

Orbit Operations Checklist

STS-126 Flight Supplement

**Mission Operations Directorate
Operations Division**

**Final
October 30, 2008**

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas




MISSION OPERATIONS DIRECTORATE

**ORBIT OPERATIONS CHECKLIST
STS-126 FLIGHT SUPPLEMENT**

FINAL
October 30, 2008

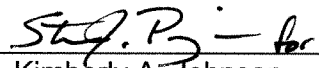
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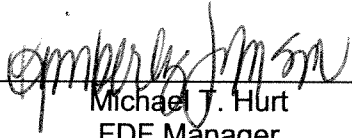
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| | | |
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| Incorporates the following: | | |
| 482#: | ORB OPS FS-0102 | ORB OPS FS-0104 |
| | ORB OPS FS-0103 | ORB OPS FS-0105 |
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| REBOOST/DAP | DS6/D. Weiler | 281-483-2666 |
| OIU | DS2/D. Brown | 281-244-9058 |
| SDBI | SK/K. Ofori | 281-244-0929 |
| WLES | DO5/R. Carroll | 281-244-0914 |
| MAUI | DS6/D. Weiler | 281-483-2666 |

CUE CARDS:

| | | |
|----------------------------------|--------------------|--------------|
| LIOH CHANGEOUT | DS4/M. Fitzpatrick | 281-483-0758 |
| ORBIT BURN MONITOR | DS6/L. Schmitt | 281-483-0649 |
| DAP TABLES | DS6/D. Weiler | 281-483-2666 |
| MAUI – RCS FIRING SEQUENCE | DS6/D. Weiler | 281-483-2666 |
| WLES CONFIG AFTER PGSC REBOOT | DO5/R. Carroll | 281-244-0914 |

ORBIT OPERATIONS CHECKLIST
STS-126 FLIGHT SUPPLEMENT

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FINAL 10/30/08

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* – Omit from flight book

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* – Omit from flight book

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COMM/INST

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**COMM/
INST**

COMM/
INST

LOAD PCMMU FORMAT

- C3 1. √OI PCMMU FORMAT – GPC
SM 62 PCMMU/PL COMM
- CRT 2. FORMAT:
SEL 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, *
DPS) >> *
 - * If LOAD – FAIL and a first load attempt: *
 - * Repeat steps 1 and 2 for failed ID *
 - * If LOAD – FAIL and a subsequent load *
 - * attempt: *
 - * √MCC *
 - * OI PCMMU PWR – 2(1) *
 - * √ERR MSG – 'I/O ERR PCM' *
 - C3 * I/O RESET PCM – ITEM 5 EXEC (*) *
 - CRT * Repeat steps 2 and 3 *
4. When final LOAD – CPLT:
SEL PGM – ITEM 2 EXEC (*)

| DNLIST COMPATIBILITY | PHASE | FORMAT ID 64/128 | CONFIG NO. |
|----------------------|--|------------------|------------|
| G1,G3,BFS | (ASCENT) | 102/FXD | – |
| G3,BFS | (ENTRY) | 102/164 | – |
| G2,G8,S2 | ORBIT/ FCS C/O | 103/161 | – |
| G2,S2,OPS 0 | OPS 0 | – /163 | – |
| G2,S2,P9 | MMU C/O | – /163 | – |
| G2,G8,S2 | RNDZ w/UHF FMT CCSU (SSOR/SSV/TCS) (PRIME) | 103/192 | 763 |
| G2,G8,S2 | RNDZ w/UHF FMT CCSU (SSOR/SSV/TCS) (B/U) | 103/211 | 770 |
| G2,G8,S2 | DOCKED ISS FMT CCSH (OIU/SSV) (PRIME) | 103/184 | 760 |
| G2,G8,S2 | DOCKED ISS FMT CCSH (OIU/SSV) (B/U) | 103/205 | 767 |
| G2,G8,S2 | OIU C/O AND SSV RATE 4 (PRIME) | 103/188 | 762 |
| G2,G8,S2 | OIU C/O AND SSV RATE 5 (B/U) | 103/203 | 765 |
| G2,G8,S2 | MPLM FMT (OIU/SSV) (PRIME) | 103/199 | 780 |
| G2,G8,S2 | MPLM FMT (OIU/SSV) (B/U) | 103/212 | 781 |

