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Produced by the NASA Center for Aerospace Information (CASI)
User's Guide to Program FLEXSTAB

A Final Report
to the
National Aeronautics and Space Administration
Manned Spacecraft Center

research performed under
Contract No. NAS 9-11303

by

R. K. Cavin, Co-Principal Investigator and Associate Professor of Electrical Engineering

and

D. Colunga, Co-Principal Investigator and Associate Professor, Computing Science

February 23, 1975

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Texas Engineering Experiment Station
Space Technology Division
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Industrial Engineering/Computing Science
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Summary

This document represents a user's manual for correctly submitting FLEXSTAB program runs on the UNIVAC 1108 computer system. All major program modules, converted and correctly executed by Texas A&M project personnel, have been included. All CUR control cards have been documented for the user's convenience. The JOB card parameters have also been included in order to provide some idea as to "reasonable" time estimates for the program modules.
FIG. 1  FLEXTAB FUNCTIONAL FLOW
Geometry Definition (GD) Program

Input Required
  GD Data Deck

Program Required
  GD program in Tape PCF = Tape B

Program Correction Required
  None

Output File Generated
  Tape A = GD tape = A05090  Geometry description

File Destinies
  Tape A:   SAIC
            UAIC
            ISIC
            ESIC
            SDSS
            TH
            GDPLOT

Cover Sheet Format
  Ref-GD/1

Control Cards
  Ref-GD/2
INSTRUCTIONS FOR CENTRAL COMPUTER COMPLEX COMPUTER RUNS

Ref-GD/1

PROGRAMMER
D. Colunga

<table>
<thead>
<tr>
<th>DIVISION CODE</th>
<th>PROG NO</th>
<th>PROJ NO</th>
<th>EST TIME</th>
<th>MAX TIME</th>
<th>LINES OUTPUT</th>
<th>DECK NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>FD 32</td>
<td>E169</td>
<td>3696E</td>
<td>1</td>
<td>2</td>
<td>6k</td>
<td></td>
</tr>
</tbody>
</table>

OPERATING SYSTEM

<table>
<thead>
<tr>
<th>OPERATING SYSTEM</th>
<th>TYPE OF RUN</th>
<th>LOG NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>II0B FORTRAN V</td>
<td>PROG. TEST</td>
<td></td>
</tr>
<tr>
<td>II0B FORTRAN IV</td>
<td>PROG. TEST</td>
<td></td>
</tr>
<tr>
<td>II0B OTHER</td>
<td>PROG. TEST</td>
<td></td>
</tr>
</tbody>
</table>

COMPUTER REQUIREMENTS

<table>
<thead>
<tr>
<th>INPUT TAPES</th>
</tr>
</thead>
<tbody>
<tr>
<td>RACK</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>* B</td>
</tr>
</tbody>
</table>

WORKING TAPES

<table>
<thead>
<tr>
<th>WORKING TAPES</th>
</tr>
</thead>
<tbody>
<tr>
<td>REEL NO</td>
</tr>
<tr>
<td>4060</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ABNORMAL STOPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL TAPE DRIVES USED</td>
</tr>
<tr>
<td>STOP AT LOC.</td>
</tr>
<tr>
<td>SR.</td>
</tr>
<tr>
<td>LOOPING LOC. THRU</td>
</tr>
<tr>
<td>EXCESS OUTPUT</td>
</tr>
<tr>
<td>EXCESS TIME</td>
</tr>
</tbody>
</table>

PROGRAMMER'S COMMENTS

* Tape B is a special Texas A&M PCF tape.

OPERATOR'S COMMENTS
Ref-GD/2

VP RUN 01048, FD32, C16, 3696E, E169, C, 2, 6
VN MSG FILE REQ TAPE 2 EH 432 1 FSTRN 1
V ASG A=A
V ASG B=PCF
V ASG E
XQT CUR
TRW B
IN B
REL B
V XQT GD

GD DATA DECK

V FIN
Steady Aerodynamic Influence Coefficient (SAIC) Program

Input Required
(1) Tape A = GD tape = A05090 (File generated by GD run)
(2) SAIC data deck

Program Required
SAIC in PCF tape (=Tape E)

Program Corrections Required
None

Output Files Generated
(1) Tape B = SAIC TAPE B = A01827

File Destinies
(1) Tape B: UAIC
          CAIC
          SDSS

Cover Sheet Format
Ref-SAIC/1

Control Cards
Ref-SAIC/2

SAIC Data Deck
Ref-Boeing Document
## INSTRUCTIONS FOR CENTRAL COMPUTER COMPLEX COMPUTER RUNS

