

Orbit Operations Checklist

STS-116 Flight Supplement

**Mission Operations Directorate
Operations Division**

**Final
August 21, 2006**

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas

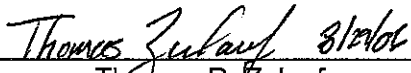


MISSION OPERATIONS DIRECTORATE

**ORBIT OPERATIONS CHECKLIST
STS-116 FLIGHT SUPPLEMENT**

FINAL
August 21, 2006

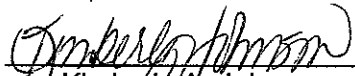
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ORB OPS/116/FIN

Incorporates the following:		
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	ORB OPS-2208	ORB OPS-2212
		ORB OPS-2213

AREAS OF TECHNICAL RESPONSIBILITY

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COMM/INST	DF2/S. Sides	281-483-4593
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DAP TABLES	DF6/W. Helms	281-244-6504
REBOOST/DAP	DF6/W. Helms	281-244-6504
OIU	DF2/S. Sides	281-483-4593
PRLA	DF5/J. Dake	281-483-3259
SDBI	SK/S. Irwin	281-483-5089
WLES	DO5/M. Halverson	281-483-1831
DTO 257	DF6/W. Helms	281-244-6504
MAUI	DF6/W. Helms	281-244-6504

CUE CARDS:

FLIGHT DAY 3 DOCKING ORBITER WITH ISS CO2 ABSORBER REPLACEMENT	DF8/M. FitzPatrick	281-483-0758
ORBIT BURN MONITOR	DF6/D. Lenort	281-483-2644
DAP TABLES	DF6/W. Helms	281-244-6504
MAUI – RCS FIRING SEQUENCE	DF6/W. Helms	281-244-6504
RSK INSTALLATION	DX3/C. Walton	281-483-3259

ORBIT OPERATIONS CHECKLIST
STS-116 FLIGHT SUPPLEMENT

LIST OF EFFECTIVE PAGES

FINAL 08/21/06

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* – Omit from flight book

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FS CC 11-14 ...	* 116/FIN

* – Omit from flight book

ORBIT OPS CUE CARDS

<u>Title</u>	<u>Ref. Page</u>	<u>Card No.</u>
FLIGHT DAY 3 DOCKING ORBITER WITH ISS CO2 ABSORBER REPLACEMENT (Front)	FS CC 11-3	ORB OPS-29a/ nonRCRS/116/O/A
LiOH CANISTER STOWAGE LOCATIONS (Back)	FS CC 11-4	ORB OPS-29b/ nonRCRS/116/O/A
ORBIT BURN MONITOR (Front).....	FS CC 11-5	ORB OPS-31a/116/O/C
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MAUI – RCS FIRING SEQUENCE (Front).....	FS CC 11-11	ORB OPS-42a/116/O/A
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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)	102/129	–
G3,BFS	(ENTRY)	102/166	756
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	–
G2,G8,S2	ORBIT (SHAB/OIU/TCS/SSV) (PRIME)	103/184	760
G2,G8,S2	ORBIT (SHAB/OIU/TCS/SSV) (B/U)	103/205	767
G2,G8,S2	ISS INT CBM (LAB FWD) (SHAB/OIU) (PRIME)	103/199	780
G2,G8,S2	ISS INT CBM (LAB FWD) (SHAB/OIU) (B/U)	103/212	781
G2,G8,S2	RNDZ/UNDOCK (SHAB/OIU/TCS/SSV) (PRIME)	103/192	763
G2,G8,S2	RNDZ/UNDOCK (SHAB/OIU/TCS/SSV) (B/U)	103/211	770
G2,G8,S2	ISS NCS CBM (NODE 1) (SHAB/OIU) (B/U)	103/208	769
G2,G8,S2	ISS NCS CBM (NODE 1) (SHAB/OIU) (PRIME)	103/188	762

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
756 ENTRY TFL 166	1	2	3	SHAB (2K)
	2	3	3	SHAB (2K)
	3	-	-	-
	4	-	-	-
	5-FPM	505		H-H-N/A *
760 ORBIT (PRIME) TFL 184	1	27	3	SHAB (8K)
	2	5	1(2)	OIU255 (ONLY) **
	3	9	5	TCS
	4	4	4	SSV (3) ***
	5-FPM	502		H-H-H *
767 ORBIT (BACKUP) TFL 205	1	19	5	TCS
	2	29	3	SHAB (8K)
	3	14	4	SSV (3) ***
	4	15	1(2)	OIU255 (ONLY) **
	5-FPM	506		H-H-H *
780 ISS INT CBM (LAB FWD) (4BC) (PRIME) TFL 199	1	27	3	SHAB (8K)
	2	-	-	-
	3	7	1(2)	OIU9 (CCSH) **
	4	-	-	-
	5-FPM	503		H-H-H *
781 ISS INT CBM (LAB FWD) (4BC) (BACKUP) TFL 212	1	-	-	-
	2	29	3	SHAB (8K)
	3	-	-	-
	4	17	1(2)	OIU9 (CCSH) **
	5-FPM	508		H-H-H *
763 RNDZ/UNDOCK (PRIME) TFL 192	1	27	3	SHAB (8K)
	2	30	1(2)	OIU7 (CCSU) **
	3	9	5	TCS
	4	8	4	SSV (2) ***
	5-FPM	501		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

Cont next page

FS 1-5

ORB OPS/116/FIN

CONFIG	DECOM	FMT	INPUT	USE
770 RNDZ/UNDOCK	1	19	5	TCS
	2	29	3	SHAB (8K)
	3	18	4	SSV (2) ***
(BACKUP)	4	31	1(2)	OIU7 (CCSU) **
TFL 211	5-FPM	507		H-H-H *
762 ISS NCS CBM	1	27	3	SHAB (8K)
(NODE 1)	2	-	-	-
(4AC)	3	6	1(2)	OIU9 (CCSH-A) **
(PRIME)	4	-	-	-
TFL 188	5-FPM	503		H-H-H *
769 ISS NCS CBM	1	-	-	-
(NODE 1)	2	29	3	SHAB (8K)
(4AC)	3	-	-	-
(BACKUP)	4	16	1(2)	OIU9 (CCSH-A) **
TFL 208	5-FPM	508		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 +9 EXEC
GNC TO GNC 1 ITEM 18 +1 4 EXEC
GNC 1 TO BUS 3 ITEM 18 +1 6 EXEC
BUS 4 BC ITEM 15 EXEC (*)
BUS 3 RT ITEM 10 EXEC (*)
LOAD FORMAT ITEM 1 +9 EXEC >>
2. GNC-1 PRIMARY ON LB-ORB N2-2 (OIU BUS 4)
LOAD FORMAT ITEM 1 +9 EXEC
GNC TO GNC 1 ITEM 18 +1 4 EXEC
GNC 1 TO BUS 4 ITEM 18 +1 5 EXEC
BUS 3 BC ITEM 11 EXEC (*)
BUS 4 RT ITEM 14 EXEC (*)
LOAD FORMAT ITEM 1 +9 EXEC >>
3. GNC-2 PRIMARY ON LB-ORB N2-1 (OIU BUS 3)
LOAD FORMAT ITEM 1 +9 EXEC
GNC TO GNC 2 ITEM 18 +1 3 EXEC
GNC 2 TO BUS 3 ITEM 18 +1 8 EXEC
BUS 4 BC ITEM 15 EXEC (*)
BUS 3 RT ITEM 10 EXEC (*)
LOAD FORMAT ITEM 1 +9 EXEC >>
4. GNC-2 PRIMARY ON LB-ORB N2-2 (OIU BUS 4)
LOAD FORMAT ITEM 1 +9 EXEC
GNC TO GNC 2 ITEM 18 +1 3 EXEC
GNC 2 TO BUS 4 ITEM 18 +1 7 EXEC
BUS 3 BC ITEM 11 EXEC (*)
BUS 4 RT ITEM 14 EXEC (*)
LOAD FORMAT ITEM 1 +9 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

FS-2-2

ORB OPS/16/FIN

STAR PAIRS PAD									
		ATT SET 1				ATT SET 2			
PAIR	ANG SEP	DUAL S TRK	SINGLE S TRK		DUAL S TRK	SINGLE S TRK			
			-Z	-Y		-Z	-Y		
A	83.8	-Y:46 R+ 88 -Z:23 P+ 155 Y+ 8	R+ 3 P+ 146 Y+ 355	R+ 175 P+ 143 Y+ 17	-Y:23 R+ 183 -Z:46 P+ 321 Y+ 5	R+ 98 P+ 334 Y+ 357	R+ 267 P+ 313 Y+ 353		
B	90.5	-Y:27 R+ 303 -Z:48 P+ 40 Y+ 329	R+ 215 P+ 40 Y+ 344	R+ 40 P+ 57 Y+ 330	-Y:48 R+ 326 -Z:27 P+ 224 Y+ 13	R+ 240 P+ 217 Y+ 27	R+ 50 P+ 239 Y+ 18		
C	91.2	-Y:59 R+ 310 -Z:33 P+ 24 Y+ 52	R+ 224 P+ 21 Y+ 67	R+ 19 P+ 48 Y+ 51	-Y:33 R+ 326 -Z:59 P+ 210 Y+ 290	R+ 229 P+ 200 Y+ 304	R+ 82 P+ 240 Y+ 299		
D	86.3	-Y:50 R+ 163 -Z:54 P+ 91 Y+ 307	R+ 95 P+ 112 Y+ 297	R+ 228 P+ 67 Y+ 300	-Y:54 R+ 89 -Z:50 P+ 293 Y+ 68	R+ 16 P+ 279 Y+ 55	R+ 215 P+ 251 Y+ 73		

