

# Orbit Operations Checklist

## STS-400 Flight Supplement

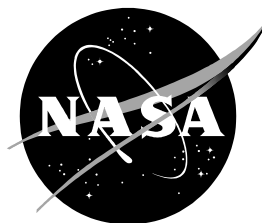
---

**Mission Operations Directorate  
Operations Division**

**Final  
December 17, 2008**

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas




<b>SMS FDF CHANGE NOTIFICATION</b>		<b>SIM PACK</b>	DATE INITIATED 4/28/09	DATE RECEIVED (PMO) 4-28-09
BOOK TITLE STS-400 ORB OPS FS		BK ISSUE (Ed, Rev, PCN) FIN	SIM PACK NUMBER SIM-206	
Change is for flights (Also give SMS load if load dependent): STS-400		SMS UNIQUE? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	DEVELOPMENTAL? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
FABRICATED ITEM CHANGE? <input type="checkbox"/> NONE <input checked="" type="checkbox"/> CUE CARDS <input type="checkbox"/> TRANSPARENCIES <input type="checkbox"/> Other _____				
INSTRUCTIONS TO USER:  <p>Incorporate the following</p> <p>1. Replace FS CC 6-11 and FS CC 6-12  After FS CC 6-12, add FS CC 6-13 and FS 6-14</p>				
AUTHORITY FOR CHANGE* (Approved 482 numbers, approved issue at print shop, supervisors deem mandatory, etc.): ORB OPS FS-00130				
OTHER AFFECTED FDF BOOKS None		*Refer to Crew Procedures Management Plan Are all SIM PACKS submitted? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
IMPLEMENTATION REQUIREMENTS		<input type="checkbox"/> Limited Distribution (List in comments)	<input type="checkbox"/> NO EARLIER THAN _____ (Date and/or Sim ID)	
			<input checked="" type="checkbox"/> NO LATER THAN 4/30/09 - 400 FD2 sim (Date and/or Sim ID)	
BOOK MGR (Signature/Date) <i>Thomas Zulauf 4-28-09</i>	SUPERVISOR (if required, Signature/Date) <i>Andy Pascoe 28Apr09</i>	FDF COORD or FDF MGR (Signature/Date) <i>STEP 28 APR 09</i>		
COMMENTS				

MISSION OPERATIONS DIRECTORATE

**ORBIT OPERATIONS CHECKLIST  
STS-400 FLIGHT SUPPLEMENT**

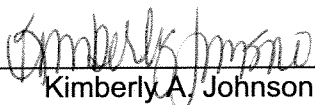
FINAL  
December 17, 2008


PREPARED BY:

  
\_\_\_\_\_  
Thomas R. Zulauf  
Publication Manager

APPROVED BY:

ACCEPTED BY:

  
\_\_\_\_\_  
Kimberly A. Johnson  
Manager, Shuttle  
Procedures Management

  
\_\_\_\_\_  
Michael T. Hurt  
FDF Manager

This document is under the configuration control of the Crew Procedures Control Board (CPCB). All proposed changes must be submitted via FDF Workflow Crew Procedure Change Request (CR) to DO3/FDF Manager.

Additional distribution of this book, for official use only, may be requested in writing to DO3/PMO Administrator. The request must include justification and requester's name, organization, position, and phone number. Contractor requests are made through the NASA or DOD organization supported. Deletions, reduction in quantity, or change of address may be submitted to DO3/FDF Management Office, 281-244-1184.

Incorporates the following:		
482#:	ORB OPS_FS-0084	ORB OPS_FS-0096 ORB OPS_FS-0111
	ORB OPS_FS-0094	ORB OPS_FS-0097 MULTI-1829
	ORB OPS_FS-0095	ORB OPS_FS-0098

AREAS OF TECHNICAL RESPONSIBILITY

Publication Manager	DO3/T. Zulauf	281-244-0922
Alternate Publication Manager	DO3/L. Giles	281-244-9068
COMM/INST	DS2/G. Horlacher	281-483-3878
PTG	DO4/K. Watts	281-244-5368
DAP TABLES	DS6/D. Weiler	281-483-2666
DAP REF	DS6/D. Weiler	281-483-2666
WLES	DO5/R. Carroll	281-244-0914

CUE CARDS:

LIOH CHANGEOUT	DS4/B. Jarvis	281-483-6808
ORBIT BURN MONITOR	DS6/D. Lenort	281-483-2644
DAP TABLES	DS6/D. Weiler	281-483-2666
WLES CONFIG AFTER PGSC REBOOT	DO5/R. Carroll	281-244-0914

ORBIT OPERATIONS CHECKLIST  
 STS-400 FLIGHT SUPPLEMENT

**LIST OF EFFECTIVE PAGES**

FINAL 12/17/08

Sign Off .....	*	400/FIN	FS 5-5.....	400/FIN
FS ii .....	*	400/FIN	FS 5-6.....	400/FIN
FS iii .....	*	400/FIN	FS 5-7.....	400/FIN
FS iv .....	*	400/FIN	FS 5-8.....	400/FIN
FS v.....		400/FIN	FS 5-9.....	400/FIN
FS vi.....		400/FIN	FS 5-10.....	400/FIN
FS 1-1 .....		400/FIN	FS 5-11.....	400/FIN
FS 1-2 .....		400/FIN	FS 5-12.....	400/FIN
FS 1-3 .....		400/FIN	FS 5-13.....	400/FIN
FS 1-4 .....		400/FIN	FS 5-14.....	400/FIN
FS 1-5 .....		400/FIN	FS 5-15.....	400/FIN
FS 1-6 .....		400/FIN	FS 5-16.....	400/FIN
FS 2-1 .....		400/FIN	FS 6-1.....*	400/FIN
FS 2-2 .....		400/FIN	FS 6-2.....*	400/FIN
FS 2-3 .....		400/FIN	FS CC 6-3.....*	400/FIN
FS 2-4 .....		400/FIN	FS CC 6-4.....*	400/FIN
FS 3-1 .....		400/FIN	FS CC 6-5.....*	400/FIN
FS 3-2 .....		400/FIN	FS CC 6-6.....*	400/FIN
FS 3-3 .....		400/FIN	FS CC 6-7.....*	400/FIN
FS 3-4 .....		400/FIN	FS CC 6-8.....*	400/FIN
FS 3-5 .....		400/FIN	FS CC 6-9.....*	400/FIN
FS 3-6 .....		400/FIN	FS CC 6-10.....*	400/FIN
FS 3-7 .....		400/FIN	FS CC 6-11.....*	400/FIN
FS 3-8 .....		400/FIN	FS 6-12.....*	400/FIN
FS 4-1 .....		400/FIN		
FS 4-2 .....		400/FIN		
FS 5-1 .....		400/FIN		
FS 5-2 .....		400/FIN		
FS 5-3 .....		400/FIN		
FS 5-4 .....		400/FIN		

