Orbit Operations Checklist

STS–99 Flight Supplement

Mission Operations Directorate
Operations Division

Final, Rev A
August 31, 1999

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MISSION OPERATIONS DIRECTORATE

ORBIT OPERATIONS CHECKLIST
STS–99 FLIGHT SUPPLEMENT

FINAL, REVISION A
August 31, 1999

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Book Manager

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(USA)

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ORB OPS/99/FIN A
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**AREAS OF TECHNICAL RESPONSIBILITY**

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* – Omit from flight book

FS iii ORB OPS/99/FIN A
ORBIT OPS CUE CARDS

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* – Omit from flight book
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H – Hard Drive     F – Floppy Disk     P – PCMCIA Card

* DOS only

**DOS applications available under Windows 95
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H – Hard Drive  F – Floppy Disk  P – PCMCIA Card

* DOS only
** DOS applications available under Windows 95
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FS 1–1 ORB OPS/99/FIN A
LOAD PCMMU FORMAT

C3  1. √OI PCMMU FORMAT – GPC
    [SM 62 PCMMU/PL COMM]

2. FORMAT:
   CRT   FXD – ITEM 1 EXEC (*)
          SEL ID – ITEM 3 +X X X EXEC

3. √SM COMM BUF – RDY
   LOAD = ITEM 4 EXEC
   √LOAD, ITEM 4 = RUN,CPLT

   If LOAD = CPLT:
   Repeat steps 2 and 3 for second ID

   * If LOAD = FAIL and ERR MSG = ‘I/O ERR MMU 1(2)’:
     * Go to 5.2a, ‘I/O ERR MMU 1(2)’ (MAL, *)
     * MCC >>
     * If LOAD = FAIL and a first load attempt:
       * Repeat steps 2 and 3 for failed ID
       *
     * If LOAD = FAIL and a subsequent load attempt:
       *
     * C3
       * √OI PCMMU PWR – 2(1)
       * √ERR MSG – ‘I/O ERR PCM’
   CRT   * I/O RESET PCM – ITEM 5 EXEC (*)
         * Repeat steps 2 and 3

4. When final LOAD = CPLT:
   PGM = ITEM 2 EXEC (*)

FS 1–2 ORB OPS/99/FIN A
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<tr>
<td>G2, G8, S2</td>
<td>SRTM Lo rate SM (BACKUP 3)</td>
<td>103/212</td>
<td>781</td>
</tr>
<tr>
<td>G2, G8, S2</td>
<td>SRTM Lo rate OI (PRIME)</td>
<td>103/179</td>
<td>757</td>
</tr>
<tr>
<td>G2, G8, S2</td>
<td>SRTM Lo rate OI (BACKUP 1)</td>
<td>103/203</td>
<td>765</td>
</tr>
<tr>
<td>G2, G8, S2</td>
<td>SRTM Lo rate OI (BACKUP 2)</td>
<td>103/185</td>
<td>761</td>
</tr>
<tr>
<td>G2, G8, S2</td>
<td>SRTM Lo rate OI (BACKUP 3)</td>
<td>103/206</td>
<td>768</td>
</tr>
</tbody>
</table>

**NOTE**

LDR TFL may affect PCMMU BITE. If PCMMU or SM 2 GPC switched since last TFL, ID 64 and 128 will not reflect current state.
LOAD PDI DECOM FORMAT

SM 62 PCMMU/PL COMM

1. PDI:

   CRT
      √I/O RESET – ITEM 8 (*)
      SEL DECOM – ITEM 9 +X EXEC
      SEL FMT – ITEM 10 +X X X EXEC
      LOAD – ITEM 11 EXEC

   If LOAD – CPLT:
      SEL INPUT – ITEM 12 +X EXEC
      LOAD – ITEM 13 EXEC
      Repeat step 1 for additional DECOMs/FPM

* If LOAD – FAIL and ERR MSG – ‘I/O
  ERR MMU 1(2)’:
  * Go to 5.2a, ‘I/O ERR MMU 1(2)’ (MAL, *
  * DPS) >>
  *
  * If LOAD – FAIL and a first load attempt:
  * Repeat step 1
  *
  * If LOAD – FAIL and a subsequent load
  * attempt:
  *
  *
  NOTE
  * Power cycling PDI will cause PDI
  * to lose DFLs previously loaded
  *
  * √MCC
  *
   A1L
   * S–BD CNTL – PNL
   * PL DATA INTLVR PWR – OFF,ON
   * √ERR MSG – ‘S62 BCE BYP PL’
   * √‘S62 BCE BYP PDI’
   * S–BD CNTL – CMD
   *
   * PCM:
   * I/O RESET PCM – ITEM 5 EXEC (*)
   *
   * PDI:
   *
   CRT
   * I/O RESET – ITEM 8 EXEC (*)
   * Repeat step 1 for all of config (XXX)


FS 1–4   ORB OPS/99/FIN A
<table>
<thead>
<tr>
<th>CONFIG</th>
<th>DECOM</th>
<th>FMT</th>
<th>INPUT</th>
<th>USE *</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTRY</td>
<td>1–5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TFL 164</td>
<td>5–FPM</td>
<td>507</td>
<td></td>
<td>H–H–N/A **</td>
</tr>
<tr>
<td>763</td>
<td>SRTM</td>
<td>1</td>
<td>4</td>
<td>SIR–C</td>
</tr>
<tr>
<td>(PRIME)</td>
<td>5–FPM</td>
<td>501</td>
<td></td>
<td>H–H–L **</td>
</tr>
<tr>
<td>770</td>
<td>SRTM</td>
<td>2</td>
<td>17</td>
<td>AODA</td>
</tr>
<tr>
<td>(BACKUP 1)</td>
<td>5–FPM</td>
<td>502</td>
<td></td>
<td>H–H–L **</td>
</tr>
<tr>
<td>780</td>
<td>SRTM</td>
<td>1</td>
<td>9</td>
<td>XSAR 2 (Outbd)</td>
</tr>
<tr>
<td>(BACKUP 2)</td>
<td>5–FPM</td>
<td>503</td>
<td></td>
<td>H–H–L **</td>
</tr>
<tr>
<td>781</td>
<td>SRTM</td>
<td>2</td>
<td>18</td>
<td>XSAR 1 (Inbd)</td>
</tr>
<tr>
<td>(BACKUP 3)</td>
<td>5–FPM</td>
<td>504</td>
<td></td>
<td>H–H–L **</td>
</tr>
<tr>
<td>757</td>
<td>SRTM</td>
<td>2</td>
<td>4</td>
<td>SIR–C</td>
</tr>
<tr>
<td>(PRIME)</td>
<td>5–FPM</td>
<td>501</td>
<td></td>
<td>L–H–H **</td>
</tr>
<tr>
<td>765</td>
<td>SRTM</td>
<td>1</td>
<td>17</td>
<td>AODA</td>
</tr>
<tr>
<td>(BACKUP 1)</td>
<td>5–FPM</td>
<td>502</td>
<td></td>
<td>L–H–H **</td>
</tr>
</tbody>
</table>

* ALL Decoms are downlinked in each config
** OI–GNC–SM, Orbiter Downlist Data Rates (High or Low)
<table>
<thead>
<tr>
<th>CONFIG</th>
<th>DECOM</th>
<th>FMT</th>
<th>INPUT</th>
<th>USE *</th>
</tr>
</thead>
<tbody>
<tr>
<td>761</td>
<td>1</td>
<td>9</td>
<td>3</td>
<td>XSAR 2 (Outbd)</td>
</tr>
<tr>
<td>SRTM</td>
<td>2</td>
<td>27</td>
<td>1</td>
<td>AODA</td>
</tr>
<tr>
<td>LO RATE OI</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>SIR–C</td>
</tr>
<tr>
<td>(BACKUP 2)</td>
<td>4</td>
<td>8</td>
<td>2</td>
<td>XSAR 1 (Inbd)</td>
</tr>
<tr>
<td>TFL 185</td>
<td>5–FPM</td>
<td>503</td>
<td></td>
<td>L–H–H **</td>
</tr>
<tr>
<td>768</td>
<td>1</td>
<td>18</td>
<td>2</td>
<td>XSAR 1 (Inbd)</td>
</tr>
<tr>
<td>SRTM</td>
<td>2</td>
<td>19</td>
<td>3</td>
<td>XSAR 2 (Outbd)</td>
</tr>
<tr>
<td>LO RATE OI</td>
<td>3</td>
<td>28</td>
<td>1</td>
<td>AODA</td>
</tr>
<tr>
<td>(BACKUP 3)</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>SIR–C</td>
</tr>
<tr>
<td>TFL 206</td>
<td>5–FPM</td>
<td>504</td>
<td></td>
<td>L–H–H **</td>
</tr>
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</table>

* ALL Decoms are downlinked in each config

** OI–GNC–SM, Orbiter Downlist Data Rates (High or Low)
PTG

STAR PAIRS PAD ........................................ FS 2–2
PAIRS ..................................................... FS 2–3
### STAR PAIRS PAD

#### ATT SET 1

<table>
<thead>
<tr>
<th>PAIR</th>
<th>ANG SEP</th>
<th>DUAL S TRK</th>
<th>SINGLE S TRK</th>
<th>DUAL S TRK</th>
<th>SINGLE S TRK</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>88.4</td>
<td>-Y:37 R+ 50</td>
<td>R+ 0</td>
<td>R+ 233</td>
<td>-Y:18 R+ 173</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Y+ 76</td>
<td>Y+ 67</td>
<td>Y+ 87</td>
<td>Y+ 293</td>
</tr>
<tr>
<td>B</td>
<td>81.9</td>
<td>-Y:97 R+ 113</td>
<td>R+ 28</td>
<td>R+ 194</td>
<td>-Y:21 R+ 161</td>
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<tr>
<td></td>
<td></td>
<td>Y+ 346</td>
<td>Y+ 332</td>
<td>Y+ 350</td>
<td>Y+ 30</td>
</tr>
<tr>
<td>C</td>
<td>84.3</td>
<td>-Y:102 R+ 67</td>
<td>R+ 323</td>
<td>R+ 145</td>
<td>-Y:101 R+ 228</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Y+ 308</td>
<td>Y+ 302</td>
<td>Y+ 321</td>
<td>Y+ 55</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Y+ 344</td>
<td>Y+ 359</td>
<td>Y+ 342</td>
<td>Y+ 359</td>
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</table>

#### ATT SET 2

<table>
<thead>
<tr>
<th>PAIR</th>
<th>ANG SEP</th>
<th>DUAL S TRK</th>
<th>SINGLE S TRK</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>+X COS</td>
<td>15 R+ 193</td>
<td>P+ 116</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Y+ 346</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>-2</td>
<td>26 R+ 167</td>
<td>P+ 31</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Y+ 346</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>-Z COS</td>
<td>28 R+ 346</td>
<td>P+ 304</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Y+ 13</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>-Z COS</td>
<td>28 R+ 346</td>
<td>P+ 304</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Y+ 13</td>
<td></td>
</tr>
</tbody>
</table>

#### ORBIT OPS/99/FINA

- Single S TRK Min Move Opt
- TGT ID = 11-110 New Star #
- Body Vector = 5

#### NOTE:

- Star 101 has been replaced by 447:EPSILON LEO, RH:145.8, DEC: 24.0
- Star 102 has been replaced by 786:DELPH INARCO, RH:288.1, DEC: 67.6

---

**MET Applicable:** 01/01/00 - EQM  
**Date L/0:** 09/16/99  
**GMT L/0:** 259/12:47:00
STAR PAIRS

HET Applicable: 0/01:00:00 - EOH
Date L/01: 09/16/99
GMT L/01: 259/12:47:00

FS 2–3 ORB OPS/99/FIN A
CREW SYS
DUAL SHIFT PRE–SLEEP ACTIVITY ............. FS 3–2

FS 3–1 ORB OPS/99/FIN A
DUAL SHIFT PRE–SLEEP ACTIVITY

1. CRYO HEATER Config per MCC

B
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

R
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

2. If FD1 and PPO2 < 3.20:
   MO69M
   LEH O2 8 vlv – CL
   Insert O2 Bleed Orifice Assy into LEH O2 8 QD
   LEH O2 8 vlv – OP
   C7
   LEH O2 SPLY 1,2 vlv – OP

3. SM CHECKPOINT INITIATE (ORB OPS, DPS)

R
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

4. Perform ERR log reset:

   GNC 0 GPC MEMORY
   ITEM 48 EXEC
   SM 0 GPC MEMORY
   ITEM 48 EXEC

R
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

5. WCS CLEANING/URINE SCREEN REPLACEMENT (Cue Card, EDO WCS URINE COLLECTION)

B
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

R
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

Cont next page

FS 3–2 ORB OPS/99/FIN A
6. MSG REVIEW/POSTING

B 2 3 4 5 6 7 8 9 10 11 12
13 14 15 16
R 1 2 3 4 5 6 7 8 9 10 11 12
13 14 15 16

7. COMM/INST, KU–BD ANT CABLE POSITIONING
   Perform during ZOE or on MCC call

B 2 3 4 5 6 7 8 9 10 11 12
13 14 15 16
R 1 2 3 4 5 6 7 8 9 10 11 12
13 14 15 16

8. CO2 ABSORBER REPLACEMENT (Cue Card)

B 2 3 4 5 6 7 8 9 10 11 12
13
R 1 2 3 4 5 6 7 8 9 10 11

FS 3–3      ORB OPS/99/FIN A
OCA

OCA SETUP ............................................. FS 4–2
CABLE DIAGRAM ................................. FS 4–3
DOWNLINK VIA GROUND CMD .. FS 4–4
DIRECTORY STRUCTURE ...................... FS 4–5
FILENAMEs ............................................. FS 4–6
KU–BAND (KFX) MANUAL DOWNLINK .... FS 4–7
S–BAND MODEM (MFX) ACTIVATION ...... FS 4–8
VIDEO CONFERENCING ....................... FS 4–9
OCA CHALKBOARD ............................... FS 4–11
APPLICATION SHARING ....................... FS 4–12
REMOTE PAN/TILT/ZOOM CONTROL OF GROUND
CAMERA (KCA CAMERA CNTL) ............ FS 4–13
OCA PROSHARE CONFIG FOR CAMCORDER
OPS ................................................... FS 4–13
OCA LOOPBACK TEST ......................... FS 4–14
CABLE DIAGRAM – LOOPBACK .......... FS 4–15
**OCA SETUP**

1. **Unstow:**
   - If not pre-routed, OCA I/F cable
   - If not pre-routed, PGSC Modem cable (if reqd)

2. **Config cables per OCA CABLE DIAGRAM, FS 4–3**

3. **Config for KU-Band file xfer:**
   - SSP3: cb PDIP PWR 2/KU-BAND RLY – cl
   - MCC for HDR(LDR)
   - A6L PDIP: Ku BAND RATE – LO(HI)

4. **For PGSCs running OCA Router, ProShare (if reqd), and KFX software:**
   - Perform PGSC ACT, steps 1 thru 5 (PGSC), 12–2, then:

5. **Config network for PGSCs running OCA Router, ProShare (if reqd), and KFX software:**
   - Perform PGSC NETWORK – Setup [for OCA Router: steps 1 thru 5 only] (PGSC), 12–16, then:

6. **Press [CTRL]/[ALT]/[DEL] to logon to Windows NT**
   - Sel ‘OK’ on ‘Logon Information’ dialog box
   - Wait approx 10 sec for logon sequence to complete

7. **VERIFY DATA RATE**
   - Double-click ‘OCA Control Panel Applet’ icon on desktop
   - ‘Local OCA Card–1’ display on desktop:
   - ‘OCA – FLIGHT SEND – 2(4)M’

   * If Send rate out of config: *
   * Sel ‘Control’ on menu bar of ‘Local’ *
   * OCA Card–1’ display *
   * Sel ‘Transmit Rate’ – 2(4) Mbps *
   * OCA internal clock (√) *

8. **Activate KFX software on PGSC networked to OCA Router:**
   - ‘KFX’
   - Double-click ‘Shuttle Apps’ icon on desktop
   - ‘OCA’ folder
   - Double-click ‘KFX’ icon
   - Arrange ‘KFX’ window as reqd

9. **Notify MCC when complete**

---

FS 4–2 ORB OPS/99/FIN A
OCA CABLE DIAGRAM
(KU–BAND OR A/G 2)
OCA DOWNLINK VIA GROUND CMD

1. **MOVE FILE(S) TO DOWNLINK DIRECTORIES**

   **NOTE**
   Files will be downlinked via ground cmd, unless MCC instructs otherwise

   See OCA DIRECTORY STRUCTURE, FS 4–5
   See OCA FILENAMES, FS 4–6, for file naming convention