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 PL CNTL – PNL *
* PL DATA INTLVR PWR – OFF,ON *
* √ERR MSG – 'S62 BCE BYP PL' *
* √'S62 BCE BYP PDI' *
* S-BD PL CNTL – CMD *
* *
* PCM: *
CRT * I/O RESET PCM – ITEM 5 EXEC (*) *
* PDI: *
* I/O RESET – ITEM 8 EXEC (*) *
* Repeat step 1 for all of config (XXX) *
```

| CONFIG | DECOM | FMT | INPUT | USE |
|--|---------------------------|----------------------------|--------------------|--|
| 763 RNDZ w/UHF FMT CCSU (PRIME) TFL 192 | 1 2 3 4 5-FPM | 30 - 9 4 505 | 1,2 - 5 4 | OIU7 (CCSU) ** - TCS SSV (3) *** H-H-H * |
| 770 RNDZ w/UHF FMT CCSU (BACKUP) TFL 211 | 1 2 3 4 5-FPM | 14 31 - 19 503 | 4 1,2 - 5 | SSV (3) *** OIU7 (CCSU) ** - TCS H-H-H * |
| 760 DOCKED FMT CCSH (PRIME) TFL 184 | 1 2 3 4 5-FPM | 7 - - 27 501 | 1,2 - - 4 | OIU9 (CCSH) ** - - SSV (2) *** H-H-H * |
| 767 DOCKED FMT CCSH (BACKUP) TFL 205 | 1 2 3 4 5-FPM | - 17 29 - 508 | - 1,2 4 - | - OIU9 (CCSH) ** SSV (2) *** - H-H-H * |
| 762 SSV RATE 4 (PRIME) TFL 188 | 1 2 3 4 5-FPM | 5 - - 1 507 | 1,2 - - 4 | OIU255 ** - - SSV (4) *** H-H-H * |
| 765 SSV RATE 5 (BACKUP) TFL 203 | 1 2 3 4 5-FPM | - 15 11 - 509 | - 1,2 4 - | - OIU255 ** SSV (5) *** - L-H-H * |

* OI-GNC-SM, Orbiter Downlist Data Rates (High or Low)
** # in OIU# represents the OIU format; (XXX) represents data type
*** # in SSV (#) represents the SSV Out Rate sw selection

Cont next page

FS 1-5

ORB OPS/126/FIN

| | | | | |
|---------------------|------------------|-------------------|--------------------|---------------------------------------|
| 780 MPLM FMT | 1 2 3 4 | 2 - - 4 | 1,2 - - 4 | OIU5 (1M) ** - - SSV (3) *** |
| (PRIME) TFL 199 | 5-FPM | 504 | | H-H-H * |
| 781 MPLM FMT | 1 2 3 4 | 14 3 - - | 4 1,2 - - | SSV (3) *** OIU5 (1M) ** - - |
| (BACKUP) TFL 212 | 5-FPM | 502 | | H-H-H * |

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

** # in OIU# represents the OIU format; (XXX) represents data type

*** # in SSV (#) represents the SSV Out Rate sw selection

LOAD OIU FORMAT/CONFIG

Determine which step is needed and complete all actions to obtain desired OIU configuration

NOTE

A corresponding TFL/DFL CONFIG is reqd for MCC to receive telemetry. Reference S62 PCMMU/PL COMM for the last loaded HDR TFL and perform LOAD PCMMU FORMAT/LOAD PDI DECOM FORMAT for the associated CONFIG

S212 OIU

1. GNC-1 PRIMARY ON LB-ORB N2-1 (OIU BUS 3)

| | |
|----------------|----------------------------------|
| LOAD FORMAT | ITEM 1 + <u>9</u> EXEC |
| GNC TO GNC 1 | ITEM 18 + <u>1</u> <u>4</u> EXEC |
| GNC 1 TO BUS 3 | ITEM 18 + <u>1</u> <u>6</u> EXEC |
| BUS 4 BC | ITEM 15 EXEC (*) |
| BUS 3 RT | ITEM 10 EXEC (*) |
| LOAD FORMAT | ITEM 1 + <u>9</u> EXEC >> |

2. GNC-1 PRIMARY ON LB-ORB N2-2 (OIU BUS 4)

| | |
|----------------|----------------------------------|
| LOAD FORMAT | ITEM 1 + <u>9</u> EXEC |
| GNC TO GNC 1 | ITEM 18 + <u>1</u> <u>4</u> EXEC |
| GNC 1 TO BUS 4 | ITEM 18 + <u>1</u> <u>5</u> EXEC |
| BUS 3 BC | ITEM 11 EXEC (*) |
| BUS 4 RT | ITEM 14 EXEC (*) |
| LOAD FORMAT | ITEM 1 + <u>9</u> EXEC >> |

3. GNC-2 PRIMARY ON LB-ORB N2-1 (OIU BUS 3)

| | |
|----------------|----------------------------------|
| LOAD FORMAT | ITEM 1 + <u>9</u> EXEC |
| GNC TO GNC 2 | ITEM 18 + <u>1</u> <u>3</u> EXEC |
| GNC 2 TO BUS 3 | ITEM 18 + <u>1</u> <u>8</u> EXEC |
| BUS 4 BC | ITEM 15 EXEC (*) |
| BUS 3 RT | ITEM 10 EXEC (*) |
| LOAD FORMAT | ITEM 1 + <u>9</u> EXEC >> |

4. GNC-2 PRIMARY ON LB-ORB N2-2 (OIU BUS 4)

| | |
|----------------|----------------------------------|
| LOAD FORMAT | ITEM 1 + <u>9</u> EXEC |
| GNC TO GNC 2 | ITEM 18 + <u>1</u> <u>3</u> EXEC |
| GNC 2 TO BUS 4 | ITEM 18 + <u>1</u> <u>7</u> EXEC |
| BUS 3 BC | ITEM 11 EXEC (*) |
| BUS 4 RT | ITEM 14 EXEC (*) |
| LOAD FORMAT | ITEM 1 + <u>9</u> EXEC >> |

Cont next page

5. MPLM (if flown)
LOAD FORMAT ITEM 1 +5 EXEC
BUS 2 BC ITEM 7 EXEC (*)
LOAD FORMAT ITEM 1 +5 EXEC >>
6. SSOR
LOAD FORMAT ITEM 1 +7 EXEC
BUS 1 BC ITEM 3 EXEC (*)
LOAD FORMAT ITEM 1 +7 EXEC >>

PTG

STAR PAIRS PAD FS 2-2
PAIRS..... FS 2-3

PTG

FS 2-1

ORB OPS/126/FIN

PTG

| STAR PAIRS PAD | | | | | | | | | | |
|----------------|-----------|---|----------------------------|----------------------------------|--|---------------------------------|---------------------------------|--|--------------|----|
| STAR PAIR | SEP ANGLE | ATTITUDE SET 1 | | | | | ATTITUDE SET 2 | | | |
| | | DUAL S TRK | | SINGLE S TRK | | | DUAL S TRK | | SINGLE S TRK | |
| | | | | -Z | -Y | | | | -Z | -Y |
| A | 82.4 | -Y:37 R+ 86 -Z:13 P+ 252 Y+ 14 | R+ 3 P+ 243 Y+ 3 | -Y:13 R+ 174 P+ 240 Y+ 24 | -Y:13 R+ 183 -Z:37 P+ 58 Y+ 357 | -Z:13 R+ 100 P+ 71 Y+ 350 | -Y:37 R+ 266 P+ 50 Y+ 346 | | | |
| B | 90.7 | -Y:41 R+ 101 -Z:88 P+ 118 Y+ 333 | R+ 8 P+ 111 Y+ 320 | -Y:88 R+ 183 P+ 104 Y+ 340 | -Y:88 R+ 178 -Z:41 P+ 285 Y+ 41 | -Z:88 R+ 81 P+ 299 Y+ 31 | -Y:41 R+ 272 P+ 275 Y+ 28 | | | |
| C | 88.6 | -Y:20 R+ 327 -Z:100 P+ 344 Y+ 295 | R+ 232 P+ 335 Y+ 309 | -Y:100 R+ 77 P+ 10 Y+ 304 | -Y:100 R+ 308 -Z:20 P+ 159 Y+ 47 | R+ 223 P+ 156 Y+ 62 | R+ 20 P+ 180 Y+ 45 | | | |
| D | 88.3 | -Y:43 R+ 348 -Z:26 P+ 302 Y+ 356 | R+ 261 P+ 292 Y+ 7 | -Y:26 R+ 74 P+ 313 Y+ 6 | -Y:26 R+ 283 -Z:43 P+ 113 Y+ 349 | R+ 196 P+ 118 Y+ 3 | R+ 13 P+ 127 Y+ 343 | | | |

STAR PAIRS PAD

FS 2-2

ORB OPS/126/FIN

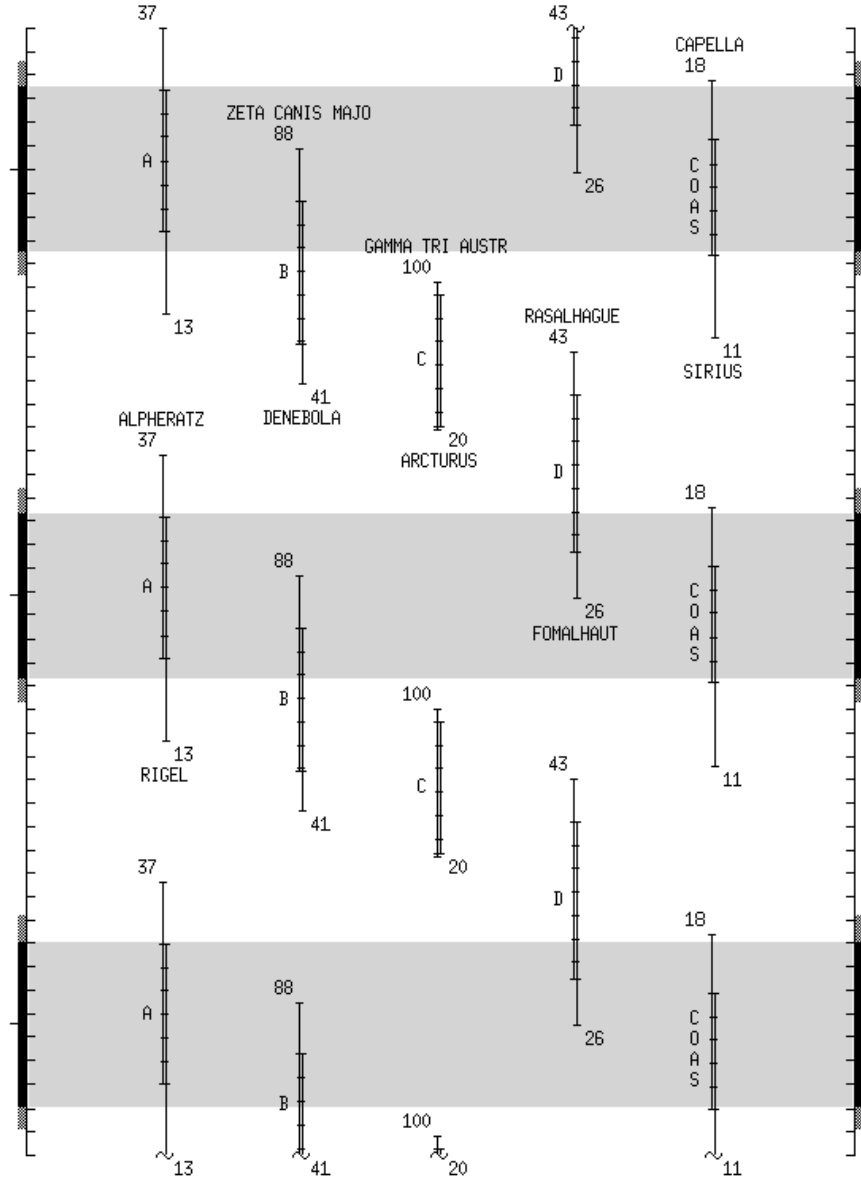
| PAIR | COAS ALIGN ATTITUDE 1 | ANG SEP | COAS ALIGN ATTITUDE 2 |
|------|--|-----------------|---|
| COAS | +X HUD 18 R+ 96 P+ 283 Y+ 48 | NOSE UP 65.8 | R+ 261 P+ 115 Y+ 66 |
| | -Z COAS 18 R+ 82 P+ 112 Y+ 47 | | TAIL UP 11 R+ 84 P+ 104 Y+ 341 |

SINGLE S TRK MIN MNVR OPT
TGT ID = 11-110 NAV STAR #

| | -Z S TRK | -Y S TRK |
|----|----------|----------|
| BV | 5 | 4 |
| P | 87.7 | ✓ 0 |
| Y | 358 | ✓ 280.57 |

MET Applicable Post OMS-2 to Nominal EOM
Liftoff Date: 11/15/08
Liftoff GMT: 320/00:55:31.000

STAR PAIRS



MET Applicable; Post OMS-2 to Nominal EOM
 Liftoff Date: 11/15/08
 Liftoff GMT: 320/00:55:31.000



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DAP TABLES

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| UNIV PTG | FS 3-3 |
| STS-126 DAP A CONFIGURATIONS..... | FS 3-4 |
| B CONFIGURATIONS..... | FS 3-6 |

**DAP
TABLES**

DAP TABLES

DAP OVERVIEW

| DAP | Purpose | DAP | Purpose |
|-----|-----------------------------|-----|---------------------------|
| A1 | Nominal | B1 | OMS & RCS Burns (ORB OPS) |
| A2 | PTC | B2 | Loss of VERN (Tail Only) |
| A3 | GG | B3 | Loss of VERN (All) |
| A4 | | B4 | |
| A5 | Loss of VERN (All) | B5 | COAS/HUD CAL |
| A6 | Loss of VERN (Tail Only) | B6 | |
| A7 | Rendezvous | B7 | Rendezvous |
| A8 | Terminal Phase | B8 | Terminal Phase |
| A9 | PROX OPS/Flyaround | B9 | Flyaround |
| A10 | Docking | B10 | Docking |
| A11 | Auto Reboost | B11 | |
| A12 | Mated Stack (VRCS & ALT) | B12 | Mated Stack |
| A13 | | B13 | |
| A14 | Orbiter alone SRMS/OBSS Ops | B14 | |
| A15 | | B15 | |

| CNTL ACC | Purpose |
|----------|---|
| 0 | Orbiter alone with unloaded RMS |
| 1 | Orbiter alone SRMS/OBSS Ops |
| 2 | Mated - VRCS and ALT with no vehicle docked to SM aft |
| 3 | Mated - VRCS and ALT with Progress/Soyuz docked to SM aft |
| 4 | Not used |
| 5 | Not used |
| 6 | Not used |
| 7 | Not used |
| 8 | Not used |
| 9 | Not used |

DAPs for mated operations are based on analysis from GNC, PDRS, C. S. Draper Labs, and ISS Structures

FS 3-2

ORB OPS/126/FIN

UNIV PTG

| |
|--|
| TGT ID = 1 Orbiting Vehicle = 2 Earth Center = 3 Earth Target Input LAT (± 90) LON (± 180 , + = East) ALT (-3444.0 to 20000.0 nm) = 4 Sun Center = 5 Celestial Target Input RA (0-359.99) DEC (± 90) = 11-110 Nav Stars |
| BODY VECTOR = 1 +X* = 2 -X* = 3 -Z* = 4 -Y Star Tracker* = 5 Selectable Input P (0-359.99) Y (270-359.99, 0-90) *Input OM \rightarrow OM (0-359.99) |
| MON AXIS = 1 +X = 2 -X |

FS 3-3

ORB OPS/126/FIN

STS-126 DAP A CONFIGURATIONS

STS-126 DAP A1 – DAP A8 CONFIGURATIONS

| | ITEM # | A1 | A2 | A3 | A4 | A5 | A6 | A7 | A8 |
|-------------|---------|---------|--------|--------|--------|--------------------|--------------------------|--------|----------------|
| PRI | | | | | | | | | |
| ROT RATE | 10 (50) | 0.2000 | 0.4000 | 0.2000 | 0.5000 | 0.2000 | 0.2000 | 0.2000 | 0.0500 |
| ATT DB | 11 (51) | 5.00 | 1.00 | 0.30 | 3.00 | 5.00 | 5.00 | 2.00 | 2.00 |
| RATE DB | 12 (52) | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| ROT PLS | 13 (53) | 0.100 | 0.100 | 0.100 | 0.100 | 0.100 | 0.100 | 0.100 | 0.100 |
| COMP | 14 (54) | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| P OPTION | 15 (55) | ALL | ALL | ALL | ALL | ALL | TAIL | ALL | ALL |
