

Payload Operations Checklist

STS-109

Mission Operations Directorate
Operations Division

Final, Rev B
January 25, 2002

National Aeronautics and
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MISSION OPERATIONS DIRECTORATE

**PAYLOAD OPERATIONS CHECKLIST
STS-109**

FINAL, REVISION B
January 25, 2002

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PAYLOAD OPERATIONS CHECKLIST
STS-109

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SSE ACT/FSS PREP

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**SSE ACT/
FSS PREP**

SSE ACTIVATION

SSE ACT/
FSS PREP

- 1. PRIMARY PAYLOAD ACT
- R1 ✓PL PRI MNC tb – ON
- ✓CAB – MNA

- 2. FSS AND MULE FMDM-B PWR ON
- L12U cb FSS A SIDE PWR – cl

- FSS FMDM-B PWR – ON (tb-gray)
- * If FSS FMDM-B PWR tb – bp, *
- * cycle sw *
- * If still no joy, continue *

- L11U cb MULE SW PWR – cl

- MULE FMDM-B PWR – ON (tb-gray)
- * If MULE FMDM-B PWR tb – bp, *
- * cycle sw *
- * If still no joy, continue *

SM 211 SSE OVERVIEW
SM I/O RESET EXEC

- * If FSS FMDM-B PWR or MULE FMDM-B PWR tb – bp *
- * and 'I/O ERROR FLEX' msg, FMDM failed: *
- L12U * FSS FMDM-B PWR – OFF (tb-bp) *
- * FMDM-A PWR – ON (tb-gray) *
- L11U * MULE FMDM-B PWR – OFF (tb-bp) *
- * FMDM-A PWR – ON (tb-gray) *
- * **SM 1 DPS UTILITY** *
- * PORT ASSIGN STRING PL 1/2 SEC – ITEM 24 *
- * EXEC (*) *

- * If 'I/O ERROR FLEX' msg, go to *
- * 1.4a 'I/O ERROR FLEX' (PL SYS, SSE) *
- * If 'BCE BYPASS' msg, go to 1.4b 'BCE *
- * BYP FLEX' (PL SYS, SSE) *

3. VERIFY SSE STATUS

NOTE

Notify MCC of any parameter not in range, continue

SM 211 SSE OVERVIEW

- ✓PCU – blank/blank
- ✓CCTV ENA OFF – *
- ✓PWR OFF – *
- ✓ESM A HTR ZONE 1&2,3 – no * (both)
- ✓B HTR ZONE 1&2,3 – no * (both)
- ✓SOPE A HTR ZONE 1&2,3 – no * (both)
- ✓B HTR ZONE 1&2,3 – no * (both)

POWER

- ✓FSS EPDSU 1/2 AMPS: < 3.0 (both)
- ✓FMDM A/B AMPS: < .15/.5 to 1.1
- ✓HTR – blank/blank
- ✓HTR A1/A2 AMPS: < 0.4 (both)
- ✓B1/B2 AMPS: < 0.4 (both)
- ✓CCTV HTR AMPS: < .10
- ✓MULE FMDM A/B AMPS: < .15/.7 to 1.3
- ✓HTR – no *
- ✓HTR AMPS: < 0.4
- ✓ESM 1&2/3 AMPS: < 0.1 (both)
- ✓SOPE 1A/2A AMPS: < 0.4 (both)
- ✓1B&2B AMPS: < 0.4
- ✓3A/3B AMPS: < 0.4 (both)
- ✓SAC EPDSU AMPS: .4 to 1.4
- ✓FSS EPDSU VOLTS: 24.0 to 32.0 (both)
- ✓MULE PDSU VOLTS: 24.0 to 32.0
- ✓SAC EPDSU VOLTS: 24.0 to 32.0 (both)

DPC

- ✓DPC 1–12: – no *
- ✓DPC 1–12 VOLTS: < 0.5
- ✓DPC 1–12 AMPS: < 0.5

THERMAL

- ✓FSS EPDSU TEMP: –20 to 50 degC (both)
- ✓FMDM TEMP: –3 to 55 degC (active FMDM only)
- ✓PCU TEMP: –20 to 50 degC (both)
- ✓PCU TEMP: –20 to 50 degC (both)
- ✓AMSB TEMP: –20 to 50 degC
- ✓AMSB TEMP: –20 to 50 degC
- ✓MULE PDSU TEMP: –20 to 50 degC
- ✓FMDM TEMP: –3 to 55 degC (active FMDM only)
- ✓SAC EPDSU TEMP: –20 to 50 degC (both)

4. FSS HEATER ACT

L12U FSS HTR PWR – PRI (tb–gray)

- * If tb – bp, cycle sw *
- * If still no joy, continue *

CRT ✓POWER FSS HTR – 1/2

- * If POWER FSS HTR NOT 1/2, go to *
- * 1.1a POWER FSS HTR NOT 1/2 *
- * (S211) (PL SYS, SSE) *

✓POWER FSS HTR A1,B1 AMPS: ≤ 0.4 (both)

- * If POWER FSS HTR A1 AMPS: > 14 or POWER FSS HTR B1 AMPS: > 11, then *
- * FSS HTR PWR – OFF (tb–bp), ✓MCC *
- * If POWER FSS HTR A1 AMPS: 0.4 to 14 or POWER FSS HTR B1 AMPS: 0.4 to 11, then *
- * notify MCC, continue *

L12U CCTV HTR PWR – ON (tb–gray)

- * If CCTV HTR PWR tb – bp, *
- * cycle sw *
- * If no joy, continue *

CRT ✓POWER FSS CCTV HTR AMPS: ≤ .9

L12U * If POWER FSS CCTV HTR AMPS: > .9, *
 * CCTV HTR PWR – OFF (tb–bp), continue *

5. MULE SURVIVAL HEATER ACT

L11U SURV HTR B PWR – ON
 ✓HTR PWR tb – gray

 * If SURV HTR PWR tb – bp, *
 * cycle sw *
 * If still no joy, continue *

CRT ✓POWER MULE HTR – *

 * If POWER MULE HTR NOT *, go to *
 * 1.1b POWER MULE HTR NOT * *
 * (S211) (PL SYS, SSE) *

 ✓POWER MULE HTR AMPS: ≤ 11

L11U * If POWER MULE HTR AMPS: > 11, *
 * SURV HTR B PWR – OFF *
 * ✓HTR PWR tb – bp *
 * ✓MCC *

6. ESM HEATER ACT

L11U ESM HTR B PWR – ON (tb–gray)

 * If ESM HTR B PWR tb – bp, *
 * cycle sw *
 * If still no joy, continue *

CRT ✓ESM B HTR ZONE 1&2,3 – * (both)

 ✓POWER MULE ESM 1&2/3 AMPS: ≤ 4/≤ 2

L11U * If POWER MULE ESM 1&2/3 AMPS: > 4/> 2, *
 * ESM HTR B PWR – OFF (tb–bp), *
 * ✓MCC *

7. SOPE HEATER ACT

L11U SOPE HTR B PWR – ON (tb–gray)

 * If SOPE HTR B PWR tb – bp, *
 * cycle sw *
 * If still no joy: *
 * SOPE HTR B PWR – OFF (tb–bp) *
 * A PWR – ON (tb–gray) *

CRT ✓SOPE B HTR ZONE 1&2,3 – * (both)
 ✓POWER MULE SOPE 1A/2A AMPS: ≤ 0.4 (both)
 ✓1B&2B AMPS: ≤ 5.1
 ✓3A/3B AMPS: ≤ 0.4/≤ 2.6

L11U * If POWER MULE SOPE AMPS not as expected: *
 * SOPE HTR B PWR – OFF (tb–bp), *
 * ✓MCC *

- L12L 8. SAC PWR ON
 cb SAC A-SIDE PWR ENA – cl
 SAC B-SIDE PWR ENA – ON
9. ASIPE HTR A ON
 ASIPE HTR A PWR – ON (mom) (tb-UP)
- * If ASIPE HTR A PWR tb – bp, cycle sw *
 - * If still no joy: *
 - * ASIPE HTR A PWR – OFF (mom) (tb-bp) *
 - * HTR B PWR – ON (mom) (tb-UP) *

CRT ✓POWER SAC EPDSU AMPS: ≤ 14

- L12L * If POWER SAC EPDSU AMPS: > 14, *
- * ASIPE HTR A PWR – OFF (mom) (tb-bp) *
 - * ✓MCC *

- L12L 10. SAP HTR B PWR ON
 SAP HTR B PWR – ON (tb-gray)
- * If SAP HTR B PWR tb – bp, cycle sw *
 - * If still no joy: *
 - * SAP HTR B PWR – OFF (tb-bp) *
 - * HTR A PWR – ON (tb-gray) *

CRT ✓POWER SAC EPDSU AMPS: ≤ 23

- L12L * If POWER SAC EPDSU AMPS: > 23, *
- * SAP HTR B PWR – OFF (tb-bp) *
 - * ✓MCC *

- L12L 11. OPA HTR A ON
 SAC OPA HTR A PWR – ON (tb-gray)
- * If SAC OPA HTR A PWR tb – bp, cycle sw *
 - * If still no joy: *
 - * SAC OPA HTR A PWR – OFF (tb-bp) *
 - * HTR B PWR – ON (tb-gray) *

CRT ✓POWER SAC EPDSU AMPS: ≤ 32

- L12L * If POWER SAC EPDSU AMPS: > 32, *
- * SAC OPA HTR A PWR – OFF (tb-bp), *
 - * ✓MCC *

- L12L 12. SAC EPDSU HTR PWR B ON
 SAC EPDSU HTR PWR – B ON (tb-gray)
- * If SAC EPDSU HTR PWR tb – bp, cycle sw *
 - * If still no joy: *
 - * SAC EPDSU HTR PWR – OFF (tb-bp) *
 - * – A ON (tb-gray) *

CRT ✓POWER SAC EPDSU AMPS: ≤ 35

L12L

- * If POWER SAC EPDSU AMPS: > 35, *
- * SAC EPDSU HTR PWR – OFF (tb–bp) *
- * ✓MCC *

13. VERIFY MECHANISM STATUS

SM 212 SSE MECHANISMS

- ✓AMSB OFF – *
- ✓AMSB AC AMPS: < .20
- ✓AMSB TEMP: –20 to 50 degC
- ✓MECH – blank
- ✓PIVOT LO TACH: < .25 deg/min
- ✓ROTATOR TACH: < 0.9 deg/min

Notify MCC, SSE ACTIVATION complete; report any anomalies

SSE CHECKOUT

1. SSP INTERFACE CHECKS

SM 211 SSE OVERVIEW

PCU ON – ITEM 1 EXEC (*)

✓PCU – P/S

✓DPC 1–12 – *

✓VOLTS: 33.7 to 35.3

✓AMPS: ≤ 0.5

- * If DPC 1–12 AMPS: > 0.5, turn off affected DPC, *
- * DPC OFF – ITEM 24 +X X EXEC (no *) *
- * (Refer to DPC ON/OFF INDEX NUMBERS *
- * (REF DATA)), ✓MCC *
- * If any other param(s) not in range, record MET *
- * and off nominal DPC values; notify MCC *
- * Continue *

NOTE

If any parameters out of limits, note and continue

L12U	cb SPACE TEL SW PWR	– cl
	ESS/MN SW ENA	– ON (tb–gray)
	MAIN BUS EXT PWR	– ON (mom) (expect no tb)
✓	IPCU RLY CL tb	– gray
	MAIN BUS EXT PWR	– OFF (mom)
✓	IPCU RLY CL tb	– bp
	ESS/MN SW ENA	– OFF (tb–bp)
	RSU SURV HTR PWR	– ON (tb–gray)
		– OFF (tb–bp)
	FHST SHUTTER	– CL (tb–gray)
		– OP (tb–bp)

CRT	PCU OFF – ITEM 2 EXEC (*)
✓	PCU – blank/blank
✓	DPC 1–12 – no *
L12U	PCU PWR CONTR A – ON
CRT	✓DPC 1–12 – *
L12U	PCU PWR CONTR A – OFF
CRT	✓DPC 1–12 – no *
L12U	PCU PWR CONTR B – ON
CRT	✓DPC 1–12 – *
L12U	PCU PWR CONTR B – OFF
CRT	✓DPC 1–12 – no *

2. FSS CCTV CHECK

CCTV ENA ON – ITEM 3 EXEC (*)

PWR ON – ITEM 5 EXEC (*)

- * If CCTV ENA ON does not indicate ‘*’, *
- * re–exec ITEM 3. If still no ‘*’, continue *

- * If CCTV PWR ON does not indicate ‘*’, *
- * re–exec ITEM 5. If still no ‘*’, attempt *
- * to display Camr image on monitor. If *
- * no image, ✓MCC *

A7U Select FSS CCTV, zoom and focus to verify Camr operational

CRT CCTV PWR OFF – ITEM 6 EXEC (*)

- * If CCTV PWR OFF not '*', *
- * do not perform CCTV ENA – OFF *

Wait 15 sec,
CCTV ENA OFF – ITEM 4 EXEC (*)

3. FSS AMSB CHECKOUT

A6U ✓PL RETEN LAT 1,2 (two) – OFF
 ✓LOGIC PWR SYS 1,2 (two) – OFF
 ✓PL SEL – 1

R13L ✓PL BAY MECH PWR SYS 1,2 (two) – OFF

SM 212 SSE MECHANISMS

AMSB ON – ITEM 7 EXEC (B(A))

- * If AMSB ON – blank, *
- * record and continue *

- ✓AMSB AC AMPS: < 0.20
- ✓MECH – blank
 - ✓SEL (ITEMS 9–19) – no *
 - ✓STAT (ITEMS 9–19) – blank
- ✓PIVOT LO TACH: < 0.25 deg/min
- ✓ROTATOR TACH: < 0.9 deg/min
- ✓O/R DIS, (ITEM 22) – *

- * If any parameter out of limit, ✓MCC *

Perform following ITEM entries and checks per table

NOTE

SEL field should show '*' only for MECHANISM selected.
For any parameters not as expected, do not deselect;
contact MCC

ITEM EXEC	MECHANISM	SEL	STAT	AMSB DC AMPS	MECH	SM 97 PL SEL 1, LAT/REL LATCH 2(1)
9	DLOCK	9 - *	ENG	.02-.08	B(A)	01/00(10/00)
Expect 'S212 AMSB DC AMPS' msg						
21	O/R ENA(*)	9 - *	RDY	.09-.20		00/00(00/00)
11	PIVOT LO	11 - *	DN	.02-.08	B(A)	00/01(00/10)
Expect 'S212 AMSB DC AMPS' msg						
21	O/R ENA (*)	11 - *	RDY	.09-.20		00/00(00/00)
22	O/R DIS (*)	11 - *	DN	.02-.08	B(A)	00/01(00/10)
12	ROTATOR	12 - *	RDY	.02-.08		00/00(00/00)
14	B LAT 1	14 - *	OP	.02-.08	B(A)	00/01(00/10)
15	B LAT 2	15 - *	OP	.02-.08	B(A)	00/01(00/10)
16	B LAT 3	16 - *	OP	.02-.08	B(A)	00/01(00/10)
17	UMB MN	17 - *	REL	.02-.08	B(A)	00/01(00/10)
18	UMB B/U	18 - *	MAT	.02-.08	B(A)	01/00(10/00)
19	BSP	19 - *	SET	.02-.08	B(A)	01/00(10/00)
20	DESEL	9-19 blank		< .04		00/00(00/00)

4. B SIDE UMBILICAL TEST

CAUTION

Operating the umbilical in a stalled condition for greater than 30 sec may result in damage to unit. An umbilical stall condition is indicated by AMSB AC AMPS > 0.6 and no mechanism motion