STAR PAIRS PAD

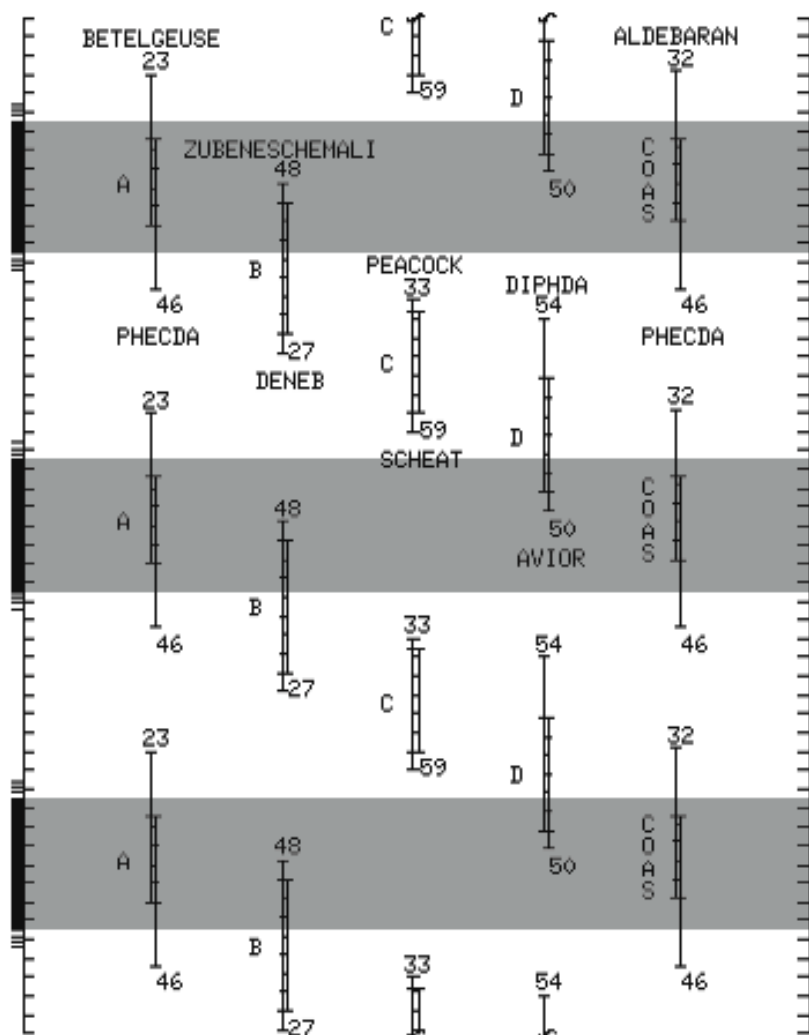
PAIR		COAS ALIGN ATTITUDE 1	ANG SEP	COAS ALIGN ATTITUDE 2
C	+X COAS	32 R+ 182 P+ 322 Y+ 63	NOSE ↑ 88 TRAIL ↑	46 R+ 243 P+ 234 Y+ 1
A		-Z COAS		32 R+ 63 P+ 233 Y+ 359
S				

SINGLE S TRK MIN MNVR OPT
TGT_ID = 11-110 NAV STAR #
BODY VECTOR = 5

	-Z S TRK	-Y S TRK
P	87.7	0
Y	358	280.6

MET Applicable: 0:01:30:00 - 11:00:00:0
Date L/O: 02/09/06
GMT L/O: 040/05:52:19

STAR PAIRS



MET Applicable: 0:01:30:00 - 11:00:00:0
 Date L/0: 02/09/06
 GHT L/0: 040/05:52:19



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FS 2-5

ORB OPS/116FF/FIN

STAR PAIRS PAD									
		ATT SET 1				ATT SET 2			
PAIR	ANG SEP	DUAL S TRK	SINGLE S TRK		DUAL S TRK	SINGLE S TRK		-Z	-Y
			-Z	-Y		-Z	-Y		
A	83.6	-Y:48 R+ 350 -Z:49 P+ 178 Y+ 31	R+ 274 P+ 164 Y+ 40	-Y:49 R+ 66 P+ 192 Y+ 40	-Y:49 R+ 272 -Z:48 P+ 344 Y+ 315	R+ 193 P+ 352 Y+ 328	-Y:48 R+ 11 P+ 3 Y+ 308		
B	83.0	-Y:36 R+ 347 -Z:79 P+ 245 Y+ 316	R+ 255 P+ 232 Y+ 327	-Y:79 R+ 80 P+ 258 Y+ 328	-Y:79 R+ 290 -Z:36 P+ 54 Y+ 29	R+ 203 P+ 58 Y+ 43	-Y:36 R+ 8 P+ 69 Y+ 23		
C	90.5	-Y:68 R+ 185 -Z:54 P+ 97 Y+ 318	R+ 89 P+ 113 Y+ 307	-Y:54 R+ 240 P+ 78 Y+ 309	-Y:54 R+ 93 -Z:68 P+ 293 Y+ 57	R+ 13 P+ 282 Y+ 43	-Y:68 R+ 205 P+ 265 Y+ 62		
D	83.5	-Y:47 R+ 76 -Z:31 P+ 89 Y+ 37	R+ 357 P+ 77 Y+ 27	-Y:31 R+ 169 P+ 75 Y+ 48	-Y:31 R+ 186 -Z:47 P+ 251 Y+ 333	R+ 109 P+ 267 Y+ 327	-Y:47 R+ 265 P+ 242 Y+ 321		
E	84.8	-Y:45 R+ 93 -Z:21 P+ 193 Y+ 338	R+ 4 P+ 184 Y+ 325	-Y:21 R+ 175 P+ 180 Y+ 346	-Y:21 R+ 185 -Z:45 P+ 358 Y+ 35	R+ 92 P+ 13 Y+ 27	-Y:45 R+ 274 P+ 350 Y+ 22		

PAIR	COAS ALIGN	ANG SEP	COAS ALIGN	ANG SEP
	ATTITUDE 1		ATTITUDE 2	
C	+X COAS	20 R+ 317 P+ 203 Y+ 329	14 R+ 13 P+ 281 Y+ 310	59
A	-Z COAS	20 R+ 220 P+ 319 Y+ 324	14 R+ 231 P+ 1 Y+ 8	59
S				59

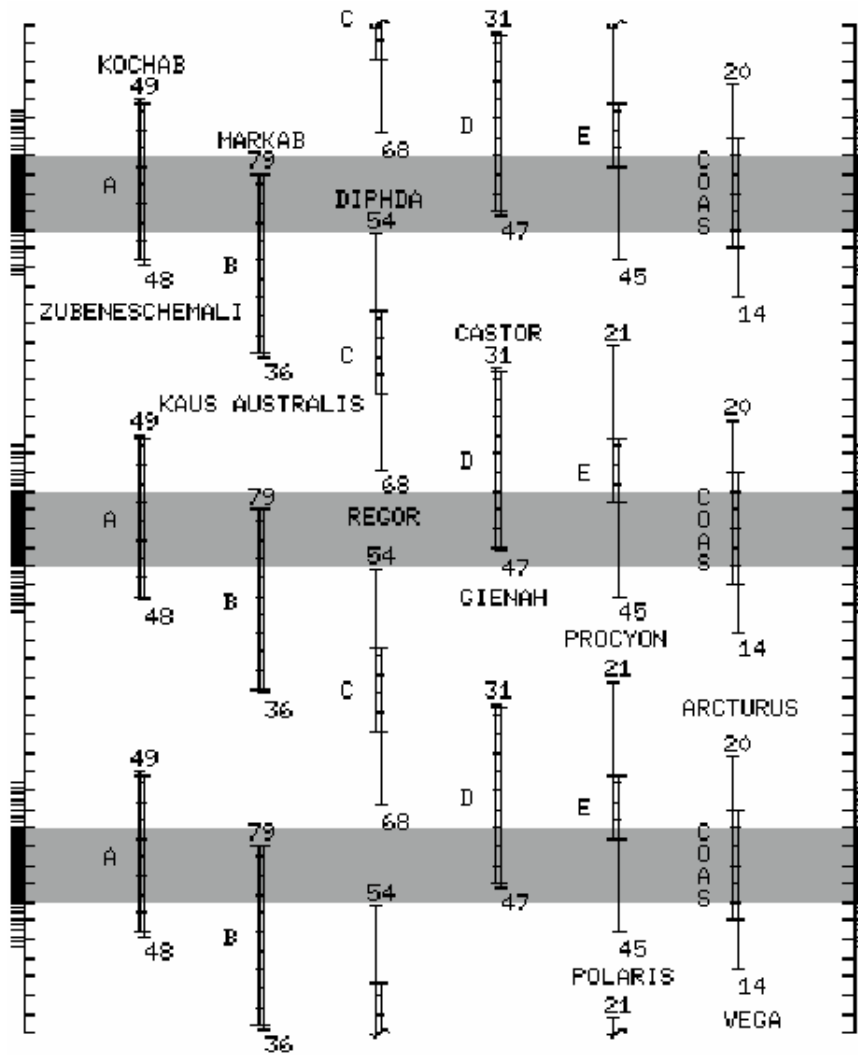
SINGLE S TRK MIN MNVR OPT
TGT_ID = 11-110 NAV STAR #
BODY VECTOR = 5

	-Z S TRK	-Y S TRK
P	87.7	0
Y	358	280.6

MET Applicable: 1.0.0.0 - 2.12.0.0
Date L/O: 05/14/04
GMT L/O: 135/00:54:21

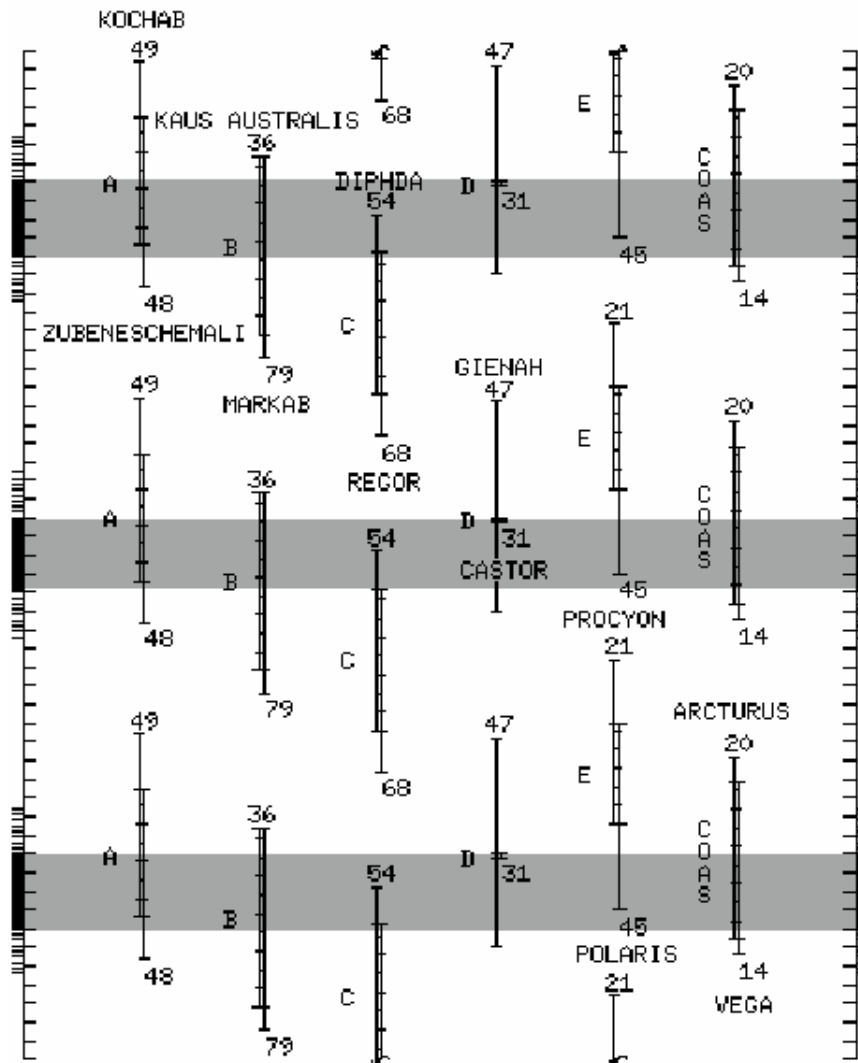
STS-116 FREE FLIGHT STAR PAIRS PAD
(APPLIES TO ALL THREE TIMELINES)