   **PGSC**
   Copy(Move) desired files to
   c:\oca-down\mail\payloads
   Notify MCC when complete

2. **MONITOR KFX DOWNLINK** (if desired)
   When link established:
   From ‘KFX’ window:
   ✓ REMOTE KFX – green
   ✓ Uplink arrow (‘↑’ next to send rate) – green
   ✓ Dnlink arrow (‘↓’ next to send rate) – green

   ✓ KFX application activated
   ✓ File Transfer Status dialog (displayed during file xfer)

3. **MONITOR MFX DOWNLINK** (if desired)
   If MFX application not activated:
   Perform OCA S–BAND MODEM(MFX)
   ACTIVATION, FS 4–8, then:
   If minimized:
   ✓ Icon Title displaying File Name, Send/Receive Status

   **NOTE**
   For detailed file xfer information, following steps must be completed prior to file xfer initiation

   Sel ‘File’ on menu bar of MFX application
   ✓ Show Status During File Xfers – (✓)
   ✓ Z MODEM(1K–X MODEM) display appears
   ✓ Displaying File Name, Send/Receive Status
OCA DIRECTORY STRUCTURE

C:\
__OCA–DOWN
  |__MAIL
  |__PAYLOADS *

__OCA–UP
  |__ARCHIVE
  |__MAIL
    |__CDR
    |__MS1
    |__MS2
    |__MS3
    |__MS4
    |__MS5
    |__PLT
    |__PS1
    |__PS2
  |__NEWS
  |__OTHER
  |__PAYLOADS
  |__SPOC **
  |__WEB

__OCA—SW (Ground Use Only)

* PAYLOADS Directory: Directory may contain flight specific subdirectory

** SpOC Directory: Directory will contain latest SpOC updates. To create SpOC update disk, copy all files in c:\oca–up\spoc\uplink to a:\uplink
### OCA FILENAMES

#### UPLINKED FILES

<table>
<thead>
<tr>
<th>Description</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>SpOC updates:</td>
<td>a:\uplink(c:\oca–up\spoc)</td>
</tr>
<tr>
<td>World News:</td>
<td>c:\oca–up\news\</td>
</tr>
<tr>
<td>Ops notes:</td>
<td>c:\oca–up\other\opsxxxxx.doc</td>
</tr>
<tr>
<td>Graphics files:</td>
<td>c:\oca–up\other\othrxxxx.bmp</td>
</tr>
<tr>
<td>Uplinked personal mail:</td>
<td>c:\oca–up\mail\</td>
</tr>
<tr>
<td>Uplinked Payload files:</td>
<td>c:\oca–up\payloads\</td>
</tr>
</tbody>
</table>

#### DOWNLINKED FILES

<table>
<thead>
<tr>
<th>Description</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal mail, other:</td>
<td>c:\oca–down\mail\</td>
</tr>
<tr>
<td>P/L files:</td>
<td>c:\oca–down\payloads\</td>
</tr>
</tbody>
</table>

#### STD FILENAMES

<table>
<thead>
<tr>
<th>Filename</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>filename.doc</td>
<td>WORD documents only</td>
</tr>
<tr>
<td>filename.txt</td>
<td>ASCII text file (NOTEPAD or WORD)</td>
</tr>
<tr>
<td>filename.bmp</td>
<td>Graphics file (Paint)</td>
</tr>
<tr>
<td>filename.pcx</td>
<td>Graphics file (Paint)</td>
</tr>
<tr>
<td>famcdr01.doc</td>
<td>family mail: CDR → family on FD01</td>
</tr>
<tr>
<td>cdfam02.doc</td>
<td>family mail: family → CDR on FD02</td>
</tr>
<tr>
<td>fltcdr02.doc</td>
<td>message: CDR → FLT Director on FD02</td>
</tr>
<tr>
<td>plx_06.doc</td>
<td>message: to Payload X on FD06</td>
</tr>
</tbody>
</table>

**NOTE**

Do not downlink medical data. Downlink directories will be cleared of all files at end of each OCA session. To retain archive copy of downlink msgs, save in personal directory.
OCA KU–BAND (KFX) MANUAL DOWNLINK

1. **CONFIGURE S/W FOR FILE DOWNLINK**
   
   If reqd, enlarge ‘KFX’ window

   From ‘KFX’ window:
   - ✔REMOTE KFX – green
   - ✔Uplink arrow (’↑’ next to send rate) – green
   - ✔Dnlink arrow (’↓’ next to send rate) – green

2. **SELECT FILE(S) TO DOWNLINK**
   
   Use WINDOWS EXPLORER to sel files/directories to transfer
   Drag files over KFX window
   Rel mouse button
   ✔‘KFX File Transfer Preview’ display appears with selected file(s) listed

3. **ADD ADDITIONAL FILE FOR DOWNLINK** (if reqd)
   
   ✔‘KFX File Transfer Preview’ display active
   Sel ‘add to list’ button (button with documents, ‘+’ symbols)
   ✔‘Select Files for Transfer’ display appears
   Sel desired file from file listbox
   Sel ‘Select’ button
   Repeat for each additional file as reqd
   Sel ‘Done’ button

4. **REMOVE FILE FROM DOWNLINK** (if reqd)
   
   ✔‘KFX File Transfer Preview’ display active
   Sel desired file(s) in listbox
   Sel ‘delete’ button (button with ‘X’)

5. **START FILE DOWNLINK**
   
   **NOTE**
   User may halt transfer while in progress by sel ‘Abort’ button

   ✔‘KFX File Transfer Preview’ display active
   Sel ‘downlink’ button (button with ‘↓’)
   ✔‘File Transfer Status’ display appears
   ✔Displaying xfer status

   * If error displayed, repeat step 5 *

FS 4–7 ORB OPS/99/FIN A
OCA S–BAND MODEM (MFX) ACTIVATION

1. ESTABLISH LINK
   On MCC GO:
   A15  PS COMM CCU PWR – OFF
   L9   PS AUD PWR – AUD
        A/G 1 – OFF
        A/G 2 – T/R
        A/A – OFF
        ICOM (two) – OFF
        VOL A/G 2 tw – 0
        XMIT/ICOM MODE – PTT/PTT

   CAUTION
   Loss of A/A (UHF) will occur if OCA PGSC
   Modem cable connected to COMM OUTLET
   and A/A in T/R on ATU

   O9   R AUD A/G 2 – OFF
   O5   L AUD A/G 2 – OFF
   R10  MS AUD A/G 2 – OFF
   A13(OV102)  OS AUD A/G 2 – OFF
   MO42F  MIDDECK SPKR AUD A/G 2 – OFF
   A15  ✓ PGSC Modem cable connected to PS COMM
        outlet

2. ACTIVATE FILE XFER S/W
   If PGSC not running Windows 95:
   Restart (or pwr on) PGSC
   At Startup Menu, sel Windows 95 option
   Press [ENTER]

   Double–click ‘Shuttle Apps’ icon on desktop
   Double–click ‘OCA’ folder
   Double–click ‘MFX’ icon
   ✓ ‘MFX’ display appears
   ✓ WINDOW – OFFLINE
   Arrange ‘MFX’ window as reqd
VIDEO CONFERENCING

1. Unstow:
   Headset
   Mini-cam
   ProShare Video/Pwr cable
   VLHS/VTS I/F cable

2. Perform OCA SETUP, steps 1 thru 5, FS 4–2, then:

3. Config cables per P/TV VIDEO CONFERENCING
   (PHOTO/TV FS, P/TV06 VID CONF)

4. Double-click ‘Shuttle Apps’ icon on desktop
   Double-click ‘OCA’ folder
   Double-click ‘OCA ProShare Video’ icon

5. ✓ Video active in ‘Local’ window

6. Adjust Thinkpad display tilt-angle, camera position, iris, focus so oper’s face centered in ‘Local’ video window

7. ✓ Picture quality and position

   * If picture quality poor:
     * From ‘Local’ video window:
       * Sel ‘Adjusts video’ button (‘slide bar’ icon)
       * Adjust picture quality as reqd
     * Sel ‘Close’ button
     * If ‘Save camera control settings?’ appears, sel ‘Yes’ button
     * From ‘Local’ video window:
       * ✓ ‘Zooms in’ button (mag glass) in out position

8. TO RECEIVE CALL
   Notify MCC when ready to receive video conference call, wait for MCC to initiate

Cont next page
9. **TO INITIATE CALL**
   Notify MCC when ready to place video conference call, wait for MCC confirmation
   Sel ‘Dial List’ button
   Sel ‘MCC, PC’
   Sel ‘Dial’ button

   **NOTE**
   Title of remote video window changes to designate caller when video conference established

10. **CONDUCT VIDEO CONFERENCE**

   **NOTE**
   Video conference performance may be affected if other applications are active

   ✓ Remote video window active, audio active
   Sel ‘Split’ button on handset
   Move remote video window directly beneath camera
   Adjust audio volume using slide bar under remote video window
   ✓ Headset/speaker Toggle button configured for headset audio (button not depressed)

11. **TERMINATE VIDEO CONFERENCE**

    **NOTE**
    When video conference completed, either side can terminate call. If MCC has disconnect, ‘Hang Up’ button will change to ‘Dial’

    From ProShare Video handset:
    Sel ‘Hang Up’ button
    Sel System Menu (upper left corner)
    Sel ‘Exit’ ([ALT]/[SHIFT]/[F4])
OCA CHALKBOARD

1. Perform VIDEO CONFERENCING, steps 1 thru 8(9), FS 4–9 then:

2. **TO RECEIVE CHALKBOARD SESSION**
   
   Notify MCC when ready to receive chalkboard session, wait for MCC to initiate

   **PGSC**
   From ProShare Video handset, sel ‘Split’ button
   If ‘Local’ video remains on screen, minimize ‘Local’ video window

3. **TO INITIATE CHALKBOARD SESSION**
   
   Notify MCC when ready to initiate chalkboard session, wait for MCC confirmation

   From ProShare Video handset, sel ‘OCA CHALKBOARD’ button
   Sel ‘Yes’ at ‘Do You Want to Share Notebook?’ dialog
   Minimize all unused windows

4. **TERMINATING CHALKBOARD SESSION**

   **NOTE**
   When chalkboard session completed, either side can terminate session

   From ProShare Personal Conferencing menu bar:
   Sel ‘Conference’
   Sel ‘UnShare Notebook’ menu

   If MCC has terminated session, sel ‘OK’ in ‘The other participant closed the notebook’

   From ProShare Personal Conferencing menu bar:
   Sel ‘File’
   Sel ‘Exit’

   **NOTE**
   Operator will be prompted to save chalkboard session in ‘xxxx.mtg’ file

FS 4–11     ORB OPS/99/FIN A
APPLICATION SHARING

PGSC  1. Launch desired application

2. Perform OCA CHALKBOARD, steps 1 thru 3, FS 4–11, then:

3. From ProShare Personal Conferencing menu bar:
   Sel ‘Application’
   Sel ‘Share Application View.’

4. From ‘Share Application View’ dialog box:
   Sel desired application
   Sel ‘OK’

5. Perform application edits with MCC when application is shared

   NOTE
   Mouse operation, shared between MCC and flight operator, must be coordinated using conference audio

6. TERMINATING APPLICATION SHARING
   Either side can terminate application sharing by exiting application
REMOTE PAN/TILT/ZOOM CONTROL OF GROUND
CAMERA (KCA CAMERA CNTL)

NOTE
PAN/TILT control only available if ground
workstation involved in video conference
has PAN/TILT, and ground PAN/TILT
camera is running

1. Perform VIDEO CONFERENCING, steps 1 thru
8(9), FS 4–9, then:

ProShare
PGSC 2. Double–click ‘Shuttle Apps’ icon on desktop
Double–click ‘OCA’ folder
Double–click ‘OCA ProShare Pan–Tilt’ icon

3. Sel ‘Help’ in KCA Camera Control menu bar for
instructions

4. When camera control ops complete, close KCA
camera control application

OCA PROSHARE CONFIG FOR CAMCORDER OPS

NOTE
Only one instance of OCA ProShare
application can be open at one time

ProShare
PGSC 1. If open, exit ProShare application

2. Double–click ‘Shuttle Apps’ icon on desktop

3. Double–click ‘OCA’ folder

4. Double–click ‘OCA ProShare Video with
Camcorder’ icon
OCA LOOPBACK TEST

NOTE
Perform procedure on OCA Router
PGSC running in Windows NT

1. LOGON TO WINDOWS NT
OCA Router
Press [CTRL]/[ALT]/[DEL] to logon to Windows NT
Sel ‘OK’ on ‘Logon Information’ dialog box
Wait approx 10 sec for logon sequence to complete
Double–click ‘OCA Control Panel Applet’ icon on desktop
✓ ‘Local OCA Card–1’ display on desktop

2. INITIATE INTERNAL LOOPBACK TEST
From ‘Local OCA Card–1’ display:
Sel ‘OCA Self Tests’ on menu bar
Sel ‘Internal Loopback’

✓ ‘Local OCA Card–1’ display:
Successful Test – Animated Signal moving inside PC icon
Unsuccessful Test – ‘Frowny Face’ displayed inside PC icon
Inform MCC of results

3. TERMINATE INTERNAL LOOPBACK TEST
From ‘Local OCA Card–1’ display:
Sel ‘OCA Self Tests’ on menu bar
Sel ‘Stop Loopback Testing’

4. INITIATE EXTERNAL LOOPBACK TEST
Disconnect OCA I/F cable from PDIP panel
Connect PDIP end of OCA I/F cable to loopback port on PGSC end of cable
See OCA CABLE DIAGRAM – LOOPBACK, FS 4–15, for cable config

From ‘Local OCA Card–1’ display:
Sel ‘OCA Self Tests’ on menu bar
Sel ‘External Loopback #1’

Cont next page
FS 4–14
5. **TERMINATE EXTERNAL LOOPBACK TEST**
   
   From 'Local OCA Card–1' display:
   
   Sel 'OCA Self Tests' on menu bar
   Sel 'Stop Loopback Testing'

---

**OCA CABLE DIAGRAM – LOOPBACK**

![Diagram of OCA cable diagram showing loopback connections.]
GPS

GPS DEVELOPMENT FLIGHT TEST ......................... FS 5–3
OPS 2 GPS TEST ........................................... FS 5–3
NAV RECOVERY .............................................. FS 5–6

SINGLE STRING GLOBAL POSITIONING SYSTEM
(DTO 700–14) .................................................. FS 5–7
MAGR UNSTOW ................................................ FS 5–7
   ONORBIT SETUP ....................................... FS 5–9
   ENTRY SETUP .......................................... FS 5–10
   PGSC SCHEMATIC ..................................... FS 5–12
   DOWNLINK (CONTINGENCY) ....................... FS 5–13
   HARD DRIVE SWAP (CONTINGENCY) .......... FS 5–14
   RESTART (CONTINGENCY) ......................... FS 5–15
GPS DEVELOPMENT FLIGHT TEST

OPS 2 GPS TEST

1. GPS POWER UP

A13

GPSPWR – ON

* If receiver not powered, *
* GPSPWR – ON *
* √GPSENCRYPT – NORMAL *
* Wait at least 30 sec *

CRT

* GNC I/O RESET *

* 

* GNC 55 GPS STATUS *
* INIT – ITEM 15 EXEC (*) *
* √MODE – INIT *
* NAV – ITEM 18 EXEC (*) *
* √MODE – INS *
* On MCC GO, proceed to next step *

2. GPS SHORT PWR CYCLE

CRT

√NAV – ITEM 18 (*)

A13

GPS PWR – OFF (5 sec), ON
(expect ‘BCE STRG 2 GPS’)

Wait 10 sec

CRT

GNC I/O RESET

√MODE – INS
√SATELLITES – tracking 4 satellites
√MCC before proceeding

3. GPS LONG PWR CYCLE

CRT

√NAV – ITEM 18 (*)

A13

GPS PWR – OFF (at least 30 sec), ON
(expect ‘BCE STRG 2 GPS’)

Wait at least 30 sec

CRT

GNC I/O RESET
CRT INIT – ITEM 15 EXEC (*)
✓ MODE – INIT
NAV – ITEM 18 EXEC (*)
✓ MODE – INS
✓ SATELLITES – tracking 4 satellites (may take up to 12 min to acquire 4 or more satellites)
✓ MCC before proceeding

4. GPS FILTER RESTART
✓ MODE – INS
RESTART – ITEM 21 EXEC (*)
Wait 5 sec
✓ RESTART – ITEM 21 (no *)

5. IMU TO GPS REASSIGNMENT

A. REASSIGN GPS 2 TO IMU 3
   GNC 55 GPS STATUS
CRT IMU – ITEM 24 +3 EXEC
✓ ’33’ next to ITEM 24
   Wait 5 min

B. REASSIGN GPS 2 TO INVALID IMU
   GNC 55 GPS STATUS
CRT IMU – ITEM 24 +2 EXEC
✓ ’21’ next to ITEM 24
   Wait 1 min

C. REASSIGN GPS 2 TO AUTO SELECTED IMU
   GNC 55 GPS STATUS
CRT IMU – ITEM 24 +0 EXEC
✓ ’_1’ next to ITEM 24

On MCC GO, proceed to next step

Cont next page
6. SATELLITE DESELECTS

A. DESELECT SATELLITES TRACKED ON PRIMARY CHANNELS

NOTE
SAT DES/RES may take up to 15 sec to be honored

Note satellite #s currently tracked on primary channels (C1–C4)