**Ref-SAIC/1**

**PROGRAMMER**

D. Colunga

<table>
<thead>
<tr>
<th>BADGE NO.</th>
<th>BOX NO.</th>
<th>PHONE NO.</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1048</td>
<td>C-16</td>
<td>5971</td>
<td>6/2</td>
</tr>
</tbody>
</table>

**DIVISION CODE**

FD-32

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<thead>
<tr>
<th>PROG. NO.</th>
<th>PROJ. NO.</th>
<th>EST. TIME</th>
<th>MAX. TIME</th>
<th>LINES OUTPUT</th>
<th>DECK NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>E169</td>
<td>3696E</td>
<td>50</td>
<td>240</td>
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**Operating System**

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Type of Run</th>
<th>Log No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>II06 FORTRAN V</td>
<td>TEST</td>
<td></td>
</tr>
<tr>
<td>II06 FORTRAN IV</td>
<td>OTHER (EXPLAIN BELOW)</td>
<td></td>
</tr>
<tr>
<td>II08 OTHER</td>
<td>OTHER</td>
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**Input Tapes**

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<thead>
<tr>
<th>Rack</th>
<th>Unit</th>
<th>Reel No.</th>
<th>File Name</th>
<th>Unit</th>
<th>Reel No.</th>
<th>File Name</th>
<th>C Save</th>
<th>Processing Required</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>A05090</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>PCF</td>
<td>E01827</td>
<td>SAIC</td>
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<td></td>
<td>X</td>
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**Output Tapes**

<table>
<thead>
<tr>
<th>Rack</th>
<th>Unit</th>
<th>Reel No.</th>
<th>File Name</th>
<th>C Save</th>
<th>Processing Required</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>4060</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Working Tapes**

<table>
<thead>
<tr>
<th>Rack</th>
<th>Unit</th>
<th>Reel No.</th>
<th>File Name</th>
<th>C Save</th>
<th>Processing Required</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>16 MM</td>
<td>35 MM</td>
<td></td>
<td></td>
<td></td>
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</table>

---

**Abnormal Stops**

<table>
<thead>
<tr>
<th>STOP AT LOC.</th>
<th>TOTAL TAPE DRIVES USED</th>
<th>ACTUAL TIME USAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOOING: LOC.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TW/YU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EXCESS OUTPUT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EXCESS TIME</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Programmer's Comments**

PCF = Special Texas A&M Input Tape.

---

**Operator's Comments**

---

**System Operator**

---
Ref-SAI/C2 Control Cards

VZ RUN 01048,FD32,C16,3696E,E169,C,240,2
VW MSG FILE REQ TAPE 3 FH432 2 FSTRN 16
V ASG A=A05090
V ASG F=PCF
VW ASG B=SAIC
V XOT CUR
TRW E
IN E
ERS
IN E
REL E
V MAP PROG
SEG AIC-MPAK=*(CPTGEN,AICGEN,TRNOVR,CAMTHK=*(CAMBER,THICK))
MPAK SEG RHEAD-WHEAD-RVEC-WVEC-VLIN-VIP-LOCATE
V XOT PROG

SAIC DATA DECK (cf REF-Boeing Document)

FIN
Internal Structural Influence Coefficient (ISIC) Program

Input Required
(1) Tape A - GD Tape = A05090 (File Generated by GD Run)
(2) ISIC Data Deck

Program Required
ISIC in A06973 tape (= Tape Z)

Output Files Generated
(1) Tape B = A07178          Matrix Catalog
       (2) Tape C = A03098          Symmetric Normal Modes Matrices
       (3) Tape D = A13214          Anti-symmetric Normal Modes Matrices
       (4) Tape E = A04911          Symmetric SDSS Matrices
       (5) Tape F = A01734          Anti-symmetric SDSS Matrices
       (6) Tape G = A.7233          Elastic Axis Plot Tape

File Destinies
(1) Tape B:   NM, SDSS
(2) Tape C:   NM
(3) Tape D:   NM
(4) Tape E:   SDSS, MERGE
(5) Tape F:   SDSS, MERGE
(6) Tape G:   SLOAD, EAPLOT

Cover Sheet Format
Ref-ISIC/1

Control Cards
Ref-ISIC/2

ISIC Data Deck
Ref-Boeing Document
INSTRUCTIONS FOR CENTRAL COMPUTER COMPLEX: COMPUTER RUNS

