODY AXIS)	*MANAL
ZFJTSN	(4) Z-FORCE DUE TO JETTISON OF EACH EXTERNAL STORE	*MANAL
ZFLJET	Z-FORCE DUE TO LEFT JET (BODY AXIS)	*STARAN
ZFLWG	Z-FORCE AT CG DUE TO LEFT WING PANEL AERODYNAMICS (BODY AXIS)	*MANAL
ZFLWG1	Z-FORCE ACTING ON LEFT WING PANEL AT PREVIOUS TIME POINT	*MANAL
ZFMR	Z-FORCE AT CG DUE TO FORCES FROM MAIN ROTOR (BODY AXIS)	*MANAL
ZFRJET	Z-FORCE DUE TO RIGHT JET (BODY AXIS)	*STARAN
ZFRWG	Z-FORCE AT CG DUE TO RIGHT WING PANEL AERO (BODY AXIS)	*MANAL
ZFRWG1	Z-FORCE ACTING ON RIGHT WING PANEL AT PREVIOUS TIME POINT	*MANAL
ZFSTBZ	TOTAL Z-FORCE DUE TO STABILIZING SURFACES (BODY AXIS)	*MANAL
ZFSTZ	(4) Z-FORCES ON STABILIZING SURFACES (BODY AXIS)	*MANAL
ZFTHR	(2) OUT-OF-PLANE DEFLECTION AT FEATHERING BEARING	*STARAN
ZFTR	Z-FORCE AT CG DUE TO FORCES FROM TAIL ROTOR (BODY AXIS)	*MANAL
ZFXTR	(4) Z-FORCE DUE TO EACH EXTERNAL STORE (BODY AXIS)	*MANAL
ZLLDUJ	(5) INCREMENT TO ZLL OF AERO SURFACE DUE TO J-CARD INPUTS	*STAMAN
ZLLINC	(6) INCREMENT TO ZERO LIFT LINE ANGLE (5=LT WING;6=RT WING)	*STAMAN
ZLLOCK	(5) LOCK FOR ZLL INCIDENCE OF AERO SURFACES (0=UNLOCKED)	*STRIMA
ZMAX1	TIME TO END FIRST (START SECOND) TIME INCREMENT IN MANEUVER	READIN
ZMAX2	TIME TO END SECOND (RESTART FIRST) TIME INCREMENT IN MANEUVER	*STAMAN
ZMAX3	TIME TO END MANEUVER AFTER FIRST TIME INCREMENT RESTARTED	*STAMAN
ZPCA	(20,2) OUT-OF-PLANE DEFLECTION OF PITCH-CHANGE-AXIS	*STARAN
ZRTR	Z-DISTANCE FROM ROTOR HUB TO BLADE SEGMENT (SHAFT AXIS)	*STARAD
ZSTAH	(2) Z-LOCATION OF ROTOR HUB (GROUND REFERENCE) (FEET)	*STRIMA
ZZ	GROUND REFERENCE Z-COMPONENT OF DISTANCE FLOWN	*MANAL
ZZD	Z-VELOCIY IN GROUND REFERENCE	*STRIMA
ZZTR	TAIL ROTOR ALTITUDE	*MANAL

To generate this output for a particular increment, IPL(90) is set to a value shown in Table 12. Further information about the variable in this table can be found in Section 4.11.2.1 of Volume II. Note that locking out a degree of freedom does not change the correspondence shown in Table 12 between IPL(90) and the variables. Also, it is only possible to obtain this extra printout for one variable in each STAB case. To obtain the printout for more than one variable, the case must be rerun for each variable of interest with IPL(90) set to the appropriate value in each repeat run.

TABLE 12. STAB DIAGNOSTIC SWITCH IN AGAJ77

IPL(90)	VARIABLE
1	FUS. U
2	FUS. W
3	FUS. Q
4	FUS. V
5	FUS. P
6	FUS. R
7	M.R. F/A FLAP RATE
8	M.R. LAT FLAP RATE
9	T.R. F/A FLAP RATE
10	T.R. LAT FLAP RATE
11	M.R. F/A FLAP DISP
12	M.R. LAT FLAP DISP
13	T.R. F/A FLAP DISP
14	T.R. LAT FLAP DISP
15	PYLON 1, MODE 1 RATE
16	PYLON 1, MODE 2 RATE
17	PYLON 1, MODE 3 RATE
18	PYLON 1, MODE 4 RATE
19	PYLON 2, MODE 1 RATE
20	PYLON 2, MODE 2 RATE
21	PYLON 2, MODE 3 RATE
22	PYLON 2, MODE 4 RATE
23	PYLON 1, MODE 1 DISP
24	PYLON 1, MODE 2 DISP
25	PYLON 1, MODE 3 DISP
26	PYLON 1, MODE 4 DISP
27	PYLON 2, MODE 1 DISP
28	PYLON 2, MODE 2 DISP
29	PYLON 2, MODE 3 DISP
30	PYLON 2, MODE 4 DISP

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