C1 ____  C2 ____  C3 ____  C4 _____

GNC 55 GPS STATUS
CRT
DES – ITEM 43 +(C1 SAT#) EXEC
DES – ITEM 44 +(C2 SAT#) EXEC
DES – ITEM 45 +(C3 SAT#) EXEC
DES – ITEM 46 +(C4 SAT#) EXEC

✓GDOP and QA1 (expected to increase)
Wait 2 min before proceeding to next step

B. RESELECT SATELLITES

GNC 55 GPS STATUS
CRT
DES – ITEM 43 –(C1 SAT#) EXEC
DES – ITEM 44 –(C2 SAT#) EXEC
DES – ITEM 45 –(C3 SAT#) EXEC
DES – ITEM 46 –(C4 SAT#) EXEC

✓GDOP and QA1 (expected to decrease)
NAV RECOVERY

1. SYSTEM SAFING
   C3
   DAP: FREE
   S–BD PM ANT – BEST ANT

   [GNC 55 GPS STATUS]
   GPS TO NAV INH – ITEM 36 EXEC (*)

   Establish COMM with MCC
   If COMM established, MCC will uplink Orbiter
   State Vector

   * If no joy on COMM: *
   * Proceed to step 2 *

   On MCC GO:
   C3
   DAP: AUTO
   S–BD PM ANT – GPC

2. NAV RECOVERY

   NOTE
   This step is only applicable in GNC OPS 2,
   and only when MCC has previously
   uplinked a Target State Vector

   [GNC 33 REL NAV]
   RNDZ NAV ENA – ITEM 1 (*)
   TGT TO ORB – ITEM 11 (*)

   C3
   DAP: AUTO
   S–BD PM ANT – GPC

   Establish COMM with MCC

   [GNC 33 REL NAV]
   RNDZ NAV ENA – ITEM 1 (no *)
SINGLE STRING GLOBAL POSITIONING SYSTEM
(DTO 700–14)

MAGR UNSTOW

MF71E 1. Open locker door

2. √Temp strip – rightmost three blocks black

* If Temp strip rightmost three blocks not black (temp > 122 degF)
* Wait 10 min

MO13Q * DC UTIL PWR – OFF

MF71E * Expansion Chassis pwr – off
* √Temp strip rightmost three blocks black

MO13Q * DC UTIL PWR – ON

MF71E * Expansion Chassis pwr – on
* PGSC pwr – on
* √MCC

MF71E 3. Remove PGSC foam assy

MAGR 4. Open PGSC monitor

PGSC √Data Display

* If data not updating, √MCC *

5. Press [ESC] twice to exit data collection program
‘C:\GPS’ appears on display

6. Enter ‘cflash’ [RETURN]
Record number of files in directory from upper flash card. Press [ENTER] and then record number of files in directory from lower flash card. Report to MCC and press [ENTER]

7. PGSC pwr – off
Expansion Chassis pwr – off

MO13Q 8. DC UTIL PWR – OFF

Cont next page
9. Demate power and GPS RS–422 connections

10. Remove cables from locker door openings

11. Reconnect power and GPS RS–422 data cables

12. DC UTIL PWR – ON

13. Expansion Chassis pwr – on

   PGSC pwr – on
MAGR ONORBIT SETUP

1. At ‘C:\GPS>’, enter ‘GPS’

2. At intro display, select ‘orbit’

   * If error msg appears, ✓MCC *

3. When intro display returns, press [F1]

4. ✓Data Display is updating

5. Wait until at least one satellite SV in STAT 5 appears on the display

6. Enter CTRL–T (sets clock in PGSC)

7. ✓Data is being recorded

   If recording, the following should appear in
   FLAGS blocks:
   ‘Recording’
   Filename
   ‘ON’

   * If not recording,  ✓  
   * enter [F8] to toggle recording *

8. Record approx MET ____:____:____

    Record drive letter and filename located in
    FLAGS block ____:____:____

    Record Disk space remaining in Mbytes located
    below FLAGS block _______ Mb

9. Call MCC (report step 8 results)

   NOTE
   Velocity RSS, FOM, time since 4 SV NAV,
   ‘4 at STAT 5’ flags are located in DATA
   DISPLAY (F1). FOM and time since 4 SV
   NAV are located in WorldMap Display (F2)

10. If FOM = 9, and Time since 4 SV NAV > 1 hr, or if
    ENU Velocity RSS > 8000 m/s, report to MCC

    FS 5–9    ORB OPS/99/FIN A
MAGR ENTRY SETUP

1. Press ESC twice to exit data collection program
   PGSC
   ✓’C:\GPS>’ appears on display

2. PGSC pwr – off
   Expansion Chassis pwr – off

3. DC UTIL PWR – OFF

4. Demate power and GPS RS–422 connectors

5. Reroute power and GPS RS–422 cables through locker door

6. Reconnect power and GPS RS–422 connectors

7. DC UTIL PWR – ON

8. Expansion Chassis pwr – on
   PGSC pwr – on

9. ✓DOS prompt appears on display
    ✓Expansion Chassis fan running

10. ✓Flash cards (two) installed in PCMCIA slots

11. Unstow foam assy and carefully place PGSC in foam
    ✓Cables routed through foam and PGSC connections secure

12. At ‘C:\GPS>’ prompt, enter ‘dflash’ to erase data on PCMCIA cards

13. When DOS prompt returns, enter ‘GPS’

14. At intro display, select ‘entry’ [RETURN]

   * If error msg appears, ✓MCC *

Cont next page
15. ✓ Data Display is updating

16. Wait until at least one satellite SV in STAT 5 appears on the display

17. Enter CTRL–T (sets clock in PGSC)
✓ Data recording OFF (lower right corner of screen)

* If recording, press [F8] to toggle *
* recording OFF *

18. Record approx MET _____:_____:_____ 

19. Call MCC (finished step 18, approx MET)

NOTE
Velocity RSS, FOM, time since 4 SV NAV, ‘4 at STAT 5’ flags are located in DATA DISPLAY (F1)

20. If FOM = 9, and Time since 4 SV NAV > 1 hr, or if Velocity RSS > 8000 m/s, report to MCC

MF71E 21. Close monitor

22. Stow foam assy (with PGSC inside) in locker and close locker door
✓ PGSC cable connections secure
**MAGR DOWNLINK (CONTINGENCY)**

**NOTE**

GPS Filenames are: GPSXXX.001 – GPSXXX.999 where XXX is Julian day.

Files are located in C:\GPS subdirectory.

When Recording Bit toggled OFF/ON, new file is created

**PGSC**
1. Exit GPS program (press [ESC] twice)
2. Insert OCA data disk into floppy drive
3. From ‘C:\GPS>’ subdirectory, enter “copy GPSXXX.XXX a:” to copy GPS data file to floppy drive where “GPSXXX.XXX” is GPS data file to be downlinked
4. Remove disk from floppy drive
5. Perform MAGR ONORBIT SETUP, steps 1 thru 4

**OCA**
6. Insert OCA data disk into OCA PGSC floppy drive
   Go to OCA DOWNLINK VIA GROUND CMD (OCA) to downlink desired file(s)
MAGR HARD DRIVE SWAP (CONTINGENCY)

1. Enter ESC twice to exit data collection program
   
   2. PGSC pwr – off
   
   Expansion Chassis pwr – off

3. Obtain spare DTO 700–14 3GB hard drive from foam assy and remove packaging

4. Open monitor

5. Pull keyboard release latches (same latches used to open monitor) forward until ‘snap’, lift keyboard up

6. Using blue tabs, pull up handle on hard drive (hard drive is located in front, right-hand side)

7. Pull up and back on handle to remove hard drive

8. Stow removed hard drive in foam assy

9. Place fresh hard drive in PGSC and snap handle into place to secure

10. Pull keyboard release latches forward and close keyboard

11. Expansion Chassis pwr – on
   
   PGSC pwr – on
   
   DOS prompt appears on display
MAGR RESTART (CONTINGENCY)

1. √‘C:\GPS>’ appears on display
2. Enter ‘dir/od’ [RETURN]
3. Record name of last file displayed (‘gpsxxx.yyy’) and call MCC
4. Enter ‘move gpsxxx.yyy d:\’, where gpsxxx.yyy is file name recorded above
5. Proceed with MAGR ONORBIT SETUP
GALLEY IODINE REMOVAL

GALLEY IODINE REMOVAL ASSEMBLY (GIRA)
  INSTALLATION .................................................. FS 6–2
  GALLEY OVERNIGHT CONFIG .......................... FS 6–4
    MORNING CONFIG .......................... FS 6–4
    WATER SAMPLE .......................... FS 6–4
  GIRA STOWAGE .................................. FS 6–5
GALLEY IODINE REMOVAL ASSEMBLY (GIRA) INSTALLATION
(Time: 1 hr)

EQUIPMENT PREPARATION

Unstow the following from _____________:

- MCV (short metal cartridge)
- ACTEX hose (labeled #3,4,5)
- ACTEX (large insulated cartridge labeled #2,3)
- Hose/Microbe filter (wrapped in washcloth) assembly (labeled #1,2)

NOTE
Have towel ready for possible release of water when mating/demating any connections.
Numbered figure labels are indicated in ()

ML90N
1. Remove tie–wrap (if present) connecting Galley Ambient and Chilled hoses
   Detach Galley Ambient and Chilled hoses from QD bracket

2. Install MCV on Ambient ( uninsulated) supply line by connecting MCV to Ambient QD at QD bracket
   and connecting Galley Ambient supply hose to other end of MCV (See figure 6–1)

3. Connect Hose/Microbe filter (#1) assembly to Galley Chilled (insulated) hose

4. Attach ACTEX (#2) to Hose/Microbe filter assembly (#2)

5. Attach ACTEX hose (#3) to ACTEX assembly (#3)

6. Connect ACTEX hose (#4) to Chilled QD at QD bracket

7. Secure ACTEX assembly as reqd (Reference figure 6–1). Ensure access to locker MF14O

Galley
8. Circulate water through galley:
   OVEN/RHS – OFF,ON
   FS 6–2   ORB OPS/99/FIN A
Figure 6–1.– GIRA configuration (connections and routing).
GALLEY OVERNIGHT CONFIG  (Time: 5 min)

NOTE
Have towel ready for possible release of water when mating/demating any connections

ML90N
1. Disconnect Galley Chilled hose from Microbe filter (#1)

2. Connect Galley Chilled hose to free end (#5) of Tee attached to Chilled QD at QD bracket

3. Circulate water through galley:
   Galley
   OVEN/RHS – OFF, ON

GALLEY MORNING CONFIG  (Time: 5 min)

NOTE
Have towel ready for possible release of water when mating/demating any connections

ML90N
1. Disconnect Galley Chilled hose from Tee (#5) attached to Chilled QD at QD bracket

2. Connect Galley Chilled hose to Microbe filter (#1)

3. Circulate water through galley:
   Galley
   OVEN/RHS – OFF, ON

GALLEY WATER SAMPLE  (Time: 5 min)

Retrieve Galley Sample Bags from ________________:

1. Wipe RHS needle with Alcohol Wipe
2. Fill one Sample Bag with 8 oz hot water
3. Fill out label (circle hot, record MET)
4. Fill one Sample Bag with 8 oz chilled water
5. Fill out label (circle cold, record MET)
6. Stow all Sample Bags in an empty fresh food locker
GIRA STOWAGE

(Time: 15 min)

NOTE
Have towel ready for possible release of water when mating/demating any connections

MAR/ Galley
1. Remove all black Velcro/Gray Tape from Chilled line assembly and hoses
   Leave insulation covers in place

ML90N
2. Detach Galley Chilled hose (insulated) from Microbe filter (#1)
   Disconnect ACTEX hose from QD bracket

3. Detach Galley Ambient hose ( uninsulated) from MCV
   Remove MCV from QD bracket
   Reconnect Galley Ambient and Chilled hoses to QD bracket

4. Break down assembly formerly installed on Chilled line into sub-assemblies as follows:
   Between ACTEX hose and ACTEX cartridge (#3)
   Between ACTEX cartridge and Hose/Microbe filter assembly (#2)

5. Resecure Galley Ambient and Chilled hoses with tie wrap (if present)

6. Return hardware to launch stowage location
FLY–CAST MANEUVERS

SINGLE–PULSE FLY–CAST MANEUVER:
  +X RCS BURN ........................................... FS 7–2

MULTI–PULSE FLY–CAST MANEUVER:
  +X RCS BURN ........................................... FS 7–9

DOUBLET/TRIPLET FLY–CAST MANEUVER:
  +X RCS BURN ........................................... FS 7–15

SINGLE–PULSE FLY–CAST MANEUVER PAD .... FS 7–23
MULTI–PULSE FLY–CAST MANEUVER PAD .... FS 7–29
DOUBLET/TRIPLET FLY–CAST MANEUVER PAD . FS 7–31
SINGLE–PULSE FLY–CAST MANEUVER:
+X RCS BURN

O14:F, √ Pri RJD LOGIC, DRIVER (sixteen) – ON
O15:F,
O16:F

O14:E, √ cb DDU (six) – cl
O15:E,
O16:E

O6 √ ANNUN INTENSITY – BRIGHT
 ANNUN LAMP TEST – L (hold up)
F6 √ RCS CMD Its (six) – illuminated

1. VERIFY PL SAFING
APCc

AODA SYSTM SUMM
√ IRU CH A, B, C RATE MODE (three) – HI/HI
√ EDM 1, 2, 3, 4 MODE (four) – SAFE(OFF)
 √ Filter Position (four) – <06

2. MNVR TO BURN ATT
C3 √ DAP: A11/AUTO/VERN

NOTE
For attitude maneuvers to/from trim burn
attitude use:
   A10/VERN for nominal maneuver
   rate (0.2 deg/sec)
   A12/VERN for high maneuver
   rate (0.3 deg/sec)

GNC UNIV PTG
TGT ID 2
BV
P 259.2 _______ (per ORB MNVR PAD)
Y 059 _______
OM 000 _______

Cont next page

FS 7–2 ORB OPS/99/FIN A
Maneuver @ MET / : : : 
DAP:  A10(A12)/AUTO/VERN  
GNC UNIV PTG
Initiate TRK – ITEM 19 EXEC

3. CONFIG DAPs

GNC 20 DAP CONFIG
CRT
Configure Fly–Cast DAPs per burn pad
EDIT DAP A – ITEM 3 +1 4 EXEC
PRI ROT PLS – ITEM 53 +________ EXEC
ALT ON TIME – ITEM 61 +1 6 8 EXEC
ALT DELAY – ITEM 62 +1 6 8 EXEC
LOAD – ITEM 5 EXEC

EDIT DAP B – ITEM 4 +1 4 EXEC
PRI ROT PLS – ITEM 53 +________ EXEC
ALT ON TIME – ITEM 61 +________ EXEC
LOAD – ITEM 5 EXEC

XJETS ROT ENA – ITEM 7 EXEC (*)

GNC, OPS 202 PRO

1: GNC ORBIT MNVR EXEC
2: GNC 20 DAP CONFIG
Enter or verify TGT DATA per ORB MNVR PAD
LOAD – ITEM 22 EXEC
TIMER – ITEM 23 EXEC
✓BURN DATA per PAD

CAUTION
Do not perform Item 27

4. DEADBAND COLLAPSE AND BURN SETUP
When within 10 deg (all axes) of attitude:
C3
DAP:  B12/AUTO/VERN

When rates damped:
DAP:  B11/AUTO/VERN

Cont next page
**GNC 25 RM ORBIT**
SW RM INH – ITEM 16 EXEC (*)

F7(F8) FLT CNTLR PWR – ON
SW RM INH – ITEM 16 EXEC (no *)

F6(F8) ADI ERR/RATE – MED
ATT – LVLH
✓ ADI ATT, then:
ATT – REF
REF pb – push

**NOTE**
ADI Rate and attitude needles are invalid during burn.

RHC pulse inputs should only be +Pitch (no Roll or Yaw)

5. **BURN EXEC**

**TIG–1:00**
C3 DAP: A/FREE/ALT
✓ ROT: PULSE/PULSE/PULSE

**GNC 20 DAP CONFIG**
Load Fly–Cast Maneuver DAPs
DAP A – ITEM 1 +1 4 EXEC
DAP B – ITEM 2 +1 4 EXEC

* If RCS CMD lts indicate Roll or *
* Yaw, abort burn *
* Do not make RHC inputs *
* DAP: FREE/VERN *