STS-116 FREE FLIGHT STAR PAIRS (TIMELINE A)



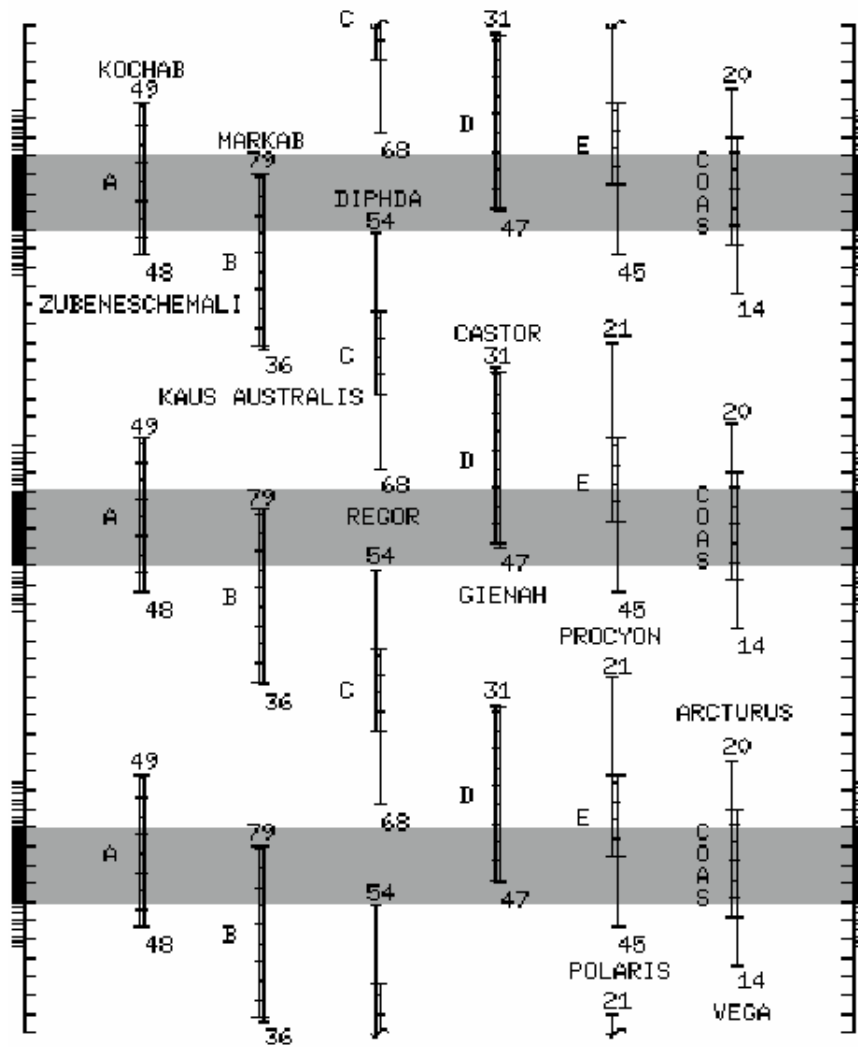
MET Applicable: 1,0,0,0 - 2,12,0,0
 Date L/O: 05/14/04
 GMT L/O: 135/00:54:21

STS-116 FREE FLIGHT STAR PAIRS (TIMELINE B)



MET Applicable: 1,0,0,0 - 2,12,0,0
 Date L/O: 05/14/04
 GMT L/O: 135/00:54:21

STS-116 FREE FLIGHT STAR PAIRS (TIMELINE C)



MET Applicable: 1,0,0,0 - 2,12,0,0
 Date L/O: 05/14/04
 GMT L/O: 135/00:54:21

DAP TABLES

DAP OVERVIEW FS 3-2
UNIV PTG FS 3-3
STS-116 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 – Pre/Post Deploy	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 – PROX OPS/Flyaround
A10 – Docking	B10 – Docking
A11 – Auto Reboost	B11 –
A12 – Mated MNVRS (VRCS)	B12 – Mated MNVRS & Att Hold (ALT)
A13 – Mated MNVRS & Att Hold - ODS Depress (VRCS)	B13 – Mated MNVRS & Att Hold - ODS Depress (ALT)
A14 – Orbiter Alone SRMS/OBSS	B14 – DTO 257
A15 – Mated Att Hold (VRCS)	B15 –

- CNTL ACC = 0 Orbiter alone with unloaded RMS
 = 1 Mated Control - VRCS - Maneuvers
 = 2 Mated Control - ALT - Maneuvers and Attitude Hold
 = 3 Mated Control - VRCS - Attitude Hold
 = 4 Mated Control - VRCS - ODS Depressurized
 = 5 Mated Control - ALT - ODS Depressurized
 = 6 Mated Control - ALT - DTO 257
 = 7 not used
 = 8 not used
 = 9 Orbiter Alone SRMS/OBSS

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

FS 3-2

ORB OPS/16/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/116/FIN

STS-116 DAP A1-- 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	PRE/POST DEPLOY	LOSS OF VERN (ALL)	LOSS OF VERN (TAIL ONLY)	RNDZ	TERMINAL PHASE

FS 3-4

ORB OPS/16/FIN

STS-116 DAP A9 -- A15 CONFIGURATIONS

	ITEM #	A9	A10	A11	A12	A13	A14	A15
PRI								
ROT RATE	10 (50)	0.1300	0.0500	0.1000	0.1000	0.1000	0.2000	0.1000
ATT DB	11 (51)	2.00	0.60	15.00	5.00	5.00	5.00	5.00
RATE DB	12 (52)	0.10	0.10	0.20	0.20	0.20	0.20	0.20
ROT PLS	13 (53)	0.100	0.100	0.100	0.040	0.040	0.100	0.040
COMP	14 (54)	.000	.000	.000	.000	.000	.000	.000
P OPTION	15 (55)	TAIL	TAIL	TAIL	TAIL	TAIL	TAIL	TAIL
Y OPTION	16 (56)	TAIL	TAIL	TAIL	TAIL	TAIL	TAIL	TAIL
TRAN PLS	17 (57)	0.050	0.050	0.100	0.010	0.010	0.100	0.010
ALT								
RATE DB	18 (58)	0.100	0.100	0.070	0.070	0.070	0.200	0.070
JET OPT	19 (59)	TAIL	TAIL	TAIL	TAIL	TAIL	TAIL	TAIL
# JETS	20 (60)	2	2	3	3	3	1	3
ON TIME	21 (61)	0.08	0.08	0.08	0.08	0.08	0.08	0.08
DELAY	22 (62)	0.00	0.00	12.00	11.04	11.04	6.00	11.04
VERN								
ROT RATE	23 (63)	0.1300	0.0500	0.1000	0.1000	0.1000	0.2000	0.1000
ATT DB	24 (64)	1.000	0.500	5.000	3.000	3.000	3.000	3.000
RATE DB	25 (65)	.020	.020	.050	.050	.050	.200	.080
ROT PLS	26 (66)	0.050	0.050	0.010	0.002	0.002	0.010	0.002
COMP	27 (67)	.000	.000	.000	.000	.000	.000	.000
CNTL ACC	28 (68)	0	0	1(2)*	1	4	9	3
PURPOSE		PROX/OPS FLYAROUND	DOCKING	AUTO REBOOST	MATED MNVRS (VRCS)	MATED MNVRS & HOLD (VRCS) ODS DEPRESS	ORBITER ALONE SRMS/OBSS	MATED ATTITUDE HOLD (VRCS)

BOLD/ITALIC indicates change from I-Load.

* 1 for Config 3&4, 2 for Config 1&2

FS 3-5

ORB OPS/116/FIN

STS-116 DAP B1 -- 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		NOMINAL OMS & RCS BURNS	LOSS OF VERN (TAIL ONLY)	LOSS OF VERN (NOSE/TAIL)		COAS/HUD CAL		RNDZ	TERMINAL PHASE

FS 3-6

ORB OPS/16/FIN

STS-116 DAP B9 -- B15 CONFIGURATIONS

	ITEM #	B9	B10	B11	B12	B13	B14	B15
PRI								
ROT RATE	30 (50)	0.1300	0.0500	0.5000	0.1000	0.1000	0.1000	0.1000
ATT DB	31 (51)	2.00	0.60	3.00	5.00	5.00	40.00	40.00
RATE DB	32 (52)	0.10	0.10	0.20	0.20	0.20	5.00	0.20
ROT PLS	33 (53)	0.040	0.040	0.040	0.040	0.040	0.120	0.003
COMP	34 (54)	.000	.000	.000	.000	.000	.000	.000
P OPTION	35 (55)	TAIL	TAIL	ALL	TAIL	TAIL	TAIL	TAIL
Y OPTION	36 (56)	TAIL	TAIL	ALL	TAIL	TAIL	TAIL	TAIL
TRAN PLS	37 (57)	0.010	0.010	0.020	0.010	0.010	0.010	0.010
ALT								
RATE DB	38 (58)	0.100	0.100	0.200	0.070	0.070	5.000	0.200
JET OPT	39 (59)	TAIL	TAIL	ALL	TAIL	TAIL	TAIL	TAIL
# JETS	40 (60)	2	2	2	3	3	2	2
ON TIME	41 (61)	0.08	0.08	0.08	0.08	0.08	0.08	0.08
DELAY	42 (62)	10.00	0.00	0.00	11.04	11.04	0.00	0.00
VERN								
ROT RATE	43 (63)	0.1300	0.0500	0.2000	0.1000	0.1000	0.1000	0.0200
ATT DB	44 (64)	1.000	0.500	1.000	3.000	3.000	40.000	5.000
RATE DB	45 (65)	.020	.020	.020	.050	.080	.500	.050
ROT PLS	46 (66)	0.020	0.020	0.002	0.002	0.002	0.001	0.001
COMP	47 (67)	.000	.000	.000	.000	.000	.000	.000
CNTL ACC	48 (68)	0	0	0	2	5	0	7
PURPOSE		PROX OPS/ FLYAROUND	DOCKING		MATED MNVRS & HOLD(P RCS)	MATED MNVRS & HOLD(P RCS) ODS DEPRESS	DTO 257	

BOLD/ITALIC indicates change from I-Load.