| Y OPTION | 16 (56) | ALL | ALL | TAIL | ALL | ALL | TAIL | ALL | ALL |
| TRAN PLS | 17 (57) | 0.100 | 0.100 | 0.100 | 0.100 | 0.100 | 0.100 | 0.100 | 0.100 |
| ALT | | | | | | | | | |
| RATE DB | 18 (58) | 0.200 | 0.200 | 0.070 | 0.200 | 0.070 | 0.070 | 0.100 | 0.100 |
| JET OPT | 19 (59) | ALL | ALL | ALL | ALL | ALL | TAIL | ALL | ALL |
| # JETS | 20 (60) | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 2 |
| ON TIME | 21 (61) | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| DELAY | 22 (62) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| VERN | | | | | | | | | |
| ROT RATE | 23 (63) | 0.2000 | 0.4000 | 0.0080 | 0.2000 | 0.0500 | 0.0500 | 0.0160 | 0.0500 |
| ATT DB | 24 (64) | 1.000 | 1.000 | 0.070 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| RATE DB | 25 (65) | .020 | .020 | .010 | .020 | .020 | .020 | .020 | .020 |
| ROT PLS | 26 (66) | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 | 0.050 |
| COMP | 27 (67) | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| CNTL ACC | 28 (68) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PURPOSE | | NOMINAL | PTC | GG | | LOSS OF VERN (ALL) | LOSS OF VERN (TAIL ONLY) | RNDZ | TERMINAL PHASE |

BOLD/ITALIC indicates change from I-Load.

FS 3-4

ORB OPS/126/FIN

STS-126 DAP A9 – DAP A14 CONFIGURATIONS

| | ITEM # | A9 | A10 | A11 | A12 | A14 |
|-------------|---------|-----------------------|---------|----------------------|-------------------------------|-------------------------------|
| PRI | | | | | | |
| ROT RATE | 10 (50) | 0.1300 | 0.0500 | 0.0500 | 0.0500 | 0.2000 |
| ATT DB | 11 (51) | 2.00 | 0.60 | 10.00 | 1.00 | 5.00 |
| RATE DB | 12 (52) | 0.10 | 0.10 | 0.20 | 0.20 | 0.20 |
| ROT PLS | 13 (53) | 0.100 | 0.100 | 0.100 | 0.040 | 0.100 |
| COMP | 14 (54) | .000 | .000 | .000 | .000 | .000 |
| P OPTION | 15 (55) | TAIL | TAIL | TAIL | TAIL | TAIL |
| Y OPTION | 16 (56) | TAIL | TAIL | TAIL | TAIL | TAIL |
| TRAN PLS | 17 (57) | 0.050 | 0.050 | 0.100 | 0.010 | 0.100 |
| ALT | | | | | | |
| RATE DB | 18 (58) | 0.100 | 0.100 | 0.035 ¹ | 0.035 ¹ | 0.200 |
| JET OPT | 19 (59) | TAIL | TAIL | TAIL | TAIL | TAIL |
| # JETS | 20 (60) | 2 | 2 | 1 | 1 | 1 |
| ON TIME | 21 (61) | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| DELAY | 22 (62) | 0.00 | 0.00 | 6.00 | 6.00 | 6.00 |
| VERN | | | | | | |
| ROT RATE | 23 (63) | 0.1300 | 0.0500 | 0.1000 | 0.0100 | 0.2000 |
| ATT DB | 24 (64) | 1.000 | 0.500 | 5.000 | 1.000 | 3.000 |
| RATE DB | 25 (65) | .020 | .020 | .050 | .020 | .200 |
| ROT PLS | 26 (66) | 0.050 | 0.050 | 0.010 | 0.002 | 0.010 |
| COMP | 27 (67) | .000 | .000 | .000 | .000 | .000 |
| CNTL ACC | 28 (68) | 0 | 0 | 2² | 2² | 1 |
| PURPOSE | | PROX/OPS FLYAROUND | DOCKING | AUTO REBOOST | MATED HOLD (VRCS & ALT) | ORBITER ALONE SRMS/OBSS |

BOLD/ITALIC indicates change from I-Load.

¹ I-loaded below keyboard limit; do not change

² CA2 for no vehicle docked at SM aft
CA3 for Progress/Soyuz docked at SM aft

FS 3-5

ORB OPS/126/FIN

STS-126 DAP B CONFIGURATIONS

STS-126 DAP B1 – DAP B8 CONFIGURATIONS

| | ITEM # | B1 | B2 | B3 | B4 | B5 | B6 | B7 | B8 |
|-------------|---------|---------------------------------|--------------------------------|--------------------------|--------|-----------------|--------|--------|-------------------|
| PRI | | | | | | | | | |
| ROT RATE | 30 (50) | 0.5000 | 0.2000 | 0.2000 | 0.2000 | 0.2000 | 0.5000 | 0.5000 | 0.0500 |
| ATT DB | 31 (51) | 3.00 | 3.00 | 3.00 | 0.30 | 3.00 | 3.00 | 2.00 | 2.00 |
| RATE DB | 32 (52) | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| ROT PLS | 33 (53) | 0.040 | 0.040 | 0.040 | 0.040 | 0.040 | 0.040 | 0.040 | 0.040 |
| COMP | 34 (54) | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| P OPTION | 35 (55) | ALL | TAIL | ALL | TAIL | TAIL | ALL | ALL | ALL |
| Y OPTION | 36 (56) | ALL | TAIL | ALL | TAIL | TAIL | ALL | ALL | ALL |
| TRAN PLS | 37 (57) | 0.100 | 0.020 | 0.020 | 0.020 | 0.020 | 0.020 | 0.050 | 0.050 |
| ALT | | | | | | | | | |
| RATE DB | 38 (58) | 0.200 | 0.070 | 0.070 | 0.100 | 0.200 | 0.200 | 0.100 | 0.100 |
| JET OPT | 39 (59) | ALL | TAIL | ALL | ALL | ALL | ALL | ALL | ALL |
| # JETS | 40 (60) | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 |
| ON TIME | 41 (61) | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| DELAY | 42 (62) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| VERN | | | | | | | | | |
| ROT RATE | 43 (63) | 0.2000 | 0.2000 | 0.2000 | 0.0080 | 0.0160 | 0.2000 | 0.2000 | 0.0500 |
| ATT DB | 44 (64) | 1.000 | 1.000 | 1.000 | 0.100 | 0.033 | 1.000 | 1.000 | 1.000 |
| RATE DB | 45 (65) | .020 | .020 | .020 | .010 | .020 | .020 | .020 | .020 |
| ROT PLS | 46 (66) | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.020 |
| COMP | 47 (67) | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| CNTL ACC | 48 (68) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PURPOSE | | OMS & RCS BURNS (ORB OPS) | LOSS OF VERN (TAIL ONLY) | LOSS OF VERN (ALL) | | COAS/HUD CAL | | RNDZ | TERMINAL PHASE |

BOLD/ITALIC indicates change from I-Load.

FS 3-6

ORB OPS/126/FIN

STS-126 DAP B9 – DAP B12 CONFIGURATIONS

| | ITEM # | B9 | B10 | B12 |
|-------------|---------|-----------------------|---------|--------------------------------|
| PRI | | | | |
| ROT RATE | 30 (50) | 0.1300 | 0.0500 | 0.0500 |
| ATT DB | 31 (51) | 2.00 | 0.60 | 5.00 |
| RATE DB | 32 (52) | 0.10 | 0.10 | 0.20 |
| ROT PLS | 33 (53) | 0.040 | 0.040 | 0.040 |
| COMP | 34 (54) | .000 | .000 | .000 |
| P OPTION | 35 (55) | TAIL | TAIL | TAIL |
| Y OPTION | 36 (56) | TAIL | TAIL | TAIL |
| TRAN PLS | 37 (57) | 0.010 | 0.010 | 0.010 |
| ALT | | | | |
| RATE DB | 38 (58) | 0.100 | 0.100 | 0.035 ¹ |
| JET OPT | 39 (59) | TAIL | TAIL | TAIL |
| # JETS | 40 (60) | 2 | 2 | 1 |
| ON TIME | 41 (61) | 0.08 | 0.08 | 0.08 |
| DELAY | 42 (62) | 10.00 | 0.00 | 6.00 |
| VERN | | | | |
| ROT RATE | 43 (63) | 0.1300 | 0.0500 | 0.1000 |
| ATT DB | 44 (64) | 1.000 | 0.500 | 3.000 |
| RATE DB | 45 (65) | .020 | .020 | .050 |
| ROT PLS | 46 (66) | 0.020 | 0.020 | 0.002 |
| COMP | 47 (67) | .000 | .000 | .000 |
| CNTL ACC | 48 (68) | 0 | 0 | 2 ² |
| PURPOSE | | PROXOPS/ FLYAROUND | DOCKING | MATED MNVRS (VRCS & ALT) |

BOLD/ITALIC indicates change from I-Load.

¹ I-loaded below keyboard limit; do not change

² CA2 for no vehicle docked at SM aft
CA3 for Progress/Soyuz docked at SM aft

FS 3-7

ORB OPS/126/FIN



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REBOOST/DAP

| | |
|----------------------------|--------|
| AUTO REBOOST..... | FS 4-2 |
| ATTITUDE REFERENCE..... | FS 4-4 |
| DOCKED DAP REFERENCE | FS 4-5 |

**REBOOST/
DAP**

AUTO REBOOST

NOTE

Allow 5 min between establishing reboost attitude and reboost start time for DAP accelerations to converge

1. If PRCS required:

O14:F, RJDA 1A L2/R2 DRIVER – OFF
O15:F, RJD MANF L5/F5/R5 DRIVER – OFF
O16:F, Pri RJD LOGIC (eight) – ON

√MCC for GO to power up Pri Drivers
RJD MANF L5/F5/R5 DRIVER – ON
Pri RJD DRIVER (eight) – ON

2. Select Reboost Configuration

GNC 20 DAP CONFIG
REBOOST CFG – ITEM 8 +_ EXEC
INTVL – ITEM 9 +_ EXEC

3. Set up Future Reboost

GNC UNIV PTG
DURATION – ITEM 27 +_ +_ +_ EXEC
START TIME – ITEM 1 +_ . . . +_ . . . +_ EXEC
RBST – ITEM 25 EXEC (FUT-*)

4. Select appropriate Reboost Rotation DAP When in attitude and prior to START TIME, DAP: A11/AUTO/VERN(ALT)

C3

If using Config 1(2):

GNC 20 DAP CONFIG
Disable X JETS ROT – ITEM 7 EXEC (no *)

REBOOST/
DAP

Cont next page

FS 4-2

ORB OPS/126/FIN

NOTE

Reboost can be aborted with an item 26 on UNIV PTG or by selecting FREE on the DAP

5. Post Reboost Configuration

If using Config 1(2):

GNC 20 DAP CONFIG

Enable X JETS ROT – ITEM 7 EXEC (*)

Return to FLIGHT PLAN Attitude

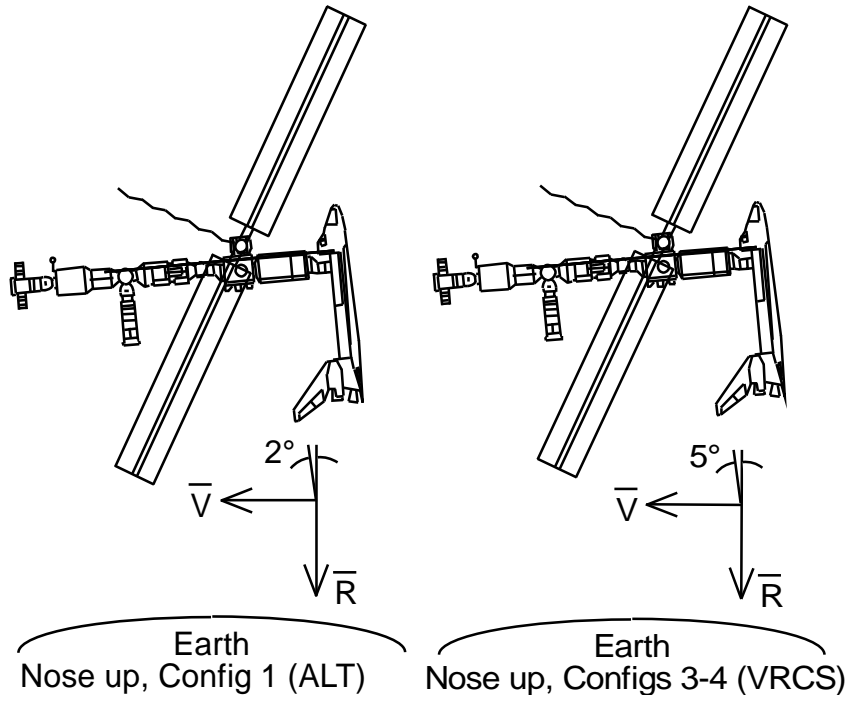
DAP: as reqd

Pri RJD LOGIC,DRIVER (sixteen) – as reqd

C3
O14,
O15,
O16

AUTO REBOOST ATTITUDE REFERENCE

ALT & VRCS ATTITUDE HOLD CONFIGURATIONS:



DOCKED DAP REFERENCE

SHUTTLE AIRLOCK

| PRESS(≥ 3.45 psia) | | DEPRESS (< 3.45 psia) |
|--------------------------------|--|-----------------------------|
| Attitude Hold (VERN or ALT) | Mated Manuevers and MPLM (VERN or ALT) | VERN or ALT |
| A12 | B12 | Not Certified |

For any attitude control during RMS + MPLM operations, only use DAP B12

ALT not certified for loaded RMS operations

CNTL ACC configurations for VERN and ALT:

CNTL ACC 2: No vehicle docked at SM aft

3: Progress/Soyuz docked at SM aft

RATE DAMPING

| | |
|--------------|--|
| RATE DAMPING | LVLH(INRTL), when rates are below rate deadband and jet activity stopped, FREE > 2 sec, AUTO |
| RATE > 0.20 | LVLH(INRTL) 6 min max FREE, LVLH(INRTL) |