**TIG RHC**
1 PULSE (+PITCH)
Monitor RCS CMD lts or STOPWATCH
While SECOND PULSE FIRING or TIG + ______ sec
C3 DAP: B
After SECOND PULSE STOPS FIRING or
TIG + ______ sec
DAP: A

Do Not Trim Residuals

FS 7–4 ORB OPS/99/FIN A
RCS JET ACTIVITY

1 PULSE DAP B DAP A

OFF

ON

1.68s 1.68s 1.68s 1.68s

FS 7–5 ORB OPS/99/FIN A
6. **POST BURN RECONFIG**

   F7(F8) FLT CNTLR PWR – OFF
   CRT GNC, OPS 201 PRO

7. **MNVR TO MAPPING ATTITUDE**

   **NOTE**
   For attitude maneuvers to/from trim burn attitude use:
   - A10 for nominal maneuver rate (0.2 deg/sec)
   - A12 for high maneuver rate (0.3 deg/sec)

   C3 √DAP: A/FREE/ALT

   **GNC UNIV PTG**
   TGT ID 2
   BV 5
   P 090
   Y 059
   OM EXEC
   (per ORB MNVR PAD)
   Initiate TRK – ITEM 19 EXEC

   **GNC 20 DAP CONFIG**
   XJETS ROT ENA – ITEM 7 EXEC (no *)
   C3 DAP: A10(A12)/FREE/VERN
   DAP: A/AUTO/VERN

   Resume mapping @ MET /
   (per ORB MNVR PAD)

8. **RECONFIG FOR GROUP B(C)**

   If Group B(C) Pwrdn:
   - O14:F, Pri RJD LOGIC, DRIVER (sixteen) – OFF
   - O15:F, RJDA 1A L2/R2 MANF DRIVER – ON
   - O16:F
   - O14:E, cb DDU (six) – as reqd
   - O15:E, O16:E

   Cont next page

   FS 7–6 ORB OPS/99/FIN A
9. **DEADBAND COLLAPSE AND EXEC ZDS**

*In attitude:*

* If ZDS mnvr MET late by >4 min, *
  * perform ZDS LATE INITIATION *
  * (Cue Card) >> *

DAP:  B13/AUTO/VERN
When deadband collapse complete
DAP:  A11/AUTO/VERN
Future load ZDS maneuver @
MET _____/______/___:
(per ORB MNVR PAD)
OM – ITEM 17 + ______ EXEC
Initiate TRK – ITEM 19 EXEC
MULTI–PULSE FLY–CAST MANEUVER:
+X RCS BURN

O14:F, \( \checkmark \) Pri RJD LOGIC DRIVER (sixteen)  –  ON
O15:F,
O16:F

O14:E, \( \checkmark \) cb DDU (six)  –  cl
O15:E,
O16:E

O6   \( \checkmark \) ANNUN INTENSITY  –  BRIGHT
     ANNUN LAMP TEST  –  L (hold up)
F6   \( \checkmark \) RCS CMD Its (six)  –  illuminated

1. VERIFY PL SAFING
APCc   [AODA SYS SUMM]
\( \checkmark \) IRU CH A,B,C RATE MODE (three)  –  HI/HI
\( \checkmark \) EDM 1,2,3,4 MODE (four)  –  SAFE(OFF)
\( \checkmark \) Filter Position (four)  –  <06

2. MNVR TO BURN ATT
C3   \( \checkmark \) DAP:  A11/AUTO/VERN

NOTE
For attitude maneuvers to/from trim burn attitude use:
A10/VERN for nominal maneuver rate (0.2 deg/sec)
A12/VERN for high maneuver rate (0.3 deg/sec)

GNC UNIV PTG
TGT ID 2
BV 5
P 259.2 (per ORB MNVR PAD)
Y 059
OM 000

Cont next page
Maneuver @ MET: 

C3 DAP: A10(A12)/AUTO/VERN

GNC UNIV PTG

Initiate TRK – ITEM 19 EXEC

3. CONFIG DAPs

GNC 20 DAP CONFIG

CRT Configure Fly–Cast DAPs per burn pad

EDIT DAP A – ITEM 3 +1 5 EXEC

PRI ROT PLS – ITEM 53 +________ EXEC

LOAD – ITEM 5 EXEC

EDIT DAP B – ITEM 4 +1 5 EXEC

PRI ROT PLS – ITEM 53 +________ EXEC

ALT ON TIME – ITEM 61 +________ EXEC

LOAD – ITEM 5 EXEC

XJETS ROT ENA – ITEM 7 EXEC (*)

GNC, OPS 202 PRO

1: GNC ORBIT MNVR EXEC

2: GNC 20 DAP CONFIG

Enter or verify TGT DATA per ORB MNVR PAD

LOAD – ITEM 22 EXEC

TIMER – ITEM 23 EXEC

BURN DATA per PAD

CAUTION

Do not perform Item 27

4. DEADBAND COLLAPSE AND BURN SETUP

When within 10 deg (all axes) of attitude:

C3 DAP: B12/AUTO/VERN

When rates damped:

DAP: B11/AUTO/VERN

GNC 25 RM ORBIT

SW RM INH – ITEM 16 EXEC (*)

F7(F8) FLT CNTLR PWR – ON

SW RM INH – ITEM 16 EXEC (no *)

Cont next page

FS 7–10 ORB OPS/99/FIN A
F6(F8)  ADI ERR/RATE – MED
ATT – LVLH
✓ADI ATT, then:
ATT – REF
REF pb – push

NOTE
ADI Rate and attitude needles are invalid during burn.

RHC pulse inputs should only be +Pitch
(no Roll or Yaw)

5. BURN EXEC

TIG–1:00
C3
DAP: A/FREE/ALT
✓ROT: PULSE/PULSE/PULSE

GNC 20 DAP CONFIG
Load Fly–Cast Maneuver DAPs
DAP A – ITEM 1 +1 5 EXEC
DAP B – ITEM 2 +1 5 EXEC

* If RCS CMD Its indicate Roll or *
* Yaw, abort burn *
* Do not make RHC inputs *
* DAP: FREE/VERN *

TIG  RHC  2 PULSES (+PITCH)
Monitor RCS CMD Its or STOPWATCH
While SECOND PULSE FIRING or TIG
+ ______ sec
C3
DAP: B
RHC
______ PULSES (+PITCH) per burn pad
After LONG PULSE STOPS FIRING or
TIG + ______ sec
C3
DAP: A
RHC
1 PULSE (+PITCH)

Do Not Trim Residuals

Cont next page
2 PULSES

1.68s 1.68s

DAP B RHC PULSES

1.68s 1.68s

DAP A FINAL RHC PULSE

RCS JET ACTIVITY
6. **POST BURN RECONFIG**
   
   F7(F8) FLT CNTLR PWR – OFF
   
   CRT GNC, OPS 201 PRO

7. **MNVR TO MAPPING ATTITUDE**
   
   **NOTE**
   For attitude maneuvers to/from trim burn attitude use:
   
   A10 for nominal maneuver rate
   
   (0.2 deg/sec)
   
   A12 for high maneuver rate
   
   (0.3 deg/sec)

   C3 ✓DAP: A/FREE/ALT

   **GNC UNIV PTG**
   
   TGT ID 2
   
   BV 5
   
   P 090 ______
   
   Y 059 ______
   
   OM ______ (per ORB MNVR PAD)
   
   Initiate TRK – ITEM 19 EXEC

   **GNC 20 DAP CONFIG**
   
   XJETS ROT ENA – ITEM 7 EXEC (no *)

   C3 DAP: A10(A12)/FREE/VERN
   
   DAP: A/AUTO/VERN

   Resume mapping @ MET
   
   /____:____:
   
   (per ORB MNVR PAD)

8. **RECONFIG FOR GROUP B(C)**
   
   If Group B(C) Pwrdn:
   
   O14:F, ✓Pri RJD LOGIC, DRIVER (sixteen) – OFF
   
   O15:F, RJDA 1A L2/R2 MANF DRIVER – ON
   
   O16:F
   
   O14:E, ✓cb DDU (six) – as reqd
   
   O15:E,
   
   O16:E

   Cont next page

   FS 7–13 ORB OPS/99/FIN A
9. **DEADBAND COLLAPSE AND EXEC ZDS**

   In attitude:
   
   * If ZDS mnvr MET late by >4 min, *
   * perform ZDS LATE INITIATION *
   * (Cue Card) >>

   **DAP:** B13/AUTO/VERN
   When deadband collapse complete
   **DAP:** A11/AUTO/VERN
   Future load ZDS maneuver @
   MET _____/______/____:
   (per ORB MNVR PAD)
   **OM** – **ITEM 17** + ______ EXEC
   Initiate **TRK** – **ITEM 19** EXEC
DOUBLET/TRIPLET FLY–CAST MANEUVER:  
+X RCS BURN

O14:F,  √Pri RJD LOGIC, DRIVER (sixteen) – ON
O15:F,
O16:F

O14:E,  √cb DDU (six) – cl
O15:E,
O16:E

O6  √ANNUN INTENSITY – BRIGHT
     ANNUN LAMP TEST – L (hold up)
F6  √RCS CMD Its (six) – illuminated

1. VERIFY PL SAFING

APCc
  AODA SYS SUMM
  √IRU CH A,B,C RATE MODE (three) – HI/HI
  √EDM 1,2,3,4 MODE (four) – SAFE(OFF)
  √Filter Position (four) – <06

2. MNVR TO BURN ATT

C3  √DAP:  A11/AUTO/VERN

NOTE
For attitude maneuvers to/from trim burn
attitude use:
  A10/VERN for nominal maneuver
  rate (0.2 deg/sec)
  A12/VERN for high maneuver
  rate (0.3 deg/sec)

GNC UNIV PTG
TGT ID 2
BV 5
P 259.2 ___ (per ORB
     MNVR PAD)
Y 059 ___
OM 000 ___

Cont next page
Maneuver @ MET: C3 DAP: A10(A12)/AUTO/VERN
GNC UNIV PTG
Initiate TRK – ITEM 19 EXEC

3. CONFIG DAPs

**GNC 20 DAP CONFIG**

CRT Configure Fly–Cast DAPs per burn pad
EDIT DAP A – ITEM 3 +1 4 EXEC
PRI ROT PLS – ITEM 53 +_____ EXEC
ON TIME – ITEM 61 +_____ EXEC
DELAY – ITEM 62 +_____ EXEC
LOAD – ITEM 5 EXEC

XJETS ROT ENA – ITEM 7 EXEC (*)

GNC, OPS 202 PRO

1: GNC ORBIT MNVR EXEC
2: GNC 20 DAP CONFIG

Enter or verify TGT DATA per ORB MNVR PAD
LOAD – ITEM 22 EXEC
TIMER – ITEM 23 EXEC
✓BURN DATA per PAD

**CAUTION**
Do not perform Item 27

4. DEADBAND COLLAPSE AND BURN SETUP

When within 10 deg (all axes) of attitude:

C3
DAP: B12/AUTO/VERN

When rates damped:
DAP: B11/AUTO/VERN

**GNC 25 RM ORBIT**
SW RM INH – ITEM 16 EXEC (*)
F7(F8) FLT CNTLR PWR – ON
SW RM INH – ITEM 16 EXEC (no *)

Cont next page
ADI ERR/RATE – MED
ATT – LVLH
✓ADI ATT, then:
   ATT – REF
   REF pb – push

NOTE
ADI Rate needles are invalid during burn.

RHC pulse inputs should only be +Pitch (no Roll or Yaw)

5. **BURN EXEC**

| TIG – 1:00 |
| C3 |

  DAP: A/FREE/ALT
  ✓ROT: PULSE/PULSE/PULSE

**GNC 20 DAP CONFIG**
Load Fly–Cast Maneuver DAPs
DAP A – ITEM 1 +1 4 EXEC

  * If RCS CMD Its indicate Roll or Yaw, abort burn
  * Do not make RHC inputs
  * DAP: FREE/VERN

| TIG | RHC |

  1 PULSE (+PITCH)

Monitor RCS CMD Its
✓Burn complete in ______ sec

Do Not Trim Residuals

Cont next page
RHC: 1 PULSE

ON  ___s  ___s  ___s

OFF

RCS JET ACTIVITY

DOUBLET
TRIPLET

RHC: 1 PULSE

ON

OFF

RCS JET ACTIVITY
6. **POST BURN RECONFIG**

   F7(F8) FLT CNTLR PWR – OFF
   CRT GNC, OPS 201 PRO

7. **MNVR TO MAPPING ATTITUDE**

   **NOTE**
   For attitude maneuvers to/from trim burn attitude use:
   - A10 for nominal maneuver rate (0.2 deg/sec)
   - A12 for high maneuver rate (0.3 deg/sec)

   C3 √DAP: A/FREE/ALT

   **GNC UNIV PTG**
   TGT ID 2
   BV 5
   P 090 ______
   Y 059 ______
   OM ______ (per ORB MNVR PAD)
   Initiate TRK – ITEM 19 EXEC

   **GNC 20 DAP CONFIG**
   XJETS ROT ENA – ITEM 7 EXEC (no *)
   C3 DAP: A10(A12)/FREE/VERN
   DAP: A/AUTO/VERN

   Resume mapping @ MET
   ______:______:______
   (per burn pad)

8. **RECONFIG FOR GROUP B(C)**

   If Group B(C) Pwrdn:
   O14:F, Pri RJD LOGIC,DRIVER (sixteen) – OFF
   O15:F, RJDA 1A L2/R2 MANF DRIVER – ON
   O16:F
   O14:E, √cb DDU (six) – as reqd
   O15:E,
   O16:E

   Cont next page
9. **DEADBAND COLLAPSE AND EXEC ZDS**

*In attitude:*

* If ZDS mnvr MET late by >4 min, *
  * perform ZDS LATE INITIATION *
  * (Cue Card) >> *

**DAP:** B13/AUTO/VERN
When deadband collapse complete
**DAP:** A11/AUTO/VERN
Future load ZDS maneuver @
**MET ______/______/____:**
(per ORB MNVR PAD)
**OM – ITEM 17 + ______ EXEC**
Initiate TRK – ITEM 19 EXEC
SINGLE–PULSE FLY–CAST MANEUVER PAD FOR

RCS SEL * 4 +X
WT 9 __________
TIG 10 __________/
TGT PEG 7 *

ΔVTOT * _________
TGO * ________:

WT 9 __________
TIG 10 __________/
TGT PEG 7 *

ΔVTOT * _________
TGO * ________:

ΔVX * 20 ( ) ________
ΔVY * 20 ( ) ________
ΔVZ * 31 ( ) ________

ΔVTOT/C0042 ________:

PRE–BURN

MNVR TO BURN ATT
DAP A10 ______ A12 ______
P ______
Y ______
OM ______
MANEUVER @ MET ______/

CONFIG DAPS
EDIT DAP A PRI ROT PLS – ITEM 53 +____
EDIT DAP B PRI ROT PLS – ITEM 53 +____
ALT ON TIME – ITEM 61 +____

BURN EXEC
While SECOND PULSE FIRING or TIG +____
After SECOND PULSE STOPS FIRING or TIG +____

POST–BURN

MNVR TO MAPPING ATTITUDE
DAP A10 ______ A12 ______
P ______
Y ______
OM ______
RESUME MAPPING @ MET ______/

DEADBAND COLLAPSE AND EXEC ZDS
FUTURE load ZDS maneuver @ MET ______/:
OM – ITEM 17 +____

NOTES:
BURN TYPE: NON–CRITICAL _____ CRITICAL ______
TIG SLIP PRIOR TO DAP: FREE ______ (RE–LOAD TGTS)

* Read–up not required

FS 7–23 ORB OPS/99/FIN A
SINGLE–PULSE FLY–CAST MANEUVER PAD FOR

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<tr>
<th>Parameter</th>
<th>Value</th>
<th>Parameter</th>
<th>Value</th>
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<tbody>
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<td>RCS SEL</td>
<td>4 +X</td>
<td>VTOT</td>
<td></td>
</tr>
<tr>
<td>WT</td>
<td>9</td>
<td>TGO</td>
<td></td>
</tr>
<tr>
<td>TIG</td>
<td>10/1:1:1:1</td>
<td>VGO X</td>
<td></td>
</tr>
<tr>
<td>TGT PEG 7</td>
<td>ΔVX 19 ( )</td>
<td>VGO Y</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ΔVY 20 ( )</td>
<td>VGO Z</td>
<td></td>
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<tr>
<td></td>
<td>ΔVZ 21 ( )</td>
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**PRE–BURN**

MNVR TO BURN ATT

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<th>A10</th>
<th>A12</th>
<th>P</th>
<th>Y</th>
<th>OM</th>
<th>MANEUVER @ MET</th>
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CONFIG DAPS