Perform FSS UMBILICAL SURVEY (PDRS OPS, PHOTO SURVEYS)

- CCTV Monitor UMB MN operations
- A6U PL RETEN LOGIC PWR SYS 2 - ON
- R13L PL BAY MECH PWR SYS 2 - ON
- CRT UMB MN SEL - ITEM 17 EXEC (* REL)
✓AMSB DC AMPS: .02 to .08
✓MECH - steady B
- A6U PL RETEN LAT 2 - LAT

CRT ✓MECH – flashing B
 ✓AMSB AC AMPS: .6 to 1.0
 ✓UMB MN STAT – RDY

* If stall condition observed (AMSB AC AMPS *
 * > 0.6 and no mechanism motion): *
 * PL RETEN LAT 2(1) – OFF *
 * ✓MCC *

Wait 8 sec

A6U ✓UMB MN STAT – MAT
 PL RETEN LAT 2 – OFF

CRT ✓MECH – steady B

CCTV Visually verify UMB in mated posn

A6U PL RETEN LAT 2 – REL

CRT ✓MECH – flashing B
 ✓AMSB AC AMPS: .6 to 1.0
 ✓UMB MN STAT – RDY

* If stall condition observed (AMSB AC AMPS *
 * > 0.6 and no mechanism motion): *
 * PL RETEN LAT 2(1) – OFF *
 * ✓MCC *

Wait 8 sec

✓UMB MN STAT – REL

A6U PL RETEN LAT 2 – OFF

CRT ✓MECH – steady B
 CCTV Visually verify UMB in released posn
 CRT DESEL – ITEM 20 EXEC (✓ITEMS 9–19 no *)
 ✓AMSB DC AMPS: < .04
 OFF – ITEM 8 EXEC (*)

R13L PL BAY MECH PWR SYS 2 – OFF
 A6U RETEN LOGIC PWR SYS 2 – OFF

Notify MCC of any anomalies in SSE CHECKOUT prior to next step

L12U 5. SSE SWAP TO A SIDE
 FSS FMDM–A PWR – ON (tb–gray)

* If FSS FMDM–A PWR tb – bp, *
 * cycle sw *
 * If still no joy, continue *

SM 211 SSE OVERVIEW

✓POWER FSS FMDM A/B AMPS: .5 to 1.1 (both)

L11U MULE FMDM–A PWR – ON (tb–gray)

- * If MULE FMDM-A PWR tb – bp, *
- * cycle sw *
- * If still no joy, continue *

CRT ✓POWER MULE FMDM A/B AMPS: .7 to 1.3 (both)

SM1 DPS UTILITY

PORT ASSIGN STRING PL 1/2 SEC – ITEM 24 EXEC (*)

- * If FSS FMDM-A PWR tb – bp and accompanied by *
- * 'I/O ERROR FLEX' msg, FSS FMDM-A failed: *
- * PORT ASSIGN STRING PL 1/2 PRI – ITEM 23 EXEC (*), *
- L12U * FSS FMDM-A PWR – OFF (tb-bp) *
- L11U * MULE FMDM-A PWR – OFF (tb-bp) *
- * ✓MCC *
- * If MULE FMDM-A PWR tb – bp and accompanied by *
- * 'I/O ERROR FLEX' msg, MULE FMDM-A failed. MULE *
- * FMDM-A PWR – OFF (tb-bp). Go to SSE CHECKOUT *
- * WITH FAILED MULE FMDM-A (CONTINGENCY OPS) *

6. MULE SURVIVAL HEATER ACT

L11U SURV HTR A PWR – ON
 HTR B PWR – OFF
 ✓HTR PWR tb – gray

- * If SURV HTR PWR tb – bp, *
- * cycle SURV HTR A PWR sw *
- * If still no joy, continue *

CRT ✓POWER MULE HTR – *

- * If POWER MULE HTR not *, *
- * go to 1.1b POWER MULE HTR *
- * NOT * (S211) (PL SYS, SSE) *

✓POWER MULE HTR AMPS: ≤ 11

- * If POWER MULE HTR AMPS: > 11, *
- L11U * SURV HTR A PWR – OFF *
- * ✓HTR PWR tb – bp *
- * ✓MCC *

7. ESM-A HEATER ACT

L11U ESM HTR A PWR – ON (tb-gray)

- * If ESM HTR A PWR tb – bp, *
- * cycle sw *
- * If still no joy, continue *

CRT ✓POWER MULE ESM 1&2/3 AMPS: ≤ 4/≤ 2

- * If POWER MULE ESM 1&2/3 AMPS: > 4/> 2, *
- * ESM HTR A PWR – OFF (tb-bp), *
- * proceed to step 8 *

L11U ESM HTR B PWR – OFF (tb-bp)

8. SOPE-A HEATER ACT
 SOPE HTR A PWR – ON (tb-gray)

- * If SOPE HTR A PWR tb – bp, *
- * cycle sw *
- * If still no joy, continue *

- CRT ✓ POWER MULE SOPE 1A/2A AMPS: ≤ 2.0/≤ 3.1
 ✓ 1B&2B AMPS: ≤ 5.1
 ✓ 3A/3B AMPS: ≤ 2.6 (both)

- * If any SOPE AMPS not as expected: *
- * SOPE HTR A PWR – OFF (tb-bp), *
- * proceed to step 9 *

L11U SOPE HTR B PWR – OFF (tb-bp)

9. VERIFY SSE STATUS

NOTE

If any parameter not in range, do not perform step 10; notify MCC

SM 211 SSE OVERVIEW

- ✓ PCU – blank/blank
- ✓ PCU OFF – *
- ✓ CCTV ENA OFF – *
- ✓ PWR OFF – *
- ✓ ESM A HTR ZONE 1&2,3 – * (both)
- ✓ B HTR ZONE 1&2,3 – blank (both)
- ✓ SOPE A HTR ZONE 1&2,3 – * (both)
- ✓ B HTR ZONE 1&2,3 – blank (both)

POWER

- ✓ FSS EPDSU 1/2 AMPS: < 3.0 (both)
- ✓ FMDM A/B AMPS: .5 to 1.1 (both)
- ✓ HTR – 1/2
- ✓ HTR A1/A2 AMPS: < 0.4 (both)
- ✓ B1/B2 AMPS: < 0.4 (both)
- ✓ CCTV HTR AMPS: < .9
- ✓ MULE FMDM A/B AMPS: .7 to 1.3 (both)
- ✓ HTR – *
- ✓ HTR AMPS: < 11.0
- ✓ ESM 1&2/3 AMPS: < 4.0/< 2.0
- ✓ SOPE 1A/2A AMPS: < 2.0/< 3.1
- ✓ 1B&2B AMPS: < 0.4
- ✓ 3A/3B AMPS: < 2.6/< 0.4

- ✓ SAC EPDSU AMPS: < 35
- ✓ FSS EPDSU VOLTS: 24.0 to 32.0 (both)
- ✓ MULE PDSU VOLTS: 24.0 to 32.0
- ✓ SAC EPDSU VOLTS: 24.0 to 32.0 (both)

DPC

- ✓ DPC 1–12 – no *
- ✓ VOLTS: < 0.5
- ✓ AMPS: < 0.5

THERMAL

- ✓ FSS EPDSU TEMP: –20 to 50 degC (both)
- ✓ FMDM TEMP: –3 to 55 degC (both)
- ✓ PCU TEMP: –20 to 50 degC (both)
- ✓ IPCU TEMP: –30 to 50 degC
- ✓ AMSB TEMP: –20 to 50 degC

- ✓MULE PDSU TEMP: -20 to 50 degC
- ✓FMDM TEMP: -3 to 55 degC (both)
- ✓SAC EPDSU TEMP: -20 to 50 degC (both)

L11U 10. FMDM-B PWRDN
MULE FMDM-B PWR - OFF (tb-bp)

* If tb - gray, note and continue *

L12U FSS FMDM-B PWR - OFF (tb-bp)

* If tb - gray, note and continue *

CRT ✓POWER FSS FMDM A/B AMPS: .5 to 1.1/< 0.15
 ✓MULE FMDM A/B AMPS: 0.7 to 1.3/< 0.15

11. VERIFY MECH STATUS

SM 212 SSE MECHANISMS

- ✓AMSB OFF - *
- ✓AC AMPS: < 0.20
- ✓TEMP: -20 to 50 degC
- ✓MECH - blank
- ✓PIVOT LO TACH: < 0.25 deg/min
- ✓ROTATOR TACH: < 0.9 deg/min

12. AMSB CHECKOUT SIDE A

Repeat step 3 for A side

CRT AMSB OFF - ITEM 8 EXEC (*)

13. FSS PCU CHECKOUT

SM 211 SSE OVERVIEW

PCU ON - ITEM 1 EXEC (*)

- ✓PCU - P/S
- ✓DPC 1-12 - *
- ✓VOLTS: 33.7 to 35.3
- ✓AMPS: ≤ 0.5

- * If DPC 1-12 AMPS > 0.5, *
- * PCU OFF - ITEM 2 EXEC (*) *
- * ✓MCC *

- PCU OFF - ITEM 2 EXEC (*)
- ✓PCU - blank/blank
- ✓DPC 1-12 - no *

Notify MCC, SSE CHECKOUT complete; report any anomalies

FSS PREP FOR BERTHING

1. FSS AMSB PWR ON
A6U ✓ PL RETEN LAT 1,2 (two) – OFF
 ✓ LOGIC PWR SYS 2(1) – OFF
 ✓ PL SEL – 1
 LOGIC PWR SYS 1(2) – ON

SM 212 SSE MECHANISMS

AMSB ON – ITEM 7 EXEC (A(B))

* If AMSB ON – blank, record and continue *

- ✓ MECH – blank
 ✓ SEL (ITEMS 9–19) – no *
 ✓ STAT (ITEMS 9–19) – blank
✓ O/R DIS (ITEM 22) – *

* If any param not as expected, ✓ MCC *

R13L PL BAY MECH PWR SYS 1(2) – ON

2. BAPS DOWNLOCK RELEASE

CAUTION

Operating the downlock in a stalled condition for greater than 30 sec may result in damage to unit. A stalled condition is indicated by AMSB AC AMPS > 2 and no mechanism motion

CCTV Configure CCTV to monitor downlock ops, P/TV11 FSS OPS (PHOTO/TV FS, SCENES)

CRT DLOCK SEL – ITEM 9 EXEC (* ENG)

- * If DLOCK STAT – *, then EOT sw failed: *
* O/R ENA – ITEM 21 EXEC (*) and continue *
* operation of downlock until observed clear *
* of BAPS pin or 20 sec max *
* Expect '212 AMSB DC AMPS' msg *
* If DLOCK STAT – RDY, continue *

- ✓ AMSB DC AMPS: .02 to .08
✓ MECH – steady A(B)

A6U ✓ PL RETEN LAT 1 tb – LAT (A side only)
 1(2) – REL (tb–bp)

CRT ✓ MECH – flashing A(B)
 ✓ AMSB AC AMPS: 2.0 to 3.75
 ✓ DLOCK STAT – RDY

- * If DLOCK STAT – ENG, then BOT sw failed, continue *
* Expect '*' *

- * If stall condition observed (AMSB AC AMPS > *
- * 2.0 and no mechanism motion): *
- * PL RETEN LAT 1(2) – OFF *
- * ✓MCC *

Wait 24 sec

✓DLOCK STAT – DIS

- A6U
- * If DLOCK STAT – RDY after 30 total sec: *
 - * PL RETEN LAT 1(2) – OFF *
 - * Perform 1.3a PRIMARY MOTOR FAILS TO *
 - * DRIVE MECHANISM (PL SYS, SSE) *

- A6U
- ✓PL RETEN LAT 1 tb – REL (A side only)
 - 1(2) – OFF

- CRT
- ✓MECH – steady A(B)

- CCTV
- Visually verify DLOCK clear of BAPS pin

3. PIVOT BAPS UP FOR BERTHING

CAUTION

Operating the pivoter in a stalled condition for greater than 30 sec may result in damage to unit. A stalled condition is indicated by AMSB AC AMPS > 0.3 and no mechanism motion

- CCTV
- Configure CCTV to monitor pivot ops, P/TV11 FSS OPS (PHOTO/TV FS, SCENES)

- CRT
- PIVOT LO SEL – ITEM 11 EXEC (* DN)

- * If PIVOT LO STAT – *, EOT sw failed: *
- * DESEL – ITEM 20 EXEC (ITEM 11 – no *) *
- * Perform SSE SSR–1 FMDM SWAP A→B(B→A) *
- * (PL SYS, SSE) and repeat step 3 for alt side *
- * If PIVOT LO STAT – RDY, continue *

- ✓AMSB DC AMPS: .02 to .08
- ✓MECH – steady A(B)

- A6U
- ✓PL RETEN LAT 1 tb – REL (A side only)
 - 1(2) – LAT (tb–bp)

Start Timer

- CRT
- ✓MECH – flashing A(B)
 - ✓AMSB AC AMPS: 0.3 to 0.5
 - ✓PIVOT LO STAT – RDY

- * If PIVOT LO STAT – DN, BOT sw failed, continue *
- * Expect ‘*’ in 23.8 min *

- CCTV
- Visually verify BAPS motion, monitor performance

- CRT
- ✓PIVOT LO TACH: > 2.5 deg/min

- A6U * If FDA 'S212 PVT STALL' received, *
 * PL RETEN LAT 1(2) – OFF, perform *
 * 1.3e 'S212 PVT(ROT) STALL' (PL SYS, SSE) *

 * If PIVOT LO TACH: < 0.25 deg/min and AMSB *
 * AC AMPS: < 0.2, PL RETEN LAT 1(2) – OFF, *
 * perform 1.3a 'PRIMARY MOTOR FAILS TO *
 * DRIVE MECHANISM' (PL SYS, SSE) *
- CRT ✓PIVOT LO STAT – UP
- A6U ✓PL RETEN LAT 1 tb – LAT (A side only)
 1(2) – OFF

 Stop Timer
 Record pivot time _____:_____
- CRT ✓MECH – steady A(B)
- CCTV Visually verify BAPS properly positioned

 Notify MCC of pivot duration
- CRT 4. AMSB PWRDN
 DESEL – ITEM 20 EXEC (ITEMS 9–19; no *)

 * If any MECH SEL – *, do not turn AMSB – OFF; *
 * notify MCC, continue *
- ✓AMSB DC AMPS: < .04
 OFF – ITEM 8 EXEC (*)
- R13L PL BAY MECH PWR SYS 1(2) – OFF
- A6U PL RETEN LOGIC PWR SYS 1(2) – OFF

 Notify MCC, FSS PREP FOR BERTHING complete; report any deviation

RETRIEVAL OPS

HPGSCA INSTALL AND CONFIG	2-2
PI CONFIG	2-3
LATCH AND MATE HST	2-5
ACTIVATE HST EXTERNAL PWR	2-11

RETRIEVAL
OPS

HPGSCA INSTALL AND CONFIG

- RETRIEVAL OPS
1. HPGSCA INSTALLATION
- L11A2 Remove HPGSCA from middeck storage
MO30F J2 Prerouted
- A1L ✓S-BD PL PWR SEL – PSP
- HPGSCA ✓Expansion Chassis pwr (rear) – off
Connect PWR cable to HPGSCA Expansion Chassis
- PDIP Remove, stow: HST PI NO 1(2) Turn-around Plug
Connect: Y-Cable to PDIP HST PI NO 1(2)
- HPGSCA Connect: Y-Cable 'PGSC INPUT' (DB9) and PGSC OUTPUT' (DB25) to
Expansion Chassis
2. HPGSCA PWR ON
- MO30F DC UTIL PWR MNC – ON
- HPGSCA Expansion Chassis pwr (rear) – on
Laptop pwr (side) – on
- * If pwr to HPGSCA fails: *
 - * Check pwr cable connection *
 - * Press pwr sw again (both) *
- Allow 'Windows'/'Hubble1' to start
- Press <F3> Hot Key
3. VERIFY SETUP AND STATUS INDICATORS
- Setup
- ✓Input Source = A
 - ✓Bit Rate = 32k
 - ✓Input PCM code = BIO-L+
 - ✓Output PCM code = BIO-L
 - ✓Loop B/W = 0.10%
- Signal Status
- ✓Sync Status Red
 - ✓Signal Present Red
 - ✓Overload Green
 - ✓Offset Green
- * If status indicators do not agree, call MCC *
- Velcro HPGSCA to desired middeck location, install HPGSCA RESTART
Cue Card
4. HPGSCA PWR OFF
- HPGSCA Laptop pwr (side) – off
Expansion Chassis pwr (rear) – off
- Notify MCC, HPGSCA INSTALL AND CONFIG complete