REBOOST

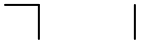
Configuration 1 is ALT PRCS only

Configuration 2 is for SHUTTLE ONLY - Do Not Use While Docked

Configurations 3 & 4 are identical and VRCS only



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OIU PROCEDURES

| | |
|----------------------|--------|
| OIU ACTIVATION | FS 5-2 |
| DEACTIVATION | FS 5-2 |

OIU

OIU ACTIVATION

NOTE

√MCC that steps 1 and 2 may not be reqd

1. Load PCMMU/PDI (config 760) for OIU
2. Power on PSP 1(2)

A1L √S-BD PL CNTL – CMD
 PWR SYS – 1(2)
 √SEL – PSP
 √PSP CMD OUTPUT – PL UMB
 CNTL – PNL,CMD

SM 62 PCMMU/PL COMM

I/O RESET PSP 1(2) – ITEM 6(7) EXEC (*)

3. Power on OIU 1(2)

SSP1 OIU PWR – OIU 1(2) ON
 √tb – UP(DN)

OIU DEACTIVATION

NOTE

√MCC for OIU ops complete

1. Possible 'S62 PDI DECOM FAIL' msg

SSP1 OIU PWR – OFF
 √tb – bp

2. MCC will config PCMMU and PDI as reqd

OIU

SHORT DURATION BIOASTRONAUTICS
INVESTIGATION (SDBI)

| | |
|---|--------|
| SDBI 1634, SLEEP-WAKE ACTIGRAPHY | FS 6-2 |
| DON ACTIWATCH | FS 6-2 |
| DOFF ACTIWATCH | FS 6-2 |
| SDBI 1900, INTEGRATED IMMUNE BLOOD COLLECTION | FS 6-3 |
| SDBI 1900, SALIVA COLLECTION FOR INTEGRATED IMMUNE | FS 6-9 |

SDBI

SDBI 1634, SLEEP-WAKE ACTIGRAPHY

- MF28K A. DON ACTIWATCH (ASAP after entry into orbit)
1. Unstow: Actiwatch
SLEEP LOGBOOK

NOTE

Actiwatch should be worn on top of non-dominant wrist outside of clothing. Face of Actiwatch should remain uncovered at all times.

If necessary to remove Actiwatch, record doff/don time in SLEEP LOGBOOK

2. Don Actiwatch on non-dominant arm and wear continuously throughout mission
3. Deploy SLEEP LOGBOOK and record required information daily (within 15 min after waking)

B. DOFF ACTIWATCH

NOTE

If mission length extended, continue to wear Actiwatch and complete SLEEP LOGBOOK as timeline permits

- MF28K On final day of orbit:
1. Remove Actiwatch, stow in locker
 2. Recover SLEEP LOGBOOK, stow in locker

SDBI

SDBI 1900, INTEGRATED IMMUNE BLOOD COLLECTION

OBJECTIVE:

Integrated Immune Assessment (Integrated Immune). The purpose of this procedure is to effectively and safely perform a blood draw, process blood samples, and properly stow them to achieve Integrated Immune Experiment objectives

PARTS:

Integrated Immune Blood Collection Kit:

- Band-Aid
- Fine Point Sharpie
- Gauze
- Tourniquet
- X-Large Gloves
- Butterfly Needle
- Tube Holder
- Blood Sample Sleeve:
 - Blood 8.5ml ACD (yellow top tube)
 - Blood 10ml EDTA (purple top tube)
- Biocide Wipes
- Biohazard Bag
- Surgical Paper Tape, 1-in
- Sharps Container
- Gray Tape

WARNING

All consumable items that come in contact with blood must be discarded in Biohazard Bag (provided in kit)

All sharp items (i.e., needles) must be discarded into Sharps Container

NOTE

Any spilled blood should be cleaned up with Gauze and followed with a Biocide Wipe

Cont next page

FS 6-3

ORB OPS/126/FIN

A. SETUP FOR BLOOD SAMPLE COLLECTION

NOTE

The lid of the Integrated Immune Blood Collection Kit, when opened, can be used as a workstation on which to temporarily store items via Velcro. Gray Tape can also be used

PI Locker 1. If desired for temporary stowage of supplies during blood draw, deploy about 12-inch piece of Gray Tape near location of blood draw

2. Deploy hardware near area where activity will be performed:

MF43H Integrated Immune Blood Collection Kit: |
Band-Aid
Fine Point Sharpie
Gauze (1 package)
Tourniquet
Butterfly Needle (1)
Tube Holder
Blood Sample Sleeve (open sleeve and loosen tubes)
Biocide Wipes
Surgical Paper Tape, 1-in
Sharps Container
Biohazard Bag
X-Large Gloves

3. Place Biohazard Bag in convenient location for trash disposal

B. PERFORM BLOOD SAMPLE COLLECTION

1. Retrieve Butterfly Needle (1) and remove from package. Place package in the Biohazard Bag and temporarily store

Cont next page

FS 6-4

ORB OPS/126/FIN

2. Retrieve Tube Holder
Screw Tube Holder onto threaded end of
Butterfly Needle
Temp stow Butterfly Needle/Tube Holder
3. Retrieve Gauze, open package but do not
remove Gauze, temp stow Gauze package
4. Retrieve Tourniquet from Integrated Immune
Blood Collection Kit
Apply Tourniquet to subject's arm
Using fingers find vein and select puncture site

| |
|---|
| <p><u>WARNING</u> Operator must don X-Large Gloves prior to needle insertion and observe Universal Precautions for Handling Biohazardous Materials</p> |
|---|

5. Retrieve and don X-Large Gloves
Retrieve and open Biocide Wipe, placing empty
package in Biohazard Bag
Cleanse area with Biocide Wipe
Place used Biocide Wipe in Biohazard Bag
6. Retrieve Butterfly Needle/Tube Holder from temp
stow
Remove protective cover from Butterfly
Needle/Tube Holder. Place cover in Biohazard
Bag

| |
|---|
| <p><u>CAUTION</u> Blood tubes must be inspected for cracks. If cracked, tubes should be discarded in the Biohazard Bag</p> |
|---|

7. Retrieve:
Blood Sample Sleeve
Surgical Paper Tape, 1-in

Cont next page

WARNING

Insert needle at 30 degree angle to vein to ensure proper blood flow and avoid injury

Avoid shifting needle from side to side after entering vein

NOTE

Taping of central portion of needle tubing to subject's arm is to prevent excessive movement during blood draw. Only tape tubing after needle is properly inserted in vein

8. Insert Butterfly Needle in subject's arm with bevel up. When the needle is properly inserted in the vein a flash of blood will be observed in butterfly tubing

Using strips of 1-in Surgical Paper Tape as necessary, tape central portion of Butterfly Needle tubing to subject's arm

Blood
Sample
Sleeve

9. Retrieve subject's empty Blood 8.5ml ACD (yellow top blood tube)

NOTE

Allow 10 sec to ensure the tube vacuum draws the appropriate volume of blood

10. Verify a flash of blood in butterfly tubing
11. Firmly push the blood tube into Tube Holder to puncture tube cap and initiate blood flow
12. When filled, detach blood tube from Tube Holder
13. Gently agitate tube for blood to mix with reagent for ~5 sec

Cont next page

FS 6-6

ORB OPS/126/FIN

- ┌ | | | ┌
- Blood Sample Sleeve
14. Temp stow filled blood tube in Blood Sample Sleeve
 15. Retrieve Blood 10.5ml EDTA tube (purple top) and repeat steps 11 thru 14 for the second tube
 16. Loosen Tourniquet
 17. Retrieve Gauze from temp stow
 18. Hold Gauze to venipuncture site while simultaneously grasping wings of Butterfly Needle and removing it at same angle of insertion, applying gentle pressure to Gauze
- Have subject hold Gauze on venipuncture site for 2-5 min
- If taped, remove tape from arm and dispose
- Slide safety shield over Butterfly Needle by holding yellow sheath and pulling wings backward

NOTE

Do not discard tube holder

19. Carefully unscrew Tube Holder from Butterfly Needle; temp stow
20. Discard used Butterfly Needle (with sharp edges facing down) in Sharps Container
21. Remove Tourniquet and stow in Integrated Immune Blood Collection Kit

Cont next page

FS 6-7

ORB OPS/126/FIN

└ | | | └

22. Keep Gauze on venipuncture site for pressure bandage
Place Band-Aid over folded Gauze
Discard any excess Gauze and Band-Aid wrapper in Biohazard Bag

23. Retrieve filled blood tubes from Blood Sample Sleeve and label both tubes with crewmember name and GMT (e.g., Smith: GMT 168:19:48)

24. Stow blood tubes back in Blood Sample Sleeve and temp stow

25. Discard X-Large Gloves in Biohazard Bag

Dispose of any remaining Biocide Wipes, Gauze, Gray Tape, or empty packaging used in the activity

C. STOW HARDWARE

1. Remove full Biohazard Bag, close with Gray Tape

Discard full Biohazard Bag in appropriate disposal location

2. Stow in Integrated Immune Blood Collection Kit:

Blood Sample Sleeve with blood samples

Sharps Container (bottom first into pouch)

Biocide Wipes (if any)

Gauze (if any)

Surgical Paper Tape, 1-in

Fine Point Sharpie

Tube Holder

Remaining Band-Aid packages (if any)

3. Stow:

MF43H

Integrated Immune Blood Collection Kit

Put away Gray Tape per crew preference

SDBI 1900, SALIVA COLLECTION FOR INTEGRATED IMMUNE

OBJECTIVE:

Integrated Immune Assessment (Integrated Immune). The purpose of this procedure is to effectively perform saliva collection to achieve Integrated Immune Experiment objectives

PARTS:

Integrated Immune Saliva Collection Kit:

Salivette Bag (package with cotton swabs)

Saliva Sample Preservative Bag

Label

Saliva Collection Dry Booklet

Saliva Sample Return Pouch

Fine Point Sharpie

A. SETUP FOR SALIVA SAMPLE COLLECTION

NOTE

Any Saliva Sample Return Pouch (labeled USED and does not have crewmember data filled in) located in the Integrated Immune Saliva Collection Kit will suffice for this step