<table>
<thead>
<tr>
<th>ED TAP A PRI ROT PLS</th>
<th>ITEM 53 +</th>
<th>ED TAP B PRI ROT PLS</th>
<th>ITEM 53 +</th>
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</thead>
<tbody>
<tr>
<td>ALT ON TIME</td>
<td>ITEM 61 +</td>
<td></td>
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</tbody>
</table>

BURN EXEC

While SECOND PULSE FIRING or TIG +______
After SECOND PULSE stops FIRING or TIG +______

**POST–BURN**

MNVR TO MAPPING ATTITUDE

<table>
<thead>
<tr>
<th>DAP</th>
<th>A10</th>
<th>A12</th>
<th>P</th>
<th>Y</th>
<th>OM</th>
<th>RESUME MAPPING @ MET</th>
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</table>

DEADBAND COLLAPSE AND EXEC ZDS

FUTURE load ZDS maneuver @ MET / / / : : :
OM – ITEM 17 +______

NOTES

<table>
<thead>
<tr>
<th>BURN TYPE:</th>
<th>NON–CRITICAL</th>
<th>CRITICAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIG SLIP PRIOR TO DAP:</td>
<td>FREE</td>
<td>(RE–LOAD TGTS)</td>
</tr>
</tbody>
</table>

FS 7–24

ORB OPS/99/FIN A
## SINGLE–PULSE FLY–CAST MANEUVER PAD FOR

### RCS SEL
- 4
- +X

### WT
- 9
- 

### TIG
- 10
- 

### TGT PEG 7
- \( \Delta V_X \)
  - 19
- \( \Delta V_Y \)
  - 20
- \( \Delta V_Z \)
  - 21

### \( \Delta V_{TOT} \)
- 

### TGO
- *
- 

### VGO X
- *
- 

### VGO Y
- *
- 

### VGO Z
- *
- 

### PRE–BURN

**MNVR TO BURN ATT**
- DAP
  - A10
  - A12
- P
- Y
- OM
- MANEUVER @ MET
- 

**CONFIG DAPS**
- EDIT DAP A
  - PRI ROT PL S
  - ITEM 53
- EDIT DAP B
  - PRI ROT PL S
  - ITEM 53
  - ALT ON TIME
  - ITEM 61

**BURN EXEC**
- While SECOND PULSE FIRING or TIG
- After SECOND PULSE STOPS FIRING or TIG

### POST–BURN

**MNVR TO MAPPING ATTITUDE**
- DAP
  - A10
  - A12
- P
- Y
- OM
- RESUME MAPPING @ MET
- 

**DEADBAND COLLAPSE AND EXEC ZDS**
- FUTURE load ZDS maneuver @ MET
- OM
- ITEM 17

**NOTES**
- BURN TYPE: NON–CRITICAL
- CRITICAL
- TIG SLIP PRIOR TO DAP: FREE
- (RE–LOAD TGTS)

---

FS 7–25

ORB OPS/99/FIN A
SINGLE–PULSE FLY–CAST MANEUVER PAD FOR ______________________

RCS SEL * 4 +X
WT 9 __________
TIG 10 __________

TGT PEG 7 *
ΔVX* 19 ( ) _______
ΔVY* 20 ( ) _______
ΔVZ* 21 ( ) _______

ΔVTOT* _______
TGO* ______:_____
VTOT/C0042 _______

VGO X* ( ) _______
VGO Y* ( ) _______
VGO Z* ( ) _______

ΔVX/C0042 _______
ΔVY/C0042 _______
ΔVZ/C0042 _______

TGT PEG 7/C0042 ΔVX/C0042 _______
ΔVY/C0042 _______
ΔVZ/C0042 _______

ΔVTOT/C0042 _______
TGO/C0042 ______:_____
VTOT/C0042 _______

VGO X/C0042 ( ) _______
VGO Y/C0042 ( ) _______
VGO Z/C0042 ( ) _______

ΔVX/C0042 _______
ΔVY/C0042 _______
ΔVZ/C0042 _______

ΔVTOT/C0042 _______
TGO/C0042 ______:_____
VTOT/C0042 _______

VGO X/C0042 ( ) _______
VGO Y/C0042 ( ) _______
VGO Z/C0042 ( ) _______

ΔVX/C0042 _______
ΔVY/C0042 _______
ΔVZ/C0042 _______

TGT PEG 7/C0042 ΔVX/C0042 _______
ΔVY/C0042 _______
ΔVZ/C0042 _______

ΔVTOT/C0042 _______
TGO/C0042 ______:_____
VTOT/C0042 _______

VGO X/C0042 ( ) _______
VGO Y/C0042 ( ) _______
VGO Z/C0042 ( ) _______

ΔVX/C0042 _______
ΔVY/C0042 _______
ΔVZ/C0042 _______

ΔVTOT/C0042 _______
TGO/C0042 ______:_____
VTOT/C0042 _______

VGO X/C0042 ( ) _______
VGO Y/C0042 ( ) _______
VGO Z/C0042 ( ) _______

ΔVX/C0042 _______
ΔVY/C0042 _______
ΔVZ/C0042 _______

PRE–BURN

MNVR TO BURN ATT
DAP A10 _____ A12 _____
P _____
Y _____
OM _____
MANEUVER @ MET _______

CONFIG DAPS
EDIT DAP A PRI ROT PLS – ITEM 53 +____
EDIT DAP B PRI ROT PLS – ITEM 53 +____
ALT ON TIME – ITEM 61 +____

BURN EXEC
While SECOND PULSE FIRING or TIG +____
After SECOND PULSE Stops FIRING or TIG +____

POST–BURN

MNVR TO MAPPING ATTITUDE
DAP A10 _____ A12 _____
P _____
Y _____
OM _____
RESUME MAPPING @ MET _______

DEADBAND COLLAPSE AND EXEC ZDS
FUTURE load ZDS maneuver @ MET _______
OM – ITEM 17 +____

NOTES: BURN TYPE: NON–CRITICAL _____ CRITICAL ______
TIG SLIP PRIOR TO DAP: FREE _____ (RE–LOAD TGTS)

FS 7–26 ORB OPS/99/FIN A
# SINGLE–PULSE FLY–CAST MANEUVER PAD FOR

| RCS SEL * | 4 | +X | ΔVTOT * |   |
| WT | 9 |   | TGO * |   |
| TIG | 10 | / | / | / |

| TGT PEG 7 * | ΔVX* | 19 | ( ) |   |
| ΔVY* | 20 | ( ) |   |
| ΔVZ* | 21 | ( ) |   |

| ΔVTOT |   |
| TGO |   |
| VGO X* | ( ) |   |
| VGO Y* | ( ) |   |
| VGO Z* | ( ) |   |

### PRE–BURN

**MNVR TO BURN ATT**

- DAP A10 ___ A12 ___
- P ___
- Y ___
- OM ___
- MANEUVER @ MET / / / / /

**CONFIG DAPS**

- EDIT DAP A PRI ROT PLS – ITEM 53 +
- EDIT DAP B PRI ROT PLS – ITEM 53 +
- ALT ON TIME – ITEM 61 +

**BURN EXEC**

- While SECOND PULSE FIRING or TIG +
- After SECOND PULSE STOPS FIRING or TIG +

### POST–BURN

**MNVR TO MAPPING ATTITUDE**

- DAP A10 ___ A12 ___
- P ___
- Y ___
- OM ___
- RESUME MAPPING @ MET / / / / /

**DEADBAND COLLAPSE AND EXEC ZDS**

- FUTURE load ZDS maneuver @ MET / / / / /
- OM – ITEM 17 +

### NOTES:

- BURN TYPE: NON–CRITICAL ___ CRITICAL ___
- TIG SLIP PRIOR TO DAP: FREE ___ (RE–LOAD TGTS)
SINGLE–PULSE FLY–CAST MANEUVER PAD FOR

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Notes</th>
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<tbody>
<tr>
<td>RCS SEL *</td>
<td>4 +X</td>
<td></td>
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<tr>
<td>WT</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>TIG</td>
<td>10 / / / /</td>
<td></td>
</tr>
<tr>
<td>TGT PEG 7</td>
<td>19 ( )</td>
<td></td>
</tr>
<tr>
<td>ΔVTOT *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TGO *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VGO X *</td>
<td>( )</td>
<td></td>
</tr>
<tr>
<td>VGO Y *</td>
<td>( )</td>
<td></td>
</tr>
<tr>
<td>VGO Z *</td>
<td>( )</td>
<td></td>
</tr>
<tr>
<td>ΔVTOT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔVX *</td>
<td>19 ( )</td>
<td></td>
</tr>
<tr>
<td>ΔVY *</td>
<td>20 ( )</td>
<td></td>
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<tr>
<td>ΔVZ *</td>
<td>21 ( )</td>
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</table>

**PRE–BURN**

- MNVR TO BURN ATT
  - DAP A10 A12
  - P
  - Y
  - OM
  - MANEUVER @ MET / / / : :

- CONFIG DAPS
  - EDIT DAP A PRI ROT PLS – ITEM 53 +
  - EDIT DAP B PRI ROT PLS – ITEM 53 +
  - ALT ON TIME – ITEM 61 +

- BURN EXEC
  - While SECOND PULSE FIRING or TIG +
  - After SECOND PULSE STOPS FIRING or TIG +

**POST–BURN**

- MNVR TO MAPPING ATTITUDE
  - DAP A10 A12
  - P
  - Y
  - OM
  - RESUME MAPPING @ MET / / : :

- DEADBAND COLLAPSE AND EXEC ZDS
  - FUTURE load ZDS maneuver @ MET / / : :
  - OM – ITEM 17 +

**NOTES:**
- BURN TYPE: NON–CRITICAL CRITICAL
- TIG SLIP PRIOR TO DAP: FREE (RE–LOAD TGTS)

Read–up not required

FS 7–28
ORB OPS/99/FIN A
## MULTI–PULSE FLY–CAST MANEUVER PAD FOR

### PRE–BURN

- **RCS SEL**: 4 +X
- **WT**: 9
- **TIG**: 10
- **TGT PEG 7**: 19
- **ΔVTOT**: ______
- **TGO**: ______:
- **VGO X**: ( ) ______
- **VGO Y**: ( ) ______
- **VGO Z**: ( ) ______
- **ΔVTOT**: ______
- **TGO**: ______:
- **VGO X**: ( ) ______
- **VGO Y**: ( ) ______
- **VGO Z**: ( ) ______

### POST–BURN

- **MNVR TO MAPPING ATTITUDE**: DAP A10 A12
  - **P**: ______
  - **Y**: ______
  - **OM**: ______
  - **RESUME MAPPING @ MET**: ______/____/____:
- **DEADBAND COLLAPSE AND EXEC ZDS**: FUTURE load ZDS maneuver @ MET ______/____/____:
  - **OM**: ITEM 17 ______

### NOTES

- **BURN TYPE**: NON–CRITICAL CRITICAL
- **TIG SLIP PRIOR TO DAP**: FREE (RE–LOAD TGTS)

---

**FS 7–29**

**ORB OPS/99/FIN A**
MULTI–PULSE FLY–CAST MANEUVER PAD FOR

| RCS SEL | 4 | +X | ΔVTOT |   |
| WT      | 9 |    | TGO   |   |
| TIG     | 10 | /:::|       |   |
| TGT PEG 7 |   |    | VGO X | (   ) |
| ΔVX*    | 19 | (   ) | VGO Y | (   ) |
| ΔVY*    | 20 | (   ) | VGO Z | (   ) |
| ΔVZ*    | 21 | (   ) |       |   |

PRE–BURN

MNVR TO BURN ATT

DAP A10 A12

P

Y

OM

MANEUVER @ MET /:::

CONFIG DAPS

EDIT DAP A PRI ROT PL S – ITEM 53 +

EDIT DAP B PRI ROT PL S – ITEM 53 +

ALT ON TIME – ITEM 61 +

BURN EXEC

While SECOND PULSE FIRING or TIG +

PULSES (+PITCH)

After LONG PULSE STOPS FIRING or TIG +

POST–BURN

MNVR TO MAPPING ATTITUDE

DAP A10 A12

P

Y

OM

RESUME MAPPING @ MET /:::

DEADBAND COLLAPSE AND EXEC ZDS

FUTURE load ZDS maneuver @ MET /:::

OM – ITEM 17 +

NOTES:

BURN TYPE: NON–CRITICAL CRITICAL

TIG SLIP PRIOR TO DAP: FREE (RE–LOAD TGTS)

FS 7–30

ORB OPS/99/FIN A
## DOUBLET/TRIPLET FLY–CAST MANEUVER PAD FOR

<table>
<thead>
<tr>
<th>RCS SEL *</th>
<th>WT</th>
<th>TIG</th>
<th>ΔVTOT *</th>
<th>TGO *</th>
<th>ΔVTOT *</th>
<th>TGO *</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>9</td>
<td>10</td>
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</table>

<table>
<thead>
<tr>
<th>ΔVTOT *</th>
<th>ΔVTOT *</th>
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<tbody>
<tr>
<td>_______</td>
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<table>
<thead>
<tr>
<th>ΔVX *</th>
<th>ΔVY *</th>
<th>ΔVZ *</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>20</td>
<td>21</td>
</tr>
</tbody>
</table>

ΔVX * ( ) ΔVY * ( ) ΔVZ * ( )

ΔVTOT/C0042

<table>
<thead>
<tr>
<th>TGT PEG 7 *</th>
<th>VGO X *</th>
<th>VGO Y *</th>
<th>VGO Z *</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΔVTOT/C0042</td>
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<td></td>
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</tr>
</tbody>
</table>

ΔVTOT/C0042

<table>
<thead>
<tr>
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<th>ΔVTOT/C0042</th>
<th>ΔVTOT/C0042</th>
</tr>
</thead>
<tbody>
<tr>
<td>_______</td>
<td>_______</td>
<td>_______</td>
</tr>
</tbody>
</table>

### PRE–BURN

**MNVR TO BURN ATT**

<table>
<thead>
<tr>
<th>DAP</th>
<th>A10</th>
<th>A12</th>
<th>P</th>
<th>Y</th>
<th>OM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

MANEUVER @ MET ______/____/:____:

**CONFIG DAPS**

<table>
<thead>
<tr>
<th>EDIT DAP</th>
<th>PRI ROT PLS</th>
<th>ALT ON TIME</th>
<th>ALT DELAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAP</td>
<td>ITEM 53</td>
<td>ITEM 61</td>
<td>ITEM 62</td>
</tr>
</tbody>
</table>

**BURN EXEC**

Burn complete in ______

### POST–BURN

**MNVR TO MAPPING ATTITUDE**

<table>
<thead>
<tr>
<th>DAP</th>
<th>A10</th>
<th>A12</th>
<th>P</th>
<th>Y</th>
<th>OM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

RESUME MAPPING @ MET ______/____/:____:

**DEADBAND COLLAPSE AND EXEC ZDS**

FUTURE load ZDS maneuver @ MET ______/____/:____:

OM – ITEM 17 +____

### NOTES:

**BURN TYPE:**

<table>
<thead>
<tr>
<th>NON–CRITICAL</th>
<th>CRITICAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

**TIG SLIP PRIOR TO DAP:**

<table>
<thead>
<tr>
<th>FREE</th>
<th>(RE–LOAD TGTS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>_____</td>
<td></td>
</tr>
</tbody>
</table>

FS 7–31

ORB OPS/99/FIN A
## DOUBLET/TRIPLET FLY–CAST MANEUVER PAD FOR

| RCS SEL * | 4 | +X | ∆VTOT * |   | TGO * |   |
| WT | 9 |   |   |   |   |   |
| TIG | 10 |   |   |   |   |   |

| TGT PEG 7 * | ∆VX | 19 | ( ) |   | VGO X * | ( ) |   |
| ∆VY | 20 | ( ) |   |   | VGO Y * | ( ) |   |
| ∆VZ | 21 | ( ) |   |   | VGO Z * | ( ) |   |

### PRE–BURN

**MNVR TO BURN ATT**
- **DAP** A10 ______ A12 ______
- **P** ______
- **Y** ______
- **OM** ______
- **MANEUVER @ MET** ______

**CONFIG DAPS**
- **EDIT DAP A PRI ROT PLS** – ITEM 53 +
- **ALT ON TIME** – ITEM 61 +
- **ALT DELAY** – ITEM 62 +

**BURN EXEC**
- √ Burn complete in ______

### POST–BURN

**MNVR TO MAPPING ATTITUDE**
- **DAP** A10 ______ A12 ______
- **P** ______
- **Y** ______
- **OM** ______
- **RESUME MAPPING @ MET** ______

**DEADBAND COLLAPSE AND EXEC ZDS**
- **FUTURE load ZDS maneuver @ MET** ______
- **OM – ITEM 17 +**

### NOTES
- **BURN TYPE:** NON–CRITICAL ______ CRITICAL ______
- **TIG SLIP PRIOR TO DAP:** FREE ______ (RE–LOAD TGTs)

---

FS 7–32

ORB OPS/99/FIN A
DOUBLE/TRIPLET FLY–CAST MANEUVER PAD FOR _______________________

RCS SEL  *  4  +X  ∆VTOT  *  _____:
WT  9  ________  TGO  *  _____:
TIG  10  _____/_____/_____/_____
TGT PEG 7  *  
   ∆VX  *  19  ( ) ________
   ∆VY  *  20  ( ) ________
   ∆VZ  *  21  ( ) ________

VGO X  *  ( ) ________
VGO Y  *  ( ) ________
VGO Z  *  ( ) ________

ΔVTOT  *  _____:
TGO  *  _____:

PRE–BURN

MNVR TO BURN ATT
DAP  A10 _____  A12 _____
P  _____
Y  _____
OM  _____
MANEUVER @ MET  _____/_____:

CONFIG DAPS
EDIT DAP A  PRI ROT PLS  – ITEM 53 +____
ALT ON TIME  – ITEM 61 +____
ALT DELAY  – ITEM 62 +____

BURN EXEC
Burn complete in ________

POST–BURN

MNVR TO MAPPING ATTITUDE
DAP  A10 _____  A12 _____
P  _____
Y  _____
OM  _____
RESUME MAPPING @ MET  _____/_____:

DEADBAND COLLAPSE AND EXEC ZDS
FUTURE load ZDS maneuver @ MET  _____/_____:
OM – ITEM 17 +____

NOTES:
BURN TYPE:  NON–CRITICAL _____  CRITICAL ______
TIG SLIP PRIOR TO DAP:  FREE ____:____ (RE–LOAD TGTS)

FS 7–33  ORB OPS/99/FIN A
DOUBLET/TRIPLET FLY–CAST MANEUVER PAD FOR _______________________

RCS SEL * 4 +X
WT 9 __________
TIG 10 ____/____:____:____.