Ref: ISIC/1

PROGRAMMER: D. Colunga

<table>
<thead>
<tr>
<th>BADGE NO.</th>
<th>BOX NO.</th>
<th>PHONE NO.</th>
<th>DATE</th>
<th>PRIORITY &amp; INITIALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1619</td>
<td>C-16</td>
<td>5971</td>
<td>6/23</td>
<td></td>
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</tbody>
</table>

DIVISION CODE: EX 24

<table>
<thead>
<tr>
<th>PROG. NO.</th>
<th>PROJ. NO.</th>
<th>EST. TIME</th>
<th>MAX. TIME</th>
<th>LINES OUTPUT</th>
<th>CHK. NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>E169</td>
<td>3696E</td>
<td>120</td>
<td>180</td>
<td>12k</td>
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</tr>
</tbody>
</table>

OPERATING SYSTEM

- 1108 FORTRAN V
- 3200 SCOPE
- 3200 SMARTS
- Other

TYPE OF RUN

- Test

COMPUTER REQUIREMENTS

- Smart 3200
- Other

INPUT TAPES

<table>
<thead>
<tr>
<th>RACK</th>
<th>UNIT</th>
<th>REEL NO.</th>
<th>FILE NAME</th>
<th>C</th>
<th>SAVE</th>
<th>PROCESSING REQUIRED</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A</td>
<td>A05090</td>
<td>A</td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Z</td>
<td>Z</td>
<td>A06973</td>
<td>Z</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>D</td>
<td>A13214</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>E</td>
<td>A04911</td>
<td>E</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>F</td>
<td>A01734</td>
<td>F</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>G</td>
<td>A07233</td>
<td>G</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4060</td>
<td>Reel No.</td>
<td></td>
<td></td>
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</table>

OUTPUT TAPES

<table>
<thead>
<tr>
<th>UNIT</th>
<th>REEL NO.</th>
<th>FILE NAME</th>
<th>C</th>
<th>SAVE</th>
<th>PROCESSING REQUIRED</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A07178</td>
<td>B</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>A03098</td>
<td>C</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>A13214</td>
<td>D</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>A04911</td>
<td>E</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>A01734</td>
<td>F</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>A07233</td>
<td>G</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4060</td>
<td>Reel No.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

WORKING TAPES

<table>
<thead>
<tr>
<th>UNIT</th>
<th>REEL NO.</th>
<th>FILE NAME</th>
<th>C</th>
<th>SAVE</th>
<th>PROCESSING REQUIRED</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>A07233</td>
<td>G</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4060</td>
<td>Reel No.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ABNORMAL STOPS

- Stop at loc. SR.
- Looping loc. thru
- Excess output
- Excess time

TOTAL TAPE DRIVES USED

- STOP: B
- TOTAL TAPE DRIVES USED: 8
- ACTUAL TIME USAGE: STOP

DUMP INSTRUCTIONS

- No dump
- Dump on stop
- Dump on loop
- Other

PROGRAMMER'S COMMENTS

OPERATOR'S COMMENTS

S/STFM OPERATOR
Ref-ISIC/2

vZ RUN 01619,EX24,C16,3696E,E169,C,180,12
N MSG FILE REQ TAPE 8 FH432 2 FSTRN 16
  ASG A=A05090
  ASG B=B
  ASG C=C
  ASG D=D
  ASG E=E
  ASG F=F
  ASG G=G
  ASG Z=A06973
vXQT CUR
  TRW Z
  IN Z
  REL Z
vMAP PROG
  SEG ISIC-MPAK-*(GDPROG,OPTION,THRE,FMAT)
MPAK SEG VIP-VLIN-RVEC-WVEC-RHEAD-WHEAD-LOCATE
THRE SEG SIC-*(SDEF,SAFMAT,TMAT,MMAT)
vXQT PROG

ISIC DATA DECK (cf REF-Boeing Document)

VFIN
**Normal Modes (NM) Program**

**Input Required**

1. Tape A = ISIC catalog tape = A06909 (File generated by ISIC)
2. Tape C = Symm ISIC tape = A06668 (File generated by ISIC)
3. Tape D = Asym ISIC tape = A06292 (File generated by ISIC)
4. NM Data Deck

**Program Required**

NM program in T0204 tape = Tape Z

**Program Correction Required**

1. Insert New SUBROUTINE AG_IE to read as follows:

   ```
   SUBROUTINE AGGIE
   DIMENSION MT(12)
   REWIND 1
   REWIND 2
   100 READ (1) I,J,K,MT
   WRITE (2) I,J,K,MT
   IF(I.GT.-1) GO TO 100
   REWIND 1
   REWIND 2
   STOP
   END
   ```

   **REASON:** Tape A should contain the original ISIC catalog, while tape B contains the altered catalog at the end of Normal Modes execution.