PI CONFIG

PDIP ✓HPGSCA connected into HST PI NO 1(2) stream

1. ✓PDI CONFIG

SM 62 PCMMU/PL COMM

✓TFL: 179(203)

✓PDI config 757(765)

<u>DECOM</u>	<u>INPUT</u>	<u>FMT</u>	<u>FDA</u> <u>ENA</u>	<u>SOURCE</u>
1	1(2)	09	no (*)	32 kbps T Normal
2	1(2)	16	no (*)	4 kbps D Normal
3	0	19	no (*)	32 kbps T Normal Backup
4	0	08	no (*)	32 kbps Inverted
5-FPM		501(509)		

L12L 2. CONFIG PL COMM

cb SW PWR – cl

PSP BYP – ENA

A1L

✓S-BD PL CNTL

✓ANT POLAR

✓XMTR PWR

✓CH SEL INTRG 1,2 tw (six)

✓MOD

PWR SEL

✓PSP CMD OUTPUT

✓PWR SYS

– CMD

– L CIRC

– LO

– 701,701

– OFF

– BOTH

– PL UMB

– 1(2)

HPGSCA 3. HPGSCA PWR ON

Expansion Chassis pwr (rear) – on

Laptop pwr (side) – on

* If pwr to HPGSCA fails: *

* Check pwr cable connection *

* Press pwr sw again (both) *

Allow 'Windows'/'Hubble1' to start

Press <F3> Hot Key

4. VERIFY HPGSCA STATE

Setup

- ✓ Input Source = A
- ✓ Bit Rate = 32k
- ✓ Input PCM code = BIO-L+
- ✓ Output PCM code = BIO-L
- ✓ Loop B/W = 0.10%

Signal Status

- ✓ Sync Status Red
- ✓ Signal Present Red
- ✓ Overload Green
- ✓ Offset Green

- * If status indicators do not agree, *
- * call MCC *

Notify MCC, PI CONFIG complete
HPGSCA ready to receive telemetry stream

LATCH AND MATE HST

WARNING

Operation of two FSS mechanisms may result in HST collision with orbiter

For any SM ALERT during FSS ops:

A6U PL RETEN LAT 1,2 (both) – OFF

R13 PL BAY MECH PWR SYS 1,2 (both) – OFF

✓MCC

CAUTION

Operating a berthing latch in a stalled condition for greater than 30 sec may result in damage to unit. A stalled condition is indicated by AMSB AC AMPS > 2.0 and no mechanism motion

1. AMSB PWR ON
- A6U ✓PL RETEN LAT 1,2 (two) – OFF
✓LOGIC PWR SYS 1(2) – OFF
✓PL SEL – 1
LOGIC PWR SYS 1(2) – ON

SM 212 SSE MECHANISMS

AMSB ON – ITEM 7 EXEC (A(B))

* If AMSB ON – blank, continue *

- ✓MECH – blank
✓SEL (ITEMS 9–19) – no *
✓STAT (ITEMS 9–19) – blank
✓O/R DIS (ITEM 22) – *

* If any param not as expected, AMSB OFF – ITEM 8 *
* EXEC (*), and perform SSE SSR–1 FMDM SWAP *
* A→B(B→A) (PL SYS, SSE), then proceed to step 2 *
* on alt side *

- R13L PL BAY MECH PWR SYS 1(2) – ON
Return to HST BERTH, step 4 (PDRS OPS FS, NOMINAL HST RETRIEVAL)
or SJ HST BERTH, step 4 (PDRS OPS FS, OFF-NOMINAL HST RETRIEVAL)

2. BERTH LAT 2 PARTIAL CLOSURE
- CCTV Verify with RMS operator that HST is in latch posn
Perform P/TV12 HST RETRIEVE/BERTH, OPS, FSS/HST Latching
(PHOTO/TV FS, SCENES)
- CAMR B(C) ✓Berth latch 2 align and monitor operations
Start VTR
- ✓DAP: FREE

- CRT B LAT 2 SEL – ITEM 15 EXEC (* OP)

* If B LAT 2 STAT – * and visually observed open, *
* then EOT sw failed: *
* DESEL – ITEM 20 EXEC (ITEMS 9–19 – no *) *
* Perform SSE SSR–1 FMDM SWAP A→B(B→A) *
* (PL SYS, SSE) and complete steps 2–9 on alt side *
* If B LAT 2 STAT – RDY, continue *

- ✓AMSB DC AMPS: .02 to .08
- ✓MECH – steady A(B)
- A6U ✓PL RETEN LAT 1 tb – REL (A side only)
1(2) – LAT (tb–bp), drive to cage ~8 sec
- CRT ✓MECH – flashing A(B)
✓AMSB AC AMPS: 2.0 to 3.75
- * If stall condition observed (AMSB AC AMPS *
* > 2.0 and no mechanism motion): *
- A6U * PL RETEN LAT 1(2) – OFF *
- * ✓MCC *
- A6U PL RETEN LAT 1(2) – OFF
- CRT ✓B LAT 2 STAT – RDY
✓MECH – blank
- CCTV ✓Latch 2 cages berthing pin
- * If latch not caging berthing pin, perform *
* 1.3a PRIMARY MOTOR FAILS TO *
* DRIVE MECHANISM (PL SYS, SSE) *

3. BERTH LAT 1 PARTIAL CLOSURE

- CCTV ✓Berth LAT 1 align and monitor operations
CAMR C(D)
- CRT B LAT 1 SEL – ITEM 14 EXEC (* OP)
- * If B LAT 1 STAT – * and visually observed open, *
- * then EOT sw failed: *
- * DESEL – ITEM 20 EXEC (ITEMS 9–19 – no *) *
- * Perform SSE SSR–1 FMDM SWAP A→B(B→A) *
- * (PL SYS, SSE) and complete steps 3–9 on alt side *
- * If B LAT 1 STAT – RDY, continue *

- ✓AMSB DC AMPS: .02 to .08
- ✓MECH – steady A(B)
- A6U ✓PL RETEN LAT 1 tb – REL (A side only)
1(2) – LAT (tb–bp), drive to cage ~8 sec
- CRT ✓MECH – flashing A(B)
✓AMSB AC AMPS: 2.0 to 3.75
- * If stall condition observed (AMSB AC AMPS *
* > 2.0 and no mechanism motion): *
- A6U * PL RETEN LAT 1(2) – OFF *
- * ✓MCC *
- A6U PL RETEN LAT 1(2) – OFF
- CRT ✓B LAT 1 STAT – RDY
✓MECH – blank
- CCTV ✓Latch 1 cages berthing pin

- * If latch not caging berthing pin, perform *
- * 1.3a PRIMARY MOTOR FAILS TO *
- * DRIVE MECHANISM (PL SYS, SSE) *

Return to HST BERTH, step 6 (PDRS OPS FS, NOMINAL HST RETRIEVAL)
 or SJ HST BERTH, step 6 (PDRS OPS FS, OFF-NOMINAL HST RETRIEVAL)

4. BERTH LAT 3 COMPLETE CLOSURE

Verify with RMS operator that RMS in TEST MODE

CCTV
CAMR B

✓Latch 3 align and monitor operations

CRT

B LAT 3 SEL – ITEM 16 EXEC (* OP)

- * If B LAT 3 STAT – * and visually observed open, *
- * then EOT sw failed: *
- * DESEL – ITEM 20 EXEC (ITEMS 9–19 – no *) *
- * Perform SSE SSR–1 FMDM SWAP A→B(B→A) *
- * (PL SYS, SSE) and complete steps 4–9 on alt side *
- * If B LAT 3 STAT – RDY, continue *

✓AMSB DC AMPS: .02 to .08

✓MECH – steady A(B)

A6U

✓PL RETEN LAT 1 tb – REL (A side only)
1(2) – LAT (tb–bp)

CRT

✓MECH – flashing A(B)
✓AMSB AC AMPS: 2.0 to 3.75
✓B LAT 3 STAT – RDY

- * If stall condition observed (AMSB AC AMPS *
- * > 2.0 and no mechanism motion): *
- * PL RETEN LAT 1(2) – OFF *
- * ✓MCC *

A6U

- * If B LAT 3 STAT – OP and motion observed, *
- * BOT sw failed. Continue and expect ‘*’ *

CRT

Wait 18 sec,
✓B LAT 3 STAT – CL

A6U

- * If B LAT 3 STAT – OP or RDY after 30 total sec: *
- * PL RETEN LAT 1(2) – OFF *
- * Perform 1.3a PRIMARY MOTOR FAILS TO *
- * DRIVE MECHANISM (PL SYS, SSE) *

A6U

✓PL RETEN LAT 1 tb – LAT (A side only)
1(2) – OFF

CRT

✓MECH – steady A(B)

CCTV

✓Latch 3 completely closed

5. BERTH LAT 2 COMPLETE CLOSURE

CCTV
CAMR B(C)

Monitor Latch 2 closure operations

CRT

B LAT 2 SEL – ITEM 15 EXEC (* RDY)
✓AMSB DC AMPS: .02 to .08

A6U ✓MECH – blank
 PL RETEN LAT 1(2) – LAT

CRT ✓MECH – flashing A(B)
 ✓AMSB AC AMPS: 2.0 to 3.75
 ✓B LAT 2 STAT – RDY

* If stall condition observed (AMSB AC AMPS *
 * > 2.0 and no mechanism motion): *
 * PL RETEN LAT 1(2) – OFF *
 * ✓MCC *

* If B LAT 2 STAT – OP, BOT sw failed. *
 * Continue and expect ‘*’ *

Wait 10 sec,
 ✓B LAT 2 STAT – CL

A6U * If B LAT 2 STAT – RDY after 30 total sec: *
 * PL RETEN LAT 1(2) – OFF *
 * Perform 1.3a PRIMARY MOTOR FAILS TO *
 * DRIVE MECHANISM (PL SYS, SSE) *

A6U ✓PL RETEN LAT 1 tb – LAT (A side only)
 1(2) – OFF

CRT ✓MECH – steady A(B)

CCTV ✓Latch 2 completely closed

6. BERTH LAT 1 COMPLETE CLOSURE

CCTV Monitor Latch 1 closure operations
 CAMR B(C),D

CRT B LAT 1 SEL – ITEM 14 EXEC (* RDY)

✓AMSB DC AMPS: .02 to .08
 ✓MECH – blank

A6U PL RETEN LAT 1(2) – LAT

CRT ✓MECH – flashing A(B)
 ✓AMSB AC AMPS: 2.0 to 3.75
 ✓B LAT 1 STAT – RDY

* If stall condition observed (AMSB AC AMPS *
 * > 2.0 and no mechanism motion): *
 * PL RETEN LAT 1(2) – OFF *
 * ✓MCC *

* If B LAT 1 STAT – OP, BOT sw failed. *
 * Continue and expect ‘*’ *

Wait 10 sec,
 ✓B LAT 1 STAT – CL

A6U * If B LAT 1 STAT – RDY after 30 total sec: *
* PL RETEN LAT 1(2) – OFF *
* Perform 1.3a PRIMARY MOTOR FAILS TO *
* DRIVE MECHANISM (PL SYS, SSE) *

A6U ✓ PL RETEN LAT 1 tb – LAT (A side only)
1(2) – OFF

CRT ✓ MECH – steady A(B)

CCTV ✓ Latch 1 completely closed

CAMR B(C),D

CCTV Perform P/TV12 HST RETRIEVE/BERTH, DEACT (PHOTO/TV FS, SCENES)

Notify MCC, B LAT ops complete. Ready for ungrapple.

RMS return to HST BERTH (PDRS OPS FS, NOMINAL HST RETRIEVAL) or
SJ HST BERTH (PDRS OPS FS, OFF-NOMINAL HST RETRIEVAL)

7. UMBILICAL DEADFACE VERIFICATION

SM 211 SSE OVERVIEW

CRT ✓ PCU – blank/blank
✓ DPC 1–12 – no *

L12U ✓ FHST SHUTTER – OP (tb–bp)
✓ RSU SURV HTR PWR – OFF (tb–bp)
✓ ESS/MN SW ENA – OFF (tb–bp)
✓ SSM WK LTS – OFF

8. MAIN UMBILICAL MATE

CCTV Monitor UMB operations
CAMR A,B

CCTV Perform P/TV12 HST RETRIEVE/BERTH, OPS, FSS/HST Umbilical Mate
(PHOTO/TV FS, SCENES)

SM 212 SSE MECHANISMS

UMB MN SEL – ITEM 17 EXEC (* REL)

* If UMB MN STAT – *: *
* DESEL – ITEM 20 EXEC (ITEMS 9–19 – no *) *
* Perform SSE SSR–1 FMDM SWAP A→B(B→A) *
* (PL SYS, SSE) and complete steps 8,9 on alt side *
* If UMB MN – RDY, continue *

✓ AMSB DC AMPS: .02 to .08
✓ MECH – steady A(B)

A6U ✓ PL RETEN LAT 1 tb – REL (A side only)
1(2) – LAT (tb–bp)

CRT ✓ MECH – flashing A(B)
✓ AMSB AC AMPS: 0.6 – 1.0
✓ UMB MN STAT – RDY

A6U * If stall condition observed (AMSB AC AMPS *
 * > 0.6 and no mechanism motion): *
 * PL RETEN LAT 1(2) – OFF *
 * ✓MCC *

CRT Wait 8 sec,
 ✓UMB MN STAT – MAT

A6U * If UMB MAT STAT – RDY or REL after 20 total sec: *
 * PL RETEN LAT 1(2) – OFF *
 * Perform 1.3a PRIMARY MOTOR FAILS TO *
 * DRIVE MECHANISM (PL SYS, SSE) *

A6U ✓PL RETEN LAT 1 tb – LAT (A side only)
 1(2) – OFF

CRT ✓MECH – steady A(B)

CCTV Visually verify UMB mated

L12U ✓MN BUS PWR ON tb – gray
 ✓ESS BUS INT PWR tb – UP

SM 210 HST SYS

✓UMB SG V INT MN BUS > 26
 ✓ESS BUS > 26

* If either tb – bp or any UMB SG V ≤ 26, *
 * ✓MCC *

9. AMSB PWRDN

SM 212 SSE MECHANISMS

DESEL – ITEM 20 EXEC (✓ITEMS 9–19, no *)

* If any MECH SEL – *, do not turn *
 * AMSB OFF; notify MCC, continue *

✓AMSB DC AMPS: < .04
 OFF – ITEM 8 EXEC (*)