TGT PEG 7 *
ΔVX* 19 ( ) _______
ΔVY* 20 ( ) _______
ΔVZ* 21 ( ) _______

ΔVTOT * _______
TGO * ______:

VGO X* ( ) _______
VGO Y* ( ) _______
VGO Z* ( ) _______

VGO X /C0042 _______
ΔVX /C0042 _______
ΔVY /C0042 _______
ΔVZ /C0042 _______

NOTES: BURN TYPE: NON–CRITICAL ______ CRITICAL ______
TIG SLIP PRIOR TO DAP: FREE ______ (RE–LOAD TGTS)

PRE–BURN
MNVR TO BURN ATT
DAP A10 _____ A12 _____
P ______
Y ______
OM ______
MANEUVER @ MET ____/____:____:

CONFIG DAPS
EDIT DAP A PRI ROT PLS – ITEM 53 +____
ALT ON TIME – ITEM 61 +____
ALT DELAY – ITEM 62 +____

BURN EXEC
✓ Burn complete in __________

POST–BURN
MNVR TO MAPPING ATTITUDE
DAP A10 _____ A12 _____
P ______
Y ______
OM ______
RESUME MAPPING @ MET ____/____:____:

DEADBAND COLLAPSE AND EXEC ZDS
FUTURE load ZDS maneuver @ MET ____/____:____:
OM – ITEM 17 +____

Read–up not required

FS 7–34
ORB OPS/99/FIN A
### DOUBLET/TRIPLET FLY-CAST MANEUVER PAD FOR

| RCS SEL * | 4   | +X  | ΔVTOT * |   |
| WT        | 9   |     | TGO *    |   |
| TIG       | 10  | / / : : : : | VGO X * | ( ) |
| TGT PEG 7 * | 19 | ( ) | VGO Y * | ( ) |
| ΔVX *     | 20  | ( ) | VGO Z * | ( ) |
| ΔVY *     | 21  | ( ) |         |   |

**PRE-BURN**

**MNVR TO BURN ATT**

<table>
<thead>
<tr>
<th>DAP</th>
<th>A10</th>
<th>A12</th>
<th>P</th>
<th>Y</th>
<th>OM</th>
<th>MANEUVER @ MET</th>
<th></th>
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</table>

**CONFIG DAPS**

<table>
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<tr>
<th>EDIT DAP A</th>
<th>PRI ROT PLS</th>
<th>ALT ON TIME</th>
<th>ALT DELAY</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>– ITEM 53 +</td>
<td>– ITEM 61 +</td>
<td>– ITEM 62 +</td>
</tr>
</tbody>
</table>

**BURN EXEC**

Burn complete in __________

**POST-BURN**

**MNVR TO MAPPING ATTITUDE**

<table>
<thead>
<tr>
<th>DAP</th>
<th>A10</th>
<th>A12</th>
<th>P</th>
<th>Y</th>
<th>OM</th>
<th>RESUME MAPPING @ MET</th>
<th></th>
</tr>
</thead>
</table>

**DEADBAND COLLAPSE AND EXEC ZDS**

FUTURE load ZDS maneuver @ MET __________

OM – ITEM 17 +

**NOTES:**

- **BURN TYPE:** NON-CRITICAL _____ CRITICAL _____
- **TIG SLIP PRIOR TO DAP:** FREE _____ (RE-LOAD TGTs)

FS 7–35

ORB OPS/99/FIN A
### DOUBLET/TRIPLET FLY–CAST MANEUVER PAD FOR _______________________

<table>
<thead>
<tr>
<th>RCS SEL *</th>
<th>WT</th>
<th>TIG</th>
<th>ΔVTOT *</th>
<th>TGO *</th>
<th>ΔVX*</th>
<th>VGO X*</th>
<th>ΔVY*</th>
<th>VGO Y*</th>
<th>ΔVZ*</th>
<th>VGO Z*</th>
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<tbody>
<tr>
<td>4</td>
<td>9</td>
<td>10</td>
<td></td>
<td></td>
<td>19</td>
<td></td>
<td>20</td>
<td></td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>+X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>( )</td>
<td></td>
<td>( )</td>
<td></td>
<td>( )</td>
<td></td>
</tr>
<tr>
<td>WT 9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TIG 10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PRE–BURN**

- MNVR TO BURN ATT
  - DAP A10 A12
  - P __________
  - Y __________
  - OM __________
  - MANEUVER @ MET __________
- CONFIG DAPS
  - EDIT DAP A PRI ROT PL$S - ITEM 53 +
  - ALT ON TIME - ITEM 61 +
  - ALT DELAY - ITEM 62 +
- BURN EXEC
  - Burn complete in __________

**POST–BURN**

- MNVR TO MAPPING ATTITUDE
  - DAP A10 A12
  - P __________
  - Y __________
  - OM __________
  - RESUME MAPPING @ MET __________
- DEADBAND COLLAPSE AND EXEC ZDS
  - FUTURE load ZDS maneuver @ MET __________
  - OM - ITEM 17 +

**NOTES:**
- BURN TYPE: NON–CRITICAL critical
- TIG SLIP PRIOR TO DAP: FREE (RE–LOAD TGTS)
- Burn complete in __________
<table>
<thead>
<tr>
<th>SRTM PULSE TESTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>VRCS PULSE TEST #1</td>
</tr>
<tr>
<td>#2</td>
</tr>
<tr>
<td>80% PRCS PULSE TEST</td>
</tr>
<tr>
<td>100% PRCS PULSE TEST</td>
</tr>
</tbody>
</table>
VRCS PULSE TEST #1

O14, O15 cb MNA, B DDU L (two) – cl

1. PULSE TEST PREP

   APC
   \[\text{AODA SYS SUMM}\]
   √ ATT Control Status – Timer
   √ Mode – TRK
   √ tracking three targets

   \[\text{GNC 20 DAP CONFIG}\]
   √ DAP: A10/AUTO/VERN
   √ CNTL ACC – (2)

   \[\text{GNC 25 RM ORBIT}\]
   SW RM INH – ITEM 16 EXEC (*)
   F7 L FLT CNTLR PWR – ON
   SW RM INH – ITEM 16 EXEC (no *)

2. MAST SETTLING

   TIG–2:00
   DAP: A/FREE/VERN
   √ DAP ROT: PULSE/PULSE/PULSE

   \begin{center}
   \textbf{CAUTION}
   \end{center}
   Do not select DAP: AUTO, INRTL, or LVLH while DAP B3 (CNTL ACC – 0) is loaded. Selection of closed loop attitude control in this config will result in excessive jet firings and eventual loss of vehicle control.

   \begin{center}
   \textbf{NOTE}
   \end{center}
   Vehicle rates displayed on Universal Pointing and on ADIs will be incorrect while DAP B3 (CNTL ACC – 0) is loaded.

Cont next page
3. **CONFIG DAPs**

   **GNC 20 DAP CONFIG**
   
   ITEM 2 +3 EXEC
   
   DAP B VERN ROT PULSE – ITEM 46
   
   +0.035 EXEC
   
   √DAP B VERN CNTL ACC – (0)

   **C3**
   
   DAP: B3/FREE/VERN

4. **PULSE TEST EXEC**

   On MCC GO:
   
   TIG
   
   L RHC: +ROLL (1 pulse)
   
   Fire F5L,L5L,L5D for 1.52 sec
   
   TIG+5:00
   
   L RHC: –ROLL (1 pulse)
   
   Fire F5R,R5R,R5D for 1.52 sec

5. **MAST SETTLING AND RECONFIG**

   **F7**
   
   L FLT CNTLR PWR – OFF
   
   **C3**
   
   DAP: A10/FREE/VERN

   **GNC 20 DAP CONFIG**
   
   √DAP A VERN CNTL ACC – (2)
   
   √NOTCH FLTR ENA – (*)

6. **RESUME ATTITUDE CONTROL**

   **TIG+7:00**
   
   DAP: A/LVLH/VERN
VRCS PULSE TEST #2

If attitude maintenance reqd, √MCC
DAP: A10/AUTO/VERN

1. PULSE TEST PREP
   APC
   AODA SYS SUMM
   √ATT Control Status – Timer
   √Mode – TRK
   √tracking three targets
   L12L √DAMPER UNCAGED tb (two) – gray

GNC 20 DAP CONFIG
   √DAP: A10/LVLH/VERN
   √CNTL ACC – (2)

GNC 25 RM ORBIT
   SW RM INH – ITEM 16 EXEC (*)
   F7 L FLT CNTLR PWR – ON
   SW RM INH – ITEM 16 EXEC (no *)

2. MAST SETTLING
   TIG–2:00
   DAP: A/FREE/VERN
   √DAP ROT: PULSE/PULSE/PULSE

CAUTION
Do not select DAP: AUTO, INRTL, or LVLH while DAP B3 (CNTL ACC – 0) is loaded. Selection of closed loop attitude control in this config will result in excessive jet firings and eventual loss of vehicle control.

NOTE
Vehicle rates displayed on Universal Pointing and on ADIs will be incorrect while DAP B3 (CNTL ACC – 0) is loaded

Cont next page
3. **CONFIG DAPs**

   *FS 8–5 ORB OPS/99/FIN A*

<table>
<thead>
<tr>
<th><strong>GNC 20 DAP CONFIG</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ITEM 2</strong> +3 EXEC</td>
</tr>
<tr>
<td>DAP B VERN ROT PULSE – ITEM 46 +0.0 3 5 EXEC</td>
</tr>
<tr>
<td>✓ DAP B VERN CNTL ACC – (0)</td>
</tr>
</tbody>
</table>

   **C3** DAP: B3/FREE/VERN

4. **PULSE TEST EXEC**

   On MCC GO:

   **TIG**

   | L RHC: | +ROLL (1 pulse) |
   | Fire F5L,L5L,L5D for 1.52 sec |

**GNC 20 DAP CONFIG**

| DAP B VERN ROT PULSE – ITEM 46 +0.0 2 0 EXEC |

   **TIG+2:00**

   | L RHC: | +PITCH (1 pulse) |
   | Fire F5L and F5R for 1.52 sec |

**GNC 20 DAP CONFIG**

| DAP B VERN ROT PULSE – ITEM 46 +0.0 2 3 EXEC |

   **TIG+4:00**

   | L RHC: | +YAW (1 pulse) |
   | Fire R5R and F5L for 1.52 sec |

   **F7**

   | L FLT CNTLR PWR – OFF |

5. **RECONFIG MAST DEPLOY DAPs**

   *FS 8–5 ORB OPS/99/FIN A*

<table>
<thead>
<tr>
<th><strong>GNC 20 DAP CONFIG</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>EDIT DAP A10 – ITEM 3 +1.0 EXEC</td>
</tr>
<tr>
<td>CNTL ACC – ITEM 68 +4 EXEC</td>
</tr>
<tr>
<td>LOAD – ITEM 5 EXEC</td>
</tr>
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</table>

6. **RESUME ATTITUDE CONTROL**

<table>
<thead>
<tr>
<th><strong>GNC 20 DAP CONFIG</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ NOTCH FLTR ENA – (8)</td>
</tr>
<tr>
<td>✓ DAP A VERN CNTL ACC – (4)</td>
</tr>
</tbody>
</table>

   **TIG+6:00**

   | DAP: A/AUTO/VERN |

   Cont next page
7. **DEADBAND COLLAPSE**

✓ In attitude:
  
  DAP: B13/AUTO/VERN

When deadband collapse complete
  
  DAP: A11/AUTO/VERN

O14, O15 cb MNA, B DDU L (two) – as reqd
80% PRCS PULSE TEST

O14, O15 cb MNA, B DDU L (two) – cl

1. VERIFY PL SAFING

APCc

AODA SYS SUMM

✓ IRU CH A, B, C RATE MODE (three) – HI/ HI
✓ EDM 1, 2, 3, 4 MODE (four) – SAFE(OFF)
✓ Filter Position (four) – <06

2. ATTITUDE MNVR

NOTE

For attitude maneuvers use:
A10/VERN for nominal maneuver rate (0.2 deg/sec)
A12/VERN for high maneuver rate (0.3 deg/sec)

If attitude maneuver reqd:

GNC UNIV PTG

TGT ID 2
BV 5
P ______ (per Flight Plan)
Y ______
OM ______

Maneuver @ MET / : : :
DAP: A10(A12)/AUTO/VERN
Initiate TRK – ITEM 19 EXEC

3. CONFIG DAPs

GNC 20 DAP CONFIG
TRANS PLS – ITEM 17 +________ EXEC
(per MCC)

C3 ✓ DAP ROT: PULSE/PULSE/PULSE
✓ DAP TRANS: PULSE/PULSE/PULSE

Cont next page
4. **PULSE TEST PREP**
   - In attitude, rates damped
   - TIG–1:00
   - DAP: A/FREE/VERN

   [GNC 25 RM ORBIT]
   - SW RM INH – ITEM 16 EXEC (*)
   - F7
   - L FLT CNTLR PWR – ON
   - SW RM INH – ITEM 16 EXEC (no *)

5. **PULSE TEST EXEC**
   - On MCC GO:
   - TIG
   - THC: 1 +X PULSE (IN)
   - Fire 2 +X PRCS jets for 1.36 sec
   - F7
   - L FLT CNTLR PWR – OFF

6. **POST PULSE TEST RECONFIG**
   - TIG+2:00
   - GNC UNIV PTG
   - TGT ID 2
   - BV 5
   - P 090 _____ (per MCC)
   - Y 059 _____
   - OM _____
   - Initiate TRK – ITEM 19 EXEC

   - DAP: A10(A12)/AUTO/VERN

7. **DEADBAND COLLAPSE AND EXEC ZDS**
   - In attitude:
   - DAP: B13/AUTO/VERN
   - When deadband collapse complete
   - DAP: A11/AUTO/VERN
   - Future load ZDS maneuver @
     - MET _____ / _____ : _____: _____
     - (per Flight Plan)
     - OM – ITEM 17 + _____ EXEC
     - Initiate TRK – ITEM 19 EXEC

   - O14,O15 cb MNA,B DDU L (two) – as reqd

---

FS 8–8 ORB OPS/99/FIN A
100% PRCS PULSE TEST

O14,O15 cb MNA,B DDU L (two) – cl

1. VERIFY PL SAFING

APCc

[AODA SYS SUMM]

✓IRU CH A,B,C RATE MODE (three) – HI/Hi
✓EDM 1,2,3,4 MODE (four) – SAFE(OFF)
✓Filter Position (four) – <06

2. ATTITUDE MNVR

NOTE
For attitude maneuvers use:
A10/VERN for nominal maneuver rate (0.2 deg/sec)
A12/VERN for high maneuver rate (0.3 deg/sec)

If attitude maneuver reqd:

[GNC UNIV PTG]

TGT ID 2
BV 5
P ______ (per Flight Plan)
Y ______
OM ______

Maneuver @ MET : : :
DAP: A10(A12)/AUTO/VERN
Initiate TRK – ITEM 19 EXEC

3. CONFIG DAPs

[GNC 20 DAP CONFIG]