   **NOTE:**
   1. This program should precede all Normal Modes runs.
   2. Tape B from ISIC should be mounted on unit A (not unit B)

2. Statement number 74 of MONITR: New Insert to read as follows:

   ```
   IF(ICF.EQ.0) GO TO 100
   ```

   **REASON:** Check value of ICF to get out of DO LOOP.

3. Statement number 26 of CTINIT:

   - Delete 4 statements and newly insert to read as follows:
     - Delete COMMON/CTO1/LCAT
     - COMMON/CTO2/NFOUT
     - COMMON/CTO3/LFOUT(6)
     - COMMON/CTO4/NMOUT(6)
     - Insert COMMON/CT01/LCAT,NFOUT,LFOUT(6),NMOUT(6)

   **REASON:** Make common statement compatible with the other subroutines

4. Statement number 46 and 47 of DSN: New Insert to read as follows:

   ```
   REWIND 7
   REWIND 8
   ```
REASON: Rewind Tape E and Tape F

Output File Generated
(1) Tape B = NM catalog tape = A08012
(2) Tape E = Symm NM tape = A01078
(3) Tape F = Asym NM tape = A01344
(4) Tape G = Shape NM tape = A08045

Matrix catalog from ISIC to SDSS
Symmetric Matrices to SDSS program
Anti-symmetric Matrices to SDSS program
Model shape tape to NMPLOT program

File Destinies
(1) Tape B: SDSS
(2) Tape E: MERGE
(3) Tape F: MERGE
(4) Tape G: NMPLOT

Cover Sheet Format
Ref-NM/1

Control Cards
Ref-NM/2
INSTRUCTIONS FOR CENTRAL COMPUTER COMPLEX COMPUTER RUNS

<table>
<thead>
<tr>
<th>Ref-NM/1</th>
<th>PROGRAMMER</th>
<th>BADGE NO.</th>
<th>PROG. NO.</th>
<th>PROJ. NO.</th>
<th>1ST TIME</th>
<th>MAX. TIME</th>
<th>LINES OUTPUT</th>
<th>DECK NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>D. Colunga</td>
<td>1619</td>
<td>E169</td>
<td>3696E</td>
<td>40</td>
<td>50</td>
<td>5k</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DIVISION CODE**: EX 24

**OPERATING SYSTEM**: 1108 FORTRAN IV

**TYPE OF RUN**: TEST

**COMPUTER REQUIREMENTS**

**INPUT TAPES**

<table>
<thead>
<tr>
<th>RACK</th>
<th>UNIT</th>
<th>REEL NO.</th>
<th>F.L. NAME</th>
<th>UNIT</th>
<th>REEL NO.</th>
<th>FILE NAME</th>
<th>C</th>
<th>SAVE</th>
<th>PROCESSING REQUIRED</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>A</td>
<td>A06909</td>
<td>A</td>
<td>B</td>
<td>A08012</td>
<td>B</td>
<td></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>C</td>
<td>A06668</td>
<td>C</td>
<td>E</td>
<td>A01078</td>
<td>E</td>
<td></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>D</td>
<td>A06292</td>
<td>D</td>
<td>F</td>
<td>A01344</td>
<td>F</td>
<td></td>
<td>Yes</td>
<td></td>
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<tr>
<td>Z</td>
<td>Z</td>
<td>T0204</td>
<td>Z</td>
<td>G</td>
<td>A08045</td>
<td>G</td>
<td></td>
<td>Yes</td>
<td></td>
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</table>

**OUTPUT TAPES**

**WORKING TAPES**

<table>
<thead>
<tr>
<th>REEL NO.</th>
<th>NO. FRAMES</th>
</tr>
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<tbody>
<tr>
<td>4060</td>
<td></td>
</tr>
</tbody>
</table>

**ABNORMAL STOPS**

- STOP AT LOC. SR
- LOOPING: LOC. THRU
- EXCESS OUTPUT
- EXCESS TIME

**PROGRAMMER'S COMMENTS**

*Tape Z = T0204 is a special Texas A&M Tape*
Ref-NM/2-1/2

VP RUN 01619,EX24,C16,3696E,E169,C,50,5
VN MSG FILE REQ TAPE 8 FH432 2 FSTRN 8
V ASG A=A06909
VS ASG B=A08012
V ASG C=A06668
V ASG D=A06292
VS ASG E=A01078
VS ASG F=A01344
VS ASG G=A08045
V ASG H,I,J,K,L,M,N,P
V FOR AGGIE