FS 3-7

ORB OPS/16/FIN



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REBOOST/DAP

AUTO REBOOST.....	FS 4-2
ATTITUDE REFERENCE.....	FS 4-4
DOCKED CONFIGURATION 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

REBOOST/
DAP

- O14:F,
O15:F,
O16:F
1. If PRCS required:
RJDA 1A L2/R2 DRIVER – OFF
RJD MANF L5/F5/R5 DRIVER – OFF
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 – *)

- C3
4. Select appropriate Reboost Rotation DAP
When in attitude and prior to START TIME,
DAP: A11/AUTO/VERN(ALT)

If using Config 1(2):

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

Cont next page

FS 4-2

ORB OPS/116/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

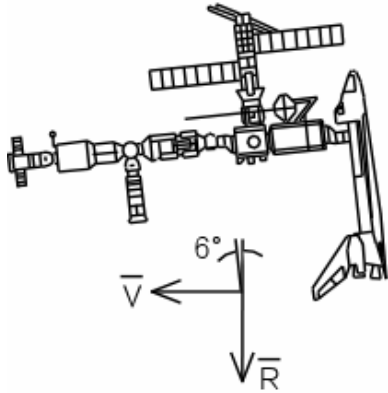
DAP: as reqd

Pri RJD LOGIC,DRIVER (sixteen) – as reqd

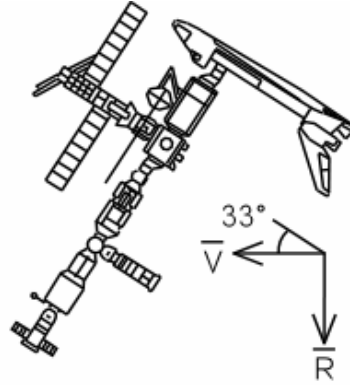
C3
O14,
O15,
O16

AUTO REBOOST ATTITUDE REFERENCE

VRCS ATTITUDE HOLD CONFIGURATIONS:

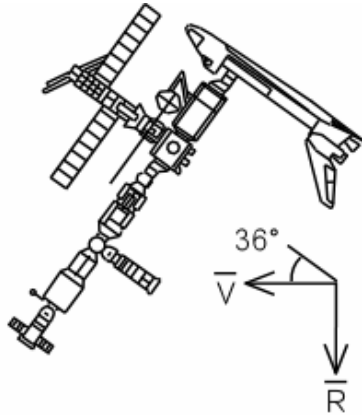


Earth
Nose up, Config 3 (VRCS)

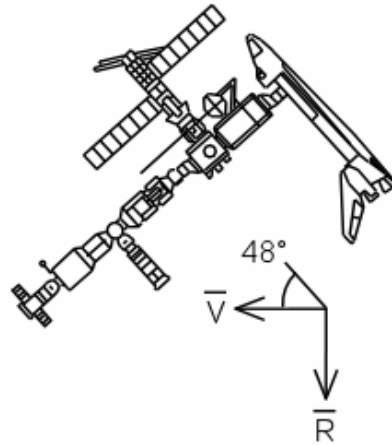


Earth
Nose up, Config 4 (+X, VRCS)

ALT ATTITUDE HOLD CONFIGURATIONS:



Earth
Nose up, Config 1 (+X, -pitch)



Earth
Nose up, Config 2 (+X)

DOCKED CONFIGURATION DAP REFERENCE

SHUTTLE AIRLOCK

PRESS (≥ 3.45 psia) DEPRESS (< 3.45 psia)

VERN	MNVR – A12 (CA: 1)	A13 (CA: 4)
	ATT HOLD – A15 (CA: 3)	
ALT	B12 (CA: 2)	B13 (CA: 5)
RATE DAMPING	LVLH(INRTL), then AUTO	
RATE > 0.20	LVLH(INRTL) 6 min max FREE, LVLH(INRTL)	

1. When shuttle airlock pressurized, select DAP:
A12/VERN for attitude maneuvering
A15/VERN for attitude maintenance
(B12/ALT) attitude maintenance or maneuvering
2. When shuttle airlock depressurized, select DAP:
A13/VERN(B13/ALT)
3. When rate damping, select DAP: AUTO when rates are below rate deadband and jet activity stopped



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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

OIU

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

PRLA

PRLA CLOSE..... FS 6-2

PRLA

FS 6-1

ORB OPS/116/FIN

PRLA CLOSE

A6U 1. √PL RETEN PL SEL – 1
√LAT 1,2,3,4,5 (five) – OFF (tb-REL)

SM 97 PL RETENTION

CRT √PL SEL 1 LAT 1,2,3,4 (eight) – ‘0’

- * If any LAT msw shows ‘1’, drive *
- * for single motor time (60 sec) *

R13L 2. PL BAY MECH PWR SYS 1,2 (two) – ON
A6U RETEN LOGIC PWR SYS 1,2 (two) – ON

NOTE

Any single motor times (>30 sec)

- 3. PL RETEN LAT 1,2 (two) – LAT
(tb-LAT, 60 sec max) |
– OFF
- 4. 3,4 (two) – LAT
(tb-LAT, 60 sec max) |
– OFF

R13L 5. PL RETEN LOGIC PWR SYS 1,2 (two) – OFF
BAY MECH PWR SYS 1,2 (two) – OFF

A6U 6. PL RETEN PL SEL – MON

PRLA

SHORT DURATION BIOASTRONAUTICS
INVESTIGATION (SDBI)

SDBI 1634, SLEEP-WAKE ACTIGRAPHY	FS 7-3
SDBI 1493, MONITORING LATENT VIRUS REACTIVATION AND SHEDDING	FS 7-5
SALIVA COLLECTION (ALL FLIGHT DAYS)	FS 7-5

SDBI

FS 7-1

ORB OPS/116/FIN



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SDBI



FS 7-2

ORB OPS/116/FIN

SDBI 1634, SLEEP-WAKE ACTIGRAPHY

ASAP after entry into orbit:

A. DON ACTIWATCH

MF71M

1. Unstow: Actiwatch
FLIGHT SLEEP LOG

NOTE

If necessary to remove Actiwatch,
record doff/don time on FLIGHT
SLEEP LOG

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

B. DOFFING ACTIWATCH

On final day of orbit:

MF71M

1. Remove Actiwatch, stow

NOTE

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

Cont next page

FS 7-3

ORB OPS/116/FIN

FLIGHT SLEEP LOG (example below) is used with SDBI 1634:

FLIGHT SLEEP LOG

Crew ID: _____ Actiwatch Dot Color: _____

Current Time: _____ [ddd:hh:mm (MET)]

Lights Out: _____ [ddd:hh:mm (MET)]

Lights On: _____ [ddd:hh:mm (MET)]

1. How long did you take to fall asleep last night? _____ (hrs) _____ (mins)
 2. How long did you sleep last night? _____ (hrs) _____ (mins)
 3. How many times did you awaken during the night? _____
 4. After the end of your sleep period, how long did you remain in bed before getting up?
_____ (hrs) _____ (mins)
 5. Where did you sleep last night? [Flight deck / Middeck / Spacehab / Sleepstation]
 6. Was your sleep disturbed: [Yes / No] (If Yes, check all that apply)
 shuttle noise mission duties voids, # of voids: _____ other crew
 physical discomfort too hot too cold other _____
 7. How did you sleep last night?
poorly _____ great
 8. How do you feel right now?
sleepy _____ alert
 9. Did you have any caffeine yesterday? [Yes / No] (If Yes, indicate how much)
coffee _____ (cups) caffeine pills _____ (100mg) _____ (200mg)
tea _____ (cups) caffeinated soft drinks _____ (glasses)
Indicate how long before bed your last caffeine intake was: _____ (hrs) _____ (mins)
 10. Did you take any medications yesterday? [Yes / No / Decline] (If Yes, list all)
-

Comments:

**SDBI 1493, MONITORING LATENT VIRUS REACTIVATION
AND SHEDDING**

SALIVA COLLECTION (ALL FLIGHT DAYS)

Immediately post-sleep (before brushing teeth):

MF71M 1. Unstow: Saliva Kit Assy

NOTE

DO NOT touch cotton w/fingers.