A6U PL RETEN LOGIC PWR SYS 1(2) – OFF

R13L PL BAY MECH PWR SYS 1(2) – OFF

Notify MCC, LATCH AND MATE HST complete; report any anomalies

ACTIVATE HST EXTERNAL PWR

1. SETUP
- L12U ✓cb SPACE TEL SW PWR – cl
 FHST SHUTTER – CL (remains bp)
- SM 210 HST SYS
- L12U ✓TLM COUNT – incr
 ✓EPS INT ESS BUS A,B,C – * * *
- SM 211 SSE OVERVIEW
PCU ON – ITEM 1 EXEC (*)
- L12U * If 'PDI DECOM FAIL' msg accompanied *
 * by MN BUS PWR ON tb – bp, notify *
 * MCC and hold *
- CRT ✓PCU – P/S
 ✓DPC 1–12 – *
 ✓VOLTS: 33.7 to 35.3
 ✓AMPS: ≤ 0.5
- * If DPC 1–12 AMPS: > 0.5, turn off affected DPC, *
* DPC OFF – ITEM 24 +X X EXEC (*) (DPC ON/OFF *
* INDEX NUMBERS (REF DATA)), *
* ✓MCC *
* If any other param(s) not in range, record MET and *
* off nominal DPC values, notify MCC *
- L12U ✓FHST SHUTTER tb – gray
2. EXTERNAL PWR ACTIVATION
On MCC GO:
 ESS/MN SW ENA – ON (tb–gray)
 MAIN BUS EXT PWR – ON (mom) (tb–gray)
 ✓IPCU REL CL tb – gray
- * If either tb – bp, notify MCC, continue *
* If both tb – bp, cycle sw (up only) *
* If no joy, ✓MCC *
- CRT ✓DPC 1–12 VOLTS: 33.8 to 35.2
 ✓AMPS: 2–7
- L12U ESS BUS EXT PWR – ON (mom) (tb–UP)
- SM 210 HST SYS
- L12U ✓UMB SG V EXT MN BUS > 30
 ✓ESS BUS > 30
3. INT ESS PWR OFF
On MCC GO:
L12U ESS BUS INT PWR – OFF (mom) (tb–bp)
 ESS/MN SW ENA – OFF (tb–bp)
- Notify MCC when complete

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IN-BAY OPERATIONS

SINGLE (DUAL) SA SLEW 3-2
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IN-BAY
OPS

SINGLE (DUAL) SA SLEW

1. SETUP

CCTV Set up CCTVs to monitor SA slew
 CAMR A,D Perform P/TV14 SA MONITORING, SETUP (PHOTO/TV FS, SCENES)

Perform following only if VRCS available:

✓In ATT
 DAP: B11/AUTO/VERN

SM 210 HST SYS

✓SLEW – blank

Inform MCC ready for SINGLE (DUAL) SA SLEW

2. STOCC INITIATE SLEW

* For any observed uncontrolled SA motion, or *
 * if unable to go free drift on time: *
 * SM 210 HST SYS *
 * SADE OFF – ITEM 11 +9 9 EXEC (OFF) *
 * Notify MCC *

On MCC call:
 DAP: FREE

STOCC CMD ± WING SLEW

NOTE

Expect 'S210 SADE WING' msg in ~30 sec

Visually verify SAs slewing

CRT ✓SLEW – +OP –OP one or both flash

SA MNVR SIZE (deg)	SLEW TIME (Motor Op, mm:ss)
15	08:32
20	09:10
30	10:16
45	11:37
60	12:45
90	14:38
100	15:11
105	15:28
180	19:08

On MCC call:
 DAP: B11/AUTO/VERN(ALT)

CRT * If no comm 2 min after SLEW +OP –OP not flashing: *
 * DAP: B11/AUTO/VERN(ALT) *

ROTATE HST

WARNING

Operation of two FSS mechanisms may result in HST collision with orbiter

For any SM ALERT during FSS ops:
 A6U PL RETEN LAT 1,2 (both) – OFF
 R13 PL BAY MECH PWR SYS 1,2 (both) – OFF
 ✓MCC

CAUTION

Operating the rotator in a stalled condition for greater than 30 sec may result in damage to unit. A stalled condition is indicated by AMSB AC AMPS > 0.3 and no mechanism motion

1. FSS AMSB PWR ON
- A6U ✓PL RETEN LAT 1,2 (two) – OFF
 ✓LOGIC PWR SYS 2(1) – OFF
 ✓PL SEL – 1
 LOGIC PWR SYS 1(2) – ON

SM 212 SSE MECHANISMS

AMSB ON – ITEM 7 EXEC (A(B))

- ✓MECH – blank
 ✓SEL (ITEMS 9–19) – no *
 ✓STAT (ITEMS 9–19) – blank
 ✓O/R DIS (ITEM 22) – *

- * If any param not as expected, ✓MCC *
- * If rotation reqd to continue EVA, AMSB *
- * OFF – ITEM 8 EXEC (*), perform *
- * SSE SSR–1 FMDM SWAP A→B(B→A) *
- * (PL SYS, SSE) and proceed to step 2 *

R13L PL BAY MECH PWR SYS 1(2) – ON

2. HST ROTATION
 Check HST in safe posn:

SM 210 HST SYS

SA–2 PHYSICAL POSITION (DEGREES)		PIVOTER POSN (DEG)	ROTATOR CONSTRAINTS
+V2	–V2		
–6 to +6	–6 to +6	75	No Rotator Constraints*
–3.5 to +3.5	–3.5 to +3.5	85	± 20° from ±V3 FWD
–6 to +6	–6 to +6	90	± 25° from ±V3 FWD ± 20° from ±V2 FWD
86.5 to 93.5	86.5 to 93.5	90	± 35° from ±V3 FWD
–15 to +15	–15 to +15	90	+V2 (270°) FWD to 155° FWD

*NOTE: BAPS Ring ZOE prevents rotation in the area from 295° to 305°

SA-3 PHYSICAL POSITION (DEGREES)		PIVOTER POSN (DEG)	ROTATOR CONSTRAINTS
+V2	-V2		
-6 to +6	-6 to +6	75	No Rotator Constraints*
-3.5 to +3.5	-3.5 to +3.5	85	No Rotator Constraints*
-6 to +6	-6 to +6	90	No Rotator Constraints*
86.5 to 93.5	86.5 to 93.5	90	$\pm 78^\circ$ from $\pm V3$ FWD
Not Installed	-90 to +90	90	-V2 (90°) FWD to -V3 (180°) FWD
Not Installed	-72 to +72	90	-V3 (180°) FWD to +V2 (270°) FWD
-90 to +90	-72 to +72	90	+V2 (270°) FWD to -V3 (180°) FWD
-72 to +72	-90 to +90	90	-V3 (180°) FWD to -V2 (90°) FWD
-90 to +90	-72 to +72	90	-V2 (90°) FWD to +V3 (360°) FWD
-90 to +90	-72 to +72	90	+V3 (360°) FWD to +V2 (270°) FWD

*NOTE: BAPS Ring ZOE prevents rotation in the area from 295° to 305°

If in a configuration not identified, \checkmark MCC

NOTE

Solar Array monitoring not reqd after both SA3s have been installed or after both SA2s have been fully retracted

CCTV Perform P/TV11 FSS OPS, OPS (PHOTO/TV FS, SCENES)
 CAMR B(D), Monitor HST posn during rotation
 ELBOW

NOTE

Attitude control allowed, if reqd, 4 min after rotation start (VRCS only) but must be in DAP: FREE prior to rotator stop. Start of rotation must occur no sooner than 4 min after stop of any preceding HST PIVOT or HST ROTATE ops. Wait period and free drift not reqd after both SA3s have been installed or after both SA2s have been fully retracted

DAP: FREE (if reqd)

SM 212 SSE MECHANISMS

ROTATOR SEL – ITEM 12 EXEC (* RDY)

- * If ROTATOR STAT – CCW or CW and visually *
- * verified not at EOT, then EOT sw failed: *
- * O/R ENA – ITEM 21 EXEC (*), continue *

\checkmark AMSB DC AMPS: .02 to .08

Mnvr to reqd posn:

<u>TASK</u>	<u>POSN</u>
Berth	B(-V3)
-V2 SA3/Diode Box	-V2
+V2 SA3/Diode Box	+V2
PCU	-V3
ACS	-V2
NCS (CASH)	-V2
NCS (ESM)	-V2
NCS/radiator	+V2/-V3
NOBL bays 5 & 6	+V3
NOBL bays 7 & 8	+V3

FSS ROTATOR POSN CORRELATION

POSN TO → FROM ↓	B (-V3) HST 180°	-V2 HST 90°	+V2 HST 270°	(+V3) HST 0°
B (-V3) HST180°		06:05 LAT	06:05 REL	12:11 LAT
-V2 HST 90°	06:05 REL		12:11 REL	06:05 LAT
+V2 HST 270°	06:05 LAT	12:11 LAT		18:16 LAT
(+V3) HST 0°	12:11 REL	06:05 REL	18:16 REL	

Times based on 14.8 deg/min actual run time during previous missions
NOTE: Table contains duration of motion in mm:ss, REL LAT switch posn

A6U PL RETEN LAT 1(2) – REL or LAT (tb–bp) as reqd

CRT ✓MECH – flashing A(B)
 ✓ROTATOR STAT – RDY

CCTV ✓Rotator posn visually
 CAMR B(D)

CRT ✓ROTATOR TACH: > 10 deg/min
 ✓AMSB AC AMPS: 0.3 to 0.5

A6U * If FDA 'S212 ROT STALL' received, *

* PL RETEN LAT 1(2) – OFF, perform *

* 1.3e 'S212 PVT(ROT) STALL' (PL SYS, SSE) *

* *

* If ROTATE TACH: < 0.9 deg/min and AMSB AC *

* AMPS: < 0.2, PL RETEN LAT 1(2) – OFF, *

* perform 1.3a PRIMARY MOTOR FAILS TO *

* DRIVE MECHANISM (PL SYS, SSE) *

✓DAP: FREE (if reqd)

A6U
CRT

Once at target position,
PL RETEN LAT 1(2) – OFF

✓MECH – blank
After 4 min (if reqd),
DAP: B11/AUTO/VERN(ALT)

3. AMSB PWRDN
DESEL – ITEM 20 EXEC (MECH SEL, ITEMS 9–19 no *)

* If any MECH SEL – *, do not turn AMSB – OFF; *
* notify MCC. Continue *

✓AMSB DC AMPS: < .04
OFF – ITEM 8 EXEC (*)

A6U PL RETEN LOGIC PWR SYS 1(2) – OFF

R13L PL BAY MECH PWR SYS 1(2) – OFF

Report to MCC when complete; report any anomalies

PIVOT HST

<u>WARNING</u> Operation of two FSS mechanisms may result in HST collision with orbiter For any SM ALERT during FSS ops: A6U PL RETEN LAT 1,2 (both) – OFF R13 PL BAY MECH PWR SYS 1,2 (both) – OFF ✓MCC Do not pivot up with BSP latch engaged

1. FSS AMSB PWR ON
A6U ✓PL RETEN LAT 1,2 (two) – OFF
 ✓LOGIC PWR SYS 2(1) – OFF
 ✓PL SEL – 1
 LOGIC PWR SYS 1(2) – ON

SM 212 SSE MECHANISMS

- AMSB ON – ITEM 7 EXEC (A(B))
✓MECH – blank
 ✓SEL (ITEMS 9–19) – no *
 ✓STAT (ITEMS 9–19) – blank
✓O/R DIS (ITEM 22) – *
- * If any param not as expected, ✓MCC *
* If pivot reqd to continue EVA, AMSB OFF – ITEM 8 *
* EXEC (*), perform SSE SSR–1 FMDM SWAP *
* A→B(B→A) (PL SYS, SSE) and proceed to step 2 *

R13L PL BAY MECH PWR SYS 1(2) – ON

2. BSP LATCH RELEASE
If pivoting up from 43.8°, continue; else, go to step 3
CRT BSP SEL – ITEM 19 EXEC (*)
 ✓STAT – SET
✓AMSB DC AMPS: .02 to .08
✓MECH – steady A(B)

- A6U PL RETEN LAT 1(2) – REL, wait 4 sec, OFF
CRT ✓BSP STAT – REL
 ✓BSP – DIS *
- * If BSP STAT not REL and BSP DIS *, continue *
* If BSP STAT REL and BSP DIS A, DIS B, continue *
* Else, perform 1.3b BSP FAILS TO DISENGAGE *
* (PL SYS, SSE) *

3. BSP LATCH SET VERIFICATION
If pivoting down to 43.8°, continue; else, go to step 4
- BSP SEL – ITEM 19 EXEC (*)
✓AMSB DC AMPS: .02 to .08
✓BSP STAT – SET

* If BSP STAT not SET, ✓MCC *

✓BSP – blank/blank/blank

* If BSP not blank, record and assume switch failed *
 * Ignore affected status and continue *

4. HST PIVOT

CAUTION

Operating the pivoter in a stalled condition for greater than 30 sec may result in damage to unit. A stalled condition is indicated by AMSB AC AMPS > 0.3 and no mechanism motion

CCTV Monitor HST posn during pivot, verify envelope clear of obstructions

NOTE

Solar Array monitoring not reqd after both SA3s have been installed or after both SA2s have been fully retracted

CCTV Perform P/TV11 FSS OPS, OPS (PHOTO/TV FS, SCENES)
 CAMR B(D),
 ELBOW

Verify BSP pip pins removed

NOTE

Attitude control allowed, if reqd, 4 min after pivot start (VRCS only). Must be in DAP: FREE prior to pivot stop. 4 min reqd between start/stop of any HST PIVOT or HST ROTATE ops. Wait period and free drift not reqd after both SA3s have been installed or after both SA2s have been fully retracted

DAP: FREE (if reqd)

CRT PIVOT LO SEL – ITEM 11 EXEC (* RDY)
 ✓AMSB DC AMPS: .02 to .08

Maneuver to reqd posn

FSS PIVOTER POSN CHANGES TIME CORRELATION

POSN TO → FROM ↓	0°	43.8°	75°	85°	90°
0°		11:35 LAT	19:50 LAT	22:29 LAT	23:48 LAT
43.8°	11:35 REL		8:15 LAT	10:54 LAT	12:13 LAT
75°	19:50 REL	8:15 REL		2:39 LAT	3:58 LAT
85°	22:29 REL	10:54 REL	2:39 REL		1:19 LAT
90°	23:48 REL	12:13 REL	3:58 REL	1:19 REL	

Times based on 3.8 deg/min actual run time during previous missions
NOTE: Duration displayed in mm:ss

Start Timer

NOTE

With BSP installed, pivoter will stall when reaching 43.8° or 90° posn and FDA will annunciate 15 sec later. 15 sec stall is reqd to preload BSP

A6U PL RETEN LAT 1(2) – REL for pivot dn or LAT for pivot up as reqd

CRT ✓MECH – flashing A(B)

CCTV Visually verify BAPS motion
CAMR B(D),
ELBOW

CRT ✓PIVOT LO TACH: > 2.5 deg/min
✓AMSB AC AMPS: 0.3 to 0.5

A6U * If unexpected 'S212 PVT STALL' msg received *
* PL RETEN LAT 1(2) – OFF, perform *
* 1.3e 'S212 PVT(ROT) STALL' (PL SYS, SSE) *

* If PIVOT LO TACH: < 0.25 deg/min and AMSB *
* AC AMPS: < 0.2, PL RETEN 1(2) – OFF, *
* perform 1.3a PRIMARY MOTOR FAIL TO *
* DRIVE MECHANISM (PL SYS, SSE) *

✓DAP: FREE (if reqd)

A6U If pivoting to 43.8°:
Expect 'S212 PVT STALL' msg
PL RETEN LAT 1(2) – OFF
Stop Timer
CRT ✓BSP – ENG *, RET *