AGGIE SOURCE DECK

V XQT AGGIE
V XQT CUR
TRW A
REL A
V ASG Z=T0204
V XQT CUR
TRW Z
IN Z
TRW Z
REL Z
V FOR,* MONITR,MONITP
-73
  IF(ICF.EQ.0) GO TO 100
  \ FOR,* CTINIT,CTINIT
-26,29
  COMMON/CT01/LCAT,NFOUT,LFOUT(6),NMOUT(6)
  \ FOR,* DSN,DSN
-45
  REWIND 7
  REWIND 8
  \ MAP NMP
    SEGMMPAK-**(INCONT,SHAPE,FNMAT,NMOUT)
MPAK SEG VIP-VLIN-RVEC-WVEC-RHEAD-WHEAD-LOCATE
  \ XQT NMP

  NM DATA DECK

  \FIN
Stability Derivatives and Static Stability (SDSS) Program

I. Generate Absolute SDSS Program

Program Required
Symbolic and relocatable SDSS in PCFC tape (= Tape C)

Output Files Generated
Tape G = A08126 Absolute SDSS tape

File Destinies
Tape G: SDSS

Cover Sheet Format
Ref-SDSS-I/1

Control Cards
Ref-SDSS-I/2
### INSTRUCTIONS FOR CENTRAL COMPUTER COMPLEX COMPUTER RUNS

**Ref-SDSS-I/1**

<table>
<thead>
<tr>
<th>PROGRAMMER</th>
<th>BADGE NO.</th>
<th>BOX NO.</th>
<th>PHONE NO.</th>
<th>DATE</th>
<th>PRIORITY &amp; INITIALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>D. Colunga</td>
<td>1048</td>
<td>16-C</td>
<td>5971</td>
<td>6/16</td>
<td></td>
</tr>
</tbody>
</table>

**DIVISION CODE**

<table>
<thead>
<tr>
<th>PROG. NO.</th>
<th>PROJ. NO.</th>
<th>EST. TIME</th>
<th>MAX. TIME</th>
<th>LINES OUTPUT</th>
<th>DECK NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FD 32</td>
<td>E169</td>
<td>5</td>
<td>6</td>
<td>2</td>
<td>1</td>
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</table>

**OPERATING SYSTEM**

<table>
<thead>
<tr>
<th>TYPE OF RUN</th>
<th>LOG NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**COMPUTER REQUIREMENTS**

<table>
<thead>
<tr>
<th>OPERATING SYSTEM</th>
<th>TYPE OF RUN</th>
<th>LOG NO.</th>
</tr>
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<tbody>
<tr>
<td>1106 FORTRAN V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3200 SCOPE</td>
<td></td>
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</tr>
<tr>
<td>PROD.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TEST</td>
<td></td>
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</table>

**INPUT TAPES**

<table>
<thead>
<tr>
<th>RACK</th>
<th>UNIT</th>
<th>REEL NO.</th>
<th>FILE NAME</th>
<th>UNIT</th>
<th>REEL NO.</th>
<th>FILE NAME</th>
<th>C</th>
<th>SAVE</th>
<th>PROCESSING REQUIRED</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>PCFC</td>
<td>C</td>
<td>G</td>
<td>A08126</td>
<td>G</td>
<td>YES</td>
<td></td>
<td></td>
<td></td>
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</table>

**OUTPUT TAPES**

<table>
<thead>
<tr>
<th>RACK</th>
<th>UNIT</th>
<th>REEL NO.</th>
<th>FILE NAME</th>
<th>UNIT</th>
<th>REEL NO.</th>
<th>FILE NAME</th>
<th>C</th>
<th>SAVE</th>
<th>PROCESSING REQUIRED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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</table>

**WORKING TAPES**

<table>
<thead>
<tr>
<th>RACK</th>
<th>UNIT</th>
<th>REEL NO.</th>
<th>FILE NAME</th>
<th>C</th>
<th>SAVE</th>
<th>PROCESSING REQUIRED</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>4060</td>
<td></td>
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<td></td>
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</tbody>
</table>

**ABNORMAL STOP**

<table>
<thead>
<tr>
<th>TOTAL TAPE DRIVES USED</th>
<th>ACTUAL TIME USAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

