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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

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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**

- II08 FORTRAN V 3200 SCOPE
- II08 FORTRAN IV 3200 SMARTS
- II08 OTHER 3200 OTHER

**COMPUTER REQUIREMENTS**

<table>
<thead>
<tr>
<th>II08 FORTRAN V</th>
<th>II08 FORTRAN IV</th>
<th>II08 OTHER</th>
</tr>
</thead>
<tbody>
<tr>
<td>✔</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

**INPUT TAPES**

- **RACK**
  - B

- **UNIT**
  - PCF

- **REEL NO.**
  - A

- **NAME**
  - A05090

- **SAVE**
  - Yes

**OUTPUT TAPES**

**WORKING TAPES**

- **UNIT**
  - 4060

- **REEL NO.**
  - 35

- **NAME**
  - 35MM

**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>
</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

VM MSG FILE REQ TAPE 2 EH 432 1 FSTRN 1
ASG A=A
ASG B=PCF
ASG E
XQT CUR
TRW B
IN B
REL B
XQT GD

GD DATA DECK

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>DIVISION CODE</th>
<th>PROG. NO.</th>
<th>PROJ. NO.</th>
<th>EST. TIME</th>
<th>MAX. TIME</th>
<th>LINES OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>FD-32</td>
<td>E169</td>
<td>3696E</td>
<td>50</td>
<td>240</td>
<td>2k</td>
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OPERATING SYSTEM | TYPE OF RUN | LOG NO. |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>II06 FORTRAN V</td>
<td>PROD. TEST</td>
<td>3200</td>
</tr>
<tr>
<td>II06 FORTRAN IV</td>
<td>OTHER OTHER</td>
<td>3200</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>
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</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>A05090</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>PCF</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>A01827</td>
<td>SAIC</td>
<td></td>
<td></td>
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OUTPUT TAPES

<table>
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<th>RACK</th>
<th>UNIT</th>
<th>REEL NO.</th>
<th>FILE NAME</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>4060</td>
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WORKING TAPES

<table>
<thead>
<tr>
<th>16 MM</th>
<th>35 MM</th>
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ABNORMAL STOPS

<table>
<thead>
<tr>
<th>STOP AT LOC. SR:</th>
<th>TOTAL TAPE DRIVES USED</th>
<th>ACTUAL TIME USAGE</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>STOP</td>
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</table>

DUMP INSTRUCTIONS

<table>
<thead>
<tr>
<th>LOOPING LOC.</th>
<th>EXCESS OUTPUT</th>
<th>EXCESS TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO DUMP</td>
<td>DUMP ON STOP</td>
<td>DUMP ON LOOP</td>
</tr>
</tbody>
</table>

PROGRAMMER'S COMMENTS

PCF = Special Texas A&M Input Tape.

OPERATOR'S COMMENTS

SYSTEM OPERATOR
Ref-SAlC/2 Control Cards

VZ RUN 01048,FD32,C16,3696E,E169,C,240,2

WN MSG FILE REQ TAPE 3 FH432 2 FSTRN 16

ASG A=A05090

ASG F=PCF

ASG B=SAIC


XQT CUR

TRW E

IN E

ERS

IN E

REL E

MAP PROG

SEG AIC-MPAK-*(CPTGEN,AICGEN,TRNOVR,CAMTHK-*(CAMBER,THICK))

MPAK SEG RHEAD-WHEAD-RVEC-WVEC-VLIN-VIP-LOCATE

XQT 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
(2) Tape C = A03098
(3) Tape D = A13214
(4) Tape E = A04911
(5) Tape F = A01734
(6) Tape G = A7233