\* – Omit from flight book

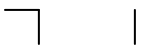
ORBIT OPS CUE CARDS

<u>Title</u>	<u>Ref. Page</u>	<u>Card No.</u>
LIOH CHANGEOUT (Front) ..	FS CC 6-3	ORB OPS-29a/ nonRCRS/400/O/A
LIOH CANISTER STOWAGE LOCATIONS (Back) .....	FS CC 6-4	ORB OPS-29b/ nonRCRS/400/O/B
ORBIT BURN MONITOR (Front).....	FS CC 6-5	ORB OPS-31a/400/O/B
OMS FAILURES (Back).....	FS CC 6-6	ORB OPS-31b/400/O/A
STS-400 DAP CONFIGURATIONS (Front/Top).....	FS CC 6-7	ORB OPS-41a/400/O/A
(Front/Bottom) .....	FS CC 6-8	ORB OPS-41aa/400/O/A
(Back/Top) .....	FS CC 6-9	ORB OPS-41b/400/O/B
(Back/Bottom).....	FS CC 6-10	ORB OPS-41bb/400/O/B
WLES CONFIG AFTER PGSC REBOOT (Front).....	FS CC 6-11	ORB OPS-47a/400/O/A

<u>CONTENTS</u>	<u>PAGE</u>
<u>COMM/INST</u> .....	FS 1-1
LOAD PCMMU FORMAT.....	FS 1-2
PDI DECOM FORMAT.....	FS 1-4
<u>PTG</u> .....	FS 2-1
STAR PAIRS PAD.....	FS 2-2
PAIRS.....	FS 2-3
<u>DAP TABLES</u> .....	FS 3-1
DAP OVERVIEW.....	FS 3-2
UNIV PTG.....	FS 3-3
STS-400 DAP A CONFIGURATIONS.....	FS 3-4
B CONFIGURATIONS.....	FS 3-6
<u>DAP REF</u> .....	FS 4-1
DAP REFERENCE.....	FS 4-2
<u>WING LEADING EDGE SENSORS (WLES)</u>	
<u>PROCEDURES</u> .....	FS 5-1
WLES ACTIVATION AND CHECKOUT.....	FS 5-2
DEACTIVATION AND TEARDOWN.....	FS 5-10
LAPTOP RECEIVER UNIT (LRU) R&R.....	FS 5-12
CONFIGURE WLES DATA FILE BACKUP PATH....	FS 5-14
WLES RNDZ TOOLS CHECKOUT PREP.....	FS 5-15
RNDZ/DEPLOY RECOVERY.....	FS 5-15
DISABLE WLES FILE BACKUP.....	FS 5-16
ENABLE WLES FILE BACKUP.....	FS 5-16
<u>CUE CARD CONFIGURATION</u> .....	FS 6-1



This Page Intentionally Blank





COMM/INST

LOAD PCMMU FORMAT..... FS 1-2  
PDI DECOM FORMAT ..... FS 1-4

**COMM/  
INST**

FS 1-1

ORB OPS/400/FIN

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/ORBIT BURN/FCS C/O	103/161	–
G2,S2,OPS 0	OPS 0	– /163	–
G2,S2,P9	MMU C/O	– /163	–
G9	Prelaunch PL C/O	103/180	758
G2,G8,S2	RNDZ w/ TCS & SSV (PRIME)	103/192	763
G2,G8,S2	RNDZ w/ TCS & SSV (B/U)	103/211	770
G2,G8,S2	SSV RATE 2 (PRIME)	103/184	760
G2,G8,S2	SSV RATE 2 (B/U)	103/205	767
G2,G8,S2	SSV RATE 4 (PRIME)	103/188	762
G2,G8,S2	SSV RATE 5 (B/U)	103/203	765

**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/ TCS & SSV  (PRIME) TFL 192	1 2 3 4 5-FPM	- - 9 4 503	- - 5 4	- - TCS SSV (3) ***  H-H-H *
770 RNDZ w/ TCS & SSV  (BACKUP) TFL 211	1 2 3 4 5-FPM	14 - - 19 502	4 - - 5	SSV (3) *** - - TCS  H-H-H *
760 SSV RATE 2  (PRIME) TFL 184	1 2 3 4 5-FPM	- - - 27 501	- - - 4	- - - SSV (2) ***  H-H-H *
767 SSV RATE 2  (BACKUP) TFL 205	1 2 3 4 5-FPM	- - 29 - 506	- - 4 -	- - SSV (2) *** -  H-H-H *
762 SSV RATE 4  (PRIME) TFL 188	1 2 3 4 5-FPM	- - - 1 505	- - - 4	- - - SSV (4) ***  H-H-H *
765 SSV RATE 5  (BACKUP) TFL 203	1 2 3 4 5-FPM	- - 11 - 507	- - 4 -	- - SSV (5) *** -  L-H-H *
758 Pre-Launch PL C/O  (PRIME) TFL 180	1 2 3 4 5-FPM	28 15 9 - 504	1,2 1,2 5 -	OIU253 ** OIU255 ** TCS -  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