* If BSP – ENG *, continue; *
* else, perform 1.3d BSP FAILS TO ENGAGE *
* (PL SYS, SSE) *

A6U If pivoting to 90°:
Expect 'S212 PVT STALL' msg
PL RETEN LAT 1(2) – OFF
Stop Timer

CCTV If pivoting to any intermediate posn:
At expected pivot completion time:
Visually confirm pivoter posn
CAMR B(D),
ELBOW

A6U PL RETEN LAT 1(2) – OFF
Stop Timer

CRT ✓MECH – blank
After 4 min, DAP: B11/AUTO/VERN(ALT) (if reqd)

5. BSP LATCH RESET
If pivoted up from 43.8°, continue; else, go to step 6
BSP SEL – ITEM 19 EXEC (*)
✓AMSB DC AMPS: .02 to .08
✓MECH – steady A(B)
A6U PL RETEN LAT 1(2) – LAT, wait 4 sec, OFF
CRT ✓BSP STAT – SET

* If BSP STAT – * or L/A, ✓MCC *

6. AMSB PWRDN
DESEL – ITEM 20 EXEC (ITEMS 9–19 no *)

* If any MECH SEL – *, do not turn *
* AMSB OFF; notify MCC. Continue *

- ✓AMSB DC AMPS: < .04
OFF – ITEM 8 EXEC (*)

A6U PL RETEN LOGIC PWR SYS 1(2) – OFF

R13L PL BAY MECH PWR SYS 1(2) – OFF

Notify MCC, PIVOT HST complete; report any anomalies

HGA DEPLOYMENT

- CCTV 1. SETUP
Set up CCTVs to monitor HGA deployment (P/TV17 HST RELEASE, OPS, HGA Deploy (PHOTO/TV FS, SCENES))

NOTE

Expect MCC call immediately prior to commanded mechanism operations

SM 210 HST SYS

- ✓TLM COUNT – incr
- ✓HGA +V3,-V3 HNG – STWD (both)
 - ✓LAT – REL (both)

Inform MCC ready for HGA deployment

2. HGA DEPLOYMENT

NOTE

HGA deployment nominally performed simo. HGA mast deploy takes ~8 min

- STOCC Command ±HGA HNG – DPLY

SM 210 HST SYS

- ✓HGA +V3,-V3 HNG – TRAN (both)

Visually verify both HGA masts deploying

Note posn of HGA dish upon clearing latches

- ✓HGA +V3,-V3 HNG – DPLY (both)

- STOCC Command HGA slew to 0,0 (straight out)
Command HGA slew to RMS/tail clearance posn

FSS STOW WITH BSP INSTALLED

CAUTION

Operating the pivoter or rotator in a stalled condition for greater than 30 sec may result in damage to unit. A stalled condition is indicated by AMSB AC AMPS > 0.3 and no mechanism motion

1. **FSS AMSB PWR ON**
- A6U ✓ PL RETEN LAT 1,2 (two) – OFF
 - ✓ LOGIC PWR SYS 2(1) – OFF
 - ✓ PL SEL – 1
 - LOGIC PWR SYS 1(2) – ON

SM 212 SSE MECHANISMS

AMSB ON – ITEM 7 EXEC A(B)

- ✓ MECH – blank
- ✓ SEL (ITEMS 9–19) – no *
- ✓ STAT (ITEMS 9–19) – blank
- ✓ O/R DIS (ITEM 22) – *

- * If any param not as expected, ✓ MCC *
- * If pivot reqd to continue EVA, AMSB OFF – ITEM 8 EXEC (*), *
- * perform SSE SSR–1 FMDM A→B(B→A) (PL SYS, SSE) and *
- * proceed to step 2 on alt side *

R13L PL BAY MECH PWR SYS 1(2) – ON

2. **ROTATE BAPS**
- CCTV Perform P/TV11 FSS OPS, OPS, FSS Config for Landing (PHOTO/TV FS, SCENES)
 - CRT ROTATOR SEL – ITEM 12 EXEC (* RDY)

- * If ROTATOR STAT – CCW or CW and visually *
- * verified not at EOT, then EOT sw failed: *
- * O/R ENA – ITEM 21 EXEC (*), continue *

- ✓ AMSB DC AMPS: .02 to .08
- A6U PL RETEN LAT 1(2) – REL or LAT as reqd
- Rotate until any berthing latch aligns with fixed target
- CRT ✓ MECH – flashing A(B)
- ✓ ROTATOR TACH: > 10 deg/min
- ✓ AMSB AC AMPS: 0.3 to 0.5
- ✓ ROTATOR STAT – RDY

- * If FDA 'S212 ROT STALL' received, PL RETEN *
- * LAT 1(2) – OFF, perform 1.3e 'S212 *
- * PVT(ROT) STALL' (PL SYS, SSE) *

- * If ROTATE TACH: < 0.9 deg/min and AMSB AC *
- A6U * AMPS: < 0.2, PL RETEN LAT 1(2) – OFF, *
- * perform 1.3a PRIMARY MOTOR FAILS TO *
- * DRIVE MECHANISM (PL SYS, SSE) *

✓ Rotator posn visually (Berthing latch aligned with fixed target)

A6U PL RETEN LAT 1(2) – OFF
CRT ✓MECH – blank

3. BSP LATCH SET VERIFICATION

BSP SEL – ITEM 19 EXEC (*)

✓AMSB DC AMPS: .02 to .08

✓BSP STAT – SET

* If BSP STAT not SET, ✓MCC *

✓BSP – blank/blank/blank

* If BSP not blank, record and assume switch failed *

* Ignore affected status and continue *

4. PIVOT DOWN

CAUTION

Operating the pivoter in a stalled condition for greater than 30 sec may result in damage to unit. A stalled condition is indicated by AMSB AC AMPS > 0.3 and no mechanism motion

CRT PIVOT LO SEL – ITEM 11 EXEC (* RDY)

✓AMSB DC AMPS: .02 to .08

Pivot to 43.8°

NOTE

With BSP installed, pivoter will stall when reaching 43.8° posn and FDA will annunciate 15 sec later. 15 sec stall is reqd to preload BSP

A6U PL RETEN LAT 1(2) – REL for 12:13

CRT ✓MECH – flashing A(B)

CCTV Visually verify BAPS motion
CAMR A,B

CRT ✓PIVOT LO TACH: > 2.5 deg/min

✓AMSB AC AMPS: 0.3 to 0.5

* If unexpected 'S212 PVT STALL' msg received, *

* PL RETEN LAT 1(2) – OFF, perform 1.3e *

* 'S212 PVT(ROT) STALL' (PL SYS, SSE) *

A6U * If PIVOT LO TACH: < 0.25 deg/min and AMSB *

* AC AMPS: < 0.2, PL RETEN LAT 1(2) – *

* OFF, perform 1.3a PRIMARY MOTOR FAILS *

* TO DRIVE MECHANISM (PL SYS, SSE) *

A6U Expect 'S212 PVT STALL' msg:

CRT PL RETEN LAT 1(2) – OFF

✓BSP – ENG *, RET *

* If BSP – ENG*, continue; *
* else, perform 1.3d BSP FAILS TO ENGAGE *
* (PL SYS, SSE) *

CRT ✓MECH – blank

5. AMSB PWRDN
 DESEL – ITEM 20 EXEC (ITEMS 9–19 no *)

✓AMSB DC AMPS: < .04
 OFF – ITEM 8 EXEC (*)

A6U PL RETEN PL SEL – MON
 LOGIC PWR SYS 1(2) – OFF

R13L PL BAY MECH PWR SYS 1(2) – OFF

Notify MCC when complete; report any anomalies

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+SA(-SA) SDM RETRACTION

CCTV 1. SETUP
✓SDM RETRACTION CCTV OVERLAY in place
Configure CCTV to monitor SDM blankets, P/TV14 HST SA MONITORING, OPS, SA SDM RETRACTION (PHOTO/TV FS, SCENES)

✓In ATT
DAP: B/AUTO/VERN

2. RETRACT TO STOW POSITION

SM 210 HST SYS

- ✓TLM COUNT – incr
- ✓SOLAR ARRAY DCE PWR A – * OFF
 ✓B – * ON
- ✓+(-) WING SDM – DPLY or TRAN

NOTE

Serial SDM retraction will take ~4-5 (8 min max). 3 min in ATT and in sun reqd prior to start of SDM retraction. Notify MCC ready for SDM retraction

CAUTION

Visually monitor blankets during retraction for anomalies per Table 1. If detected, exec following:
SOLAR ARRAY DCE STOP – ITEM 9 EXEC
 ✓+(-) WING – flashing
Remain in free drift, notify MCC

On MCC call:
DAP: FREE

NOTE

Expect ‘S210 DCE +(-) WING’ msg

STOCC +(-) WING SDM – RETRACT

SM 210 HST SYS

- ✓SOLAR ARRAY +(-) WING – no flash
- ✓SDM – TRAN

NOTE

SDM retraction may unexpectedly stop due to spurious microswitch trigger. SOLAR ARRAY +(-) WING – no flash may continue even though there is no motion

Visually verify SDM blankets retracting smoothly

After retraction:

CRT ✓SOLAR ARRAY +(-) WING SDM – flashing
 ✓SDM – STWD

Notify MCC, +SA(-SA) SDM RETRACTION complete

DAP: B/AUTO/VERN

MCC will complete remaining SDM retraction steps

- * If motion stop, notify MCC of following: *
- * SDM Retraction stopped, DCE STOP, *
- * Reason + Data + Current Status + # of SPAs visible *
- * (per Tables 1 and 2 below) *
- * *
- * ✓MCC for DAP config *

Table 1

REASON	DATA
No drum rotation and no bistem motion for ten sec	Both stopped simultaneously
No drum rotation for ten sec	
Tip displacement	(Port/Stbd) (inner/outer) tip
Blanket slack	(Port/Stbd)
Blanket over flange	(Inner/Outer)
Bistem kink	At (Port/Stbd) (inner/outer) SPA#
Obstruction (name)	At (Port/Stbd) (inner/outer) SPA#
Cushion roller	(Port/Stbd)
Thermal Shield	(Port/Stbd) (inner/outer)

Table 2

CURRENT STATUS (with DATA)
No anomalies visible [Wings stable, motion damped, blanket(s) tight, bistem(s) straight]
Dynamic motion
Excessive tip deflection static
Blanket(s) slack
Bistem(s) discontinuity at SPA#
Thermal Shield Interference

CONFIGURE PRIME COMM STRING FOR HPGSCA

NOTE

Possible 'S62 PDI DECOM FAIL' msg

- L12L 1. REMOVE PI DATA at PDIP
PSP BYP – DSBL
cb SW PWR – op
- PDIP 2. INSERT HPGSCA CONNECTOR AT PDIP
Remove Turn-Around Plug on HST PI NO 1(2)
Connect Y-cable to HST PI NO 1(2)
- HPGSCA 3. HPGSCA PWR ON
Expansion Chassis pwr (rear) – on
Laptop pwr (side) – on

- * If pwr to HPGSCA fails: *
- * ✓Pwr cable connection *
- * Press pwr sw again (both) *

Allow 'Windows'/'Hubble1' to start

- L12L 4. ENABLE PSP BYPASS
cb SW PWR – cl
PSP BYP – ENA
- HPGSCA 5. CONFIGURE HPGSCA TO CURRENT HST DATA RATE
✓MCC for current data rate (if unknown)
Depress hot key (F1–F6) for correct rate
6. STATUS INDICATORS

Signal Status

- ✓Sync Status Green
 - ✓Signal Present Green
 - ✓Overload Green
 - ✓Offset Green
- Report status to MCC

CONFIGURE PRIME COMM STRING FOR PSP-BYPASS ONLY

NOTE

Possible 'S62 PDI DECOM FAIL' msg

- L12L 1. REMOVE PI DATA FROM HPGSCA
PSP BYP – DSBL
cb SW PWR – op
- HPGSCA 2. HPGSCA PWR OFF
Laptop pwr (side) – off
Expansion Chassis pwr (rear) – off
- PDIP 3. Insert Turnaround Plug at PDIP
Disconnect Y-cable from HST PI NO 1(2)
Install Turn-Around Plug on HST PI NO 1(2)
- L12L 4. ENABLE PSP BYPASS
cb SW PWR – cl
PSP BYP – ENA
- Report status to MCC

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ORU/ORI OPERATIONS

SA SECT 1 TO BATT 1	4-2
4 TO BATT 4	4-2
DEADFACE +SA(-SA)	4-3
PCU PWRDN	4-4
PWRUP	4-5
SAP PWRDN	4-6
DEADFACE FOC/ACS	4-6
COSTAR FOR ESM INSTALL	4-7
ESM PWRDN	4-7
OPA PWRDN	4-7
DEADFACE NICMOS/COSTAR FOR NCS INSTALL	4-8
RSU/ECU	4-8

ORU/ORI
OPS

SA SECT 1 TO BATT 1

SM 210 HST SYS

- ✓PSP ENA ID - 1
- ✓TLM COUNT - incr
- ✓RCVR 1(2) LOCK - *
- Log CMD CT: _____
- ✓SA SECTS - +OFF
- SA DEACT - ITEM 20 +9 8 EXEC
- ✓SA SECTS - ON

Log CMD CT: _____
MET: ____/____:____:____

- * If SA SECTS +OFF, command not received. *
- * Reverify comm config and re-exec command *
- * If still no joy, ✓MCC *

Notify EVA crewmembers, ready for +V2 Panel Deploy

SA SECT 4 TO BATT 4

SM 210 HST SYS

- ✓PSP ENA ID - 1
- ✓TLM COUNT - incr
- ✓RCVR 1(2) LOCK - *
- Log CMD CT: _____
- ✓SA SECTS - -OFF
- SA DEACT - ITEM 20 +9 9 EXEC
- ✓SA SECTS - ON

Log CMD CT: _____
MET: ____/____:____:____

- * If SA SECTS -OFF, command not received. *
- * Reverify comm config and re-exec command *
- * If still no joy, ✓MCC *

Notify EVA crewmembers, ready for -V2 Panel Deploy

DEADFACE +SA(-SA)

SM 210 HST SYS

- ✓PSP ENA ID - 1
- ✓TLM COUNT - incr
- ✓RCVR 1(2) LOCK - *

- ✓DCE PWR A/B - no*, OFF
- ✓SADE - OFF
- ✓SA SECTS - +OFF(-OFF)
- ✓SURV HTR - OFF
- ✓SADE OLD - OFF
- ✓SPA - ABCDE

- * If any parameters not as expected and NO COMM: *
- * *
- * Log CMD CT: _____ *
- * Log MET: ___/___:___:___ *
- * *
- * If DCE PWR A/B * or ON: *
- * DCE PWR OFF - ITEM 10 +9 9 EXEC (OFF) *
- * If SADE ON: *
- * SADE OFF - ITEM 11 +9 9 EXEC (OFF) *
- * If SURV HTR ON: *
- * SA DEACT - ITEM 20 +9 7 EXEC *
- * ✓SURV HTR - OFF *
- * *
- * Log CMD CT: _____ *
- * Log MET: ___/___:___:___ *
- * *
- * If SA SECTS not +OFF(-OFF), ✓MCC *
- * If SADE OLD not OFF, ✓MCC *
- * If SPA not ABCDE, ✓MCC *

Notify EVA crewmembers, SA ready for changeout

PCU PWRDN

NOTE

Perform steps 1,2 prior to battery disconnect

- L12U
1. PWRDN PRECHECKS
 - ✓ESS BUS EXT PWR tb – UP
 - ✓INT PWR tb – bp
 - ✓FHST SHUTTER – CL (tb–gray)
 - ✓RSU SURV HTR PWR – OFF (tb–bp)
 - ✓MN BUS PWR ON tb – gray
 - ✓cb SPACE TEL SW PWR – cl
 - ✓IPCU RLY CL tb – gray
 - ✓MAIN BUS EXT PWR tb – gray
 - ✓SSM WK LTS – OFF