DO NOT bite down or chew cotton

2. Remove Salivette Bag Assy w/cotton rolls from 'UNUSED' pocket
3. Open Salivette Bag Assy w/cotton rolls and remove a cotton roll using fingers on the outside of the bag
4. Lightly roll cotton in mouth w/tongue until saturated (2 min max)
5. Replace Salivette Bag Assy w/cotton rolls in 'UNUSED' pocket
6. Place cotton roll in Collection Bag Assy by guiding w/tongue
7. Close seal on Collection Bag Assy, remove clamp, mix preservative w/cotton roll
8. Reclamp across top of Collection Bag Assy
9. Write the FD or MET on Collection Bag Assy using a Sharpie
10. Stow Collection Bag Assy in 'USED' pocket
11. Temp stow Saliva Kit

MF71M 12. If last FD, stow Saliva Kit

NOTE

If mission length extended, as timeline permits, continue collecting saliva samples to end of mission or until sample Collection Bags are depleted



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WING LEADING EDGE SENSORS (WLES) PROCEDURES

WLE
SENSORS

ACTIVATION AND CHECKOUT	FS 8-2
DEACTIVATION AND TEARDOWN	FS 8-9
WLE LAPTOP RECEIVER UNIT (LRU) R&R	FS 8-11
CONFIGURE DATA FILE BACKUP PATH	FS 8-14
DECONFIGURE DATA FILE BACKUP PATH	FS 8-14
PREP WLES LAPTOPS FOR TRANSFER.....	FS 8-15
FOR RNDZ TOOLS CHECKOUT	FS 8-17
WLES RECONFIG POST DOCK/UNDOCK	FS 8-17
DISABLE WLES FILE BACKUP	FS 8-18
ENABLE WLES FILE BACKUP	FS 8-18

ACTIVATION AND CHECKOUT

1. UNSTOW EQUIPMENT

NOTE

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

MA16G Unstow:
Laptop Receiver Units (2)
Cabin Relay Units (2) (S/N 1664, 1728)
A31p laptops (2)

2. SETUP WLE RELAY UNITS

A13 Retrieve WLE SYSTEM CABLE coiled on panel A6
Connect to MICRO WIS SYSTEM A – J7 (see
fig 8-1)

W7 Connect to J1 on Cabin Relay Unit S/N 1664 and
secure to STBD side of aft cabin with Velcro (see
fig 8-2)

Verify terminator connected to J2

A13 Retrieve WLE SYSTEM CABLE coiled on panel A9
Connect to MICRO WIS SYSTEM B – J8 (see
fig 8-1)

A4 Connect to J1 on Cabin Relay Unit S/N 1728 and
secure to PORT side of aft cabin with Velcro (see
fig 8-3)

Verify terminator connected to J2

NOTE

Green patch on Cabin Relay Unit is antenna and must face into cabin.
Software is configured to communicate with specific Relay Units on specific buses

Cont next page

FS 8-2

ORB OPS/116/FIN

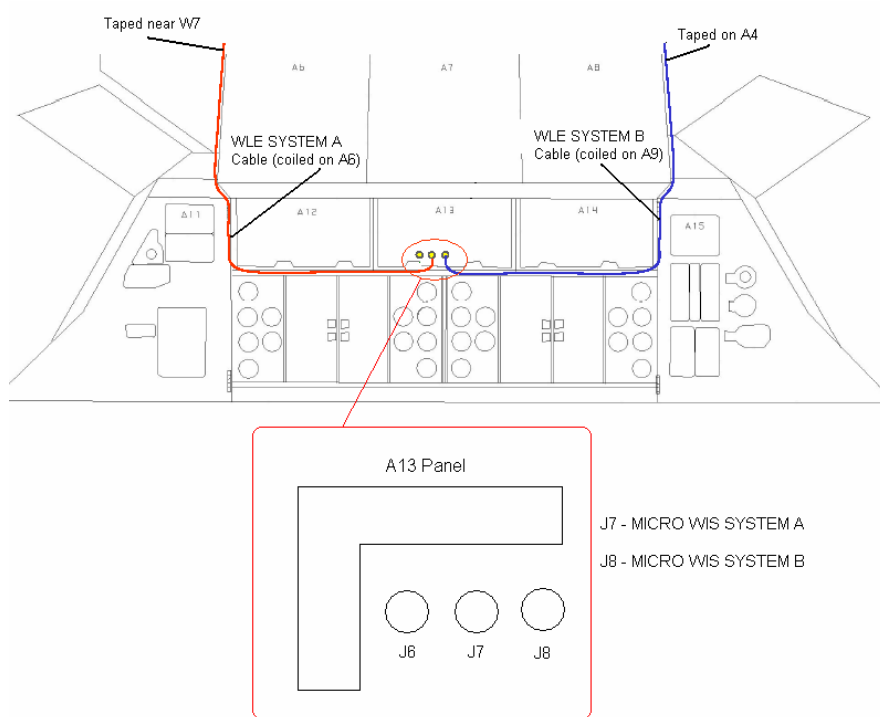


Figure 8-1.- A13 panel.

Cont next page

FS 8-3

ORB OPS/116/FIN

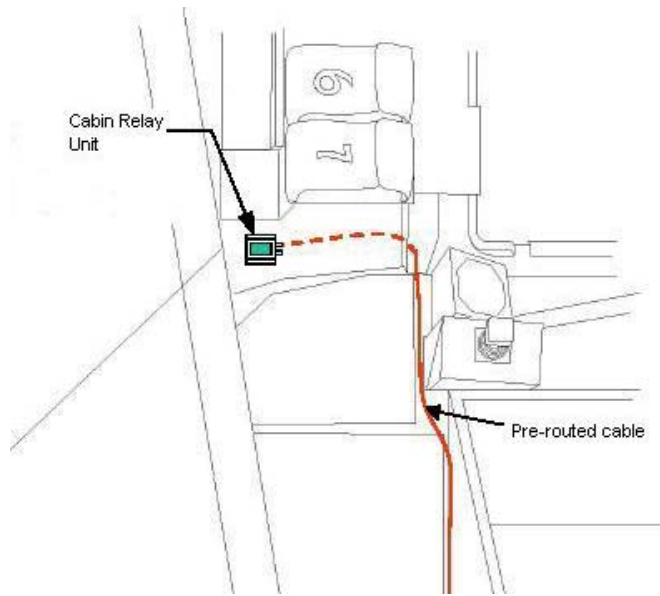


Figure 8-2.- Aft STBD location.

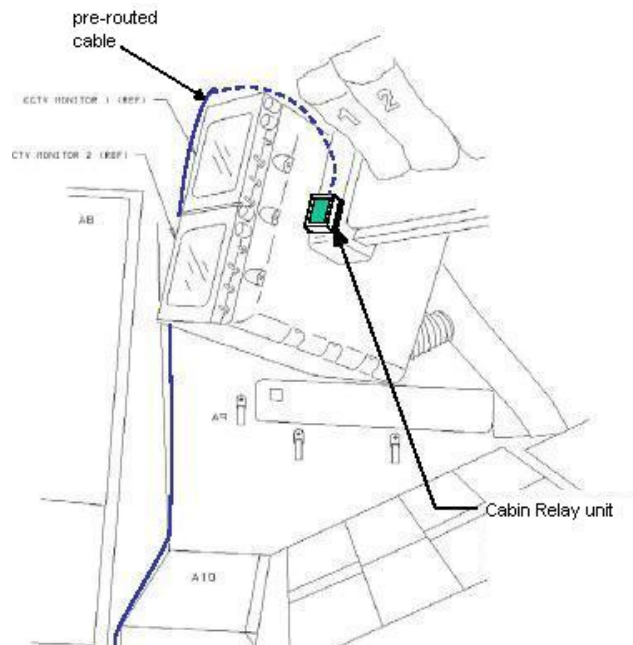


Figure 8-3.- Aft PORT location.

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3. SETUP PRIME WLE LAPTOP

A31p

Verify laptop physically connected to network before proceeding with setup
If necessary, close all applications, exit Windows
Click 'Start'>'Shutdown'
Secure Laptop Receiver Unit to A31p with Velcro (see fig 8-4)
Connect Laptop Receiver Unit to A31p Serial port using thumbscrews (see fig 8-5)

4. SETUP BACKUP WLE LAPTOP

A31p

Verify laptop physically connected to network before proceeding with setup
If necessary, close all applications, exit Windows
Click 'Start'>'Shutdown'
Secure Laptop Receiver Unit to A31p with Velcro (see fig 8-4)
Connect Laptop Receiver Unit to A31p Serial port (see fig 8-5)

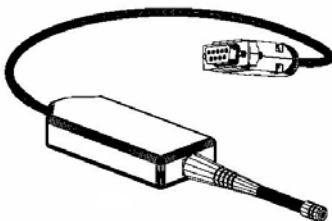


Figure 8-4.- Laptop Receiver Unit.



Figure 8-5.- A31p ports.

Cont next page

5. LAUNCH WLE SOFTWARE

Perform for both laptops:

A31p pwr – On

Select clock from system tray

Verify time is set to GMT (Casablanca,
Monrovia), adjust if necessary

Click 'OK'

Double click 'Shuttle Apps'>'EWBMTAU-
WLEFlight'

'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'

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

FS 8-6

ORB OPS/116/FIN

6. 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 1664 and 1728 (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

√Via: 'RF'

√Mode: 'Idle'

NOTE

'Last Update' times nominally update every 5 to 15 sec

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

7. ENABLE DATA FILE BACKUP

Use prime WLES laptop

'Main'

Click 'System Settings' (left side of display)

'Directories'

At the line 'Backup Directory' click 'Browse...'

Navigate to the mapped drive for the backup WLES laptop (expected to be the "U" drive)

Navigate to 'Program Files'>'Invocon'>'EWBMTAU-WLEFlight'

Click 'OK'

Cont next page

FS 8-7

ORB OPS/116/FIN

‘Backup Interval’

Using drop-down list, select 30 minutes

Click ‘Status’ (left side of display)

8. 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

Using Windows Explorer, navigate to

‘My Computer’>‘C:’>‘Program Files’>

‘Invocon’>‘EWBMTAU-WLEFlight’>‘Command’

NOTE

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

Delete file labeled ‘BLOCK.xml’

NOTE

Files appearing in the ‘Data’ folder verifies two-way communication with the Sensor Units in the orbiter wing. You may view this by using Windows Explorer to navigate to: ‘My Computer’>‘C:’>‘Program Files’>‘Invocon’>‘EWBMTAU-WLEFlight’>‘Data’

Notify MCC-H: “WLES setup complete”

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

DEACTIVATION AND TEARDOWN

A31p 1. DEACTIVATE WLE SENSORS LAPTOP 'Enhanced Wideband MicroTAU – WLEFlight 2.2'

For each WLES A31p:

Click 'Exit'

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

click 'Yes'

Click 'Start'>'Shutdown'

Disconnect Laptop Receiver Unit from A31p

Serial port

Remove Laptop Receiver Unit from Velcro on
A31p

2. REMOVE WLE SENSOR RELAY UNITS

Remove Cabin Relay Units (2) from aft cabin (see
fig 8-6 and fig 8-7)

Disconnect Cabin Relay Units from pre-routed
cables

Coil cables, stow in launch location

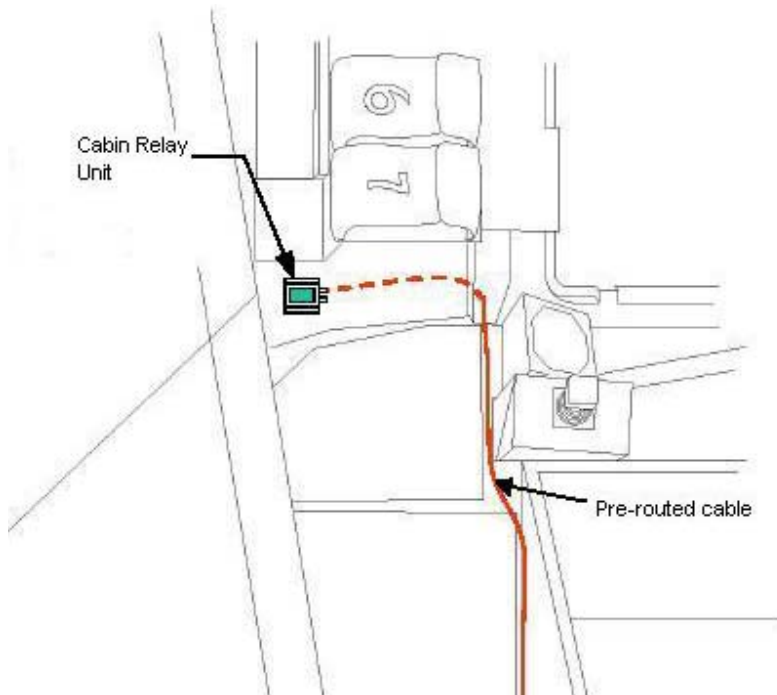


Figure 8-6.- Aft STBD location.