This Page Intentionally Blank



PTG

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

**PTG**

FS 2-1

ORB OPS/400/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	91.4	-Y:14 R+ 344 -Z:26 P+ 310 Y+ 25	-Z:14 R+ 261 P+ 298 Y+ 36	-Y:26 R+ 65 P+ 324 Y+ 33	-Y:26 R+ 282 -Z:14 P+ 119 Y+ 320	-Z:26 R+ 197 P+ 125 Y+ 334	-Y:14 R+ 23 P+ 138 Y+ 315			
B	82.7	-Y:69 R+ 119 -Z:81 P+ 213 Y+ 28	-Z:69 R+ 36 P+ 213 Y+ 13	-Y:81 R+ 211 P+ 197 Y+ 29	-Y:81 R+ 150 -Z:69 P+ 29 Y+ 350	-Z:81 R+ 68 P+ 36 Y+ 337	-Y:69 R+ 231 P+ 15 Y+ 345			
C	91.5	-Y:12 R+ 204 -Z:103 P+ 247 Y+ 61	-Z:12 R+ 93 P+ 273 Y+ 55	-Y:103 R+ 296 P+ 242 Y+ 46	-Y:103 R+ 89 -Z:12 P+ 93 Y+ 309	-Z:103 R+ 345 P+ 75 Y+ 298	-Y:12 R+ 166 P+ 77 Y+ 319			
D	81.9	-Y:36 R+ 0 -Z:47 P+ 77 Y+ 24	-Z:36 R+ 283 P+ 63 Y+ 31	-Y:47 R+ 79 P+ 88 Y+ 35	-Y:47 R+ 263 -Z:36 P+ 242 Y+ 324	-Z:47 R+ 184 P+ 252 Y+ 336	-Y:36 R+ 356 P+ 256 Y+ 315			

FS 2-2

STAR PAIRS PAD

PAIR	COAS ALIGN ATTITUDE 1	ANG SEP	COAS ALIGN ATTITUDE 2
COAS	+X HUD 27 R+ 94 P+ 304 Y+ 332	NOSE UP 62.7	R+ 94 P+ 300 Y+ 34
	-Z COAS 27 R+ 276 P+ 295 Y+ 57		R+ 83 P+ 126 Y+ 60

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

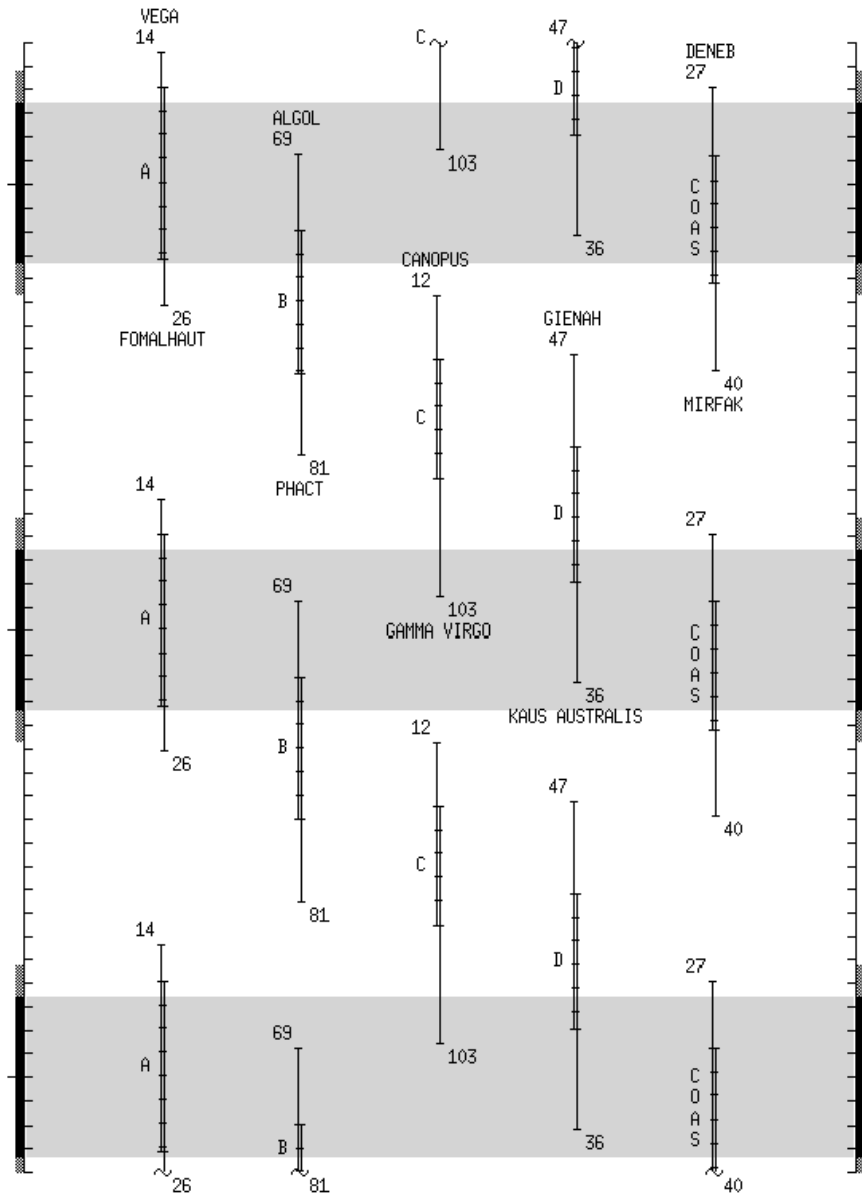
	-Z S TRK	-Y S TRK
BV	5	4
P	87.7	✓ 0
Y	358	✓ 280.57

MET Applicable 001/00:00:00 to 008/00:00:00  
Liftoff Date: 08/14/08  
Liftoff GMT: 227/08:58:30.000

ORB OPS/400/FIN



# STAR PAIRS



MET Applicable: 001/00:00:00 to 008/00:00:00  
 Liftoff Date: 08/14/08  
 Liftoff GMT: 227/08:58:30,000



This Page Intentionally Blank



DAP TABLES

DAP OVERVIEW .....	FS 3-2
UNIV PTG .....	FS 3-3
STS-400 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		B10	
A11		B11	
A12	Nose-To-Nose Orientation	B12	
A13		B13	
A14	Orbiter alone SRMS/OBSS Ops	B14	
A15	Crosswise Orientation (ALT ONLY)	B15	

CNTL ACC	Purpose
0	Nominal
1	Orbiter alone SRMS/OBSS Ops
2	Crosswise Orientation
3	Not used
4	Nose-To-Nose Orientation
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, and C. S. Draper Labs

FS 3-2

ORB OPS/400/FIN

## UNIV PTG

TGT ID = 1 Orbiting Vehicle = 2 Earth Center = 3 Earth Target Input LAT ( $\pm 90$ ) LON ( $\pm 180$ , + = East) ALT (-3444.0 to 20000.0 nm) = 4 Sun Center = 5 Celestial Target Input RA (0-359.99) DEC ( $\pm 90$ ) = 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/400/FIN