- MF43H
1. Unstow:
Integrated Immune Saliva Collection Kit:
Fine Point Sharpie
Label from plastic window of Saliva Sample Return Pouch
 2. Write crewmember name on label using Fine Point Sharpie
Return label to plastic window it was taken from
Temp stow Fine Point Sharpie

Cont next page

FS 6-9

ORB OPS/126/FIN

B. PERFORM LIQUID SALIVA SAMPLE COLLECTION

NOTE

Liquid saliva should be collected immediately post-sleep (before brushing teeth, before breakfast, and before any liquid intake)

1. Retrieve from Integrated Immune Saliva Collection Kit:
Salivette Bag
Saliva Sample Preservative Bag
2. Temp stow Saliva Sample Preservative Bag

NOTE

Touching the Cotton Swab with fingers at any point of the data collection will contaminate the sample

3. Open Salivette Bag and by kneading and manipulating the outside of package, separate one Cotton Swab from the others and move it towards the opening of the package
4. Place Salivette Bag with Cotton Swab near mouth and then transfer Cotton Swab from package into mouth. Lightly roll Cotton Swab around mouth with tongue until saturated (2 min max). Do not bite down or chew on Cotton Swab
5. Stow Salivette Bag with remaining Cotton Swab in Integrated Immune Saliva Collection Kit
6. Retrieve Saliva Sample Preservative Bag from temp stow
7. Using mouth, place Cotton Swab in Saliva Sample Preservative Bag

Cont next page

8. Close seal on Saliva Sample Preservative Bag

NOTE

Ensure bag is sealed prior
to mixing preservative

9. Remove clamp, mix preservative with Cotton Swab
10. Reclamp across top of Saliva Sample Preservative Bag
11. Using Fine Point Sharpie, write crewmember name and GMT on Saliva Sample Preservative Bag (e.g., Smith: GMT 168:19:48)
12. Stow sample in Saliva Sample Return Pouch (labeled with crewmember name in part A step 2) inside Integrated Immune Saliva Collection Kit

C. PERFORM DRY SALIVA COLLECTION

NOTE

First sample should be taken as
soon after waking as is convenient

1. Retrieve from Integrated Immune Saliva Collection Kit:
Dry Saliva Collection Book
2. Write crewmember name in name section on cover of Dry Saliva Collection Book
3. Open cover
Select (but do not remove from book) the corresponding sheet of filter paper to the time period sample is being taken (WAKE, WAKE + 30 MINUTES, WAKE + SIX HOURS, WAKE + TEN HOURS, RETIRE) as illustrated on the cover

Label GMT on corresponding color and time period on cover

Cont next page

NOTE

Take care not to touch other collection time's filter papers when using Dry Saliva Collection Book

4. Place filter paper in mouth and saturate filter paper with saliva

NOTE

Do not touch saturated part of filter paper while drying. Filter paper does not have to be 100% dry before stowing/temp stowing. Use crew discretion

5. Remove filter paper from mouth. Wipe excess liquid saliva from filter paper with lips
Allow to air dry
6. Temp stow Dry Saliva Collection Book or maintain on person if desired
7. For subsequent collections, retrieve Dry Saliva Collection Book from temp stow and repeat steps 3 thru 6 four times throughout the day that correspond to the remaining four time intervals from wake period
8. After collecting last dry saliva sample, open Saliva Sample Return Pouch (labeled with crew ID) inside Integrated Immune Collection Kit and stow Dry Saliva Collection Book inside Saliva Sample Return Pouch

D. STOW HARDWARE

MF43H

1. Stow: Integrated Immune Saliva Collection Kit |

WING LEADING EDGE SENSORS (WLES) PROCEDURES

| | |
|---|---------|
| WLES ACTIVATION AND CHECKOUT..... | FS 7-2 |
| DEACTIVATION AND TEARDOWN..... | FS 7-10 |
| LAPTOP RECEIVER UNIT (LRU) R&R..... | FS 7-12 |
| CONFIGURE WLES DATA FILE BACKUP PATH..... | FS 7-14 |
| PREP WLES LAPTOPS FOR TRANSFER..... | FS 7-15 |
| WLES RNDZ TOOLS CHECKOUT PREP..... | FS 7-16 |
| DOCK/UNDOCK RECOVERY..... | FS 7-16 |
| DISABLE WLES FILE BACKUP | FS 7-17 |
| ENABLE WLES FILE BACKUP | FS 7-17 |

**WLE
SENSORS**

WLES ACTIVATION AND CHECKOUT

1. UNSTOW EQUIPMENT

NOTE

A31p laptops may already be unstowed as part of orbiter laptop network setup

ML60E

Unstow:

Laptop Receiver Units (2)
Cabin Relay Units (2):
 CRU A (S/N 1920)
 CRU B (S/N 1984)
STS6 A31p laptop (WLES)
STS3 A31p laptop (KFX)

2. SETUP WLES RELAY UNITS

CAUTION

Cross-connecting CRU A to MICRO WIS SYSTEM B (and vice versa) will prevent WLES ops, though step 8 would still show good comm

NOTE

Green patch on Cabin Relay Unit is antenna and must face into cabin

| | |
|--------------|---|
| A6 | Unstow coiled WLE SYSTEM A cable |
| A13 | Connect plug PNL A13 SYSTEM A to jack MICRO WIS SYSTEM A J7 (see fig 7-1) |
| CRU A | Connect plug CABIN RELAY UNIT to J1 on CRU S/N 1920 |
| STBD OVHD | Secure CRU A to STBD side of aft cabin with Velcro (see fig 7-2) |
| A9 | Unstow coiled WLE SYSTEM B cable |
| A13 | Connect plug PNL A13 SYSTEM B to jack MICRO WIS SYSTEM B J8 (see fig 7-1) |
| CRU B | Connect plug CABIN RELAY UNIT to J1 on CRU S/N 1984 |
| PORT OVHD | Secure CRU B to PORT side of aft cabin with Velcro (see fig 7-3) |

WLE
SENSORS

Cont next page

FS 7-2

ORB OPS/126/FIN

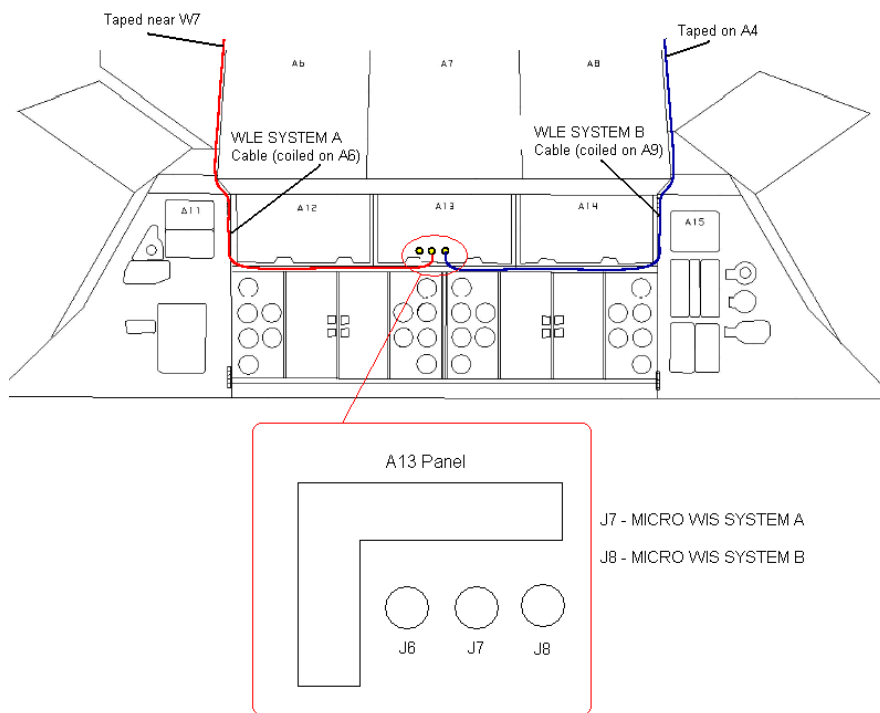


Figure 7-1.- A13 panel.

Cont next page

FS 7-3

ORB OPS/126/FIN

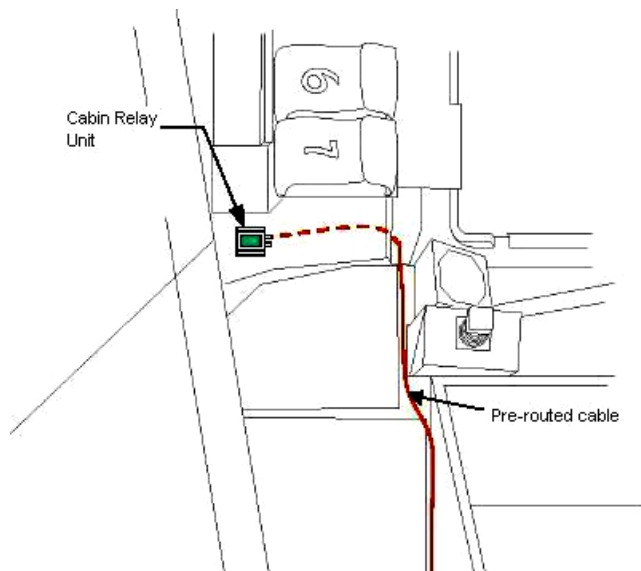


Figure 7-2.- Aft STBD location.

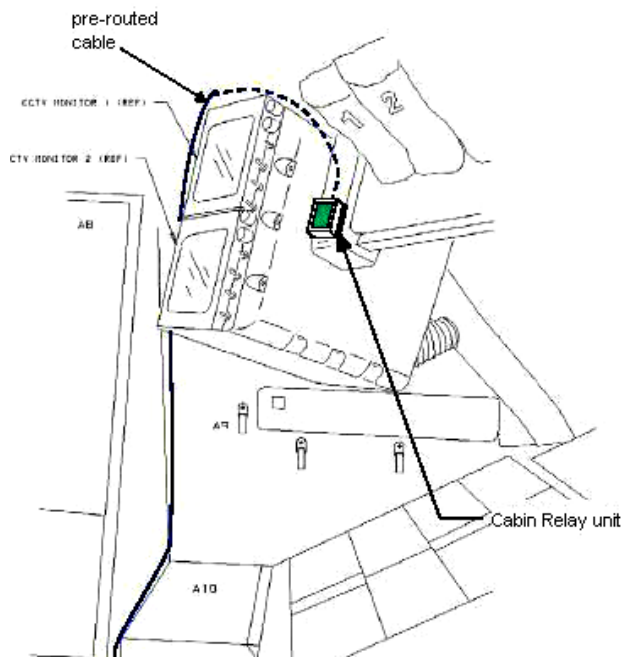


Figure 7-3.- Aft PORT location.

Cont next page

NOTE

Laptops may be powered or unpowered.
Laptops may be connected to network or standalone

- A31p
3. SETUP PRIME WLES LAPTOP
Secure Laptop Receiver Unit to A31p with Velcro (see fig 7-4)
Connect Laptop Receiver Unit to A31p Serial port using thumbscrews (see fig 7-5)
Verify line of sight between Laptop Receiver Unit and both CRUs
Verify 5-in minimum distance between Laptop Receiver Unit and both CRUs
 4. SETUP BACKUP WLES LAPTOP

NOTE

Single laptop ops are preferred over delays in activation. If problems with Backup Laptop occur, skip step 4

Secure Laptop Receiver Unit to A31p with Velcro (see fig 7-4)
Connect Laptop Receiver Unit to A31p Serial port using thumbscrews (see fig 7-5)
Verify line of sight between Laptop Receiver Unit and both CRUs
Verify 5-in minimum distance between Laptop Receiver Unit and both CRUs

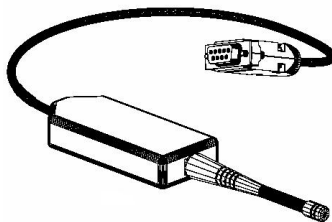


Figure 7-4.- Laptop Receiver Unit.

Cont next page

FS 7-5

ORB OPS/126/FIN



Figure 7-5.- A31p ports.

5. LAUNCH WLES SOFTWARE

Perform for both laptops:

If laptops are off, A31p pwr – On

Double click the time in system tray (lower-right corner)

'Date and Time Properties'

'Time Zone'

Time zone – (GMT) Greenwich Mean Time

Click 'OK'

Double click 'Shuttle Apps'>'WLES'>'WLES'

'Backup Mode Selection'

If setting up one A31p, select 'Standard'

|

If setting up two A31p laptops:

For prime laptop, select 'Primary'

For backup laptop, select 'Secondary'

If 'EWBMTAU-WLEFlight' appears with message 'Run the current command:

XXXX_AA_BB_SNYYY.xml?':

Click 'Yes'

NOTE

The secondary laptop lid may be closed at this time, if no longer needed for other applications. The laptops are configured so that they do not enter 'standby' or 'hibernate' mode when the lids are closed. However, due to cooling concerns, fully closing the lid is not recommended

Cont next page

A31p

6. VERIFY LRU INSTALLATION

Use prime WLES laptop

'Enhanced Wideband MicroTAU – WLEFlight 3.0'

Click 'System Settings' (left side of display)

'Communications Settings'

√RF Receiver Port: 'COM 1'

Click 'Query Receiver'

Verify 'Receiver found on COM1' message appears

7. VERIFY DATA FILE BACKUP

Use prime WLES laptop

Verify 'Backup Directory:' set to:

'N:\Program Files\Invocon\EWBMTAU-WLEFlight'

- * If 'Backup Directory' not set as above: *
- * 'System Settings' *
- * 'Directories' *
- * At the line 'Backup Directory:' click *
- * 'Browse...' (right side of display) *
- * *
- * 'Browse for Folder' *
- * Navigate to WLES folder on KFX: *
- * 'My Computer'>'C on KFX (N:)'> *
- * 'Program Files'>'Invocon'> *
- * 'EWBMTAU-WLEFlight' *
- * *
- * Click 'OK' *

Verify 'Backup Interval' set to '30 minutes'

Cont next page

FS 7-7

ORB OPS/126/FIN

8. VERIFY COMM WITH RELAY UNITS

Use prime WLES laptop

'Main'

Click 'Unit List' (left side of display)

NOTE

Each Cabin Relay Unit is identified with a unique serial number; this number appears as 'Unit ID' in the software

√Cabin Relay Units Unit ID 1920 and 1984 (2) present on display in first column; scroll down as necessary

For each Cabin Relay Unit:

√Unit ID present

√Type: 'Relay-GL'