**STOP AT LOC.**

- DUMP INSTRUCTIONS
- NO DUMP
- DUMP ON STOP
- DUMP ON LOOP
- OTHER

**PROGRAMMER'S COMMENTS**

* PCFC is a special Texas A&M PCF Tape

**OPERATOR'S COMMENTS**

**SYSTEM**

**OPERATOR**
Ref-SDSS-1/2-1/4

VP RUN 01048,FD32,C16,3696E,E169,C,6,1
VN MSG FILE REQ TAPE 2 FH432 O FSTRN 1
W ASG C=PCFC
E ASG E
G ASG G=A08126
COM 03477775
XQT CUR
TRW C
IN C
ERS
IN C
TRW C
TRW E
TWR E, CARDIN/CODEx
TWR E, DCORNL/CODE
TWR E, DEXDW/CODE
TWR E, DPERE/CODE
TWR E, DSTEM/CODE
TWR E, DWT/CODE
TWR E, DGYRO/CODE
TWR E, FA/CODE
TWR E, FT/CODE
TWR E, FTOTAL/CODE
TWR E, F2F3/CODE
TWR E, MATPRT/CODE
Ref-SDSS-I/2-2/4

TWR E, SPECS/CODE
TWR E, TA/CODE
TWR E, TMDATA/CODE
TWR E, TMPRT/CODE
TWR E, TRIM/CODE
TWR E, TRIMCC/CODE
TWR E, TRIMIT/CODE
TWR E, TS/CODE
TWR E, WTDATA/CODE
TWR E, WTDER/CODE
TWR E, CSAB/CODE
TWR E, CINVER/CODE
TWR E, VIPA/CODE
TWR E, DATE/CODE
TWR E, INTURP/CODE
TWR E, DATA/CODE

TEF E
ERS
TRW E
IN E
TRW E

MAP CARDAL, CARDAL
SEG CARDIN-DPERT-DWT-DSTAB-DCONRL-DGYRO-DTRST-MATPRT-;
   SPECS-INTURP-DATA-DATE-DEXDW

DEF CARDIN
v MAP TRIA,TRIA
  SEG TRIM-TRIMIT-FTOTAL-TMPRT-CINVER-CSAB-WTDER-F2F3-
    WTDATA-TRIMCC-FT-FA-VIPA-FS-TA-TS-TMDATA
  DEF TRIM
  v XQT CUR
    TOC
    TRW C
    TRW E
    OUT E
    TEF E
    TRW E
    ERS
    IN C
    ERS
    IN C
    TRI C
    IN E
    TRI E
v MAP SDSSPE,SDSSPE
  SEG SDSS-MPAK-*(ONE,ENGINE,TRANS,DUAL,BASIC,SIX,POST)
MPAK SEG RHEAD-WHEAD-RVEC-WVEC-VLIN-VIP
ONE SEG PREPAR-*(CARDIN,TAPEIN)
SIX SEG STACON-*(DONE,TRIM,SHAPE,INTDW,SDSP,PERT1,P2,PERT3,PERT4)
P2 SEG PERT2-*(RDULSC-VAICA-UAICS-UDATA-UCTRAN,UPRES)
v ABS SDSSPE,SDSSDE
Ref-SDSS-1/2-4/4

\texttt{\textbackslash v XQT CUR} \\
\texttt{TOC} \\
\texttt{TRW G} \\
\texttt{OUT G,2} \\
\texttt{TFF G} \\
\texttt{TRI G} \\
\texttt{\textbackslash v EOF} \\
\texttt{\textbackslash v FIN}
Stability Derivatives and Static Stability (SDSS) Program

II. SDSS Run

Input Required

1. Tape A = GD tape = A05090 (File generated by GD)
2. Tape B = SAIC tape = A01827 (File generated by SAIC)
3. Tape C = Catalog tape = A08118 (File generated by ISIC)
4. Tape D = Symm ISIC tape = A14061 (File generated by ISIC)
5. Tape E = Asym ISIC tape = A12922 (File generated by ISIC)
6. SDSS Data Deck

Program Required

Tape Z = ABS SDSS tape = A08126 (File generated by SDSS-1)

Program Correction Required

None

Output File Generated

1. Tape F = SDSS tape
2. Punched card output

Loads matrices for SLOADS
Data for CER and TH

File Destinies

Tape F: SLOADS
CER
TH

Cover Sheet Format

Ref SDSS-II/1

Control Cards

Ref SDSS-II/2
Ref-SDSS-11/1

Programmer: Colunga

<table>
<thead>
<tr>
<th>DIVISION CODE</th>
<th>PROG NO</th>
<th>PROJ NO</th>
<th>EST TIME</th>
<th>MAX TIME</th>
<th>LINES OUTPUT DECK NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>EX 24</td>
<td>E169</td>
<td>3656E</td>
<td>10</td>
<td>15</td>
<td>Sk</td>
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</table>