## STS-400 DAP A CONFIGURATIONS

### STS-400 DAP A1 – DAP A8 CONFIGURATIONS

	ITEM #	A1	A2	A3	A4	A5	A6	A7	A8
<b>PRI</b>									
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
<b>ALT</b>									
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
<b>VERN</b>									
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/400/FIN

STS-400 DAP A9 – DAP A15 CONFIGURATIONS

	ITEM #	A9	A10	A11	A12	A13	A14	A15
<b>PRI</b>								
ROT RATE	10 (50)	0.2000			<b>0.1000</b>		0.2000	0.1000
ATT DB	11 (51)	1.00			5.00		5.00	5.00
RATE DB	12 (52)	0.10			0.20		0.20	0.20
ROT PLS	13 (53)	0.100			0.100		0.100	0.040
COMP	14 (54)	.000			.000		.000	.000
P OPTION	15 (55)	TAIL			ALL		TAIL	TAIL
Y OPTION	16 (56)	TAIL			ALL		TAIL	TAIL
TRAN PLS	17 (57)	0.050			0.100		0.100	0.050
<b>ALT</b>								
RATE DB	18 (58)	0.100			<b>0.070</b>		0.200	<b>0.070</b>
JET OPT	19 (59)	TAIL			ALL		TAIL	<b>ALL</b>
# JETS	20 (60)	2			<b>3</b>		1	<b>3</b>
ON TIME	21 (61)	0.08			0.08		0.08	0.08
DELAY	22 (62)	0.00			<b>11.04</b>		6.00	<b>11.04</b>
<b>VERN</b>								
ROT RATE	23 (63)	0.2000			<b>0.0500</b>		0.2000	0.1000
ATT DB	24 (64)	1.000			<b>5.000</b>		3.000	2.000
RATE DB	25 (65)	.020			<b>.070</b>		.200	.050
ROT PLS	26 (66)	0.050			0.010		0.010	0.005
COMP	27 (67)	.000			.000		.000	.000
CNTL ACC	28 (68)	0			<b>4</b>		1	<b>2</b>
PURPOSE		PROX/OPS FLYAROUND			NOSE-TO-NOSE		ORBITER ALONE SRMS/OBSS	CROSSWISE (ALT ONLY)

**BOLD/ITALIC** indicates change from I-Load.

FS 3-5

ORB OPS/400/FIN

## STS-400 DAP B CONFIGURATIONS

### STS-400 DAP B1 – DAP B8 CONFIGURATIONS

	ITEM #	B1	B2	B3	B4	B5	B6	B7	B8
<b>PRI</b>									
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
<b>ALT</b>									
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
<b>VERN</b>									
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/400/FIN



STS-400 DAP B9 – DAP B15 CONFIGURATIONS

	ITEM #	B9	B10	B11	B12	B13	B14	B15
<b>PRI</b>								
ROT RATE	30 (50)	0.2000						
ATT DB	31 (51)	1.00						
RATE DB	32 (52)	0.10						
ROT PLS	33 (53)	0.040						
COMP	34 (54)	.000						
P OPTION	35 (55)	TAIL						
Y OPTION	36 (56)	TAIL						
TRAN PLS	37 (57)	0.010						
<b>ALT</b>								
RATE DB	38 (58)	0.100						
JET OPT	39 (59)	TAIL						
# JETS	40 (60)	2						
ON TIME	41 (61)	0.08						
DELAY	42 (62)	0.00						
<b>VERN</b>								
ROT RATE	43 (63)	0.2000						
ATT DB	44 (64)	1.000						
RATE DB	45 (65)	.020						
ROT PLS	46 (66)	0.020						
COMP	47 (67)	.000						
CNTL ACC	48 (68)	0						
PURPOSE		FLYAROUND						

**BOLDITALIC** indicates change from I-Load.

FS 3-7

ORB OPS/400/FIN



This Page Intentionally Blank



REBOOST/DAP

DAP REFERENCE..... FS 4-2 |

DAP  
REF

FS 4-1

ORB OPS/400/FIN

**DAP REFERENCE**

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)

DAP  
REF

WING LEADING EDGE SENSORS (WLES) PROCEDURES

WLES ACTIVATION AND CHECKOUT.....	FS 5-2
DEACTIVATION AND TEARDOWN.....	FS 5-10
LAPTOP RECEIVER UNIT (LRU) R&R.....	FS 5-12
CONFIGURE WLES DATA FILE BACKUP PATH.....	FS 5-14
WLES RNDZ TOOLS CHECKOUT PREP.....	FS 5-15
RNDZ/DEPLOY RECOVERY .....	FS 5-15
DISABLE WLES FILE BACKUP .....	FS 5-16
ENABLE WLES FILE BACKUP .....	FS 5-16

**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

## WLE SENSORS

A6                    Unstow coiled WLE SYSTEM A cable  
A13                  Connect plug PNL A13 SYSTEM A to jack MICRO  
                          WIS SYSTEM A J7 (see fig 5-1)  
CRU A                Connect plug CABIN RELAY UNIT to J1 on CRU  
                          S/N 1920  
STBD                Secure CRU A to STBD side of aft cabin with Velcro  
OVHD                (see fig 5-2)

A9                    Unstow coiled WLE SYSTEM B cable  
A13                  Connect plug PNL A13 SYSTEM B to jack MICRO  
                          WIS SYSTEM B J8 (see fig 5-1)  
CRU B                Connect plug CABIN RELAY UNIT to J1 on CRU  
                          S/N 1984  
PORT                Secure CRU B to PORT side of aft cabin with Velcro  
OVHD                (see fig 5-3)