TRANS PLS – ITEM 17 +_______ EXEC
(per MCC)

C3 ✓DAP ROT: PULSE/PULSE/PULSE
✓DAP TRANS: PULSE/PULSE/PULSE

Cont next page

FS 8–9 ORB OPS/99/FIN A
4. **PULSE TEST PREP**
   ✓ In attitude, rates damped
   TIG–2:00
   DAP: A/FREE/VERN

   **GNC 25 RM ORBIT**
   SW RM INH – ITEM 16 EXEC (*)

   F7
   L FLT CNTLR PWR – ON
   SW RM INH – ITEM 16 EXEC (no *)

5. **PULSE TEST EXEC**
   On MCC GO:
   TIG
   THC: 1 +X pulse (IN)
   Fire 2 +X PRCS jets for 1.68 sec

   F7
   L FLT CNTLR PWR – OFF

6. **POST PULSE TEST RECONFIG**
   TIG+2:00
   **GNC UNIV PTG**
   TGT ID 2
   BV 5
   P 090 _____ (per MCC)
   Y 059 _____
   OM
   Initiate TRK – ITEM 19 EXEC

   ✓ DAP: A10(A12)/AUTO/VERN

7. **DEADBAND COLLAPSE AND EXEC ZDS**
   ✓ In attitude:
   DAP: B13/AUTO/VERN
   When deadband collapse complete
   DAP: A11/AUTO/VERN
   Future load ZDS maneuver @
   MET _____/_____/_____:____:
   (per Flight Plan)
   OM – ITEM 17 + ______ EXEC
   Initiate TRK – ITEM 19 EXEC

   O14,O15 cb MNA,B DDU L (two) – as reqd
PRCS JETS

JET DESELECT ............................... FS 9–2
RESELECT ................................. FS 9–3

FS 9–1  ORB OPS/99/FIN A
JET DESELECT

NOTE
Do not reselect any jets with previous fail off/leak

GNC 23 RCS
CRT
RCS FWD – ITEM 1 EXEC (*)
MANF VLVS STAT OVRD
1 CL – ITEM 40 EXEC
2 CL – ITEM 41 EXEC
3 CL – ITEM 42 EXEC
4 CL – ITEM 43 EXEC

RCS L – ITEM 2 EXEC (*)
MANF VLVS STAT OVRD
2 CL – ITEM 41 EXEC
4 CL – ITEM 43 EXEC

JET DESELECTIONS
JET DES L3L – ITEM 13 EXEC (*)
JET DES L1L – ITEM 15 EXEC (*)
JET DES L1U – ITEM 21 EXEC (*)
JET DES L3D – ITEM 29 EXEC (*)

RCS R – ITEM 3 EXEC (*)
MANF VLVS STAT OVRD
2 CL – ITEM 41 EXEC
4 CL – ITEM 43 EXEC

JET DESELECTIONS
JET DES R3R – ITEM 13 EXEC (*)
JET DES R1R – ITEM 15 EXEC (*)
JET DES R1U – ITEM 21 EXEC (*)
JET DES R3D – ITEM 29 EXEC (*)
JET RESELECT

NOTE
Do not reselect any jets with previous fail off/leak

GNC 23 RCS
CRT
RCS FWD – ITEM 1 EXEC (*)
MANF VLVS STAT OVRD
1 OP – ITEM 40 EXEC
2 OP – ITEM 41 EXEC
3 OP – ITEM 42 EXEC
4 OP – ITEM 43 EXEC

RCS L – ITEM 2 EXEC (*)
MANF VLVS STAT OVRD
2 OP – ITEM 41 EXEC
4 OP – ITEM 43 EXEC

JET RESELECTIONS
JET DES L3L – ITEM 13 EXEC (no *)
JET DES L1L – ITEM 15 EXEC (no *)
JET DES L1U – ITEM 21 EXEC (no *)
JET DES L3D – ITEM 29 EXEC (no *)

RCS R – ITEM 3 EXEC (*)
MANF VLVS STAT OVRD
2 OP – ITEM 41 EXEC
4 OP – ITEM 43 EXEC

JET DESELECTIONS
JET DES R3R – ITEM 13 EXEC (no *)
JET DES R1R – ITEM 15 EXEC (no *)
JET DES R1U – ITEM 21 EXEC (no *)
JET DES R3D – ITEM 29 EXEC (no *)
HEAT EXCHANGE UNIT EVALUATION (DTO 686)

DTO 686 PREP ................................. FS 10–2
INITIATION ................................. FS 10–3
TERMINATION .............................. FS 10–6
RECONFIG ................................. FS 10–6
NOTE
Procedure purges supply water dumpline of H2O and configures dumpline for DTO 686

INITIATION

NOTE
Have towel ready for possible release of water when mating/demating any connections

WCS
1. Unstow and install SPLY H2O Dumpline Purge Device into CONT H2O X–TIE POT QD (Lower QD with blue Velcro and ‘POTABLE’ label)

R11L
2. SPLY H2O DUMP ISOL VLV – CL (tb–CL)
   VLV ENA/NOZ HTR – ON
   CRT When SUPPLY H2O NOZ T A,B exceed 100 degF (~5 min), continue

R11L
3. SPLY H2O DUMP VLV – OP
   CRT When SUPPLY H2O NOZ T A,B exceed 250 degF (~5 min), continue

R11L
4. SPLY H2O DUMP VLV – CL (tb–CL), wait 60 sec
   – OP (tb–OP), wait 60 sec
   – CL (tb–CL)

WCS
5. Remove, stow SPLY H2O Dumpline Purge Device from CONT H2O X–TIE POT QD

WCS
Outboard Wall

WCS
1. Unstow and install SPLY H2O Dumpline Purge Device into CONT H2O X–TIE POT QD (Lower QD with blue Velcro and ‘POTABLE’ label)

R11L
2. SPLY H2O DUMP ISOL VLV – CL (tb–CL)
   VLV ENA/NOZ HTR – ON
   CRT When SUPPLY H2O NOZ T A,B exceed 100 degF (~5 min), continue

R11L
3. SPLY H2O DUMP VLV – OP
   CRT When SUPPLY H2O NOZ T A,B exceed 250 degF (~5 min), continue

R11L
4. SPLY H2O DUMP VLV – CL (tb–CL), wait 60 sec
   – OP (tb–OP), wait 60 sec
   – CL (tb–CL)

WCS
5. Remove, stow SPLY H2O Dumpline Purge Device from CONT H2O X–TIE POT QD
**DTO 686 INITIATION**

**SM 66 ENVIRONMENT**

R11L 1. SPLY H2O DUMP VLV ENA/NOZ HTR – ON
– OP (tb–OP)
When SUPPLY H2O NOZ T A,B exceed 250 degF (~10 min):
SPLY H2O DUMP VLV ENA/NOZ HTR – OFF

________ Unstow from Locker

2. Chill Can Components from storage locker
   Chill Can sub–assembly, figure 10–1
   Chill Can Koozie, figure 10–2
   Jello Bag, figure 10–3
   90° Elbow, figure 10–4

---

Figure 10–1
Figure 10–2

Cont next page
3. Hydrate Jello Bag per label instructions, using Galley water

4. Slip Chill Can into Koozie. Chill Can QD should pass thru hole at top of Koozie (figure 10–2), as shown in figure 10–5
5. Place Chill Can into inner pocket of hydrated Jello Bag, as in figure 10–3, then wrap Koozie around Jello Bag and Chill Can.

6. Record on provided data sheet which Chill Can number is being tested. Each Chill Can is labeled on the side, 1 thru 3. Connect the 90° Elbow to the QD at the top of the Chill Can.

7. Attach completed assembly to the CONT H2O X–TIE POT QD (Port side WCS) via the 90° Elbow.

**NOTE**
Jello will take up to 3.5 hr to chill.
DTO 686 TERMINATION

1. After 3.5 hr, open Jello Bag and observe consistency and taste of the Jello. Record this information and the can number on the provided data sheet.

2. Disconnect the Chill Can assembly from the cross-tie QD; remove the 90° Elbow from the top of the Chill Can.

3. Inspect components for problems; restow when not in use.

R11L 4. SPLY H2O DUMP VLV ENA/NOZ HTR – ON
     – CL (tb–CL)
     ENA/NOZ HTR – OFF

DTO 686 RECONFIG

1. After final DTO 686 TERMINATION,
R11L SPLY H2O DUMP ISOL VLV – OP (tb–OP)
EPSON 800 COLOR PRINTER CHECKOUT

UNSTOW AND ASSEMBLE PRINTER ............. FS 11–2
WARM–UP AND SELF–TEST ..................... FS 11–5
STOW PRINTER ................................. FS 11–6
CHECK PRINTER SETTINGS ..................... FS 11–7
PRINTER PAPER JAM ............................. FS 11–7
BLACK INK CARTRIDGE CHANGEOUT ......... FS 11–8
COLOR INK CARTRIDGE CHANGEOUT .......... FS 11–10
CLEANING PRINTER HEADS ..................... FS 11–12
EXECUTE PACKAGE PRINTING ................. FS 11–13
UNSTOW AND ASSEMBLE PRINTER (10 min)

NOTE
Power PRINTER off when not in use

1. UNSTOW

MF43G
AC W PWR cable (if reqd)
PRINTER DATA CABLE (one of the following):
   6 ft parallel data cable
   25 ft parallel data cable
   25 ft network data cable
PRINTER PAPER

MF14G
PRINTER PAPER FEEDER TRAY
PAPER OUTPUT TRAY

2. ASSEMBLE PRINTER

PRINTER
Align arrows on PAPER FEEDER TRAY and back of PRINTER
Insert white tabs on PAPER FEEDER TRAY (near arrows) into black outlined slots on PRINTER (See figure 11–1)
Slide tray downward
Attach PAPER FEEDER TRAY to PRINTER (Secure via thumbscrews)
Attach PAPER OUTPUT TRAY to PRINTER (Secure via thumbscrews)

MO52J
✓ AC UTIL PWR – OFF
Connect AC W PWR CABLE to PRINTER power port (See figure 11–2)

✓ AC PWR CABLE connected to AC UTIL PWR panel
Connect PRINTER DATA CABLE to PRINTER
Connect PRINTER DATA CABLE to PROSHARE PGSC (parallel port or network port)
Insert 8.5” x 11” paper into PAPER FEEDER TRAY (~50 sheets)

Cont next page
Attach PRINTER to wall of desired area (example: AFD or AIRLOCK ditch) using Velcro.

If OCA Router not configured, reference OCA SETUP, FS 4–2.

Figure 11–1.– Side view of printer and trays, ready for assembly.
**PRINTER Top View (Inside Cover)**

- Paper light
- Black ink indicator light
- Color ink indicator light
- Black cartridge advance button (beneath cover)
- Color cartridge advance button (beneath cover)

**PRINTER Back View**

- Power Port
- Parallel Port
- Network Port

**760XD PGSC with SelectaDock Expansion Unit**

- External display connector
- External diskette drive connector
- RS-232 Com 1
- Parallel connector
- Line-out jack
- SCSI connector
- Power port
- MID/Joystick port

Figure 11–2.– Printer – Top view/back view.
WARM–UP AND SELF–TEST

WARM–UP
MO52J 1. AC UTIL PWR – ON
PGSC 2. √ OCA PGSC – ON

3. PRINTER PWR – on (See figure 11–1)
   √ Flashing green pwr light (~5 min)

4. √ PRINTER ready
   (Ready when pwr light is steady green)

NOTE
After successful test print, terminate Self–Test by powering printer OFF

SELF–TEST
1. PRINTER PWR – OFF

2. Press and hold LOAD/EJECT button, then press POWER button
   (Hold LOAD/EJECT button for 3 sec after depressing POWER button, then release)

3. Observe printing of one black text page and one color text page

4. √ Print quality
   (Look for missing sections in Nozzle Check section)

5. If print quality not acceptable, go to CLEANING PRINTER HEADS

6. If paper jam, go to PRINTER PAPER JAM

7. If printer quality acceptable, PRINTER PWR – OFF
   (to terminate Self–Test)

8. Notify MCC: Status of Self–Test results
STOW PRINTER

MO52J
1. AC UTIL PWR – OFF
   (Remove paper from PAPER FEEDER TRAY and stow it)

PRINTER
2. Remove PAPER FEEDER TRAY from PRINTER (disconnect via thumbscrews)
3. Remove PAPER OUTPUT TRAY from PRINTER (disconnect via thumbscrews)
4. Disconnect AC W PWR cable from PRINTER
5. Disconnect AC W PWR cable from AC UTIL OUTPUT panel, if reqd
6. Disconnect PRINTER DATA cable from PRINTER
7. Disconnect PRINTER DATA cable from PROSHARE PGSC (parallel port or network port)

STOW

MF43G
AC W PWR cable (if reqd)
PRINTER DATA CABLE (one of the following):
   6 ft parallel data cable
   25 ft parallel data cable
   25 ft network data cable
PRINTER PAPER

MF14G
PRINTER PAPER FEEDER TRAY
PAPER OUTPUT TRAY
CHECK PRINTER SETTINGS

1. Sel ‘Start’ from Windows taskbar
2. Sel ‘Settings’
3. Sel ‘Printers’
4. Right–click on appropriate printer icon:
   Parallel: Epson Printer (Local)
   Network: Epson Printer (Network)
5. Verify ‘Set as default’ selected (√)
6. Sel ‘Properties’
7. Sel ‘Main’ tab
8. Check ‘Automatic’ selected (●)
9. Click ‘OK’ to exit

PRINTER PAPER JAM

1. PRINTER PWR – off (press power button once)
2. √PRINTER LIGHT – OFF
3. √PAPER FEEDER TRAY clear of obstruction
   √PAPER OUTPUT TRAY clear of obstruction
4. Raise PRINTER cover (See figure 11–1)
   √Inside of printer clear from obstruction
5. If paper jam cleared, proceed to WARM–UP AND SELF–TEST
6. If paper jam continues, NOTIFY MCC
7. If reqd, stow PRINTER (Reference STOW PRINTER)
BLACK INK CARTRIDGE CHANGEOUT

NOTE
Perform if black ink cartridge light is illuminated. Changeout of black and color cartridges takes approx 5 min.

If black ink cartridge light is flashing, black ink is low.

If black ink cartridge light is solid, black ink is out

1. ✓ PRINTER – Ready
   (notice steady green pwr light)

2. Raise PRINTER cover (See figure 11–1)

   NOTE
   Printer will reset if step 4 not performed within 1 min after step 3. If reset experienced, repeat step 3

3. Press and hold “black ink cartridge advance button” (~3 sec) and release. Black ink cartridge (leftmost) will move and become accessible

   CAUTION
   Do NOT squeeze INK CARTRIDGE

4. Lift tab on purple cover
   Remove black ink cartridge

5. Cover opening on used cartridge with Gray Tape
   Stow old cartridge in Ziploc bag
   Place Ziploc in printer locker

6. Unstow new cartridge from sealed pack
   Remove small yellow plastic tab on top (Do not remove white tab; reference instructions on cartridge)

   Cont next page
7. Insert new cartridge (arrow should be pointing toward back of printer)

8. Lower and latch tab on purple cover 
   *(Do not reopen)*
   If also changing color cartridge, go to step 3 in 
   COLOR INK CARTRIDGE CHANGEOUT
   Otherwise, continue

9. Lower and close PRINTER cover

10. Press the LOAD/EJECT button; printer will perform 
    a cleaning that will last approx 3 min

11. Perform Self–Test to ensure proper operations
COLOR INK CARTRIDGE CHANGEOUT

NOTE
Perform if color ink cartridge light is illuminated. Changeout of black and color cartridges takes approx 5 min.

If color ink cartridge light is flashing, color ink is low.