√Last Update: time is updating (every 5 to 15 sec)

- * If one CRU time updates: *
- * | Continue procedure *
- * | Report off-nominal CRU status in step 10 *
- * | *
- * If neither CRU time updates after 2 min, *
- * contact MCC-H *

√Via: 'RF'

√Mode: 'Idle'

9. INITIATE COMMANDING

NOTE

The first time a user navigates to 'Program Files' folder, display may show information saying the program files are hidden. To view the contents of the folder, select 'display files' in the left-hand portion of the Windows Explorer window

Double click 'Shuttle Apps'>'WLES'>'WLES Data Folder'

Double click 'Shuttle Apps'>'WLES'>'WLES Cmd Folder' |

Cont next page

NOTE

Deleting 'BLOCK.xml' file initiates command execution. Command files disappear from this folder as they are executed.

Files appearing in the 'Data' folder verifies two-way communication with the Sensor Units in the orbiter wing

'Command'

Delete file labeled 'BLOCK.xml'

At prompt "Are you sure you want to send 'Block.xml' to the Recycle Bin?", click 'Yes'

Wait 1 minute

Verify the first data file appears in the 'Data' folder

Close 'Command' and 'Data' folders

10. REPORT WLES STATUS

Notify MCC-H: "WLES setup complete"

If reporting off-nominal CRU status, include:

Unit ID

Type

Last Update (updating or static)

Via

Mode

NOTE

The laptop lid may be closed at this time, if no longer needed for other applications. The laptops are configured so that they do not enter 'standby' or 'hibernate' mode when the lids are closed. However, due to cooling concerns, fully closing the lid is not recommended

WLES DEACTIVATION AND TEARDOWN

1. DEACTIVATE WLES LAPTOP
A31p 'Enhanced Wideband MicroTAU – WLEFlight 3.0'

For each WLES A31p:

Click 'Exit'

At prompt 'Are you sure you want to exit?'

click 'Yes'

Click 'Start' > 'Turn Off Computer...' > 'Turn Off'

Disconnect Laptop Receiver Unit from A31p

Serial port

Remove Laptop Receiver Unit from Velcro on
A31p

2. REMOVE WLES RELAY UNITS
Remove Cabin Relay Units (2) from aft cabin (see
figs 7-6 and 7-7)
Disconnect Cabin Relay Units from pre-routed
cables
Disconnect and coil cables, stow in launch location

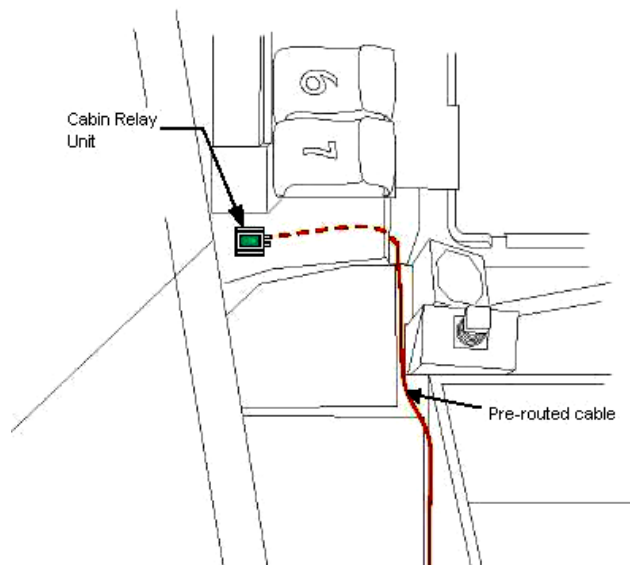


Figure 7-6.- Aft STBD location.

Cont next page
FS 7-10

ORB OPS/126/FIN

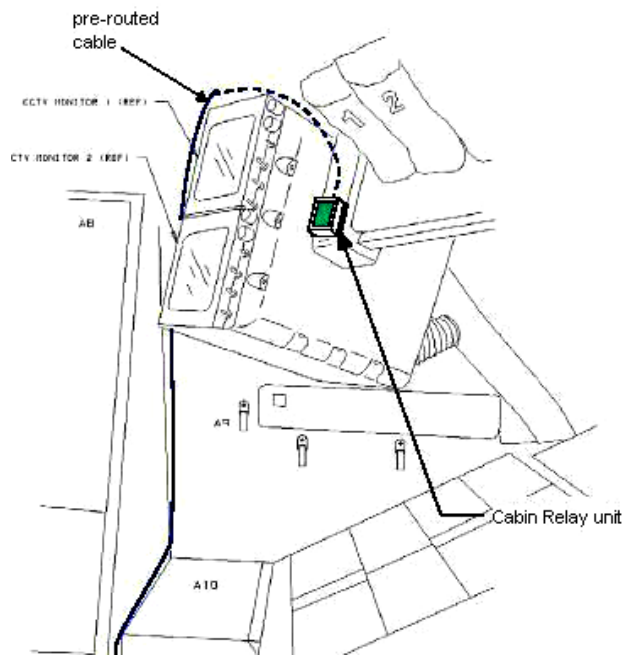


Figure 7-7.- Aft PORT location.

- ML60E
3. STOW EQUIPMENT
 Stow:
 Laptop Receiver Units (2)
 Cabin Relay Units (2)
 Notify MCC-H: "WLES Teardown Complete"

WLES LAPTOP RECEIVER UNIT (LRU) R&R

- A31p 1. DISCONNECT BACKUP LRU FROM LAPTOP
'Enhanced Wideband MicroTAU – WLEFlight 3.0'

Click 'Exit'
At prompt 'Are you sure you want to exit?'
click 'Yes'

Disconnect Backup LRU from Backup A31p Serial
port (see fig 7-8)
Remove Backup LRU from Velcro on Backup A31p
(see fig 7-9)



Figure 7-8.- A31p ports.

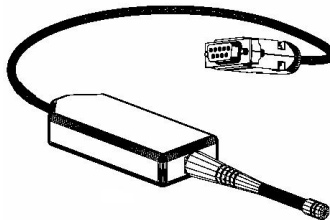


Figure 7-9.- Laptop Receiver Unit.

2. DISCONNECT PRIME LRU FROM LAPTOP
Disconnect Prime LRU from Prime A31p Serial port
(see fig 7-8)
Remove LRU from Velcro on A31p

Cont next page

FS 7-12

ORB OPS/126/FIN

3. CONNECT BACKUP LRU

Connect Backup LRU to Prime WLES A31p Serial port
Secure LRU to A31p with Velcro

A31p

4. VERIFY LRU INSTALLATION

Use prime WLES laptop

'Enhanced Wideband MicroTAU – WLEFlight 3.0'
Click 'System Settings' (left side of display)

'Communications Settings'
√RF Receiver Port: 'COM 1'

Click 'Query Receiver'
Verify 'Receiver found on COM1' message appears

5. VERIFY COMM WITH RELAY UNITS

Click 'Unit List' (left side of display)

√Cabin Relay Units Unit ID 1920 and 1984 (2) present
on display in first column; scroll down as necessary

For each Cabin Relay Unit:

- √Unit ID present
- √Type: 'Relay-GL'
- √Last Update: time is updating (every 5 to 15 sec)
- √Via: 'RF'
- √Mode: 'Idle'

If no time updates after 2 min, contact MCC-H

Notify MCC-H: "WLES LRU R&R complete", mark
failed LRU as 'failed'

ML60E

6. STOW EQUIPMENT

Stow:
Prime (failed) LRU

CONFIGURE WLES DATA FILE BACKUP PATH

NOTE

MCC will identify new backup WLES laptop to be used in place of KFX (N:)

- A31p Use prime WLES laptop
- 'Enhanced Wideband MicroTAU – WLEFlight 3.0'
Click 'System Settings' (left side of display)
- 'Directories'
At the line 'Backup Directory:' click 'Browse...' (right side of display)
- 'Browse for Folder'
Navigate to WLES folder on KFX:
 'My Computer'>'C on KFX (N:)'>'Program Files'>'Invocon'>'EWBMTAU-WLEFlight'
- Click 'OK'
- Verify 'Backup Directory:' set to:
 'N:\Program Files\Invocon\EWBMTAU-WLEFlight'
- Verify 'Backup Interval' set to '30 minutes'
- Click 'Unit List' (left side of display)

PREP WLES LAPTOPS FOR TRANSFER

- A31p 1. DEACTIVATE WLES LAPTOP(S)
'Enhanced Wideband MicroTAU – WLEFlight 3.0'

For each WLES A31p to be transferred:

Click 'Exit'

At prompt 'Are you sure you want to exit?'

click 'Yes'

Click 'Start'>'Turn Off Computer... '>'Turn Off'

Disconnect Laptop Receiver Unit from A31p

Serial port

Remove Laptop Receiver Unit from Velcro on
A31p

2. SET UP NEW WLES LAPTOPS

√MCC-H for which laptop to use

If Prime Laptop being transferred:

Perform WLES ACTIVATION AND CHECKOUT,
steps 3, 5 thru 8, then:

If Backup Laptop being transferred:

Perform WLES ACTIVATION AND CHECKOUT,
steps 4 and 5, then:

Notify MCC-H: "PREP WLES LAPTOPS FOR
TRANSFER complete"

WLES RNDZ TOOLS CHECKOUT PREP

- A31p
1. DEACTIVATE BACKUP WLES LAPTOP
On backup WLES laptop:
 'Enhanced Wideband MicroTAU – WLEFlight 3.0'
 Click 'Exit'
 At prompt 'Are you sure you want to exit?'
 click 'Yes'
 Disconnect Laptop Receiver Unit from A31p
 Serial port
 Leave attached to laptop with Velcro on A31p
 2. DEACTIVATE WLES FILE BACKUP
On prime WLES laptop:
 'Enhanced Wideband MicroTAU – WLEFlight 3.0'
 Click 'System Settings' (left side of display)

 'Backup Mode Selection'
 Click 'Standard'
 Click 'Unit List' (left side of display)

WLES DOCK/UNDOCK RECOVERY

- A31p
1. RECOVER BACKUP WLES LAPTOP
On backup WLES laptop:
 Connect Laptop Receiver Unit to A31p Serial port
 If laptop is off:
 | A31p pwr – On
 | At prompt select option 1 to start WLES
 If laptop is on:
 Double click 'Shuttle Apps'>'WLES'>'WLES'
 'Backup Mode Selection'
 Click 'Secondary'
 2. REACTIVATE WLES FILE BACKUP
On prime WLES laptop:
 'Enhanced Wideband MicroTAU – WLEFlight 3.0'
 Click 'System Settings' (left side of display)

 'Backup Mode Selection'
 Click 'Primary'
 Click 'Unit List' (left side of display)

┌ | | | ┌

DISABLE WLES FILE BACKUP

(SWITCH TO STANDARD MODE)

A31p On prime WLES laptop:
 'Enhanced Wideband MicroTAU – WLEFlight 3.0'
 Click 'System Settings' (left side of display)

 'Backup Mode Selection'
 Click 'Standard'
 Click 'Unit List' (left side of display)

ENABLE WLES FILE BACKUP

(SWITCH TO PRIMARY MODE)

A31p On prime WLES laptop:
 'Enhanced Wideband MicroTAU – WLEFlight 3.0'
 Click 'System Settings' (left side of display)

 'Backup Mode Selection'
 Click 'Primary'
 Click 'Unit List' (left side of display)



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MAUI ANALYSIS OF UPPER-ATMOSPHERIC
INJECTIONS (MAUI)

MAUI PROCEDURE FS 8-2

MAUI

FS 8-1

ORB OPS/126/FIN

MAUI

MAUI PROCEDURE

- 15:00 or earlier 1. MANEUVER TO START ATTITUDE
(BIASED +ZLV +YVV)

Deploy MAUI – RCS FIRING SEQUENCE
(Cue Card)

GNC 20 DAP CONFIG

√DAP A1, B1 loaded

UNIV PTG

TGT ID – ITEM 8 +2 EXEC
BODY VECT – ITEM 14 +5 EXEC
P – ITEM 15 +2 7 0 EXEC
Y – ITEM 16 +3 5 0 EXEC
OM – ITEM 17 +2 7 0 EXEC

TRK – ITEM 19 EXEC (CUR - *)

2. INITIATE TIMER

√MCC for start time

GNC 2 TIME

Set count down/count up timer per MCC

√MET – ITEM 2 EXEC (*)

CRT TIMER COUNT TO – ITEM 17 + + +
EXEC

3. SETUP

O14:E, cb DDU L (two) – cl
O15:E

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

GNC 20 DAP CONFIG

DAP A PRI P OPTION – ITEM 15 EXEC (NOSE)
ROT PLS – ITEM 13 +1.0 0 0 EXEC
TRAN PLS – ITEM 17 +0.7 3 EXEC
VERN ROT PLS – ITEM 26 +0.1 5 3 EXEC

Cont next page

GNC 23 RCS

Deselect Jets:

Forward RCS page – ITEM 1 EXEC

JET DES F1D – ITEM 23 EXEC (*)

F2D – ITEM 27 EXEC (*)

C3 √DAP: A/AUTO/VERN
 √DAP TRANS: PULSE/PULSE/PULSE
 DAP ROT: PULSE/PULSE/PULSE

-05:00 4. VERIFY ATTITUDE
 Verify in attitude

NOTE

For the following RCS firing sequence
(step 5):

- A. Expect total orbiter body rates (RSS) to exceed 1 deg/sec
- B. Possible loss of comm due to orbiter body rates and attitude excursions
- C. For any jet fail OFF, continue with firing sequence
- D. Requirement is for a particular jet group, not a specific jet
- E. The table in step 5 is also provided as a cue card

Cont next page

FS 8-3

ORB OPS/126/FIN

5. RCS FIRING SEQUENCE

NOTE

Use the table below or the cue card