Cont next page

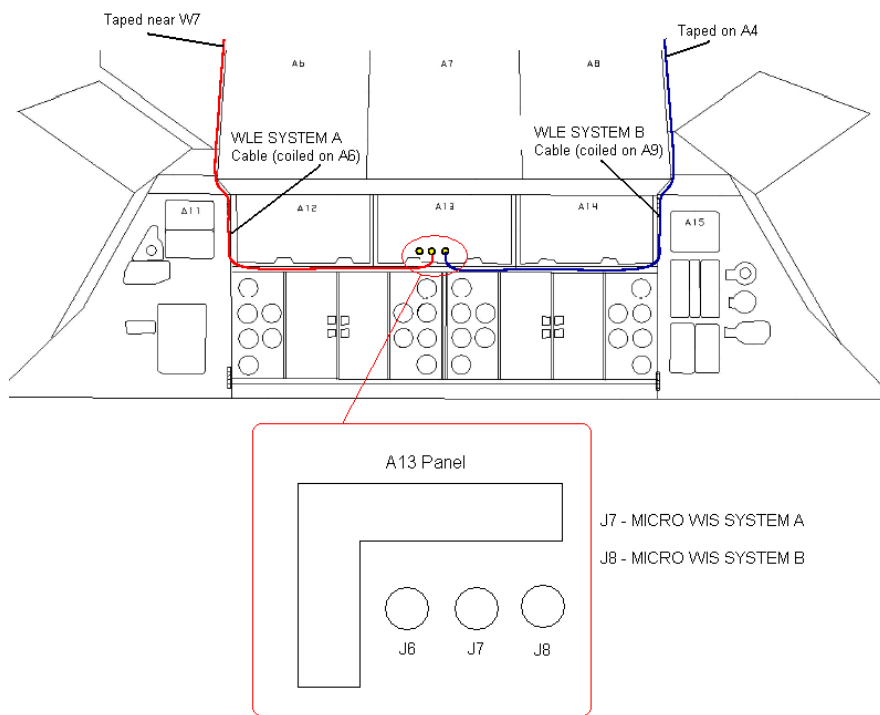


Figure 5-1.- A13 panel.

Cont next page

FS 5-3

ORB OPS/400/FIN

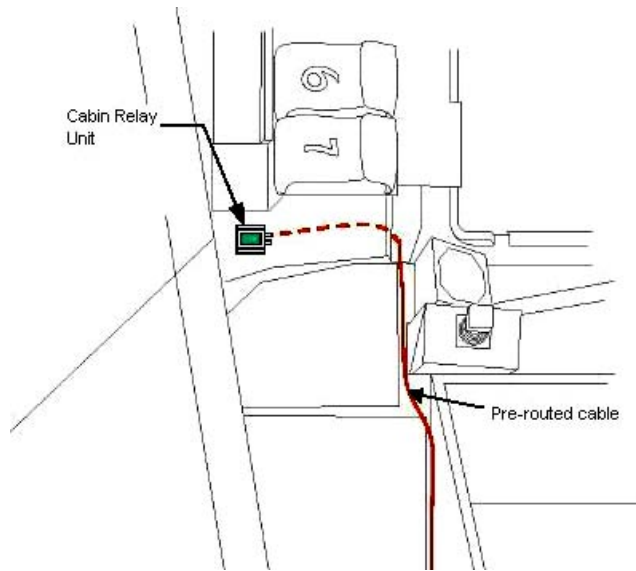


Figure 5-2.- Aft STBD location.

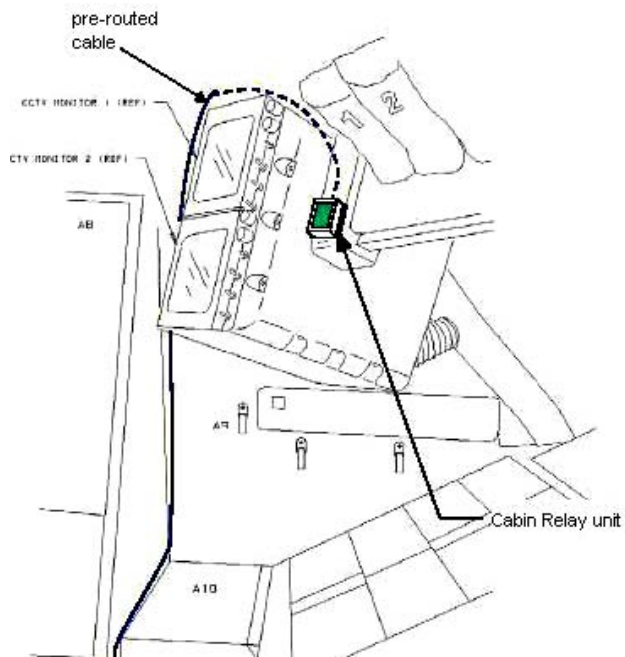


Figure 5-3.- Aft PORT location.

Cont next page

FS 5-4

ORB OPS/400/FIN



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 5-4)

Connect Laptop Receiver Unit to A31p Serial port  
using thumbscrews (see fig 5-5)

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 5-4)

Connect Laptop Receiver Unit to A31p Serial port  
using thumbscrews (see fig 5-5)

Verify line of sight between Laptop Receiver Unit  
and both CRUs

Verify 5-in minimum distance between Laptop  
Receiver Unit and both CRUs

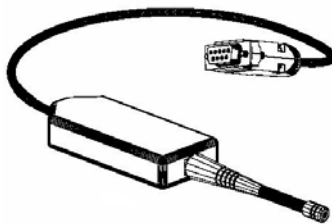


Figure 5-4.- Laptop Receiver Unit.

Cont next page

FS 5-5

ORB OPS/400/FIN



Figure 5-5.- 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 5-7

ORB OPS/400/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

- A31p 1. DEACTIVATE WLES LAPTOP  
'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 5-6 and 5-7)

Disconnect Cabin Relay Units from pre-routed  
cables

Disconnect and coil cables, stow in launch location

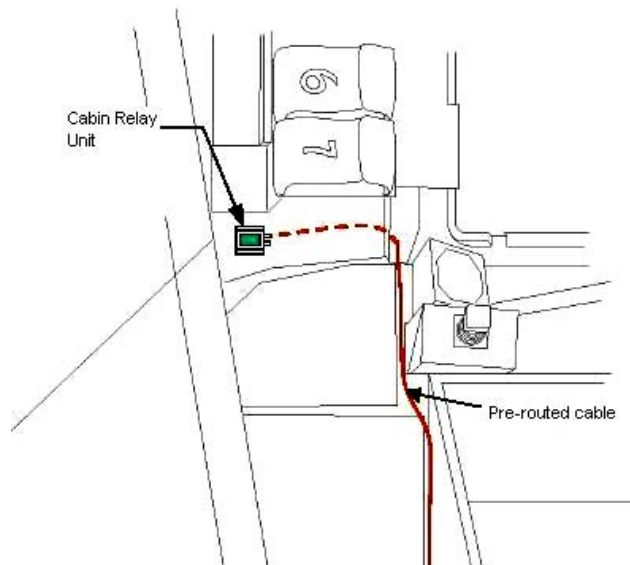


Figure 5-6.- Aft STBD location.