**Operating System**

- FORTRAN V
- FORTRAN IV
- OTHER

**Type of Run**

- 3200 SCOPE
- 3200 SMARTS
- OTHER (EXPLAIN BELOW)

**Computer Requirements**

- 3200

**Input Tapes**

<table>
<thead>
<tr>
<th>RACK</th>
<th>UNIT</th>
<th>REEL NO</th>
<th>FILE NAME</th>
<th>UNIT</th>
<th>REEL NO</th>
<th>FILE NAME</th>
<th>C</th>
<th>Save</th>
<th>Processing Required</th>
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<tbody>
<tr>
<td>A</td>
<td>A05090</td>
<td>A</td>
<td>F</td>
<td>F</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>A01827</td>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>C</td>
<td>A08118</td>
<td>C</td>
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<tr>
<td>D</td>
<td>A140061</td>
<td>D</td>
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<td></td>
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<tr>
<td>E</td>
<td>A12922</td>
<td>E</td>
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<td></td>
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<tr>
<td>Z</td>
<td>A08126</td>
<td>Z</td>
<td>WORKING TAPES</td>
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</table>

**Output Tapes**

<table>
<thead>
<tr>
<th>REEL NO</th>
<th>NO. FRAMES</th>
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<tbody>
<tr>
<td>4060</td>
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</tbody>
</table>

**Abnormal Stops**

<table>
<thead>
<tr>
<th>STOP AT LOC.</th>
<th>TOTAL TAPE DRIVES USED</th>
<th>ACTUAL TIME USAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR</td>
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<tr>
<td>LOOPING LOC.</td>
<td></td>
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<tr>
<td>THRU</td>
<td></td>
<td></td>
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<tr>
<td>EXCESS OUTPUT</td>
<td></td>
<td></td>
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<tr>
<td>EXCESS TIME</td>
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</tbody>
</table>

**Programmer’s Comments**

**Operator’s Comments**

**System Operator**

---
Ref-SDSS-II/2

VP RUN 01048,FD32,C16,3696E,F169,C,15,5  D. COLUNGA
VN MSG FILE REQ TAPE 7 FH432 2 FSTRN 16
VN MSG PUNCHED CARD OUTPUT
V ASG A=A05090
V ASG B=A01827
V ASG C=A08118
V ASG D=A14061
V ASG E=A12922
V ASG F=F
V ASG Z=A08126
V XQT CUR
   TRW Z
   IN Z
   REL Z
V XQT SPSSDE

SDSS DATA DECK

VFIN
Program To Fix Up SDSS

v RUN
vM MSG TAPE 2 FH432 O FSTRN 2
v ASG A = Current SDSS PCF Tape
v ASG B = B
v ASG C, D
v COM 03477775
v XQT CUR
   TRW A
   FIND A, SPECS/SYMBOLIC
   TRD A
v FOR, *SPECS, SPECS
-211
   REWIND NT17
v XOT CUR
   TRW C
   OUT C,1 SYMBOLIC
   TEF C
   TRW D
   OUT D,3 RELOCATABLE
   TEF D
   ERS
   TRW A
   TRW C
   I. A
   IN C
   TRW B
   OUT B UPDATED SYMBOLIC FILE
   TEF B
   ERS
   IN A
   TRW D
   IN D
   OUT B + RELOCATABLE FILE UPDATED
   TEF B
TRW A
TRW B
REL A
ERS
IN B
LIST SPECS
TRW B
REL B
\* FIN
Geometry Definition Plot Program (GDPLLOT)

Input Required
(1) GD Tape = ZZ0424 (Generated by GD)
(2) GDPLLOT Data Deck

Program Required
GDPLLOT program (source) Deck consist of
(1) GDPL
(2) PGD
(3) LOCATE and
(4) Subprogram of the CALCOMP and GERBER basic software namely PLOT, LINE, AXIS, NUMBER, SCALE, SYMBOL, STOPP, etc.
(5) Subprogram in S/360 Library such as DATE

Program Change Required
Subroutine STOPP (equivalent to LINE4 of CALCOMP package) should be added to the last plot program.