Cont next page

FS 8-9

ORB OPS/116/FIN

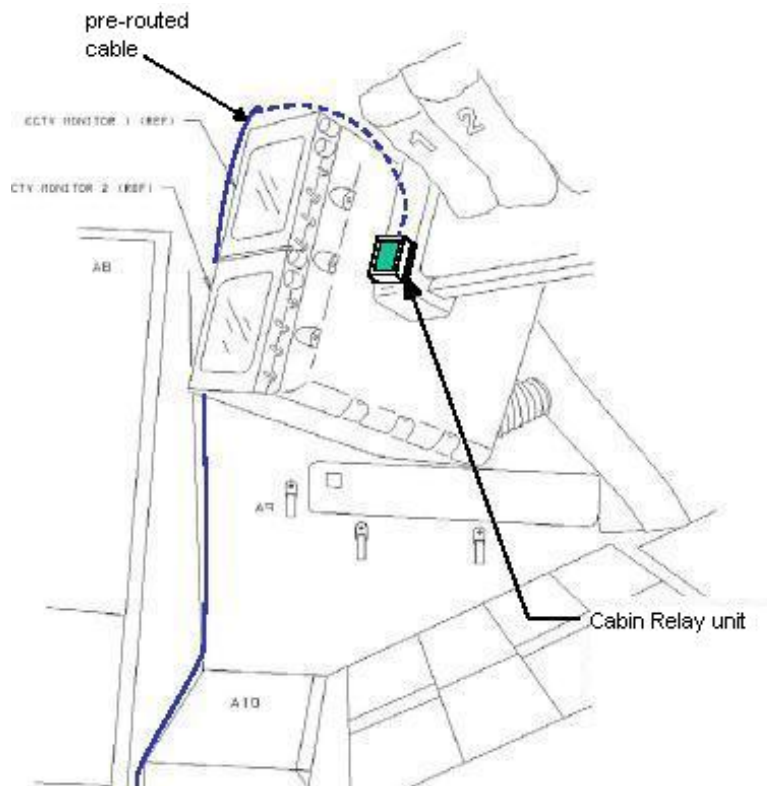


Figure 8-7.- Aft PORT location.

3. STOW EQUIPMENT

MA16G

Stow:

Laptop Receiver Units (2)

Cabin Relay Units (2)

Notify MCC-H: "WLES Teardown Complete"

WLE LAPTOP RECEIVER UNIT (LRU) R&R

- A31p
1. DISCONNECT BACKUP LRU FROM LAPTOP
'Enhanced Wideband MicroTAU – WLEFlight 2.2'
Click 'Exit'
At prompt 'Are you sure you want to exit?'
click 'Yes'
Close other software applications
Click 'Start'>'Shutdown'
Disconnect Backup LRU from Backup A31p Serial
port (see fig 8-8)
Remove Backup LRU from Velcro on Backup A31p
(see fig 8-9)

NOTE

Laptop can now be restarted for use



Figure 8-8.- A31p ports.

- A31p
2. DISCONNECT PRIME LRU FROM LAPTOP
'Enhanced Wideband MicroTAU – WLEFlight 2.2'
Click 'Exit'
At prompt 'Are you sure you want to exit?',
click 'Yes'
Close other software applications
Click 'Start'>'Shutdown'

Cont next page

FS 8-11

ORB OPS/116/FIN

Disconnect Prime LRU from Prime A31p Serial port
(see fig 8-8)
Remove LRU from Velcro on A31p

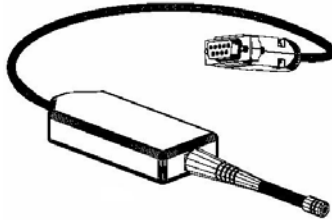


Figure 8-9.- Laptop Receiver Unit.

3. CONNECT BACKUP LRU
Connect Backup LRU to Prime WLES A31p Serial port
Secure LRU to A31p with Velcro
4. LAUNCH WLE SOFTWARE
Pwr – On
Double click ‘Shuttle Apps’>‘EWBMTAU-WLEFlight’

‘Backup Mode Selection’
Select ‘Standard’
5. VERIFY COMM WITH RELAY UNITS
‘Main’

Click ‘Unit List’ (left side of display)
√Cabin Relay Units Unit ID 1664 and 1728 (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
√Via: ‘RF’
√Mode: ‘Idle’

A31p

Cont next page

FS 8-12

ORB OPS/116/FIN

NOTE

'Last Update' times nominally
update every 5 to 15 sec

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

Click 'Status' (left side of display)

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

- MA16G 6. STOW EQUIPMENT
Stow:
Prime (failed) LRU

CONFIGURE DATA FILE BACKUP PATH

A31p Use prime WLES laptop |

 'Main'
 Click 'System Settings' (left side of display)

 'Directories'
 At the line 'Backup Directory' click 'Browse...'

 Navigate to the mapped drive for the backup WLES
 laptop (expected to be the "U" drive) |

 Navigate to 'Program Files'>'Invocon'>'EWBMTAU-
 WLEFlight'

 Click 'OK'

 'Backup Interval'
 Verify interval is set for 30 minutes

 Click 'Status' (left side of display)

DECONFIGURE DATA FILE BACKUP PATH

A31p Use prime WLES laptop |

 'Main'
 Click 'System Settings' (left side of display)

 'Directories'
 At the line 'Backup Directory' click 'Browse...'

 Navigate to the 'C' drive of the Prime WLES laptop

 Navigate to 'Program Files'>'Invocon'

 Click 'OK'

 'Backup Interval'
 Verify interval is set for 30 minutes

 Click 'Status' (left side of display)

PREP WLES LAPTOPS FOR TRANSFER

- A31p 1. DEACTIVATE WLE SENSORS LAPTOP(S)
'Enhanced Wideband MicroTAU – WLEFlight 2.2'

For each WLES A31p in use:

Click 'Exit'

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

click 'Yes'

Click 'Start'>'Shutdown'

Disconnect Laptop Receiver Unit from A31p

Serial port

Remove Laptop Receiver Unit from Velcro on

A31p

- _____ 2. CONNECT LRU TO 'NEW' PRIME WLES LAPTOP

√MCC-H for which laptop to use

Click 'Start'>'Shutdown'

Connect LRU to A31p Serial port

Secure LRU to A31p with Velcro

- _____ 3. CONNECT LRU TO 'NEW' BACKUP WLES LAPTOP

√MCC-H for which laptop to use

Click 'Start'>'Shutdown'

Connect LRU to A31p Serial port

Secure LRU to A31p with Velcro

4. LAUNCH WLE SOFTWARE

Perform for both laptops:

A31p pwr – On

Select clock from system tray

Verify time is set to GMT (Casablanca,
Monrovia), adjust if necessary

Click 'OK'

Double click 'Shuttle Apps'>'EWBMTAU-
WLEFlight'

'Backup Mode Selection'

For prime laptop, select 'Primary'

For backup laptop, select 'Secondary'

Cont next page

5. VERIFY COMM WITH RELAY UNITS

'Main'

Click 'Unit List' (left side of display)

√Cabin Relay Units Unit ID 1664 and 1728 (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

√Via: 'RF'

√Mode: 'Idle'

NOTE

'Last Update' times nominally update every 5 to 15 sec

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

Click 'Status' (left side of display)

6. ENABLE DATA FILE BACKUP

Use prime WLES laptop

'Main'

Click 'System Settings' (left side of display)

'Directories'

At the line 'Backup Directory' click 'Browse...'