2. TURN OFF DPCs 3,5,7

On MCC GO:

- ✓PCU PWR CONTR A,B (two) – OFF

* If PCU PWR CONTR A,B (two) – ON, *
* ✓MCC *

SM 211 SSE OVERVIEW

DPC 3 OFF – ITEM 24 +7 3 EXEC
5 OFF – ITEM 24 +7 5 EXEC
7 OFF – ITEM 24 +7 7 EXEC

- ✓DPC 3,5,7 – no *
 - ✓VOLTS: < 1.0 (after 30 sec)
 - ✓AMPS: < 0.5

NOTE

In order to prevent essential bus failover, first throw ESS BUS INT PWR – OFF and hold down, then throw ESS BUS EXT PWR – OFF. Hold both switches momentarily, then release both

3. HST PWRDN (POST BATTERY DEMATE)

On MCC GO:

- L12U
- ESS/MN SW ENA – ON (tb–gray)
- Expect 'PDI DECOM FAIL' msg:
- ESS BUS INT PWR – OFF (hold through next switch throw)
 - EXT PWR – OFF (mom, then release both)
 - ✓INT PWR tb – bp
 - ✓EXT PWR tb – bp
 - MAIN BUS EXT PWR – OFF (mom) (tb–bp)
 - ✓IPCU RLY CL tb – bp
 - ✓MN BUS PWR ON tb – bp

If FHST LPS not installed, ✓MCC

FHST SHUTTER – OP (tb–bp)
ESS/MN SW ENA – OFF (tb–bp)
cb SPACE TEL SW PWR – op

SM 211 SSE OVERVIEW

PCU OFF – ITEM 2 EXEC (*)

- ✓DPC 1–12 – no *
- ✓VOLTS: < 1.0 (after 30 sec)
- ✓AMPS: < 0.5

Notify MCC, HST PWRDN complete
 Notify EV, GO for PDU fuse plug and PCU connector demate

PCU PWRUP

Upon completion of PCU connector mate (36 connectors + SPG) and re–installation of PDU fuseplugs (all)

1. DPC PWR ON

On EV GO, notify MCC

If no comm, proceed:

- L12U cb SPACE TEL SW PWR – cl
- FHST SHUTTER – CL (remains bp)

SM 211 SSE OVERVIEW

PCU ON – ITEM 1 EXEC (*)

- ✓PCU – P/S
- ✓DPC 1–12 – *
- ✓VOLTS: 33.7 to 35.3
- ✓AMPS: ≤ 0.5

- * If DPC 1–12 AMPS > 0.5, turn off affected DPC, *
- * DPC OFF – ITEM 24 +X X EXEC (no *) (DPC *
- * ON/OFF INDEX NUMBERS (REF DATA)), *
- * ✓MCC *
- * If any other parameter out of range, ✓MCC *

- L12U ✓FHST SHUTTER tb – gray

2. EXTERNAL PWR ACTIVATION

ESS/MN SW ENA – ON (tb–gray)

MAIN BUS EXT PWR – ON (mom) (tb–gray)

- ✓IPCU RLY CL tb – gray

- * If either tb – bp, notify MCC, continue *
- * If both tb – bp, cycle sw (up only) *
- * If no joy, ✓MCC *

- CRT ✓DPC 1–12 VOLTS: 33.8 to 35.2
- ✓AMPS: 2–7

- L12U ESS BUS EXT PWR – ON (mom) (tb–UP)
- ESS/MN SW ENA – OFF (tb–bp)

SM 210 HST SYS

- ✓UMB SG V EXT MN BUS > 30
- ✓ESS BUS > 30

Notify MCC when complete

MCC 3. COMM REACQ
MCC and STOCC perform Comm Reacq

Expect MCC GO for battery remate

NOTE

Do not continue to step 4 until battery reconnect has been completed. Step 4 is performed during PCU Functional Test on MCC call

L12U 4. ACTIVATE INT ESS BUS
On MCC GO:
ESS/MN SW ENA – ON (tb-gray)
ESS BUS INT PWR – ON (mom) (tb-UP)

SM 210 HST SYS

✓EPS INT ESS BUS A,B,C – * * *

L12U ESS/MN SW ENA – OFF (tb-bp)
PCU PWRUP complete

SAP PWRDN

On EV GO, after NCC has been removed from SAC

L12L SAP HTR B(A) PWR – OFF (tb-bp)

* If SAP HTR B(A) PWR tb – gray, *
* cycle sw *
* If still no joy, ✓MCC *

Notify MCC, SAP PWRDN complete

DEADFACE FOC/ACS

SM 210 HST SYS

✓PSP ENA ID – 1
✓TLM COUNT – incr
✓RCVR 1(2) LOCK – *
Log CMD CT: _____
✓FOC – ON
FOC OFF – ITEM 12 +9 8 EXEC
– ITEM 12 +9 9 EXEC
✓FOC – OFF

Log CMD CT: _____
MET: ___/___:___:___

* If FOC ON, command not received. Reverify *
* comm config and re-exec command *
* If still no joy, ✓MCC *

Notify EVA crewmembers, ready for ACS changeout

DEADFACE COSTAR FOR ESM INSTALL

SM 210 HST SYS

- ✓PSP ENA ID - 1
- ✓TLM COUNT - incr
- ✓RCVR 1(2) LOCK - *

Log CMD CT: _____

- ✓COSTAR - ON
- COSTAR OFF - ITEM 14 +9 8 EXEC
- ITEM 14 +9 9 EXEC
- ✓COSTAR - OFF

Log CMD CT: _____

MET: ____/____:____:____

- * If COSTAR ON, command(s) not received. *
- * Reverify comm config and re-exec command *
- * If still no joy, ✓MCC *

Notify EVA crewmembers, ready for ESM install

ESM PWRDN

On EV GO, after ESM has been removed from MULE

L11U ESM HTR A(B) PWR - OFF (tb-bp)

- * If ESM HTR A(B) PWR tb - gray, *
- * cycle sw *
- * If still no joy, continue *

SM 211 SSE OVERVIEW

CRT ✓ESM HTR A(B) ZONE 1&2,3 - blank (both)

✓MULE ESM 1&2,3 AMPS < 0.1 (both)

Notify MCC, ESM PWRDN complete

OPA PWRDN

L12L SAC OPA HTR A(B) PWR - OFF (tb-bp)

- * If SAC OPA HTR A(B) PWR tb - gray, *
- * cycle sw *
- * If still no joy, ✓MCC *

Notify MCC, OPA PWRDN complete

DEADFACE NICMOS/COSTAR FOR NCS INSTALL

SM 210 HST SYS

- ✓PSP ENA ID - 1
- ✓TLM COUNT - incr
- ✓RCVR 1(2) LOCK - *

Log CMD CT: _____

- ✓NICMOS - ON
- ✓COSTAR - ON
- NICMOS OFF - ITEM 13 +9 8 EXEC
- ITEM 13 +9 9 EXEC
- ✓NICMOS - OFF

COSTAR OFF - ITEM 14 +9 8 EXEC
- ITEM 14 +9 9 EXEC

- ✓COSTAR - OFF

Log CMD CT: _____

MET: ___/___:___:___

- * If NICMOS ON or COSTAR ON, command(s) not received. *
- * Reverify comm config and re-exec command *
- * If still no joy, ✓MCC *

Notify EVA crewmembers, ready for NCS install

DEADFACE RSU/ECU

SM 210 HST SYS

- ✓PSP ENA ID - 1
- ✓TLM COUNT - incr
- ✓RCVR 1(2) LOCK - *

Log CMD CT: _____

L12U ✓RSU SURV HTR PWR - OFF (tb-bp)

CRT ✓RSU STAT 1,2,3 - ON

- ✓MAMP 1,2,3: 84-168 mA
- 1 OFF - ITEM 15 +9 9 EXEC
- 2 OFF - ITEM 16 +9 9 EXEC
- 3 OFF - ITEM 17 +9 9 EXEC
- ✓MAMP 1,2,3: ≤ 20 mA
- ✓STAT 1,2,3 - OFF

Log CMD CT: _____

MET: ___/___:___:___

- * If RSU STAT ON or MAMPs > 20, command not received. *
- * Reverify comm config and re-exec command *
- * If still no joy, ✓MCC *

When MAMPs < 20 for 10 min (spindown complete), notify EVA crewmembers RSU ready for changeout

CONTINGENCY OPERATIONS

FSS STOW WITHOUT BSP	5-2
HST JETTISON FOR RAPID SAFE	5-5
SAC JETTISON	5-11
RAC JETTISON	5-13
ENABLE RNDZ NAV	5-15
POST REL RADAR ACQUISITION	5-15
RR NAV	5-15
BSP MECHANISM CHECKOUT	5-16
SSE CHECKOUT WITH FAILED MULE FMDM-A	5-17
EVA HARDWARE/SA-2 JETTISON	5-20
RAPID SAFING WITHOUT HST	5-25

FSS STOW WITHOUT BSP

1. FSS AMSB PWR ON

- A6U ✓PL RETEN LAT 1,2 (two) – OFF
 - ✓LOGIC PWR SYS 2(1) – OFF
 - ✓PL SEL – 1
 - LOGIC PWR SYS 1(2) – ON

SM 212 SSE MECHANISMS

AMSB ON – ITEM 7 EXEC (A(B))

- ✓MECH – blank
 - ✓SEL (ITEMS 9–19) – no *
 - ✓STAT (ITEMS 9–19) – blank
- ✓O/R DIS (ITEM 22) – *

R13L PL BAY MECH PWR SYS 1(2) – ON

2. BAPS PIVOT DOWN FOR STOW

CAUTION
Operating the pivoter in a stalled condition for greater than 30 sec may result in damage to unit. A stalled condition is indicated by AMSB AC AMPS > 0.3 and no mechanism motion

CCTV Perform P/TV11 FSS OPS, OPS, FSS Config for Landing (PHOTO/TV FS, SCENES)

CRT PIVOT LO SEL – ITEM 11 EXEC (* UP)

- * If PIVOT LO STAT – *, EOT sw failed: *
- * DESEL – ITEM 20 EXEC (ITEMS 9–19 – no *) *
- * Perform SSE SSR–1 FMDM SWAP A→B(B→A) *
- * (PL SYS, SSE) and continue on alt side *
- * If PIVOT LO STAT – RDY, continue *

- ✓AMSB DC AMPS: .02 to .08
- ✓MECH – steady A(B)

A6U ✓PL RETEN LAT 1 tb – LAT (A side only)
1(2) – REL (tb–bp)

CRT ✓MECH – flashing A(B)
✓PIVOT LO TACH: > 2.5 deg/min
✓AMSB AC AMPS: 0.3 to 0.5
✓PIVOT LO STAT – RDY

- * If PIVOT LO STAT – UP, EOT sw failed, *
- * continue *
- * Expect '*' in 23.8 min *

CCTV
CAMR
A,B,C Visually verify BAPS motion; monitor performance

CONTINGENCY
OPS

- A6U * If FDA 'S212 PVT STALL' received, *
- * PL RETEN LAT 1(2) – OFF, perform *
- * 1.3e 'S212 PVT(ROT) STALL' (PL SYS, SSE) *
- * *
- * If PIVOT LO TACH: < 0.25 deg/min and AMSB *
- * AC AMPS: < 0.2, PL RETEN LAT 1(2) – OFF, *
- * perform 1.3a PRIMARY MOTOR FAILS TO *
- * DRIVE MECHANISM (PL SYS, SSE) *

Wait 23.8 min

- CRT ✓PIVOT LO STAT – DN
- A6U ✓PL RETEN LAT 1 tb – REL (A side only)
- 1(2) – OFF
- CRT ✓MECH – steady A(B)
- Visually verify BAPS properly positioned

3. DOWNLOCK INSERTION

CAUTION

Operating the downlock in a stalled condition for greater than 30 sec may result in damage to unit. A stalled condition is indicated by AMSB AC AMPS > 2.0 and no mechanism motion

DLOCK SEL – ITEM 9 EXEC (* DIS)

- * If DLOCK STAT – *, then EOT sw failed: *
- * DESEL – ITEM 20 EXEC (ITEM 9 – no *) *
- * Perform SSE SSR–1 FMDM SWAP A→B(B→A) *
- * (PL SYS, SSE) and continue on alt side *
- * If DLOCK STAT – RDY, continue *

- ✓AMSB DC AMPS: .02 to .08
- ✓MECH – steady A(B)

- A6U ✓PL RETEN LAT 1 tb – REL (A side only)
- 1(2) – LAT (tb–bp)

- CRT ✓MECH – flashing A(B)
- ✓AMSB AC AMPS: 2.0 to 3.75
- ✓DLOCK STAT – RDY

- A6U * If stall condition observed (AMSB AC AMPS > 2.0 *
- * and no mechanism motion): *
- * PL RETEN LAT 1,2 (both) – OFF *
- * ✓MCC *

- * If DLOCK STAT – DIS, continue *
- * Expect '*' *

Wait 24 sec,
 ✓DLOCK STAT – ENG

- A6U * If DLOCK STAT – RDY after 30 total sec: *
- * PL RETEN LAT 1(2) – OFF *
- * Perform 1.3a PRIMARY MOTOR FAILS TO *
- * DRIVE MECHANISM (PL SYS, SSE) *

A6U ✓PL RETEN LAT 1 tb – LAT (A side only)
1(2) – OFF

CRT ✓MECH – steady A(B)

Visually verify DOWNLOCK engaged

4. AMSB PWRDN

SM 212 SSE MECHANISMS

DESEL – ITEM 20 EXEC (ITEMS 9–19; no *)

✓AMSB DC AMPS: < .04

OFF – ITEM 8 EXEC (*)

A6U PL RETEN PL SEL – MON
LOGIC PWR SYS 1(2) – OFF

R13L PL BAY MECH PWR SYS 1(2) – OFF

Notify MCC, FSS STOWED

HST JETTISON FOR RAPID SAFE

1. PL BAY CONFIG
 If EVA:
 ✓BSP pip pin removed prior to EV crew ingress
 ✓RMS clear of payload envelope

2. DAP/TIMER SETUP
 DAP: A10/INRTL/VERN(ALT), LO Z

- O14, Pri RJD LOGIC, DRIVER (sixteen) – ON
 O15, ✓cb MNA,C DDU AFT (two) – cl
 O16

- SM 2 TIME
- F7,A4 Set CRT and Event Timers counting down to SEP 1
 MET ____/____:____:____

- 10:00 3. ADI SETUP
 A6U ADI ATT – LVLH
 ERR – MED
 RATE – LO
 SENSE: – Z

4. ACTIVATE LOGIC AND MECH POWER
 ✓PL RETEN LAT 1,2 (two) – OFF
 LOGIC PWR SYS 1,2 (two) – ON
 ✓PL SEL – 1

- R13 PL BAY MECH PWR SYS 1,2 (two) – ON

- SM 212 SSE MECHANISMS
- AMS ON – ITEM 7 EXEC (A(B))

5. PIVOT HST
 Perform this step only if pivoter not at 90°, else go to step 6

 PIVOT LO SEL – ITEM 11 EXEC (* RDY)

- A6U PL RETEN LAT 1(2) – LAT

- CRT ✓MECH – flashing A(B)