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

<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>1619</td>
<td>C-16</td>
<td>5971</td>
<td>6/23</td>
<td></td>
</tr>
</tbody>
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<table>
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<th>PROG. NO.</th>
<th>PROJ. NO.</th>
<th>EST. TIME</th>
<th>MAX. TIME</th>
<th>LINES OUTPUT</th>
<th>DEC. NO.</th>
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<td>EX 24</td>
<td>E169</td>
<td>3696E</td>
<td>120</td>
<td>180</td>
<td>12k</td>
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<table>
<thead>
<tr>
<th>OPERATING SYSTEM</th>
<th>TYPE OF RUN</th>
<th>LOG NO.</th>
<th>COMPUTER REQUIREMENTS</th>
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</thead>
<tbody>
<tr>
<td>1108 FORTRAN V</td>
<td>TEST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1108 FORTRAN IV</td>
<td>OTHER (EXPLAIN BELOW)</td>
<td>3200</td>
<td></td>
</tr>
<tr>
<td>1108 OTHER</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INPUT TAPES</th>
<th>OUTPUT TAPES</th>
</tr>
</thead>
<tbody>
<tr>
<td>RACK</td>
<td>UNIT</td>
</tr>
<tr>
<td>A</td>
<td>A05090</td>
</tr>
<tr>
<td>Z</td>
<td>A06973</td>
</tr>
<tr>
<td>D</td>
<td>A13214</td>
</tr>
<tr>
<td>E</td>
<td>A04911</td>
</tr>
<tr>
<td>G</td>
<td>A07233</td>
</tr>
<tr>
<td></td>
<td>4060</td>
</tr>
<tr>
<td></td>
<td>16 MM</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ABNORMAL STOPS</th>
<th>TOTAL TAPE DRIVES USED</th>
<th>ACTUAL TIME USAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>STOP AT LOC. SR.</td>
<td>B</td>
<td>DUMP INSTRUCTIONS</td>
</tr>
<tr>
<td>LOOPING LOC. THRU</td>
<td>NO DUMP</td>
<td></td>
</tr>
<tr>
<td>EXCESS OUTPUT</td>
<td>DUMP ON STOP</td>
<td></td>
</tr>
<tr>
<td>EXCESS TIME</td>
<td>DUMP ON LOOP</td>
<td></td>
</tr>
<tr>
<td>OTHER</td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>PROGRAMMER'S COMMENTS</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>OPERATOR'S COMMENTS</th>
</tr>
</thead>
</table>

| S/STFM OPERATOR |
Ref-ISIC/2

V2 RUN 01619,EX24,C16,3696E,E169,C,180,12
N MSG FILE REQ TAPE 8 FH432 Z 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

XQT CUR
TRW Z
IN Z
REL Z

MAP PROG
SEG ISIC-MPAK-*(GDPROG,OPTION,THRE,FMAT)
MPAK SEG VIP-VLIN-RVEC-WVEC-RHEAD-WHEAD-LOCATE
THRE SEG SIC-*(SDEF,SAFMA,TMAT,MMAT)

XQT PROG

ISIC DATA DECK 'cf REF-Boeing Document'

REFIN
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:

   ```fortran
   SUBROUTINE AG_IE
   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:

   ```fortran
   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:

   ```fortran
   Delete COMM/CTO1/LCAT
   COMMON/CTO2/NFOUT
   COMMON/CTO3/LFOUT(6)
   COMMON/CTO4/NMOUT(6)
   Insert COMM/CTO1/LCAT,NFOUT,LFOUT(6),NMOUT(6)
   ```