Cont next page

FS 5-10

ORB OPS/400/FIN

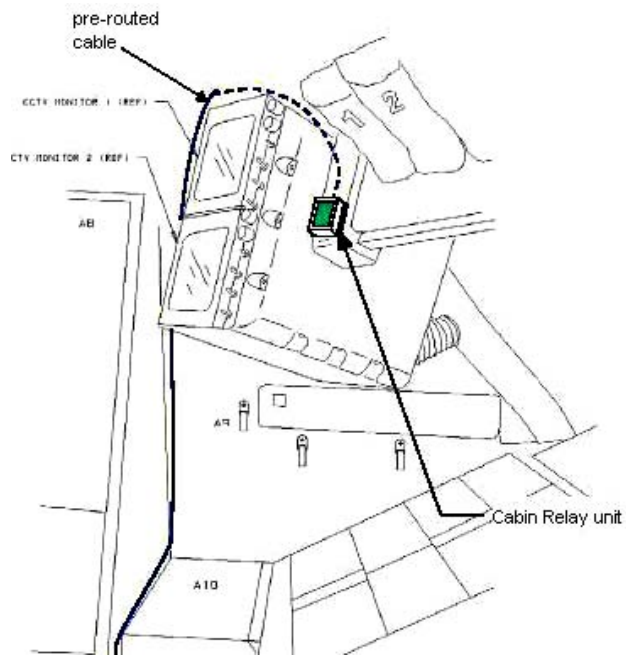


Figure 5-7.- Aft PORT location.

- 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 5-8)  
Remove Backup LRU from Velcro on Backup A31p  
(see fig 5-9)



Figure 5-8.- A31p ports.

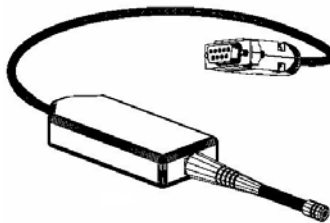


Figure 5-9.- Laptop Receiver Unit.

2. DISCONNECT PRIME LRU FROM LAPTOP  
Disconnect Prime LRU from Prime A31p Serial port  
(see fig 5-8)  
Remove LRU from Velcro on A31p

Cont next page

FS 5-12

ORB OPS/400/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)

## 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 RNDZ/DEPLOY 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)



CUE CARD CONFIGURATION

CUE  
CARDS

NOT FLOWN

FS 6-1

ORB OPS/400/FIN





This Page Intentionally Blank

**CUE  
CARDS**



NOT FLOWN

FS 6-2

ORB OPS/400/FIN



TOP

HOOK  
VELCRO

**LiOH CHANGEOUT**

(11 Crewmembers/Single Shift/FD 1-16)

FLIGHT DAY	POS A	POS B	CK CMLPT
LAUNCH	1	2	
PRE FD01	"	"	
POST FD02	"	"	
PRE FD02	3	4	
POST FD03	"	"	
PRE FD03	5	6	
POST FD04	"	"	
MID FD04	7	8	
PRE FD04	9	10	
POST FD05	11	12 *	
MID FD05	"	13	
PRE FD05	14	15	
POST FD06	16	17	
MID FD06	18 *	19	
PRE FD06	20	"	
POST FD07	21	22	
MID FD07	23	24	
PRE FD07	"	25	
POST EOM	26	27	
MID EOM	28	29	(deorbit)
PRE EOM	30	31	
POST EOM+1	32	33	
MID EOM+1	34 *	35	
PRE EOM+1	36	"	
POST EOM+2	37	38	
MID EOM+2	"	39	
PRE EOM+2	40	41	

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

ORB OPS-29a/nonRCRS/400/O/A

NOTE

This card is specifically used for the STS-400 mission  
with the orbiter conducting single shift operations with  
a crew size of 11

(reduced copy)

NOT FLOWN

FS CC 6-3

ORB OPS/400/FIN

TOP  
BACK OF 'LIOH CHANGEOUT'

HOOK  
VELCRO

**LIOH CHANGEOUT (CONT)**

FLIGHT DAY	POS A	POS B	CK CMPLT
POST EOM+3	42	43	
MID EOM+3	44	45	
PRE EOM+3	46	"	
POST EOM+4	47	48	
MID EOM+4	49	50	
PRE EOM+4	51	52	
POST EOM+5	53	54	
MID EOM+5	"	55	
PRE EOM+5	56	57	
POST EOM+6	58	59	

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

**LIOH CANISTER STOWAGE LOCATIONS**

**Ascent Stowage Locations**

MD52M (LiOH Box): Cans 1-31 \*  
MF43M: Can 32-34 (3 Cans)  
MF57M: Can 35-37 (3 Cans)  
MF71O: Can 38-40 (3 Cans)  
MF28E: Can 41 (1 Can)  
EXT A/L FLOOR: Can 42-59 (18 Cans)

**Entry (EOM) Stowage Locations**

MD52M (LiOH Box): 31 Cans \*  
MF28E: 1 Can  
MF43M: 3 Cans  
MF57M: 3 Cans  
MF71O: 3 Cans  
EXT A/L FLOOR: 18 USED Cans

\* 2 LiOH cans installed in LiOH slots  
A and B

ORB OPS-29b/nonRCRS/400/O/B

(reduced copy)