 Pivot to 90°

- A6U PL RETEN LAT 1(2) – OFF

6. DEADFACE UMBILICAL
 L12U ESS/MN SW ENA – ON (tb-gray)
 ESS BUS INT PWR – ON (mom) (tb-UP)
 EXT PWR – OFF (mom) (tb-bp)
 MAIN BUS EXT PWR – OFF (mom) (tb-bp)
 FHST SHUTTER – OP (tb-bp)

7. DISCONNECT UMBILICAL
 CRT UMB MN SEL – ITEM 17 EXEC (* MAT)
 A6U PL RETEN LAT 1(2) – REL

 CRT ✓UMB MN STAT – RDY (wait 8 sec)
 ✓STAT – REL

 A6U PL RETEN LAT 1(2) – OFF

 8. FINAL SETUP
 A4 Set Event Timer to count up from SEP 1 TIG

 GNC UNIV PTG
 ✓RATES: < .1 deg/sec

 -:02:00 DAP: A/FREE/VERN(PRI)
 GNC 20 DAP CONFIG
 Change DAP A,B to A1,B1

 -01:00 9. OPEN BERTHING LATCHES

 NOTE
 Perform SEP 1 BURN ASAP once LATCH 2
 open and verified clear

 SM 212 SSE MECHANISMS
 B LAT 3 SEL – ITEM 16 EXEC (* CL)

 A6U PL RETEN LAT 1(2) – REL

 CRT ✓B LAT 3 STAT – RDY (wait 18 sec)
 ✓3 STAT – OP

 A6U PL RETEN LAT 1(2) – OFF

 CRT B LAT 1 SEL – ITEM 14 EXEC (* CL)

 A6U PL RETEN LAT 1(2) – REL

 CRT ✓B LAT 1 STAT – RDY (wait 18 sec)
 ✓1 STAT – OP

 A6U PL RETEN LAT 1(2) – OFF

 CRT B LAT 2 SEL – ITEM 15 EXEC (* CL)

 A6U PL RETEN LAT 1(2) – REL

 CRT ✓B LAT 2 STAT – RDY (wait 18 sec)
 ✓2 STAT – OP

 A6U PL RETEN LAT 1(2) – OFF

 Visually verify LATCHES open and umbilical clear

10. HST TO SUN POINT

If any SA-2 < 80% (4 of 5 SPAs) deployed:

SM 210 HST SYS

PCS MODE - ITEM 7 +9 3(9 4) EXEC

✓SNPT DIS - NO

If both SA-2s > 80% (4 of 5 SPAs) deployed or both SA-3s installed:

NOTE

Expect 'PDI DECOM FAIL' msg

SM 210 HST SYS

PCS MODE - ITEM 7 +9 5 EXEC

- ITEM 7 +9 6 EXEC

11. SEP 1 BURN

A6U

✓SENSE: -Z

FLT CNTLR PWR - ON

✓DAP: A1/FREE/VERN(PRI)

DAP TRANS: PULSE/PULSE/PULSE, LO Z

If OMS or RCS propellant leak,

DAP: NORM Z

+ :00:00

AFT THC: +Z (out) 1 pulse (0.1 fps)

When HST clear of latches,

DAP: A1/INRTL/VERN(PRI)

If Lo Z:

AFT THC +Z (out) 9 pulses (0.9 fps)

If NORM Z:

AFT THC +Z (out) 7 pulses (0.7 fps)

Record MET ____/____:____:____

NOTE

Perform steps 15,16 in parallel with steps 12,13

12. PERFORM OUT-OF-PLANE MNVR

CRT

GNC UNIV PTG

CNCL - ITEM 21 EXEC

GNC, OPS 202 PRO

GNC ORBIT MNVR EXEC

RCS SEL - ITEM 4 EXEC (*)

Set TIG to current time + 2:00 (+3:00 if NORM Z)

TGT PEG 7 ΔVx - ITEM 19 +0 EXEC

ΔVy - ITEM 20 +2 EXEC

ΔVz - ITEM 21 +0 EXEC

LOAD - ITEM 22 EXEC

TIMER - ITEM 23 EXEC

✓VGOZ: ≥ 0

* If VGO Z < 0: *
 * TGT PEG 7 ΔVy – ITEM 20 (-2) EXEC *
 * LOAD – ITEM 22 EXEC *
 * TIMER – ITEM 23 EXEC *
 * √VGOZ: ≥ 0 *

Do not mnvr to burn att

A6U At TIG, deflect THC to null VGOs

13. PERFORM FINAL SEP

GNC ORBIT MNVR EXEC

CRT √RCS SEL – ITEM 4 (*)

If ΔVy (step 12) +2:
 TV ROLL – ITEM 5 +2 7 0 EXEC
 If ΔVy (step 12) -2:
 TV ROLL – ITEM 5 +0 9 0 EXEC

Set TIG to TIG from step 12 +15:00
 TGT PEG 7 ΔVx – ITEM 19 +3 EXEC
 ΔVy – ITEM 20 +0 EXEC
 ΔVz – ITEM 21 +0 EXEC

LOAD – ITEM 22 EXEC
 TIMER – ITEM 23 EXEC
 DAP: A/AUTO/PRI

At TIG-8:00,
 MNVR – ITEM 27 EXEC (*)

A6U At TIG, deflect THC to null VGOs
 FLT CNTLR PWR – OFF

14. RADAR NAV (IF DESIRED)
 ENABLE RNDZ NAV, 5-15
 POST REL RADAR ACQUISITION, 5-15
 RR NAV, 5-15

15. ROTATOR (DUAL MOTOR DRIVE)
 If B/L aligned with fixed target (+V3 FWD), go to step 16

NOTE

Rotate to align closest berthing latch to fixed target

SM 212 SSE MECHANISMS

ROTATOR SEL – ITEM 12 EXEC (* RDY)

A6U PL RETEN LAT 1(2) – REL or LAT as reqd

L12U FSS FMDM B(A) PWR – ON (tb-gray)

SM 1 DPS UTILITY

PORT ASSIGN STRING PL 1/2 PRI(SEC) – ITEM 23(24) EXEC (*)

SM 212 SSE MECHANISMS

AMSB PWR ON – ITEM 7 EXEC (*)
ROTATOR SEL – ITEM 12 EXEC (* RDY)

A6U PL RETEN LAT 2(1) – REL or LAT as reqd

CRT ✓MECH – flashing A,B
Complete maneuver to reqd posn

CCTV When rotator in posn:
A6U PL RETEN LAT 1,2 (two) – OFF

16. START PIVOT DN (DUAL MOTOR DRIVE)

SM 212 SSE MECHANISMS

BSP SEL – ITEM 19 EXEC (* SET)
PIVOT LO SEL – ITEM 11 EXEC (* RDY)

If step 15 not performed:

A6U : PL RETEN LAT 1(2) – REL
L12U : FSS FMDM B(A) – ON

SM 1 DPS UTILITY

: PORT ASSIGN STRING PL 1/2 PRI(SEC) – ITEM 23(24) EXEC (*)

SM 212 SSE MECHANISMS

: AMSB PWR ON – ITEM 7 EXEC (*)
: PIVOT LO SEL – ITEM 11 EXEC (* RDY)

A6U : PL RETEN LAT 2(1) – REL
CRT : ✓MECH – flashing A,B
: After BSP – ENG/RET status received (6:06):
: PL RETEN LAT 1,2 (two) – OFF
L Go to step 17

A6U PL RETEN LAT 2(1) – REL

SM 1 DPS UTILITY

PORT ASSIGN STRING PL 1/2 SEC(PRI) – ITEM 24(23) EXEC (*)

SM 212 SSE MECHANISMS

CRT PIVOT LO SEL – ITEM 11 EXEC (* RDY)

A6U PL RETEN LAT 1(2) – REL

CRT ✓MECH – flashing A,B

A6U After BSP–ENG/RET status received (6:06),
PL RETEN LAT 1,2(two) – OFF

17. VERIFY BSP ENGAGED

CRT ✓BSP – ENG *
✓BSP – RET (not blank)

* If BSP – ENG (no *) or *
* BSP – RET (blank), ✓MCC *

18. CLOSEOUT
- | | | |
|------|---------------------------|-------|
| A6U | √ PL RETEN LAT 1,2 (two) | - OFF |
| | LOGIC PWR SYS 1,2 (two) | - OFF |
| | PL SEL | - MON |
| R13L | PL BAY MECH PWR 1,2 (two) | - OFF |

19. SSE RAPID DEACT

NOTE

Expect 'I/O ERROR FLEX' msg

- | | | |
|----|------------|----------------------|
| R1 | PL PRI MNC | - OFF (mom) (tb-OFF) |
| | CAB | - OFF |

SAC JETTISON

1. PRE-REL CONFIG
 - ✓PDRS MPMs deployed
 - ✓Elbow Camr stowedPerform HST JETTISON FOR RAPID SAFE

A6U 2. AFT STATION CONFIG FOR RELEASE
ADI ATT - LVLH
ERR - MED
RATE - LO
SENSE: -Z

O14, Pri RJD LOGIC, DRIVER (sixteen) - ON
O15, ✓cb MNA, C DDU AFT (two) - cl
O16

A1U ✓KU CNTL - CMD
✓PWR - ON
MODE - RDR PASSIVE
RADAR OUTPUT - LO
sel - GPC
SIG STRENGTH sel - KU
SLEW RATE - as reqd

A2 DIGI-DIS SEL - R/RDOT
✓X-PNTR SCALE - X1

Install -Z COAS

3. MNVR TO BACKAWAY JETTISON ATT
 - ✓DAP A1, B1 loaded

GNC UNIV PTG

TGT ID: 2
BODY VECT: 2
OM: 180
TRK - ITEM 19 EXEC (CUR-*)
ERR TOT - ITEM 23 EXEC (*)
DAP: A/AUTO/VERN, no LO Z

4. ENABLE RNDZ NAV
ENABLE RNDZ NAV, 5-15

5. LATCH REL
EV crewmembers disconnects carrier umbilicals

On EV call:

GNC UNIV PTG

✓Rates < 0.1 deg/sec
DAP: A/FREE/VERN(PRI)

GNC 33 REL NAV

ORB TO TGT - ITEM 10 EXEC

EV crew opens passive latches per RMS/PRLA CONTINGENCY EVA
(EVA, ORB CONT EVA)

Verify EVA crewmembers clear of SAC

A6U PL RETEN PL SEL – 2
LOGIC PWR SYS 1,2 (two) – ON
R13L PL BAY MECH PWR SYS 1,2 (two) – ON
A6U RETEN LAT 4 – REL (tb–bp)

After ~ 30 sec (60 sec max):

✓PL RETEN LAT 4 tb – REL
LAT 4 – OFF
R13L PL BAY MECH PWR SYS 1,2 (two) – OFF
RETEN LOGIC PWR SYS 1,2 (two) – OFF
PL SEL – MON

00:00:00 6. SEP 1 BURN
A6U ✓SENSE: –Z
FLT CNTLR PWR – ON
On EV call:
AFT THC: +Z (out) 1 pulse (0.1 fps)
When separation confirmed,
AFT THC: +Z (out) 4 pulses (0.4 fps)
✓VZ ~0.5 fps

00:01:00 7. SEP 2 BURN (RETROGRADE)
A6U AFT THC: +Z (out) 15 pulses (1.5 fps)
FLT CNTLR PWR – OFF
DAP: A/INRTL/VERN
8. RADAR NAV (if desired)
POST REL RADAR ACQUISITION, 5–15
RR NAV, 5–15

RAC JETTISON

1. PRE-REL CONFIG
 - ✓PDRS MPMs deployed
 - ✓Elbow Camr stowed
 - Perform HST JETTISON FOR RAPID SAFE, steps 1-18

- A6U 2. AFT STATION CONFIG FOR RELEASE
 - ADI ATT - LVLH
 - ERR - MED
 - RATE - LO
 - SENSE: -Z

- O14, O15, O16 Pri RJD LOGIC, DRIVER (sixteen) - ON
 - ✓cb MNA, C DDU AFT (two) - cl

- A1U
 - ✓KU CNTL - CMD
 - ✓PWR - ON
 - MODE - RDR PASSIVE
 - RADAR OUTPUT - LO
 - sel - GPC
 - SIG STRENGTH sel - KU
 - SLEW RATE - as reqd

- A2 DIGI-DIS SEL - R/RDOT
 - ✓X-PNTR SCALE - X1

 - Install -Z COAS

3. MNVR TO BACKAWAY JETTISON ATT
 - ✓DAP A1, B1 loaded

 - | |
|--------------|
| GNC UNIV PTG |
|--------------|
 - TGT ID: 2
 - BODY VECT: 2
 - OM: 180
 - TRK - ITEM 19 EXEC (CUR-*)
 - ERR TOT - ITEM 23 EXEC (*)
 - DAP: A/AUTO/VERN, no LO Z

4. ENABLE RNDZ NAV
 - ENABLE RNDZ NAV, 5-15

- A6U 5. ACTIVATE LATCHES
 - ✓PL RETEN LAT (five) - OFF
 - PL SEL - 3
 - LOGIC PWR SYS 1,2 (two) - ON

- R13L PL BAY MECH PWR SYS (1,2) - ON

- | |
|--------------------|
| SM 97 PL RETENTION |
|--------------------|
- ✓RDY-FOR-LAT 1,2,3,4,5 (ten) - 1
- ✓LAT 1,2,3,4,5 (ten) - 1

* If any rel msw shows '1', expect single *
* motor time (60 sec) *

6. AKA RELEASE
GNC UNIV PTG
 ✓ Rates < 0.1 deg/sec
 DAP: A/FREE/VERN(PRI)
GNC 33 REL NAV
 ORB TO TGT – ITEM 10 EXEC

A6U ✓ PL RETEN LAT 5 tb – LAT
 ✓ RDY 5 tb – gray

Note single motor times (> 30 sec)
 PL RETEN LAT 5 – REL (tb–REL), 60 sec max
 – OFF

7. PRLA RELEASE

A6U ✓ PL RETEN LAT 1,2,3,4 tb (four) – LAT
 ✓ RDY 1,2,3,4 tb (four) – gray

Note single motor times (> 30 sec)
 PL RETEN LAT 1,2 (two) – REL (tb–REL), 60 sec max
 – OFF
 3,4 (two) – REL (tb–REL), 60 sec max
 – OFF

00:00:00
 A6U 8. SEP 1 BURN
 ✓ SENSE: –Z
 FLT CNTLR PWR – ON
 On EV call:
 AFT THC: +Z (out) 1 pulse (0.1 fps)
 When separation confirmed,
 AFT THC: +Z (out) 4 pulses (0.4 fps)
 ✓ VZ ~0.5 fps

00:01:00
 A6U 9. SEP 2 BURN (RETROGRADE)
 AFT THC: +Z (out) 15 pulses (1.5 fps)
 FLT CNTLR PWR – OFF
 DAP: A/INRTL/VERN

10. RADAR NAV (if desired)
 POST REL RADAR ACQUISITION, 5–15
 RR NAV, 5–15

11. PRLA CLOSURE
 Note single motor times (> 30 sec)
 PL RETEN LAT 1,2 (two) – LAT (tb–LAT), 60 sec max
 – OFF
 3,4 (two) – LAT (tb–LAT), 60 sec max
 – OFF

R13L
 A6U 12. DEACTIVATE LATCHES
 PL BAY MECH PWR SYS 1,2 (two) – OFF
 RETEN LOGIC PWR SYS 1,2 (two) – OFF
 PL SEL – MON

ENABLE RNDZ NAV

- ✓MCC for target vector onboard
- GNC 33 REL NAV
- RNDZ NAV ENA – ITEM 1 EXEC (*)
- ✓SV SEL, ITEM 4 – (PROP)
- ✓INH RNG, ITEM 18 – (*)
 - RDOT, ITEM 21 – (*)
 - Angles, ITEM 24 – (*)
- RR – ITEM 13 EXEC (*)