MAUI – RCS FIRING SEQUENCE

| Timer | Jets Fired | CDR | PLT |
|--------|------------|---|--|
| -03:00 | | √Body rates: $+0.047 \leq \text{roll} \leq +0.087$ $-0.020 \leq \text{pitch} \leq +0.020$ $-0.020 \leq \text{yaw} \leq +0.020$ DAP: FREE DAP: A/PRI Inform PLT "GO" for jet deselection | Configure initial setup [GNC 23 RCS] Left RCS page – ITEM 2 EXEC On CDR "GO", proceed <u>NOTE</u> Expect DAP RECONF msgs in following actions Deselect jets: JET DES L5L – ITEM 37 EXEC (*) Right RCS page – ITEM 3 EXEC JET DES R5D – ITEM 39 EXEC (*) Forward RCS page – ITEM 1 EXEC JET DES F5L – ITEM 37 EXEC (*) <u>NOTE</u> Queue the following ITEM entry on the scratch pad. Do not perform the EXEC until specified at 35 sec JET DES F3D – ITEM 25 |
| -00:30 | | FLT CNTRL PWR – ON | |
| 00:00 | RXA, LXA | THC +X (in) (3 sec firing) | |
| 00:15 | FXL, LXL | THC +Y (right) (3 sec firing) | |
| 00:30 | FXR, RXR | THC -Y (left) (3 sec firing) | |
| 00:35 | | | When jets stop firing: [GNC 23 RCS] EXEC [JET DES F3D – ITEM 25 (*)] |
| 00:45 | F4D | RHC +pitch (Past Soft Stop, hold 3 sec) | |
| 00:48 | | RHC release | |
| 00:50 | | | DAP: VERN |
| 01:00 | R5R | RHC +yaw (10 sec firing) | |
| 01:20 | L5D | RHC -pitch (12 sec firing) | |
| 01:40 | F5R | RHC +pitch (12 sec firing) | |
| | | FLT CNTRL PWR – OFF | Return to MAUI PROCEDURE, step 6, (ORB OPS FS, <u>MAUI</u>) |

Cont next page

FS 8-4

ORB OPS/126/FIN

6. CLEANUP
F6 √FLT CNTRL PWR – OFF

GNC 23 RCS

√Forward RCS page – ITEM 1 EXEC

Reselect Jets:

JET DES F1D – ITEM 23 EXEC (no *)
F3D – ITEM 25 EXEC (no *)
F2D – ITEM 27 EXEC (no *)
F5L – ITEM 37 EXEC (no *)

Left RCS page – ITEM 2 EXEC
JET DES L5L – ITEM 37 EXEC (no *)

Right RCS page – ITEM 3 EXEC
JET DES R5D – ITEM 39 EXEC (no *)

GNC 20 DAP CONFIG

DAP A1 – ITEM 1 + 1 EXEC

7. SNAP LVLH ATTITUDE AND NULL RATES

When time \geq +03:30:

DAP: A/PRI
DAP: LVLH

When rates stable:

DAP: VERN

Return to FLT PLN attitude

8. RECONFIGURE TO GROUP B POWERDOWN

√MCC

O14:E, cb DDU L (two) – op
O15:E

O14:F, Pri RJD LOGIC,DRIVER (sixteen) – OFF
O15:F, RJDA 1A L2/R2 MANF DRIVER – ON
O16:F



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CUE
CARDS

CUE CARD CONFIGURATION



NOT FLOWN

FS 9-1

ORB OPS/126/FIN

CUE
CARDS

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FS 9-2

ORB OPS/126/FIN

TOP

HOOK
VELCRO

LiOH CHANGEOUT

(7 crewmembers/Single Shift/FD 1-15)

| FLIGHT DAY | POS A | POS B | CK CMPLT |
|------------|-----------------|-----------------|-------------|
| LAUNCH | 1 | 2 | |
| PRE FD01 | " | " | |
| POST FD02 | 3 | 4 | |
| PRE FD02 | 5 * | 6 | |
| POST FD03 | 7 | " | DOCKING |
| PRE FD03 | " | STS-122_____ | |
| POST FD04 | " | " | |
| PRE FD04 | STS-122_____ | " | |
| POST FD05 | " | " | |
| PRE FD05 | " | STS-122_____ | |
| POST FD06 | " | " | |
| PRE FD06 | STS-122_____ | " | |
| POST FD07 | " | " | |
| PRE FD07 | " | STS-122_____ | |
| POST FD08 | " | " | |
| PRE FD08 | STS-122_____ | " | |
| POST FD09 | " | " | |
| PRE FD09 | " | STS-122_____ | |
| POST FD10 | " | " | |
| PRE FD10 | STS-123_____ | " | |
| POST FD11 | " | " | |
| PRE FD11 | " | STS-123_____ | |
| POST FD12 | " | " | |
| PRE FD12 | STS-123_____ | " | |
| POST FD13 | " | " | |
| MID FD13 | STS-123 * _____ | STS-123 * _____ | HATCH CLOSE |
| PRE FD13 | " | " | |
| POST FD14 | STS-123_____ | STS-123_____ | |
| PRE FD14 | " | STS-123_____ | |
| POST FD15 | STS-123_____ | STS-123_____ | |
| PRE FD15 | STS-124 * _____ | STS-124 * _____ | |

*Re-bag and seal LiOH cans w/Gray Tape and stow
(Locations of canisters on back)

ORB OPS-29a/nonRCRS/126/O/B

NOTE

This card is specifically used for the STS-126 mission with the orbiter conducting single shift operations with a crew size of 7. This changeout scheme reflects FD3 docking with ISS, Vozdukh, and dual bed CDRA operation

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FS CC 9-3

ORB OPS/126/FIN

TOP
BACK OF 'LIOH CHANGEOUT'

HOOK
VELCRO

LIOH CHANGE OUT (cont)
(7 crewmembers/Single Shift/FD 16-19)

| FLIGHT DAY | POS A | POS B | CK CMPLT |
|------------|-------|-------|----------|
| POST FD16 | 8 | 9 | EOM |
| PRE FD16 | 10 | " | |
| POST FD17 | 11 | 12 | EOM+1 |
| PRE FD17 | 13 * | 14 * | |
| POST FD18 | 15 | 16 | EOM+2 |
| PRE FD18 | " | 17 | |
| POST FD19 | 18 | 19 | EOM+3 |

*Re-bag and seal LiOH cans w/Gray Tape and stow

LIOH CANISTER STOWAGE LOCATIONS

Ascent Stowage Locations

Orbiter:

MD52M (LiOH Box): Cans 1-31 *
MPLM: Cans 32-42

ISS:

STS-122 Cans 14-20
STS-123 Cans 22-31
STS-124 Cans 1-9 (used), 27-31

Entry (EOM) Stowage Locations

Orbiter:

MD52M (LiOH Box) *:

ISS:

* 2 LiOH cans installed in LiOH slots A and B
ORB OPS-29b/nonRCRS/126/O/B

(reduced copy)

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FS CC 9-4

ORB OPS/126/FIN

TOP

HOOK
VELCRO

HOOK
VELCRO

ORBIT BURN MONITOR

| | | |
|--|--|---|
| OMS TEMP* | L R | |
| FU IN P ≥ | 219 | 220 |
| ≤ | 201 | 208 |
| or No FU IN P | | |
| | | OMS ENG FAIL OMS PRPLT FAIL |
| OMS PC* & OMS ↓ | | |
| ENG VLV 1 or 2 < 70 | | OMS ENG FAIL |
| or OX IN P > 227 | | OMS PRPLT FAIL |
| or OX IN P ≤ 227 | | |
| or No OX IN P | | |
| OMS OX/FU TK P (√ENG IN P) | | |
| OX/FU LOW | | He PRESS/VAP ISOL (two) – OP If aff TK P not incr: OMS PRPLT FAIL |
| OX & FU HIGH | | He PRESS/VAP ISOL (two) – CL Cycle He A(B) to maintain TK P 234-284 |
| OMS N2 REG P HIGH or LOW | | OMS ENG – ARM |
| OMS N2 TK P LOW (√[OMS/MPS]) | | At N2 TK P < 470: OMS ENG – ARM |
| OMS GMBL | PRI fail SEC fail | L(R) OMS GMBL – SEC If high RCS usage: OMS ENG FAIL |
| GPC | <input type="checkbox"/> (<input type="checkbox"/>) & Burning OMS aff | aff GPC PWR – OFF If SEC GMBL avail: aff MDM FF 1(4) – OFF, ON L(R) OMS GMBL – SEC |
| | SEC GMBL lost 2 FAs lost | If high RCS usage: OMS ENG FAIL √MAN SHUTDN |
| I/O ERROR FA | 1(4) | L(R) OMS GMBL – SEC ♦ I/O RESET If high RCS usage: OMS ENG FAIL |
| | 2 FAs lost | √MAN SHUTDN |
| BCE STRG D | 1(4) | I/O RESET (if recov: >>) If high RCS usage: L(R) OMS GMBL – SEC |
| GPC SET SPLIT | Non-crit burn Crit burn | STOP BURN: OMS ENG(s) – OFF Go to “GPC” above |
| I/O ERROR PCM | | OI PCMMU PWR – 2(1) |
| BCE BYP OA | | SM I/O RESET |

*If XFD, BLDN, or sensor fail, monitor ENG IN P for off-nominal performance

ORB OPS-31a/126/O/B

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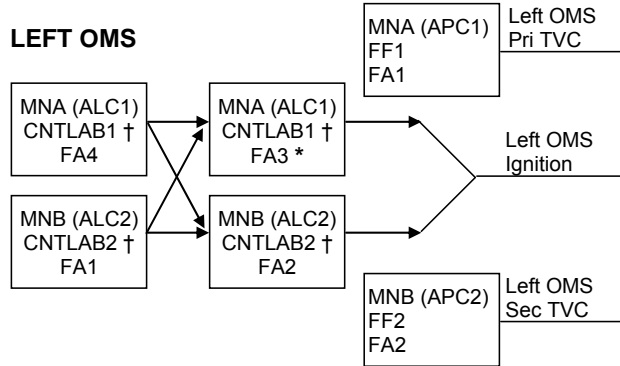
FS CC 9-5

ORB OPS/126/FIN

TOP
BACK OF 'ORBIT BURN MONITOR'

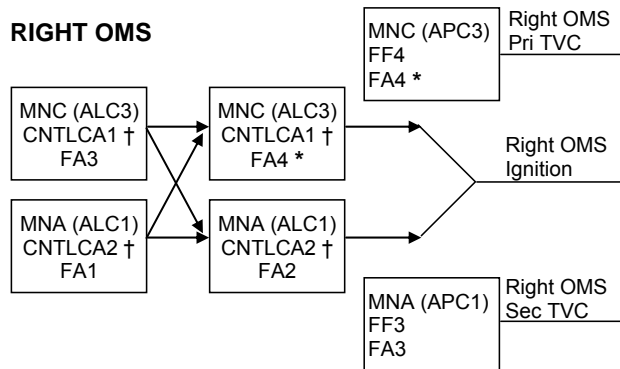


LEFT OMS



- † If CNTL AB1 or AB2 (CA1 or CA2) failed and ign path still exists at OMS fail, assume L(R) OMS ↓ is PRPLT FAIL
- * If L(R) Pc failed high during burn or FA3(4) failed, at L(R) OMS fail, no guidance downmode after L(R) OMS ENG switch OFF (TGO slow, ADI needles in error, 6 ft/s underburn)

RIGHT OMS



| If two FA MDMs lost | | |
|---------------------|-----------------------|----------------------------|
| MDMs | Preburn: ENG – OFF | During burn: MAN SHUTDN |
| 1,2 | LEFT (TVC) | BOTH |
| 1,3 | RIGHT (IGN) | LEFT |
| 1,4 | LEFT (IGN) | RIGHT |
| 2,3 | LEFT (IGN) | RIGHT |
| 2,4 | RIGHT (IGN) | LEFT |
| 3,4 | RIGHT (TVC) | BOTH |

ORB OPS-31b/126/O/A

(reduced copy)

NOT FLOWN

FS CC 9-6

ORB OPS/126/FIN

NOT FLOWN

FS CC 9-7

ORB OPS/126/FIN

(reduced copy)

TOP

PILE
VELCRO

ORB OPS-41a/126/O/B

PILE
VELCRO

STS-126 DAP A1 – DAP A8 CONFIGURATIONS

| | ITEM # | A1 | A2 | A3 | A4 | A5 | A6 | A7 | A8 |
|-------------|---------|---------|--------|--------|--------|--------------------|--------------------------|--------|----------------|
| PRI | | | | | | | | | |
| ROT RATE | 10 (50) | 0.2000 | 0.4000 | 0.2000 | 0.5000 | 0.2000 | 0.2000 | 0.2000 | 0.0500 |
| ATT DB | 11 (51) | 5.00 | 1.00 | 0.30 | 3.00 | 5.00 | 5.00 | 2.00 | 2.00 |
| RATE DB | 12 (52) | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| ROT PLS | 13 (53) | 0.100 | 0.100 | 0.100 | 0.100 | 0.100 | 0.100 | 0.100 | 0.100 |
| COMP | 14 (54) | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| P OPTION | 15 (55) | ALL | ALL | ALL | ALL | ALL | TAIL | ALL | ALL |
| Y OPTION | 16 (56) | ALL | ALL | TAIL | ALL | ALL | TAIL | ALL | ALL |
| TRAN PLS | 17 (57) | 0.100 | 0.100 | 0.100 | 0.100 | 0.100 | 0.100 | 0.100 | 0.100 |
| ALT | | | | | | | | | |
| RATE DB | 18 (58) | 0.200 | 0.200 | 0.070 | 0.200 | 0.070 | 0.070 | 0.100 | 0.100 |
| JET OPT | 19 (59) | ALL | ALL | ALL | ALL | ALL | TAIL | ALL | ALL |
| # JETS | 20 (60) | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 2 |
| ON TIME | 21 (61) | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| DELAY | 22 (62) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| VERN | | | | | | | | | |