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

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

   ```fortran
   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**

**Ref-NM/1**

**PROGRAMMER**

D. Colunga

**BADGE NO.** 1619  **BOX NO.** C-16  **PHONE NO.** 5971  **DATE** 6/30

**DIVISION CODE** EX 24  **PROG. NO.** E169  **PROJ. NO.** 3696

<table>
<thead>
<tr>
<th><strong>KST TIME</strong></th>
<th><strong>MAX. TIME</strong></th>
<th><strong>LINES OUTPUT</strong></th>
<th><strong>DECK NO.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>50</td>
<td>5k</td>
<td></td>
</tr>
</tbody>
</table>

**OPERATING SYSTEM**
- 1108 FORTRAN IV
- 3200 SCOPE
- PROD. X
- TEST

**TYPE OF RUN**
- COMPUTER REQUIREMENTS

**LOG NO.**

**RACK UNIT REEL NO. NAME SAVE PROCESSING REQUIRED**

<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>A</td>
<td>A</td>
<td>A06909</td>
<td>B</td>
<td>B</td>
<td>A08012</td>
<td>B</td>
<td>Yes</td>
<td></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>Yes</td>
<td></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>Yes</td>
<td></td>
<td></td>
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<tr>
<td>Z</td>
<td>Z</td>
<td>T0204</td>
<td>G</td>
<td>A08045</td>
<td>G</td>
<td>Yes</td>
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<td></td>
<td></td>
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</table>

**WORKING TAPES**
- 4060

<table>
<thead>
<tr>
<th>REEL NO.</th>
<th>NO. FRAMES</th>
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</thead>
<tbody>
<tr>
<td>16 MM</td>
<td>35 MM</td>
</tr>
</tbody>
</table>

**ABNORMAL STOPS**
- STOP AT LOC.
- LOOPING LOCS.
- EXCESS OUTPUT
- EXCESS TIME

**TOTAL TAPE DRIVES USED**
- DUMP INSTRUCTIONS
- NO DUMP
- DUMP ON STOP
- DUMP ON LOOP
- OTHER

**PROGRAMMER'S COMMENTS**

*Tape Z = T0204 is a special Texas A&M Tape*

**OPERATOR'S COMMENTS**
Ref-NM/2-1/2

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

AGGIE SOURCE DECK

> XQT AGGIE
> XQT CUR
> TRW A
> REL A
> ASG Z=T0204
> XQT CUR
> TRW Z
> IN Z
> TRW Z
> REL Z
> FOR,* MONITR,MONITP
Ref-NM/2-2/2

-73
   IF(ICF.EQ.0) GO TO 100
\FOR,* CTINIT,CTINIT
-26,29
   COMMON/CTO1/LCAT,NFOUT,LFOUT(6),NMOUT(6)
\FOR,* DSN,DSN
-45
   REWIND 7
   REWIND 8
\MAP NMP
   SEG NM-MPAK-*(INCONT,SHAPE,FMAT,NMOUT)
MPAK SEG VIP-VLIN-RVEC-WVEC-RHEAD-WHEAD-LOCATE
\XQT NMP

NM DATA DECK

\FIN
Stability Derivatives and Static Stability (SDSS) Program

1. 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

| PROGRAMMER | BADGE NO. | BOX NO. | PHONE NO. | DATE | PRIORITY
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>D. Colunga</td>
<td>1048</td>
<td>16-C</td>
<td>5971</td>
<td>6/16</td>
<td>INITIALS</td>
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<th>PROG. NO</th>
<th>PROJ. NO</th>
<th>EST. TIME</th>
<th>MAX. TIME</th>
<th>LINES OUTPUT</th>
<th>DECK NO.</th>
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<tbody>
<tr>
<td>FD 32</td>
<td>E169</td>
<td>3696E</td>
<td>5</td>
<td>6</td>
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<table>
<thead>
<tr>
<th>OPERATING SYSTEM</th>
<th>TYPE OF RUN</th>
<th>LOG NO.</th>
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<tbody>
<tr>
<td>1106 FORTRAN V</td>
<td></td>
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<tr>
<td>3200 SCOPE</td>
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<tr>
<td>PROD.</td>
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<tr>
<td>TEST</td>
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<table>
<thead>
<tr>
<th>COMPUTER REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1106 FORTRAN IV</td>
</tr>
<tr>
<td>3200 SMARTS</td>
</tr>
<tr>
<td>OTHER (EXPLAIN BELOW)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>INPUT TAPES</th>
<th>OUTPUT TAPES</th>
</tr>
</thead>
<tbody>
<tr>
<td>RACK</td>
<td>UNIT</td>
</tr>
<tr>
<td>C</td>
<td>PCFC</td>
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<table>
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<tr>
<th>WORKING TAPES</th>
</tr>
</thead>
<tbody>
<tr>
<td>RACK</td>
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<tr>
<th>ABNORMAL STOPS</th>
<th>TOTAL TAPE DRIVES USED</th>
<th>ACTUAL TIME USAGE</th>
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<tr>
<td>STOP AT LOC. SR:</td>
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<td>STOP</td>
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<tr>
<td>LOOPING LOC. THRU</td>
<td></td>
<td>START</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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<table>
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<tr>
<th>Programmer's Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>* PCFC is a special Texas A&amp;M PCF Tape</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Operator's Comments</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>System Operator</th>
</tr>
</thead>
</table>
Ref-SDSS-1/2-1/4

VP RUN 01048,FD32,C16,3696E,E169,C,6,1
VN MSG FILE REQ TAPE 2 FH432 0 FSTRN 1
VW ASG C=PCFC
VG ASG E
VG ASG G=A08126
VC COM 03477775
VX QTR CUR
   TRW C
   IN C
   ERS
   IN C
   TRW C
   TRW E
      TWR E, CARDIN/ CODE
      TWR E, DCONRL/ CODE
      TWR E, DEXDw/ CODE
      TWR E, DPERT/ CODE
      TWR E, DSTAB/ 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

VC: I1Nf,A

D. CG: UNGA
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-TTOTAL-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-*(RDSLSC-VAICA-UAICS-UDATA-UCTRAN,UPRES)
V ABS SDSSPE,SDSSDE
v XQT CUR
   TOC
   TRW G
   OUT G,2
   TFF G
   TRI G
v EOF
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-I)

Program Correction Required
None

Output File Generated
(1) Tape F = SDSS tape
(2) Punched card output

File Destinies
Tape F: SLOADS
   CER
   TH

Cover Sheet Format
Ref SDSS-II/1

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

**Ref:** SDSS-II/1

<table>
<thead>
<tr>
<th>PROGRAMMER</th>
<th>BOX NO.</th>
<th>PHONE NO.</th>
<th>DATE</th>
<th>PRIO.</th>
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<tr>
<td>Colonga</td>
<td>1619</td>
<td>C-16</td>
<td>5971</td>
<td>6/23</td>
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<table>
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<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>
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<tbody>
<tr>
<td>EX 24</td>
<td>E169</td>
<td>3606E</td>
<td>10</td>
<td>15</td>
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#### OPERATING SYSTEM

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<tr>
<th>LOG NO</th>
<th>COMPUTER REQUIREMENTS</th>
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#### TYPE OF RUN

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#### INPUT TAPES

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<th>UNIT</th>
<th>REEL NO</th>
<th>FILE NAME</th>
<th>UNIT</th>
<th>REEL NO</th>
<th>FILE NAME</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>A</td>
<td>A05090</td>
<td>A</td>
<td>F</td>
<td>F</td>
<td>Yes</td>
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<tr>
<td>B</td>
<td>B</td>
<td>A01827</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>C</td>
<td>C</td>
<td>A08118</td>
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<tr>
<td>D</td>
<td>D</td>
<td>A140061</td>
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</tr>
<tr>
<td>E</td>
<td>E</td>
<td>A12922</td>
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</table>

**NOTES:**
- Z A08126 WORKING TAPES
- 4060

#### OUTPUT TAPES

<table>
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<tr>
<th>REEL NO</th>
<th>NO. FRAMES</th>
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<td>16 MM</td>
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</tr>
<tr>
<td>35 MM</td>
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</table>

#### ABNORMAL STOPS

- STOP AT LOC. 5
- LOOPING LOC. THRU
- EXCESS OUTPUT
- EXCESS TIME

#### TOTAL TAPE DRIVES USED

- 7

#### ACTUAL TIME USAGE

- START
- STOP

---

**OPERATOR'S COMMENTS**

---

**SYSTEM OPERATOR**
Ref-SDSS-II/2

VP RUN 01048,FD32,C16,3696E,E169,C,15,5

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

V FIN
Program To Fix Up SDSS

RUN
MSG TAPE 2 FH432 O FSTRN 2
ASG A= Current SDSS PCF Tape
ASG B=B
ASG C,D
COM 03477775
XQT CUR
TRW A
FIND A,SPECS/SYMBOLIC
TRD A
FOR, *SPECS, SPECS
-211
REWIND NT17
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
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

(2) GERBER 622 Time about 40 min.
Ref-GDPL-1

//DQ835 JOB (909T4,3--I02,003,DC)," D. COLUNGA SPACE SHUTTLE "
/*CLASS F 230k - 320k TAPE SETUP
/*SETUP
// EXEC GERBER,PARM.FORT=BCD,REGION=320k
//FORT.SYSIN DD *

GDPLOT 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

**User Name:** D. Colunga

**Return To:** 3-C

**Run Time:** 002

**Lines:** 003

**Cards:** 0

**Class:** F

**Requested Priority:** Assigned

---

<table>
<thead>
<tr>
<th>STEP NAME</th>
<th>DD NAME</th>
<th>DATA SET NAME</th>
<th>VOLUME</th>
<th>Action Code</th>
<th>Protect Ring</th>
<th>LIBRARY CONTROL</th>
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<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

**Operator Comments:**

**Program terminated normally:** Yes

**Time turned in:**

---

**Specify reason:**

**Time Executed:**
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.