Navigate to the mapped drive for the backup WLES laptop (recorded in step 3 above)

Navigate to 'Program Files'>'Invocon'>'EWBMTAU

Click 'OK'

Notify MCC-H: "WLES laptop prep for transfer complete"

PREP WLES FOR RNDZ TOOLS CHECKOUT

- A31p
1. DEACTIVATE BACKUP WLES LAPTOP
On backup WLES laptop:
 'Enhanced Wideband MicroTAU – WLEFlight 2.2'
 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:
 'Main'
 Click 'System Settings' (left side of display)
 'Backup Mode'
 Click 'Standard'
 Click 'Status' (left side of display)

WLES RECONFIG POST DOCK/UNDOCK

- A31p
1. RECOVER BACKUP WLES LAPTOP
On backup WLES laptop:
 If necessary, close all applications, exit Windows
 Click 'Start'>'Shutdown'
 Connect Laptop Receiver Unit to A31p Serial port
 A31p pwr – On
 Double click 'Shuttle Apps'>'EWBMTAU-
 WLEFlight'
 'Backup Mode Selection'
 Click 'Secondary'
 2. REACTIVATE WLES FILE BACKUP
On prime WLES laptop:
 'Main'
 Click 'System Settings' (left side of display)
 'Backup Mode'
 Click 'Primary'
 Click 'Status' (left side of display)

┌ | | | ┐

DISABLE WLES FILE BACKUP

- A31p 1. DISABLE WLES FILE BACKUP
On prime WLES laptop:

'Main'
Click 'System Settings' (left side of display)

'Backup Mode'
Click 'Standard'
Click 'Status' (left side of display)

ENABLE WLES FILE BACKUP

- A31p 1. ENABLE WLES FILE BACKUP
On prime WLES laptop:

'Main'
Click 'System Settings' (left side of display)

'Backup Mode'
Click 'Primary'
Click 'Status' (left side of display)

DTO 257 PRCS TEST

DTO 257 PRCS TEST FS 9-2

**DTO
257**

FS 9-1

ORB OPS/116/FIN

DTO 257 PRCS TEST

NOTE

Test is expected to take ~20 min and may result in shuttle/station attitude excursions

DTO
257

- | | |
|---------------------------|--|
| O14:F,
O15:F,
O16:F | 1. √Pri RJD LOGIC, DRIVER (sixteen) – ON |
| O14:E,
O15:E | √cb DDU L (two) – cl |
| 00:00 | 2. DAP: FREE |
| C3 | √DAP: NO LO Z |
| | 3. GNC 20 DAP CONFIG
Load DAP B14 |
| | √DAP parameters per DAP Table |
| | Disable X JETS ROT – ITEM 7 EXEC (no *) |
| | 4. GNC UNIV PTG
√ERR TOT (*) |
| | <h3><u>NOTE</u></h3> <p>Following step (SPEC 25 Item 16) will inhibit all GNC switches (including THC), freezing outputs at last valid state. Subsequent Item 16 will re-enable all GNC switches</p> |
| | 5. GNC 25 RM ORBIT
SW RM INH – ITEM 16 EXEC (*) |
| F7 | FLT CNTLR PWR – ON |
| CRT | SW RM INH – ITEM 16 EXEC (no *) |

Cont next page

FS 9-2

ORB OPS/116/FIN

03:00		6. When in free drift for at least 3 min: DAP: B/FREE/ALT √DAP ROT: PULSE/PULSE/PULSE
	C3	
00:00		RHC -PITCH, 1 pulse (expect LXD & RXD)
04:00		Continue with next step
		7. GNC 20 DAP CONFIG DAP B ROT PLS – ITEM 33 + <u>0.0</u> <u>5</u> EXEC
00:00		RHC +PITCH, 1 pulse (expect LXU & RXU)
03:00		Continue with next step
		8. GNC 20 DAP CONFIG DAP B ALT JET OPTION – ITEM 39 EXEC (ALL) # JETS – ITEM 40 + <u>1</u> EXEC
	C3	DAP: LO Z
00:00		RHC +PITCH, 1 pulse (expect FXD)
02:30		Continue with next step
		9. GNC 20 DAP CONFIG DAP B ROT PLS – ITEM 13 + <u>0.0</u> <u>7</u> EXEC ALT JET OPTION – ITEM 39 EXEC (TAIL)
	C3	DAP: NO LO Z
00:00		RHC +YAW, 1 pulse (expect RXR)
	C3	DAP: LO Z
02:30		Continue with next step

Cont next page

FS 9-3

ORB OPS/116/FIN

10. GNC 20 DAP CONFIG
 DAP B ALT JET OPTION – ITEM 39 EXEC
 (ALL)
 # JETS – ITEM 40 +2 EXEC
 CNTL ACC – ITEM 48 +6 EXEC

GNC 23 RCS

Forward RCS page – ITEM 1 EXEC
 JET DES F4R – ITEM 15 EXEC

00:00 RHC -YAW, 1 pulse (expect F4R & LXL)

02:30 Continue with next step

11. GNC 23 RCS
 Forward RCS page – ITEM 1 EXEC
 JET DES F4R – ITEM 15 EXEC

GNC 20 DAP CONFIG

Load DAP A12,B12
 Enable X JET ROT – ITEM 7 EXEC (*)

C3 DAP: VERN(ALT)
 DAP: A(B)/LVLH

12. Load attitude per FLIGHT PLAN

When rates damped:
 DAP: A(B)/AUTO

- F7 13. FLT CNTLR PWR – OFF

O14:F,
 O15:F,
 O16:F

Pri RJD LOGIC,DRIVER (sixteen) – as reqd

O14:E,
 O15:E

cb DDU L (two) – as reqd

MAUI ANALYSIS OF UPPER-ATMOSPHERIC
INJECTIONS (MAUI)

MAUI PROCEDURE FS 10-2

MAUI

FS 10-1

ORB OPS/116/FIN

MAUI PROCEDURE

- 15:00 or earlier 1. VERIFY MANEUVER TO START ATTITUDE IN PROGRESS

Deploy MAUI – RCS FIRING SEQUENCE
(Cue Card)

√Attitude MNVR in progress (if MNVR reqd)

GNC 20 DAP CONFIG

√DAP A1, B1 loaded

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)

TRAN PLS – ITEM 17 +0.7 3 EXEC

VERN ROT PLS – ITEM 26 +0.1 5 3 EXEC

MAUI

Cont next page

FS 10-2

ORB OPS/116/FIN

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 per Flight Plan

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 10-3

ORB OPS/116/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	R1A, L1A	THC +X (in) (3 sec firing)	
00:15	F1L, L1L	THC +Y (right) (3 sec firing)	
00:30	F2R, R1R	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 (hard stop, hold 3 sec)	
00:48		RHC release	
00:50			DAP: VERN
01:00	R5R	RHC +yaw (pulse 10 sec)	
01:20	L5D	RHC -pitch (pulse 12 sec)	
01:40	F5R	RHC +pitch (pulse 12 sec)	
		FLT CNTRL PWR – OFF	Return to MAUI PROCEDURE, step 6, (ORB OPS FS, MAUI)

Cont next page

FS 10-4

ORB OPS/116/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 CARD CONFIGURATION

CUE
CARDS



NOT FLOWN

FS 11-1

ORB OPS/116/FIN





**CUE
CARDS**

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NOT FLOWN

FS 11-2

ORB OPS/116/FIN

TOP

HOOK
VELCRO

FLIGHT DAY 3 DOCKING
ORBITER with ISS
CO2 ABSORBER REPLACEMENT
 (7 Crewmembers/Single Shift/FD 1-15)

FLIGHT DAY	POS A	POS B	CK CMPLT
LAUNCH	1	2	
PRE FD1	"	"	
POST FD2	3	4	
PRE FD2	5	"	
POST FD3	6	7	DOCKING
PRE FD3	"	"	
POST FD4	"	"	
PRE FD4	"	"	
POST FD5	"	"	
PRE FD5	"	"	
POST FD6	"	"	
PRE FD6	"	"	
POST FD7	"	"	
PRE FD7	"	"	
POST FD8	"	"	
PRE FD8	"	"	
POST FD9	"	"	
PRE FD9	"	"	
POST FD10	"	"	
PRE FD10	"	"	
POST FD11	"	"	
MID FD11	8	9	Post ODS Upper Hatch Closure
PRE FD11	"	10	
POST FD12	11	12	
PRE FD12	13	"	
POST FD13	14	15	EOM
PRE FD13	16 *	17 *	
POST FD14	18	19	EOM+1
PRE FD14	"	20	
POST FD15	21	22	EOM+2
PRE FD15	23 *	24 *	
POST FD16	25	26	EOM+3

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

ORB OPS-29a/nonRCRS/116/O/A

NOTE

This card is specifically used for STS-116 mission with orbiter conducting single shift ops with crew size of 7. Changeout schedule assumes FD3 docking with ISS; Vozdukh and CDRA on during docked operations

(reduced copy)

FAB USE ONLY

FS CC 11-3

ORB OPS/116/FIN

TOP
BACK OF 'FLIGHT DAY 3 DOCKING
ORBITER with ISS
CO2 ABSORBER REPLACEMENT'

HOOK
VELCRO

**LiOH CANISTER STOWAGE
LOCATIONS**

Orbiter:

MD52M (LiOH Box): Cans 1-31*

* 2 LiOH cans installed in LiOH slots A and B

ORB OPS-29b/nonRCRS/116/O/A

(reduced copy)

FAB USE ONLY

FS CC 11-4

ORB OPS/116/FIN

HOOK
VELCRO

HOOK
VELCRO

ORBIT BURN MONITOR

OMS TEMP*		
FU IN P ≥	L 225	R 220
≤	L 205	R 204
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		
OX IN P ≤ 227		OMS PRPLT FAIL
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	L(R) OMS GMBL – SEC (twice)
	SEC fail	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 (twice)
	SEC GMBL lost	If high RCS usage: OMS ENG FAIL
	2 FAs lost	√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		I/O RESET (if recov: >>)
	1(4)	If high RCS usage:
		L(R) OMS GMBL – SEC (twice)
GPC SET SPLIT	Non-crit burn	STOP BURN: OMS ENG(s) – OFF
	Crit burn	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/116/O/C

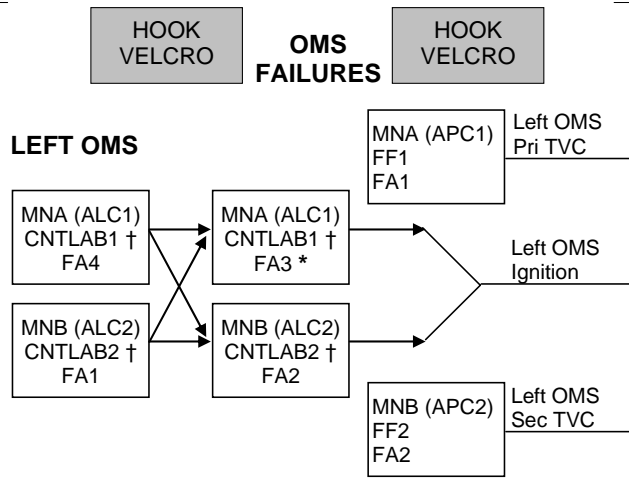
(reduced copy)

FAB USE ONLY

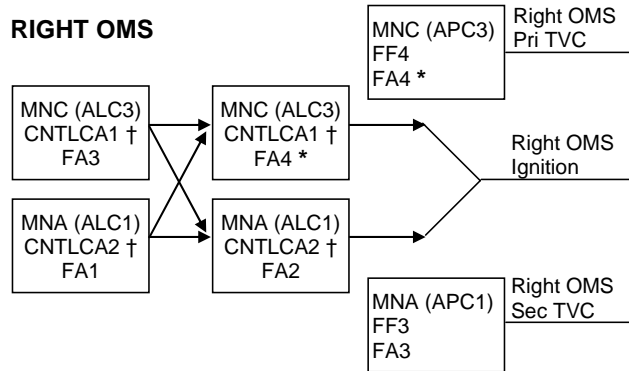
FS CC 11-5

ORB OPS/116/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/116/O/A

(reduced copy)