| ROT RATE | 23 (63) | 0.2000 | 0.4000 | 0.0080 | 0.2000 | 0.0500 | 0.0500 | 0.0160 | 0.0500 |
| ATT DB | 24 (64) | 1.000 | 1.000 | 0.070 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| RATE DB | 25 (65) | .020 | .020 | .010 | .020 | .020 | .020 | .020 | .020 |
| ROT PLS | 26 (66) | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 | 0.050 |
| COMP | 27 (67) | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| CNTL ACC | 28 (68) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PURPOSE | | NOMINAL | PTC | GG | | LOSS OF VERN (ALL) | LOSS OF VERN (TAIL ONLY) | RNDZ | TERMINAL PHASE |

BOLD/ITALIC indicates change from I-Load.

HINGE

NOT FLOWN

FS CC 9-8

ORB OPS/126/FIN

(reduced copy)

TOP
HINGED AT BOTTOM OF
'STS-126 DAP A1 – DAP A8 CONFIGURATIONS'
HINGE

STS-126 DAP B1 – DAP B8 CONFIGURATIONS

| | ITEM # | B1 | B2 | B3 | B4 | B5 | B6 | B7 | B8 |
|-------------|---------|---------------------------------|--------------------------------|--------------------------|--------|----------------|--------|--------|-------------------|
| PRI | | | | | | | | | |
| ROT RATE | 30 (50) | 0.5000 | 0.2000 | 0.2000 | 0.2000 | 0.2000 | 0.5000 | 0.5000 | 0.0500 |
| ATT DB | 31 (51) | 3.00 | 3.00 | 3.00 | 0.30 | 3.00 | 3.00 | 2.00 | 2.00 |
| RATE DB | 32 (52) | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| ROT PLS | 33 (53) | 0.040 | 0.040 | 0.040 | 0.040 | 0.040 | 0.040 | 0.040 | 0.040 |
| COMP | 34 (54) | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| P OPTION | 35 (55) | ALL | TAIL | ALL | TAIL | TAIL | ALL | ALL | ALL |
| Y OPTION | 36 (56) | ALL | TAIL | ALL | TAIL | TAIL | ALL | ALL | ALL |
| TRAN PLS | 37 (57) | 0.100 | 0.020 | 0.020 | 0.020 | 0.020 | 0.020 | 0.050 | 0.050 |
| ALT | | | | | | | | | |
| RATE DB | 38 (58) | 0.200 | 0.070 | 0.070 | 0.100 | 0.200 | 0.200 | 0.100 | 0.100 |
| JET OPT | 39 (59) | ALL | TAIL | ALL | ALL | ALL | ALL | ALL | ALL |
| # JETS | 40 (60) | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 |
| ON TIME | 41 (61) | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| DELAY | 42 (62) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| VERN | | | | | | | | | |
| ROT RATE | 43 (63) | 0.2000 | 0.2000 | 0.2000 | 0.0080 | 0.0160 | 0.2000 | 0.2000 | 0.0500 |
| ATT DB | 44 (64) | 1.000 | 1.000 | 1.000 | 0.100 | 0.033 | 1.000 | 1.000 | 1.000 |
| RATE DB | 45 (65) | .020 | .020 | .020 | .010 | .020 | .020 | .020 | .020 |
| ROT PLS | 46 (66) | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.020 |
| COMP | 47 (67) | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| CNTL ACC | 48 (68) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PURPOSE | | O/S & RCS BURNS (ORB OPS) | LOSS OF VERN (TAIL ONLY) | LOSS OF VERN (ALL) | | COASHUD CAL | | RNDZ | TERMINAL PHASE |

BOLD/ITALIC indicates change from I-Load.

HOOK
VELCRO

ORB OPS-41aa/126/O/A

HOOK
VELCRO

NOT FLOWN

FS CC 9-9

ORB OPS/126/FIN

(reduced copy)

TOP
BACK OF 'STS-126 DAP A1 – DAP A8 CONFIGURATIONS'

PILE
VELCRO

ORB OPS-41b/126/O/B

PILE
VELCRO

STS-126 DAP A9 – DAP A14 CONFIGURATIONS

| | ITEM # | A9 | A10 | A11 | A12 | A14 |
|-------------|---------|-----------------------|---------|----------------------|-------------------------------|-------------------------------|
| PRI | | | | | | |
| ROT RATE | 10 (50) | 0.1300 | 0.0500 | 0.0500 | 0.0500 | 0.2000 |
| ATT DB | 11 (51) | 2.00 | 0.60 | 10.00 | 1.00 | 5.00 |
| RATE DB | 12 (52) | 0.10 | 0.10 | 0.20 | 0.20 | 0.20 |
| ROT PLS | 13 (53) | 0.100 | 0.100 | 0.100 | 0.040 | 0.100 |
| COMP | 14 (54) | .000 | .000 | .000 | .000 | .000 |
| P OPTION | 15 (55) | TAIL | TAIL | TAIL | TAIL | TAIL |
| Y OPTION | 16 (56) | TAIL | TAIL | TAIL | TAIL | TAIL |
| TRAN PLS | 17 (57) | 0.050 | 0.050 | 0.100 | 0.010 | 0.100 |
| ALT | | | | | | |
| RATE DB | 18 (58) | 0.100 | 0.100 | 0.035 ¹ | 0.035 ¹ | 0.200 |
| JET OPT | 19 (59) | TAIL | TAIL | TAIL | TAIL | TAIL |
| # JETS | 20 (60) | 2 | 2 | 1 | 1 | 1 |
| ON TIME | 21 (61) | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| DELAY | 22 (62) | 0.00 | 0.00 | 6.00 | 6.00 | 6.00 |
| VERN | | | | | | |
| ROT RATE | 23 (63) | 0.1300 | 0.0500 | 0.1000 | 0.0100 | 0.2000 |
| ATT DB | 24 (64) | 1.000 | 0.500 | 5.000 | 1.000 | 3.000 |
| RATE DB | 25 (65) | .020 | .020 | .050 | .020 | .200 |
| ROT PLS | 26 (66) | 0.050 | 0.050 | 0.010 | 0.002 | 0.010 |
| COMP | 27 (67) | .000 | .000 | .000 | .000 | .000 |
| CNTL ACC | 28 (68) | 0 | 0 | 2² | 2² | 1 |
| PURPOSE | | PROX/OPS FLYAROUND | DOCKING | AUTO REBOOST | MATED HOLD (VRCS & ALT) | ORBITER ALONE SRMS/OBSS |

BOLD/ITALIC indicates change from I-Load.
¹ I-loaded below keyboard limit; do not change
² CA2 for no vehicle docked at SM aft
 CA3 for Progress/Soyuz docked at SM aft

HINGE

NOT FLOWN

FS CC 9-10

ORB OPS/126/FIN

(reduced copy)

TOP
 BACK OF 'STS-126 DAP B1 – DAP B8 CONFIGURATIONS'
 HINGED AT BOTTOM OF 'STS-126 DAP A9 – DAP A14 CONFIGURATIONS'
 HINGE

STS-126 DAP B9 – DAP B12 CONFIGURATIONS

| | ITEM # | B9 | B10 | B12 |
|-------------|---------|-----------------------|---------|--------------------------------|
| PRI | | | | |
| ROT RATE | 30 (50) | 0.1300 | 0.0500 | 0.0500 |
| ATT DB | 31 (51) | 2.00 | 0.60 | 5.00 |
| RATE DB | 32 (52) | 0.10 | 0.10 | 0.20 |
| ROT PLS | 33 (53) | 0.040 | 0.040 | 0.040 |
| COMP | 34 (54) | .000 | .000 | .000 |
| P OPTION | 35 (55) | TAIL | TAIL | TAIL |
| Y OPTION | 36 (56) | TAIL | TAIL | TAIL |
| TRAN PLS | 37 (57) | 0.010 | 0.010 | 0.010 |
| ALT | | | | |
| RATE DB | 38 (58) | 0.100 | 0.100 | 0.035 ¹ |
| JET OPT | 39 (59) | TAIL | TAIL | TAIL |
| # JETS | 40 (60) | 2 | 2 | 1 |
| ON TIME | 41 (61) | 0.08 | 0.08 | 0.08 |
| DELAY | 42 (62) | 10.00 | 0.00 | 6.00 |
| VERN | | | | |
| ROT RATE | 43 (63) | 0.1300 | 0.0500 | 0.1000 |
| ATT DB | 44 (64) | 1.000 | 0.500 | 3.000 |
| RATE DB | 45 (65) | .020 | .020 | .050 |
| ROT PLS | 46 (66) | 0.020 | 0.020 | 0.002 |
| COMP | 47 (67) | .000 | .000 | .000 |
| CNTL ACC | 48 (68) | 0 | 0 | 2² |
| PURPOSE | | PROXOPS/ FLYAROUND | DOCKING | MATED MNVRS (VRCS & ALT) |

BOLD/ITALIC indicates change from I-Load.

¹ I-loaded below keyboard limit; do not change

² CA2 for no vehicle docked at SM aft

CA3 for Progress/Soyuz docked at SM aft

HOOK
VELCRO

ORB OPS-41bb/126/O/B

HOOK
VELCRO

TOP

MAUI – RCS FIRING SEQUENCE

| Timer | Jets Fired | CDR | PLT |
|--------|------------|--|--|
| -03:00 | | Body rates: $+0.047 \leq \text{roll} \leq +0.087$ $-0.020 \leq \text{pitch} \leq +0.020$ $-0.020 \leq \text{yaw} \leq +0.020$ DAP: FREE DAP: A/PRI Inform PLT "GO" for jet deselects | Configure initial setup [GNC 23 RCS] Left RCS page – ITEM 2 EXEC On CDR "GO", proceed NOTE Expect DAP RECONF msgs in following actions Deselect jets: JET DES L5L – ITEM 37 EXEC (*) Right RCS page – ITEM 3 EXEC JET DES R5D – ITEM 39 EXEC (*) Forward RCS page – ITEM 1 EXEC JET DES F5L – ITEM 37 EXEC (*) NOTE Queue the following ITEM entry on the scratch pad. Do not perform the EXEC until specified at 35 sec JET DES F3D – ITEM 25 |
| -00:30 | | FLT CNTRL PWR – ON | |
| 00:00 | RXA, LXA | THC +X (in) (3 sec firing) | |
| 00:15 | FXL, LXL | THC +Y (right) (3 sec firing) | |
| 00:30 | FXR, RXR | THC -Y (left) (3 sec firing) | |
| 00:35 | | | When jets stop firing: [GNC 23 RCS] EXEC [JET DES F3D – ITEM 25 (*)] |
| 00:45 | F4D | RHC +pitch (Past Soft Stop, hold 3 sec) | |
| 00:48 | | RHC release | |
| 00:50 | | | DAP: VERN |
| 01:00 | R5R | RHC +yaw (10 sec firing) | |
| 01:20 | L5D | RHC -pitch (12 sec firing) | |
| 01:40 | F5R | RHC +pitch (12 sec firing) | |
| | | FLT CNTRL PWR – OFF | Return to MAUI PROCEDURE, step 6, (ORB OPS FS, MAUI) |

ORB OPS-42a/126/O/A

(reduced copy)

NOT FLOWN

FS CC 9-11

ORB OPS/126/FIN



TOP
 BACK OF 'MAUI - RCS FIRING SEQUENCE'



HOOK
 VELCRO

HOOK
 VELCRO



HOOK
 VELCRO



ORB OPS-42b/126/O/A



NOT FLOWN

(reduced copy)
 FS CC 9-12

ORB OPS/126/FIN



TOP

WLES CONFIG AFTER PGSC REBOOT

1. If window appears asking to launch WLES software:
 - Click '1' to launch WLES software
 - Else:
 - Double click 'Shuttle Apps'>'WLES'>'WLES'
2. ✓MCC for 'Backup Mode Selection'
3. If EWBMTAU - WLEFlight window appears:
 - 'Run current command XXXX_YY_ZZZZ.xml' –
 - Click 'Yes'

ORB OPS-47a/126/O/A

FABRICATION NOTES

Fabricate on flight approved yellow Post-it

(reduced copy)

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FS CC 9-13

ORB OPS/126/FIN



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FS 9-14

ORB OPS/126/FIN



Space Shuttle Program
FLIGHT DATA FILE

JSC-48036-126
FINAL



ORBIT OPS CHECKLIST

STS
126

Flight Cover (trim bottom to expose tabs)