Output Generated
(1) GERBER Tape (Used as the input data for GERBER plotter: 7track)
(2) GERBER plotted sheet
(3) "Geometric Data from Geometry Definition File" (printed sheet)

Job Control Cards
Ref-GDPL-1

OS/360 Job Ticket
Ref-GDPL-2

GERBER Job Ticket
Ref-GDPL-3

Work Statistics
(1) IBM S/360 Card in 910
Card out 0
Lines 1932 line
Time 1.12 min.
Cost $8.52
(?) GERBER 622 Time about 40 min.
Ref-GDPL-1

//DQ835  JOB (909T4,3-C--,002,003,DC)," D. COLUNGA SPACE SHUTTLE "
/*CLASS       F     230k - 320k          TAPE SETUP
/*SETUP
   // EXEC GERBER,PARM.FORT=BCD,REGION=320k
   //FORT.SYSIN DD *

GDPL OT SOURCE DECK

//GO.FT01F001 DD UNIT=TAPE9,
   // VOL=SER=ZZ0424,
   // DISP=(OLD,PASS),
   // LABEL=(1,NL),
   // DCB=(RECFM=VSB,LRECL=7196,BLKSIZE=7200)
   //GO.SYSIN DD *

GDPL DATA DECK

/*
### OS/360 JOB TICKET

<table>
<thead>
<tr>
<th>User Name</th>
<th>Return To</th>
<th>Run Time</th>
<th>Lines</th>
<th>Cards</th>
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</thead>
<tbody>
<tr>
<td>D. Colunga</td>
<td>3-C</td>
<td>002</td>
<td>003</td>
<td>0</td>
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</table>

<table>
<thead>
<tr>
<th>Class</th>
<th>Requested Priority</th>
<th>Assigned</th>
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<tbody>
<tr>
<td>F</td>
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</tbody>
</table>

### VOLUME

<table>
<thead>
<tr>
<th>Step Name</th>
<th>DD Name</th>
<th>Data Set Name</th>
<th>Serial #</th>
<th>Type</th>
<th>Action Code</th>
<th>File Protect Ring</th>
<th>Library Control When Pulled</th>
<th>When Filed</th>
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</thead>
<tbody>
<tr>
<td>GO</td>
<td>FT20F001</td>
<td>APTAPE</td>
<td>zz0455</td>
<td>Tape</td>
<td>Input Output</td>
<td>Out</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>FT01F001</td>
<td></td>
<td>zz0424</td>
<td>Tape</td>
<td>Input Output</td>
<td>In</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Operator Comments

Program terminated normally □Yes □No

No system ABEND Code □Yes □No

I/O Error on

JCL Error □Yes □No

Time turned in

Time Executed

specify reason
On the plotter area below, roughly sketch your expected results. Clearly show the starting point for the plot, and note the total width and height of your drawing.

NOTE TO OPERATOR

NUMBER OF FILES ON TAPE 1  NUMBER OF PLOTS PER FILE 1

SCALE AT WHICH PLOT IS TO BE DRAWN: .5 1X2 3 4 5 6 7 8 9 10 16

PPF NO.  TYPE  COLOR

TYPE OF PAPER: INKED VELLUM OTHER

COMMENTS:

DATE PLOTTED ___________ TIME OF DAY ___________ PLOT TIME ___________
STARTING TIME ___________ FINISH TIME ___________
REPLotted FILE ___________ STOP ___________
RESTART FILE ___________ STOP ___________
Program Correction For GDPL

1. Problem
GDPL was originally programmed for plotting data using the CALCOMP. This program could be used for the GERBER plotter except that in the GERBER the last line was not produced.

2. Program Change Suggestion
On the GERBER CALL STOPP gives the required final line.

Therefore in GDPL

**ORIGINAL PROGRAM**

```
CARD #
0061 60 READ (NTGD) (STOR(I),I=1,10),X0,Y0,Z0,THETR,STOR(11)
     (Comment: READ NEW DATA from GD tape)
0062 IF(STOR(1).EQ.0) GO TO 400
     (Comment: Check if DATA is completed)
...
0352 400 PGNU=PGNU+15.
0353 CALL PLOT (PGN1,-YPAGE,-3) (To reset origin for next file)
0354 CALL PGD (NTGD,KFILGD) (To print GDTAPE)
```

**Correction**

Insert CALL STOPP between 0353 and 0354

3. Document
There are no documents containing GERBER instructions. However, subroutine "STopp" is equivalent to subroutine "LINE4" of CALCOMP basic package.

Subroutine **LINE4** (from LOCAL OS/360 Library Subroutines pp 30.0)

**LINE4** - is used to purge the buffer to insure that the last plot of a job is complete. An end file mark is placed on the plot tape. **LINE4** should be the last plotting routine called and should only be called once.

CALL LINE4  No arguments are used.