FAB USE ONLY

FS CC 11-6

ORB OPS/116/FIN

FAB USE ONLY

FS CC 11-7

ORB OPS/116/FIN

(reduced copy)

TOP

PILE
VELCRO

PILE
VELCRO

STS-116 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	PRE/POST DEPLOY	LOSS OF VERN (ALL)	LOSS OF VERN (TAIL ONLY)	RNDZ	TERMINAL PHASE

ORB OPS-41a/116/O/A

HINGE

TOP
HINGED AT BOTTOM OF
'STS-116 DAP A1 – A8 CONFIGURATIONS'
HINGE

STS-116 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		NOMINAL OMS & RCS BURNS	LOSS OF VERN (TAIL ONLY)	LOSS OF VERN (NOSE/TAIL)		COASHUD CAL		RNDZ	TERMINAL PHASE

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TOP
BACK OF 'STS-116 DAP A1 – A8 CONFIGURATIONS'

PILE
VELCRO

PILE
VELCRO

STS-116 DAP A9 – DAP A15 CONFIGURATIONS

	ITEM #	A9	A10	A11	A12	A13	A14	A15
PRI								
ROT RATE	10 (50)	0.1300	0.0500	0.1000	0.1000	0.1000	0.2000	0.1000
ATT DB	11 (51)	2.00	0.60	15.00	5.00	5.00	5.00	5.00
RATE DB	12 (52)	0.10	0.10	0.20	0.20	0.20	0.20	0.20
ROT PLS	13 (53)	0.100	0.100	0.100	0.040	0.040	0.100	0.040
COMP	14 (54)	.000	.000	.000	.000	.000	.000	.000
P OPTION	15 (55)	TAIL	TAIL	TAIL	TAIL	TAIL	TAIL	TAIL
Y OPTION	16 (56)	TAIL	TAIL	TAIL	TAIL	TAIL	TAIL	TAIL
TRAN PLS	17 (57)	0.050	0.050	0.100	0.010	0.010	0.100	0.010
ALT								
RATE DB	18 (58)	0.100	0.100	0.070	0.070	0.070	0.200	0.070
JET OPT	19 (59)	TAIL	TAIL	TAIL	TAIL	TAIL	TAIL	TAIL
# JETS	20 (60)	2	2	3	3	3	1	3
ON TIME	21 (61)	0.08	0.08	0.08	0.08	0.08	0.08	0.08
DELAY	22 (62)	0.00	0.00	12.00	11.04	11.04	6.00	11.04
VERN								
ROT RATE	23 (63)	0.1300	0.0500	0.1000	0.1000	0.1000	0.2000	0.1000
ATT DB	24 (64)	1.000	0.500	5.000	3.000	3.000	3.000	3.000
RATE DB	25 (65)	.020	.020	.050	.050	.050	.200	.080
ROT PLS	26 (66)	0.050	0.050	0.010	0.002	0.002	0.010	0.002
COMP	27 (67)	.000	.000	.000	.000	.000	.000	.000
CNTL ACC	28 (68)	0	0	1(2)*	1	4	9	3
PURPOSE		PROX OPS FLYAROUND	DOCKING	AUTO REBOOST	MATED MNVRS (VRCS)	MATED MNVRS & HOLD (VRCS) ODS DEPRESS	ORBITER ALONE SRMS/OBSS	MATED ATTITUDE HOLD (VRCS)

BOLD/ITALIC indicates change from I-Load.

* 1 for Config 3&4, 2 for Config 1&2

ORB OPS-41b/116/O/B

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TOP
 BACK OF 'STS-116 DAP B1 – B8 CONFIGURATIONS'
 HINGED AT BOTTOM OF 'STS-116 DAP A9 – A15 CONFIGURATIONS'
 HINGE

STS-116 DAP B9 – DAP B15 CONFIGURATIONS

	ITEM #	B9	B10	B11	B12	B13	B14	B15
PRI								
ROT RATE	30 (50)	0.1300	0.0500	0.5000	<i>0.1000</i>	<i>0.1000</i>	<i>0.1000</i>	0.1000
ATT DB	31 (51)	2.00	0.60	3.00	5.00	5.00	40.00	40.00
RATE DB	32 (52)	0.10	0.10	0.20	0.20	0.20	5.00	0.20
ROT PLS	33 (53)	0.040	0.040	0.040	0.040	0.040	0.120	0.003
COMP	34 (54)	.000	.000	.000	.000	.000	.000	.000
P OPTION	35 (55)	TAIL	TAIL	ALL	TAIL	TAIL	TAIL	TAIL
Y OPTION	36 (56)	TAIL	TAIL	ALL	TAIL	TAIL	TAIL	TAIL
TRAN PLS	37 (57)	0.010	0.010	0.020	0.010	0.010	0.010	0.010
ALT								
RATE DB	38 (58)	0.100	0.100	0.200	<i>0.070</i>	<i>0.070</i>	5.000	0.200
JET OPT	39 (59)	TAIL	TAIL	ALL	TAIL	TAIL	TAIL	TAIL
# JETS	40 (60)	2	2	2	3	3	2	2
ON TIME	41 (61)	0.08	0.08	0.08	0.08	0.08	0.08	0.08
DELAY	42 (62)	10.00	0.00	0.00	11.04	11.04	0.00	0.00
VERN								
ROT RATE	43 (63)	0.1300	0.0500	0.2000	<i>0.1000</i>	<i>0.1000</i>	<i>0.1000</i>	0.0200
ATT DB	44 (64)	1.000	0.500	1.000	3.000	3.000	40.000	5.000
RATE DB	45 (65)	.020	.020	.020	.050	.080	.500	.050
ROT PLS	46 (66)	0.020	0.020	0.002	0.002	0.002	0.001	0.001
COMP	47 (67)	.000	.000	.000	.000	.000	.000	.000
CNTL ACC	48 (68)	0	0	0	2	5	0	7
PURPOSE		PROX OPS/ FLYAROUND	DOCKING		MATED MNVRS & HOLD(P RCS)	MATED MNVRS & HOLD(P RCS) ODS DEPRESS	DTO 257	

BOLD/ITALIC indicates change from I-Load.

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ORB OPS-41bb/116/O/B

HOOK
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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	R1A, L1A	THC +X (in) (3 sec firing)	
00:15	F1L, L1L	THC +Y (right) (3 sec firing)	
00:30	F2R, R1R	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 (hard stop, hold 3 sec)	
00:48		RHC release	
00:50			DAP: VERN
01:00	R5R	RHC +yaw (pulse 10 sec)	
01:20	L5D	RHC -pitch (pulse 12 sec)	
01:40	F5R	RHC +pitch (pulse 12 sec)	
		FLT CNTRL PWR – OFF	Return to MAUI PROCEDURE, step 6, (ORB OPS FS, MAUI)

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TOP
BACK OF 'MAUI - RCS FIRING SEQUENCE'

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TOP

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RECUMBENT SEAT KIT (RSK) INSTALLATION

NOTE

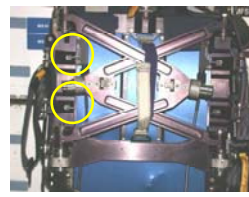
This procedure may be used to install RSK(s) 6, 7, and 8. Refer to figures as reqd for assembly steps (Time: 1 hr)



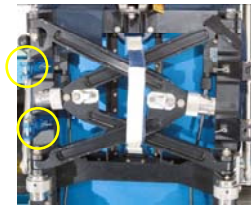
① Unstow Headrest(s), bushing(s), RSK (blue) ICU brackets and extension strap(s)



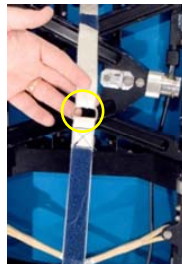
② Install bushing into port side of seat back



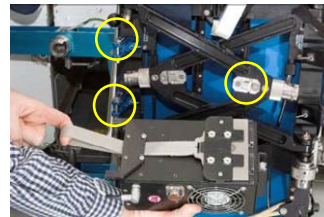
③ Remove ICU brackets on stbd seat pan (pull spring pin, slide out bracket)



④ Install RSK (blue) ICU brackets (pull spring pin, slide in brackets)



⑤ Install extension strap(s) (loop strap through D-ring)



⑥ Install ICU(s) onto blue ICU brackets. Pull strap and install bottom of ICU onto bracket on top of seat leg (note: see photo 7 for config with ICU installed onto seat. Seat legs will still be folded)



⑦ Restrain ICU and seat legs using extension strap



⑧ Install RSK headrest(s)



⑨ Open seat pan(s) into entry config (pull gold T-handles on port & stbd seat back to release seat pan(s))

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ORB OPS-43a/116/O/A

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ORB OPS/116/FIN

TOP, BACK OF 'RECLINABLE SEAT KIT (RSK) INSTALLATION'

HOOK
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10 If RSK 8 reqd:
Attach rail 7 to rail 8 and secure
using pip pins (two)



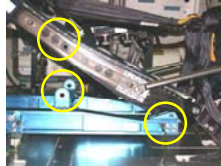
11 As reqd:
Open deck stud collars (push button,
lift collars/four per rail 6 and rail 7).
Align collars aft of deck studs and
slide rail(s) fwd onto deck studs and
close collars



12 If RSK 8 reqd:
Backout knobs on rail 8, place QD
into park per decal. Open browline
QD (push button, lift collar) and align/
secure QD onto browline deck stud.
Tighten knobs



13 As reqd:
Open MF43K, MF57K, MF71K remove
tray(s). Verify foot box is attached to
MF71K



14 As reqd:
Attach seat(s) to rail(s).
Align slots, install pip pins (4)



15 As reqd:
Route O2/COMM/ICU lines

CAUTION
Verify ICU pwr OFF before
making connections

Connect ICU pwr (per plug in plan).
Install parachute(s), install lumbar
cushion(s).

HOOK
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ORB OPS-43b/116/O/A

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ORB OPS/116/FIN

Space Shuttle Program
FLIGHT DATA FILE

JSC-48036-116
FINAL



ORBIT OPS CHECKLIST

STS
116

Flight Cover (trim bottom to expose tabs)