```
<table>
<thead>
<tr>
<th>X</th>
<th>Y</th>
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<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>40</td>
<td>25</td>
</tr>
</tbody>
</table>
```

**NOTE TO OPERATOR**

- **NUMBER OF FILES ON TAPE**: 1
- **NUMBER OF PLOTS PER FILE**: 1
- **SCALE AT WHICH PLOT IS TO BE DRAWN**: 0.5
- **PPN NO.**: [Blank]
- **TYPE**: B.P
- **COLOR**: Black
- **TYPE OF PAPER**: [Blank]
- **COMMENTS**: [Blank]

```
DATE PLOTTED: [Blank]  TIME OF DAY: [Blank]  PLOT TIME: [Blank]
STARTING TIME: [Blank]  FINISH TIME: [Blank]
RELOT FILE: [Blank]  STOP: [Blank]
RESTART FILE: [Blank]  STOP: [Blank]
```

*ORIGINAL PAGE IS OF POOR QUALITY*
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),XO,YO,ZO,THETR,STOR(11)
(Comment: READ NEW DATA from GD tape)

0062 IF(STOR(I).EQ.0) GO TO 400
(Comment: Check if DATA is completed)

0352 400 PGNU=PGNU+15.
0353 CALL PLOT (PGNU,-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 "STOPT" 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.