If color ink cartridge light is solid, color ink is out

1. □ PRINTER – Ready
   (notice steady green pwr light)

2. Raise PRINTER cover (See figure 11–1)

   NOTE
   Printer will reset if step 4 not performed within 1 min after step 3. If reset experienced, repeat step 3

3. Press and hold “color ink cartridge advance button” (~3 sec) and release. Color ink cartridge (leftmost) will move and become accessible

   CAUTION
   Do NOT squeeze INK CARTRIDGE

4. Lift tab on purple cover
   Remove color ink cartridge

5. Cover opening on used cartridge with Gray Tape
   Stow old cartridge in Ziploc bag
   Place Ziploc in printer locker

6. Unstow new cartridge from sealed pack
   Remove small yellow plastic tab on top (Do not remove white tab; reference instructions on cartridge)

Cont next page
7. Insert new cartridge (arrow should be pointing toward back of printer)

8. Lower and latch tab on purple cover  
   (Do not reopen)  
   If also changing black cartridge, go to step 3 in  
   BLACK INK CARTRIDGE CHANGEOUT  
   Otherwise, continue

9. Lower and close PRINTER cover

10. Press the LOAD/EJECT button; printer will perform  
    a cleaning that will last approx 3 min

11. Perform Self–Test to ensure proper operations
CLEANING PRINTER HEADS (Black and/or Color)

NOTE
Printer must be ON, not printing and appropriate ink cartridge light must not illuminate red

1. ✓PRINTER PWR – on

2. ✓Ink cartridge lt – OFF
   If ink cartridge lt flashing, go to BLACK/COLOR INK CARTRIDGE CHANGEOUT

3. Sel ‘Start’ from Windows taskbar

4. Sel ‘Settings’

5. Sel ‘Printers’

6. Right–click on appropriate printer icon:
   Parallel: Epson Printer (Local)
   Network: Epson Printer (Network)

7. Verify ‘Set as default’ selected (√)

8. Sel ‘Properties’

9. Sel ‘Utility’ tab

10. Sel ‘Head Cleaning’
    Sel ‘Next’

11. Sel ‘Black’, ‘Color’, or ‘Both’
    Sel ‘Next’

12. When cleaning is complet(~5 min), sel ‘Nozzle Check’ (If test still missing sections, redo steps 10 and 11)

13. If nozzle test is nominal, click ‘OK’ to exit
EXECUTE PACKAGE PRINTING

NOTE
Perform following procedure(s) if instructed by MCC

DOCUMENTS
1. Sel ‘Shuttle Apps’ from Desktop
2. Sel ‘Epson’ group folder
3. Double–click ‘Docs Printing’ Icon

PICTURES
1. Sel ‘Shuttle Apps’ from Desktop
2. Sel ‘Epson’ group folder
3. Double–click ‘PICS Printing’ Icon
CYCLE ERGOMETER OPS

ERGOMETER SETUP .................................. FS 12–2
RECONFIG/STOW ................................... FS 12–6
CYCLE ERGOMETER MANUAL OPS ................. FS 12–9
ALTERNATE ERGOMETER EXERCISE ............... FS 12–10
ERGOMETER SETUP

1. Remove Ergometer Assy from middeck floor, transport Ergometer to desired exercise location

2. Unstow:
   - Ergo Assy
   - Ergometer Accessories Bag (Shoe Bag)
   - Shoe Bag
   - Bio Bag
   - Bio Bag
   - Sound Mounts (4)
   - Adjustable Quick Disconnects (AQDs)
   - Spacers (4)

   NOTE
   102 only – spacers are not used on flight deck

3. Attach AQDs (four) to seat floor studs. Install sound mounts and spacers on ADQs

Disassemble Ergo Assy:
4. Remove seat stem pip pin, seat stem foot, restraining belt; temp stow
5. Remove seat assy, temp stow
6. Remove Ergometer pip pins (four), ergometer assy straps (four); release Ergometer from frame; temp stow

7. Mount both frame sections loosely to AQDs on seat floor studs (fig 12–1) using Knurled Kbs (four)

8. Install seat assy on seat stem; insert seat stem foot into stem
   Move seat assy pip pin (one) from green to yellow position, secure w/seat stem pip pin, slide blocks together, tighten Knurled Kbs, and secure w/Velcro

9. ✓Ergometer ON/OFF – OFF

Cont next page
NOTE
Following steps will interrupt power to other loads on that utility outlet

MO52J

10. **DC UTIL PWR** – OFF

11. Connect prerouted Ergometer Pwr cable to Ergometer Pwr Jack

12. **DC UTIL PWR** – ON

Shoe Bag

13. Unstow Ergometer Display Panel

14. Connect Ergometer Display Panel cable to Ergometer Display Jack; temp stow

Figure 12–1. – Ergometer w/PCIS.

Bio Bag

15. Unstow Threaded Fasteners (four), and Wrench

Cont next page
NOTE
Ergometer ON/OFF, MANUAL/REMOTE
switches should face subject

16. Mount Ergometer to frame assy w/Threaded
Fasteners (four)
Tighten w/Wrench

17. Unstow:
Ergo Acc Bag
Ergometer Pedals
Crank

18. Install pedals on cranks using Wrench from Ergo
Acc Bag, attach cranks w/pedals to Ergometer,
tighten w/Wrench (fig 12–1)

NOTE
Install RED on RIGHT; BLUE on LEFT

19. Unstow:
MF14G PCIS Kit:
PCIS Isolators – yellow (4)
PCIS Bridging Bar (1)
Bridging Bar Clamp Assy (1)

20. Install PCIS Isolators (four) on deck studs
(fig 12–1)

21. Install one end of Bridging Bar on PCIS Isolator
at seat end of Ergo Assy. Install RED on right

22. Remove Knurled Kbs (four) from AQDs

23. Raise entire cycle/frame assy from deck

24. Connect Ergo Assy AQDs (two) in frame section
w/o seat stem to PCIS Isolators (two) w/o
Bridging Bar Assy

25. Rotate seat stem foot and reinsert with pad on top

Cont next page
26. Install other end of Bridging Bar PCIS Isolator w/bar on top of seat stem

27. Stow in Bio Bag:
   Sound Mounts (4)
   AQDs (4)
   Spacers (4)

   **NOTE**
   Rubber pads on Bridging Bar must contact seat stem

28. Hand tighten Bridging Bar Clamp under seat stem

   As reqd, if exercise session follows immediately, perform muscle stretch:
   29. Hold each stretch 1 min
   30. While stretching, relax involved muscle

31. Adjust seat assy for subject comfort

32. Mount Ergometer
    Secure shoes into pedals
    Secure body w/restraining belt

33. Ergometer ON/OFF – ON

34. Perform exercise

35. Ergometer ON/OFF – OFF
RECONFIG/STOW

NOTE
Following steps will interrupt power to other loads on that utility outlet

MO52J 1. √ DC UTIL PWR – OFF

2. Disconnect prerouted Ergometer Pwr cable, secure

3. If other loads on utility outlet (verify per Plug–In Plan)
   DC UTIL PWR – ON

MF14G 4. Unstow PCIS Kit

Ergo Acc 5. Detach Ergometer Display Panel cable,
Bag  Ergometer pedals, cranks; stow

Bio Bag 6. Remove Threaded Fasteners, stow

7. Remove Ergometer from frame, temp stow

8. Remove seat stem pip pin, seat stem foot; temp stow

9. Remove seat assy, reconfigure for launch/landing (pip pin moves from yellow to green hole)

10. Remove Bridging Bar Clamp from under seat stem and stow
    Temp stow frame section with seat stem; stow Bridging Bar Clamp in PCIS Kit

11. Release other frame section from PCIS Isolators and temp stow

12. Remove Bridging Bar from PCIS Isolators and stow in PCIS Kit

Cont next page
13. Remove PCIS Isolators from deck studs and stow in PCIS Kit

14. Stow PCIS Kit in MF14G

15. Slide frame half, w/o seat stem, onto stem in launch/landing config (fig 12–2)

16. Unstow Ergo Assy Straps (two pair), slide onto frame

17. Unstow Pip Pins

18. Attach Ergometer horizontally to frame w/pip pins (fig 12–2)
   ✓ Arrow on decal, seat stem face same direction

19. Slide seat assy onto seat stem, reinstall seat stem foot, secure w/seat stem pip pin

20. Tighten Knurled Kbs (two) on seat assy

21. Secure restraining belt around seat assy, seat stem

22. Mount frame to launch/landing position in middeck using frame/AQDs (four), w/seat stem facing forward (fig 12–2)

23. Using Ergo Assy Straps attach Ergo Acc Bag to Ergometer (fig 12–2)

24. Pull straps tight; secure loose ends
Figure 12–2.– Ergometer middeck launch/landing configuration (ergo assy).
CYCLE ERGOMETER MANUAL OPS

Ergo Acc
1. Unstow Manual Control Kb Bag

2. Screw Manual Control Kb into bushing on Ergometer (fig 12–1)

**NOTE**
To increase workload, turn Manual Control Kb cw. To decrease workload, turn Manual Control Kb ccw

If workload/pedal speed desired, pwr available:
3. ✓Ergometer ON/OFF – ON
   Set desired pedal speed, workload on display panel
   Perform exercise
   Adjust Manual Control Kb until ONLY center LED on workload illuminated; repeat for any change in workload

If workload/pedal speed feedback not desired or pwr not available:
4. Perform exercise, adjusting Manual Control Kb cw or ccw as desired
ALTERNATE ERGOMETER EXERCISE

1. Unstow Bungee Cords (Bio Bag)
2. Connect two sets of four Bungee Cords in series
3. Stand topside of Ergometer w/feet approx shoulder width apart
4. Attach Bungees to opposite corners of Ergometer frame crossing Bungees over shoulders (figs 12–3, 12–4)
5. Adjust bungee length for comfort

NOTE
Use towels, socks for shoulder padding if desired

6. Perform exercise
7. Stow Bungee Cords (Bio Bag)

Figure 12–3.– Alternate exercise bungee attachments – front view (facing stbd).

Cont next page
Figure 12–4. – Alternate exercise bungee attachments – side view (facing stbd).
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<th>SHUTTLE COMPOUND SPECIFIC ANALYZER – COMBUSTION PRODUCTS (CSA–CP)</th>
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<td>ACTIVATION</td>
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ACTIVATION

MA73J

1. Unstow: CSA–CP

NOTE
Audible beep occurs when MODE pb depressed during unit activation

2. MODE pb – press, hold until ‘RELEASE’ displayed

NOTE
Wait ~1 min while unit runs self–check routine. A single beep occurs when self–check routine complete

3. √Display indicates readings for O2, HCN, HCL, CO

DATA LOGGER ACTIVATION

CSA–CP

1. Press MODE pb 9 times until ‘LOG OFF’ displayed

NOTE
The operation mode will revert to nominal display after 10 sec

2. ‘+’ pb – press to activate CSA–CP internal data logger
   √‘LOG ON’ displayed

3. Deploy CSA–CP in mid–deck location w/ good air flow
   Record location: ______________________

CSA–CP DEACTIVATION

1. MODE pb – press, hold until ‘RELEASE’ displayed
   √Unit off

MA73J

2. Stow CSA–CP

FS 13–2 ORB OPS/99/FIN A
BATT CHANGEOUT

MA73J 1. Unstow:
   Batt Pack

   2. Deactivate CSA–CP, if activated
      MODE pb – press, hold until ‘RELEASE’
      displayed

   3. Turn fasteners (two) on back panel ccw 1/4 turn
      Temp stow panel

      NOTE
      Stowed data maintained for maximum of 30
      min w/o batt installed. All data will be lost
      if batt installation delayed >30 min

   4. Grasp Batt Pack pull tab, remove pack and mark
      as “Discharged”

   5. Install replacement Batt Pack, press firmly to
      seat electrodes

   6. Replace panel, press firmly, turn fasteners (two)
      cw 1/4 turn to lock

MA73J 7. Stow used Batt Pack

   8. If redeploying CSA–CP, repeat ACTIVATION,
      DATA LOGGER ACTIVATION, and CSA–CP
      DEACTIVATION
      If not deploying CSA–CP, stow
CUE CARD CONFIGURATION

NOT FLOWN        FS 14–1        ORB OPS/99/FIN A
This card is specifically used for STS–99 mission with orbiter conducting dual shift ops with crew size of 6.

*Reseal LiOH cans w/Gray Tape and stow (Location of canisters on back)

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<th>POS B</th>
<th>CMPLT</th>
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<td>LAUNCH</td>
<td>1*</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>PRE RED FD1</td>
<td>3</td>
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<td>9</td>
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</tr>
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</tr>
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<td>12</td>
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</tr>
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<td>13</td>
<td>&quot;</td>
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</tr>
<tr>
<td>PRE RED FD5</td>
<td>14</td>
<td>15*</td>
<td></td>
</tr>
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<td>&quot;</td>
<td>16</td>
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</tr>
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<td>17*</td>
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</tr>
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<td></td>
</tr>
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<td>&quot;</td>
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<td></td>
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<td>22</td>
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</tr>
<tr>
<td>PRE RED FD8</td>
<td>23</td>
<td>&quot;</td>
<td></td>
</tr>
</tbody>
</table>

(reduced copy)
### LiOH Canister Stowage Locations

**MD52M (LiOH):**
- Cannisters: 3–31

**Middeck Stbd:**
- Canisters: 32–38

**Ceiling Bag (Bottom):**
- Canisters: 32–38

---

### DUAL SHIFT ORBITER CO2 ABSORBER REPLACEMENT

*(6 Crewmembers/BLUE sleeps 1st/FD 9–14)*

<table>
<thead>
<tr>
<th>FLIGHT DAY</th>
<th>POS A</th>
<th>POS B</th>
<th>CK CMPLT</th>
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<tr>
<td>PRE BLUE FD9</td>
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<td>25*</td>
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<tr>
<td>PRE RED FD9</td>
<td>&quot;</td>
<td>26</td>
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</tr>
<tr>
<td>PRE BLUE FD10</td>
<td>27</td>
<td>&quot;</td>
<td></td>
</tr>
<tr>
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<td>28</td>
<td>29</td>
<td></td>
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<td>PRE RED FD11</td>
<td>31</td>
<td>&quot;</td>
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</tr>
<tr>
<td>POST RED FD12</td>
<td>32</td>
<td>33</td>
<td>EOM</td>
</tr>
<tr>
<td>PRE BLUE FD12</td>
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<td>34*</td>
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<td>POST RED FD14</td>
<td>&quot;</td>
<td>38</td>
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</table>

*Reseal LiOH cans w/Gray Tape and stow*

---

(6 Crewmembers/BLUE sleeps 1st/FD 9–14)
RCS JET ACTIVITY – SINGLE–PULSE FLY–CAST MANEUVERS

1 PULSE | DAP B | DAP A

ON: 1.68s 1.68s 1.68s

OFF:

RCS JET ACTIVITY – MULTI–PULSE FLY–CAST MANEUVERS

2 PULSES | DAP B | DAP A

ON: 1.68s 1.68s 1.68s 1.68s

OFF:

(reduced copy)
RCS JET ACTIVITY – DOUBLET FLY–CAST MANEUVERS

RHC: 1 PULSE

ON

OFF

TOP
HOOK VELCRO

RCS JET ACTIVITY – TRIPLET FLY–CAST MANEUVERS

RHC: 1 PULSE

ON

OFF

TOP
HOOK VELCRO

(removed copy)

FAB USE ONLY
FS CC 14–6
ORB OPS/99/FIN A
ZDS LATE INITIATION

1. DETERMINE LATE STATUS
   Record Current OM (per UNIV PTG) __________
   Record Minutes Late
   (Rounded up to nearest even minute) __________
   Check (PGSC WorldMap or GNC 55 GPS STATUS)
   orbiter NORTH _____ or SOUTH _____

2. DETERMINE OMICRON FOR LATE ZDS
   Record Omicron (per TABLE N or S) __________

3. INPUT NEW OMICRON
   DAP: B13/AUTO/VERN

   GNC UNIV PTG
   OM ITEM 17 + _ _ EXEC (per step 2)
   ITEM 19 EXEC
   When in att DAP: A11/AUTO/VERN

4. FUTURE LOAD ZDS
   GNC UNIV PTG
   OM ITEM 17 + _ _ EXEC (2.8 NORTH or 357.2 SOUTH)

   If OM not bold (per step 3):
   Future Load:
   (Old ZDS MET + Minutes Late + 3 min) =
   ITEM 19 EXEC >>

   If OM bold:
   ITEM 19 EXEC >>

(reduced copy)

ORB OPS–33a/99/O/A
### TABLE N – Late ZDS North

<table>
<thead>
<tr>
<th>Minutes Late</th>
<th>358.8</th>
<th>359.0</th>
<th>359.2</th>
<th>359.4</th>
<th>359.6</th>
<th>359.8</th>
<th>360.0</th>
<th>360.2</th>
<th>360.4</th>
<th>360.6</th>
<th>360.8</th>
<th>361.0</th>
<th>361.2</th>
<th>361.4</th>
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<td>1.0</td>
<td>0.8</td>
<td>0.6</td>
<td>0.4</td>
<td>0.2</td>
<td>0.0</td>
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<td>0.4</td>
<td>0.2</td>
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</table>

**NOTE:** For OM > 0.2 use late OM of 2.8

### TABLE S – Late ZDS South

| Minutes Late | 2.8 | 2.6 | 2.4 | 2.2 | 2.0 | 1.8 | 1.6 | 1.4 | 1.2 | 1.0 | 0.8 | 0.6 | 0.4 | 0.2 | 0.0 | 0.8 | 0.6 | 0.4 | 0.2 | 0.0 |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 6            | 1.2 | 1.0 | 0.8 | 0.6 | 0.4 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 8            | 0.8 | 0.6 | 0.4 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 10           | 0.5 | 0.3 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 12           | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 14           | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 16           | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 18           | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 20           | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 22           | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

**NOTE:** For OM < 359.8 use late OM of 357.2

ORB OPS–33b/99/O/A

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