NOT FLOWN

FS CC 6-4

ORB OPS/400/FIN



TOP

HOOK  
VELCRO

HOOK  
VELCRO

**ORBIT BURN MONITOR**

<b>OMS TEMP*</b>	<table border="1"><tr><td></td><td><b>L</b></td><td><b>R</b></td></tr><tr><td>FU IN P ≥</td><td>219</td><td>220</td></tr><tr><td>≤</td><td>201</td><td>208</td></tr></table>		<b>L</b>	<b>R</b>	FU IN P ≥	219	220	≤	201	208	OMS ENG FAIL ----- OMS PRPLT FAIL
	<b>L</b>	<b>R</b>									
FU IN P ≥	219	220									
≤	201	208									
	or No FU IN P										
<b>OMS PC* &amp; OMS ↓</b>	ENG VLV 1 or 2 < 70 ----- or OX IN P > 227 ----- OX IN P ≤ 227 or No OX IN P	OMS ENG FAIL ----- OMS PRPLT FAIL									
<b>OMS OX/FU TK P (√ENG IN P)</b>	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									
<b>OMS N2 REG P HIGH or LOW</b>		OMS ENG – ARM									
<b>OMS N2 TK P LOW</b> (√[OMS/MPS])		At N2 TK P < 470: OMS ENG – ARM									
<b>OMS GMBL</b>	PRI fail ----- SEC fail	L(R) OMS GMBL – SEC (twice) If high RCS usage: OMS ENG FAIL									
<b>GPC</b>	<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 (twice)									
	SEC GMBL lost ----- 2 FAs lost	If high RCS usage: OMS ENG FAIL ----- √MAN SHUTDN									
<b>I/O ERROR FA</b>	1(4)	L(R) OMS GMBL – SEC ----- • I/O RESET If high RCS usage: OMS ENG FAIL ----- √MAN SHUTDN									
<b>BCE STRG D</b>	1(4)	I/O RESET (if recov: >>) ----- If high RCS usage: L(R) OMS GMBL – SEC (twice)									
<b>GPC SET SPLIT</b>	Non-crit burn ----- Crit burn	STOP BURN: OMS ENG(s) – OFF ----- Go to "GPC" above									
<b>I/O ERROR PCM</b>		OI PCMMU PWR – 2(1)									
<b>BCE BYP OA</b>		SM I/O RESET									

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

ORB OPS-31a/400/O/B

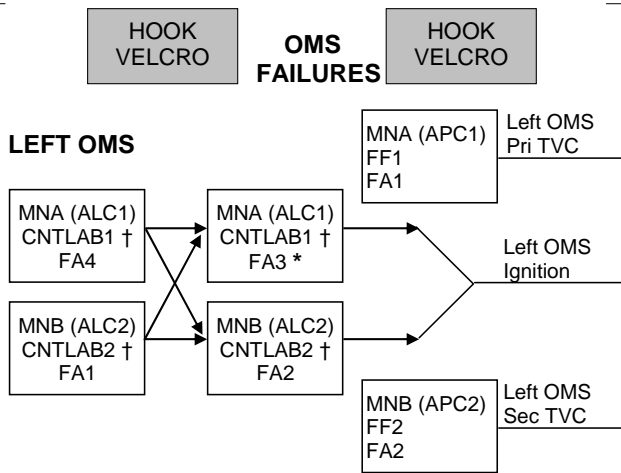
(reduced copy)

NOT FLOWN

FS CC 6-5

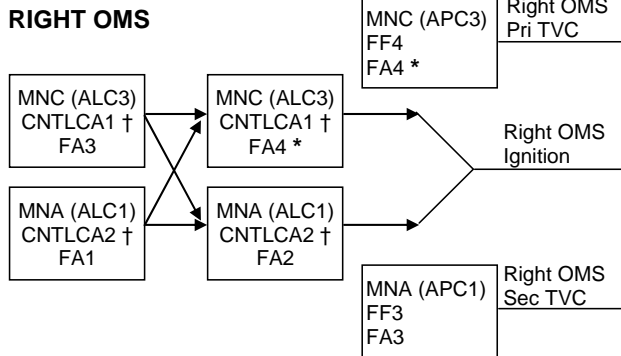
ORB OPS/400/FIN

TOP  
BACK OF 'ORBIT BURN MONITOR'



† 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)



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/400/O/A

(reduced copy)

NOT FLOWN

FS CC 6-6

ORB OPS/400/FIN

NOT FLOWN

FS CC 6-7

ORB OPS/400/FIN

(reduced copy)

TOP

PILE  
VELCRO

ORB OPS-41a/400/O/A

PILE  
VELCRO

**STS-125 DAP A1 – DAP A8 CONFIGURATIONS**

PRI	ITEM #	A1	A2	A3	A4	A5	A6	A7	A8
<b>PRI</b>									
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
<b>ALT</b>									
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
<b>VERN</b>									
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 6-8

ORB OPS/400/FIN

(reduced copy)

TOP  
HINGED AT BOTTOM OF  
'STS-400 DAP A1 – DAP A8 CONFIGURATIONS'  
HINGE

STS-400 DAP B1 – DAP B8 CONFIGURATIONS

	ITEM #	B1	B2	B3	B4	B5	B6	B7	B8
<b>PRI</b>									
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
<b>ALT</b>									
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
<b>VERN</b>									
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)		COASHUD CAL		RNDZ	TERMINAL PHASE

**BOLD/ITALIC** indicates change from I-Load.

HOOK  
VELCRO

ORB OPS-41aa/400/O/A

HOOK  
VELCRO

NOT FLOWN

FS CC 6-9

ORB OPS/400/FIN

(reduced copy)

TOP  
BACK OF 'STS-400 DAP A1 – DAP A8 CONFIGURATIONS'

PILE  
VELCRO

ORB OPS-41b/400/O/B

PILE  
VELCRO

STS-400 DAP A9 – DAP A15 CONFIGURATIONS

	ITEM #	A9	A10	A11	A12	A13	A14	A15
<b>PRI</b>								
ROT RATE	10 (50)	0.2000			<b>0.1000</b>		0.2000	0.1000
ATT DB	11 (51)	1.00			5.00		5.00	5.00
RATE DB	12 (52)	0.10			0.20		0.20	0.20
ROT PLS	13 (53)	0.100			0.100		0.100	0.040
COMP	14 (54)	.000			.000		.000	.000
P OPTION	15 (55)	TAIL			ALL		TAIL	TAIL
Y OPTION	16 (56)	TAIL			ALL		TAIL	TAIL
TRAN PLS	17 (57)	0.050			0.100		0.100	0.050
<b>ALT</b>								
RATE DB	18 (58)	0.100			<b>0.070</b>		0.200	<b>0.070</b>
JET OPT	19 (59)	TAIL			ALL		TAIL	<b>ALL</b>
# JETS	20 (60)	2			<b>3</b>		1	<b>3</b>
ON TIME	21 (61)	0.08			0.08		0.08	0.08
DELAY	22 (62)	0.00			<b>11.04</b>		6.00	<b>11.04</b>
<b>VERN</b>								
ROT RATE	23 (63)	0.2000			<b>0.0500</b>		0.2000	0.1000
ATT DB	24 (64)	1.000			<b>5.000</b>		3.000	2.000
RATE DB	25 (65)	.020			<b>.070</b>		.200	.050
ROT PLS	26 (66)	0.050			0.010		0.010	0.005
COMP	27 (67)	.000			.000		.000	.000
CNTL ACC	28 (68)	0			<b>4</b>		1	<b>2</b>
PURPOSE		PROX/OPS FLYAROUND			NOSE-TO-NOSE		ORBITER ALONE SRMS/OBSS	CROSSWISE (ALT ONLY)

**BOLD/ITALIC** indicates change from I-Load.

-----  
HINGE

NOT FLOWN

FS CC 6-10

ORB OPS/400/FIN

(reduced copy)

TOP  
BACK OF 'STS-400 DAP B1 – DAP B8 CONFIGURATIONS'  
HINGED AT BOTTOM OF 'STS-400 DAP A9 – DAP A15 CONFIGURATIONS'  
HINGE

**STS-400 DAP B9 – DAP B15 CONFIGURATIONS**

	ITEM #	B9	B10	B11	B12	B13	B14	B15
<b>PRI</b>								
ROT RATE	30 (50)	0.2000						
ATT DB	31 (51)	1.00						
RATE DB	32 (52)	0.10						
ROT PLS	33 (53)	0.040						
COMP	34 (54)	.000						
P OPTION	35 (55)	TAIL						
Y OPTION	36 (56)	TAIL						
TRAN PLS	37 (57)	0.010						
<b>ALT</b>								
RATE DB	38 (58)	0.100						
JET OPT	39 (59)	TAIL						
# JETS	40 (60)	2						
ON TIME	41 (61)	0.08						
DELAY	42 (62)	0.00						
<b>VERN</b>								
ROT RATE	43 (63)	0.2000						
ATT DB	44 (64)	1.000						
RATE DB	45 (65)	.020						
ROT PLS	46 (66)	0.020						
COMP	47 (67)	.000						
CNTL ACC	48 (68)	0						
PURPOSE		FLYAROUND						

**BOLD/ITALIC** indicates change from I-Load.

HOOK  
VELCRO

ORB OPS-41bb/400/O/B

HOOK  
VELCRO

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/400/O/A

FABRICATION NOTES

Fabricate on flight approved yellow Post-it

(reduced copy)

NOT FLOWN

FS CC 6-11

ORB OPS/400/FIN

NOT FLOWN

FS CC 6-12

ORB OPS/400/SIM-206

(reduced copy)

TOP

HOOK  
VELCRO

HOOK  
VELCRO

HOOK  
VELCRO

### LON PBA/QDM SETUP AND TEMP STOW

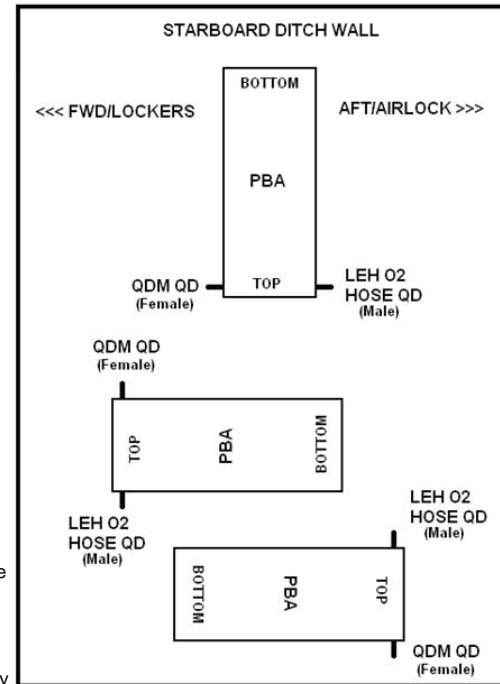
1. Retrieve LON PBA and QDM masks

**WARNING**  
Ensure no ignition sources or hazardous items are temp stowed near LON PBA during mission

- Ditch Area
2. Temp stow all LON PBA on STBD Ditch Wall, secure as reqd using Velcro, bungees and/or Gray Tape (see diagram)
  3. Connect QDM to female QD on LON PBA
  4. Connect QDM comm cables to HIU and connect comm extension cable from HIU to orbiter comm on MHA2. Verify good comm
  5. Verify each LON PBA bottle is in OFF position and remove its launch pin. Pin will not be reused

**WARNING**  
Do not connect LEH O2 Hoses 9, 10, 11 to LON PBA at this time

6. Route LEH O2 supply hoses for seats 9, 10, 11 on perimeter of ditch such that each hose will reach its respective LON PBA and be clear of translation pathways. Temp stow hoses near Male QD on each LON PBA
7. On MCC Go:  
Disconnect O2 Bleed Orifice from LEH Port 8, stow for entry  
Connect QDM assigned to LEH Port 8



ORB OPS-52a/400/O,D,E/SIM-206



NOT FLOWN

FS CC 6-13

ORB OPS/400/SIM-206

(reduced copy)

TOP  
BACK OF 'LON PBA/QDM SETUP AND TEMP STOW'

HOOK  
VELCRO

HOOK  
VELCRO

HOOK  
VELCRO

**LON PBA/QDM DONNING**

STBD  
Ditch  
wall

1. Retrieve QDM from LON PBA
2. Turn both LON PBA bottles to ON position
3. Don QDM and set to Emergency

**WARNING**  
LON PBA supports 30 minutes of crew breathing  
LON PBA Crew must connect to orbiter O2 once cabin pressure reaches 12 psi to ensure continuous O2 supply to QDM. Connection of QDM to orbiter O2 supply prior to a cabin pressure of 12 psi may starve crew members of O2

4. When cabin pressure at 12 psi:  
Connect orbiter LEH O2 hose to LON PBA

ORB OPS-52b/400/O,D,E/SIM-206

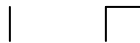


This Page Intentionally Blank

NOT FLOWN

FS 6-14

ORB OPS/400/SIM-206



Space Shuttle Program  
FLIGHT DATA FILE

JSC-48036-400  
FINAL



# ORBIT OPS CHECKLIST

STS  
400

Flight Cover (trim bottom to expose tabs)