POST REL RADAR ACQUISITION

- GNC 33 REL NAV
- KU ANT ENA – ITEM 2 EXEC (*)
- GNC I/O RESET

- SM ANTENNA
- RDR RNG MIN – ITEM 6 EXEC (*)
- A1U ✓KU RADAR OUTPUT – LO
 - ✓sel – GPC
 - ✓MODE – RDR PASSIVE
 - CNTL – PNL
- * If no lock within 2 min: *
- * KU sel – AUTO TRACK *
- * SLEW – as reqd (as seen in COAS) *
- * KU SEARCH – SEARCH (tb-gray) *
- * If no lock-on within 1 min: *
- * KU sel – GPC *

POST REL RR NAV

- A1U ✓KU TRACK tb – gray
- GNC 33 REL NAV
- ✓RR – ITEM 13 (*)
 -
 - **If RATIO > 1.0** •
 - FORCE 3 MARKS •
 - If RATIO still > 1.0, call •
 - MCC •
 -
- When RATIO < 1.0 for four NAV cycles (~31 sec),
 - AUTO RNG – ITEM 17 EXEC
 - RDOT – ITEM 20 EXEC
 - Angles – ITEM 23 EXEC
- When updates small and stable,
 - SV SEL – ITEM 4 EXEC (FLTR)
- SM ANTENNA
- RDR RNG AUTO – ITEM 5 EXEC (*)

BSP MECHANISM CHECKOUT

1. FSS AMSB PWR ON
A6U ✓ PL RETEN LAT 1,2 (two) – OFF
 ✓ LOGIC PWR SYS 2(1) – OFF
 ✓ PL SEL – 1
 LOGIC PWR SYS 1(2) – ON

SM 212 SSE MECHANISMS

- AMSB ON – ITEM 7 EXEC (A(B))
✓ MECH – blank
 ✓ SEL (ITEMS 9–19) – no *
 ✓ STAT (ITEMS 9–19) – blank
✓ O/R DIS (ITEM 22) – *

R13L PL BAY MECH PWR SYS 1(2) – ON

2. BSP REL
CRT If BSP DIS A, DIS B or DIS *, ✓ MCC
 BSP SEL – ITEM 19 EXEC (*)
 ✓ AMSB DC AMPS: .02 to .08
 ✓ MECH – steady A(B)
 ✓ BSP STAT – SET
A6U PL RETEN LAT 1(2) – REL, wait 4 sec, then OFF
CRT ✓ BSP STAT – REL

* If BSP STAT not REL: *
* Perform 1.3a PRIMARY MOTOR FAILS *
* TO DRIVE MECHANISM (PL SYS, SSE) *

3. BSP SET
On MCC GO:
A6U PL RETEN LAT 1(2) – LAT, wait 4 sec, then OFF
CRT ✓ BSP STAT – SET

* If BSP STAT not SET: *
* Perform 1.3a PRIMARY MOTOR FAILS *
* TO DRIVE MECHANISM (PL SYS, SSE) *

4. AMSB PWRDN
CRT DESEL – ITEM 20 EXEC (MECH SEL ITEMS 9–19 no *)

* If any MECH SEL – *, do not turn *
* AMSB OFF; notify MCC, continue *

- ✓ AMSB DC AMPS: < .04
 OFF – ITEM 8 EXEC (*)
A6U PL RETEN LOGIC PWR SYS 1(2) – OFF
R13L BAY MECH PWR SYS 1(2) – OFF

Notify MCC BSP MECHANISM CHECKOUT complete; report any anomalies

SSE CHECKOUT WITH FAILED MULE FMDM-A

- L11U 1. MULE SURVIVAL HEATER C/O
SURV HTR A PWR – ON
B PWR – OFF
✓PWR tb – gray
B PWR – ON
A PWR – OFF
✓PWR tb – gray

* If SURV HTR PWR tb – bp, *
* cycle SURV HTR A PWR sw *
* If still no joy, continue *

2. ESM-A HEATER C/O
ESM HTR A PWR – ON (tb-gray)

* If ESM HTR A PWR tb – bp, *
* cycle sw *
* If still no joy, continue *

ESM HTR A PWR – OFF (tb-bp)

3. SOPE A HEATER C/O
SOPE HTR A PWR – ON (tb-gray)

* If SOPE HTR A PWR tb – bp, *
* cycle sw *
* If still no joy, continue *

SOPE HTR A PWR – OFF (tb-bp)

4. VERIFY SSE STATUS

NOTE

If any parameter not in range, notify MCC

SM 211 SSE OVERVIEW

- ✓PCU – blank/blank
- ✓PCU OFF – *
- ✓CCTV ENA OFF – *
- ✓PWR OFF – *

POWER

- ✓FSS EPDSU 1/2 AMPS: < 3.0 (both)
- ✓FSS FMDM A/B AMPS: .5 to 1.1 (both)
 - ✓HTR – 1/2
 - ✓A1/A2 AMPS: < .4 (both)
 - ✓B1/B2 AMPS: < .4 (both)
 - ✓CCTV HTR AMPS: < .9
- ✓SAC EPDSU AMPS: < 35
- ✓FSS EPDSU VOLTS: 24.0 to 32.0 (both)
- ✓SAC EPDSU VOLTS: 24.0 to 32.0 (both)
- ✓DPC 1-12 – no *
 - ✓VOLTS: < 0.5
 - ✓AMPS: < 0.5

THERMAL

- ✓FSS EPDSU TEMP: -20 to 50 degC (both)
- ✓FMDM TEMP: -3 to 55 degC (both)
- ✓PCU TEMP: -20 to 50 degC (both)
- ✓IPCU TEMP: -30 to 50 degC
- ✓AMSB TEMP: -20 to 50 degC
- ✓SAC EPDSU TEMP: -20 to 50 degC (both)

5. AMSB CHECKOUT SIDE A

SM 212 SSE MECHANISMS

- ✓AMSB OFF - *
- ✓AMSB AC AMPS: < 0.20
- ✓AMSB TEMP: -20 to 50 degC
- ✓MECH - blank
- ✓PIVOT LO TACH: < 0.25 deg/min
- ✓ROTATOR TACH: < 0.9 deg/min

- A6U ✓PL RETEN LAT 1,2 (two) - OFF
 - ✓LOGIC PWR SYS 1,2 (two) - OFF
 - ✓PL SEL - 1

- R13L ✓PL BAY MECH PWR SYS 1,2 (two) - OFF

- CRT AMSB ON - ITEM 7 EXEC (A(B))

* If AMSB ON - blank, *
* record and continue *

- ✓AMSB AC AMPS: < .20
- ✓MECH - blank
 - ✓SEL (ITEMS 9-19) - no *
 - ✓STAT (ITEMS 9-19) - blank
- ✓PIVOT LO TACH: < .25 deg/min
- ✓ROTATOR TACH: < .9 deg/min
- ✓O/R DIS (ITEM 22) - *

* If any parameter out of limit, ✓MCC *

Perform following ITEM ENTRIES and checks per table

NOTE

SEL field should show '*' for only MECHANISM selected.
For any parameters not as expected, do not deselect;
contact MCC

ITEM EXEC	MECHANISM	SEL	STAT	AMSB DC AMPS	MECH	SM 97 PL SEL 1, LAT/REL LATCH 2(1)
9	DLOCK	9 - *	ENG	.02-.08	B(A)	01/00(10/00)
Expect 'S212 AMSB DC AMPS' msg						
21	O/R ENA(*)	9 - *	RDY	.09-.20		00/00(00/00)
11	PIVOT LO	11 - *	DN	.02-.08	B(A)	00/01(00/10)
Expect 'S212 AMSB DC AMPS' msg						
21	O/R ENA (*)	11 - *	RDY	.09-.20		00/00(00/00)
22	O/R DIS (*)	11 - *	DN	.02-.08	B(A)	00/01(00/10)
12	ROTATOR	12 - *	RDY	.02-.08		00/00(00/00)
14	B LAT 1	14 - *	OP	.02-.08	B(A)	00/01(00/10)
15	B LAT 2	15 - *	OP	.02-.08	B(A)	00/01(00/10)
16	B LAT 3	16 - *	OP	.02-.08	B(A)	00/01(00/10)
17	UMB MN	17 - *	REL	.02-.08	B(A)	00/01(00/10)
18	UMB B/U	18 - *	MAT	.02-.08	B(A)	01/00(10/00)
19	BSP	19 - *	SET	.02-.08	B(A)	01/00(10/00)
20	DESEL	9-19 blank		< .04		00/00(00/00)

AMSB OFF - ITEM 8 EXEC (*)

6. FSS PCU CHECKOUT

SM 211 SSE OVERVIEW

PCU ON - ITEM 1 EXEC (*)

✓PCU - P/S

✓DPC 1-12 - *

✓VOLTS: 33.7 to 35.3

✓AMPS: ≤ 0.5

* If DPC 1-12 AMPS: > 0.5, *

* PCU OFF - ITEM 2 EXEC (*), *

* ✓MCC *

PCU OFF - ITEM 2 EXEC (*)

✓PCU - blank/blank

✓DPC 1-12 - no *

7. FSS FMDM-A PWRDN

SM 1 DPS UTILITY

PORT ASSIGN STRING PL 1/2 PRI - ITEM 23 EXEC (*)

L12U

FSS FMDM-A PWR - OFF (tb-bp)

* If tb - gray, note and continue *

SM 211 SSE OVERVIEW

✓POWER FSS FMDM A/B AMPS: < 0.15/.5 to 1.1

Notify MCC, SSE CHECKOUT complete; report any anomalies

EVA HARDWARE/SA-2 JETTISON

1. CONFIG HST

Pivot FSS to 90° and rotate as reqd:

Perform PIVOT HST (IN-BAY OPS)

Perform ROTATE HST (IN-BAY OPS)

✓MCC (SA slew may be reqd)

✓BSP pinned

CDR/PLT

O14,O15,
O16:E

2. ORBITER MNVR TO JETTISON ATTITUDE

cb DDU (six) – cl

O14,O15,
O16:F

PRI RJD DRIVER,LOGIC (sixteen) – ON

✓DAP: A10/AUTO/VERN(ALT)

GNC 201 UNIV PTG

TRK OPTION:

TGT ID +2

BODY VECTOR +2

✓P +180.0

✓Y +0.0

OM +0.0

TRK – ITEM 19 EXEC (CUR-*)

3. ACQUIRE FAILED ORU

Configure orbiter lighting as reqd to support night jettison

Unstow HHL

MS

✓VTR recording

SM 94 PDRS CONTROL

✓PL ID, ITEM 3: 4

✓INIT ID, ITEM 24: 4

RHC
A8U

RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

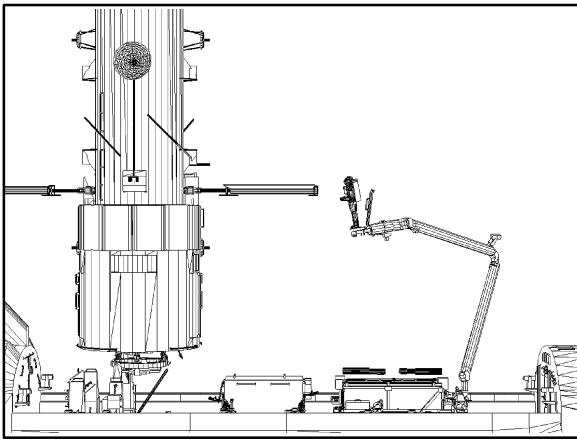
MODE – ORB LD, ENTER

If acquiring failed SA-2 from HST,

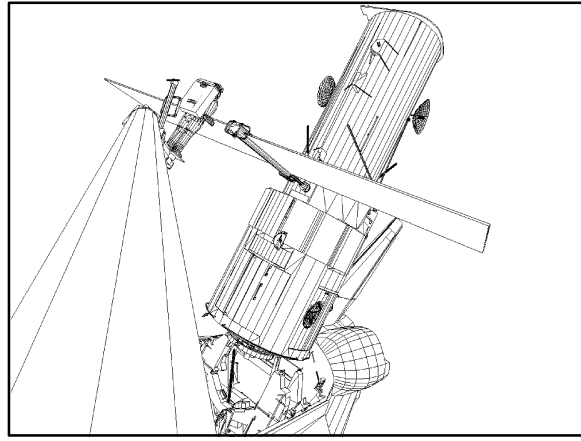
mnvr to Failed SA-2 Removal posn:

S:135°L B:30°R

X	Y	Z	PITCH	YAW	ROLL	PL ID
-854	1	-718	350	330	0	3
-870	10	-715	350	330	0	4
SY	SP	EP	WP	WY	WR	
-55.2	+120.4	-126.6	-14.1	+27.4	-162.9	



STARBOARD



ELBOW (20,-20)

CDR/PLT At SADA clamp removal:
DAP: FREE

MS/EV If acquiring other failed hardware,
mnmr as reqd to grasp failed ORU

4. RMS MNVR TO HARDWARE JETTISON POSN

SM 94 PDRS CONTROL

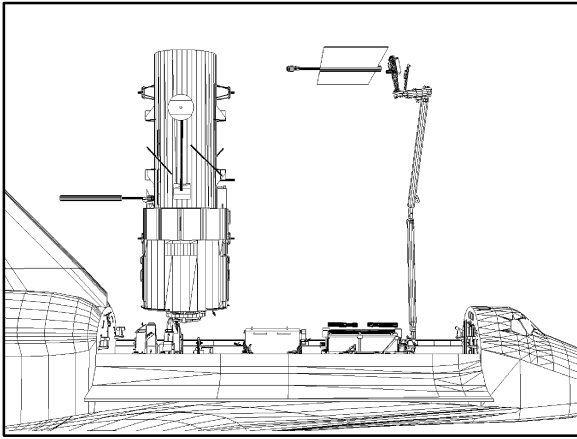
MS PL ID – ITEM 3 +5 EXEC
 INIT ID – ITEM 24 +5 EXEC

RHC RATE – as reqd (VERN within 10 ft)
A8U BRAKES – OFF (tb-OFF)
 MODE – ORB LD, ENTER

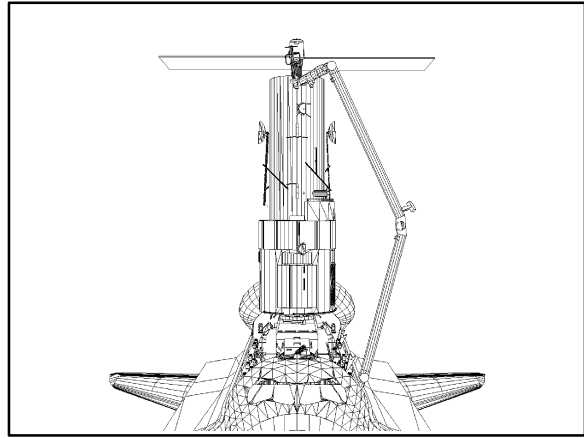
When hardware clear of HST:
DAP: A/AUTO/VERN(ALT),
FREE as reqd to maintain control of jettison hardware

Mnmr to Hardware Jettison posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-734	1	-983	350	330	0	3
-750	10	-980	350	330	0	4
-750	10	-980	350	330	0	5
SY	SP	EP	WP	WY	WR	
-95.4	+85.5	-40.3	-87.5	+62.7	-133.6	



STARBOARD



FRONT

5. PREP FOR RELEASE

GNC 20 DAP CONFIG

REBOOST CFG – ITEM 8 +2 EXEC

INTVL – ITEM 9 +5.1 2 EXEC

GNC UNIV PTG

Set start time to current time:

START TIME – ITEM 1 +__ +__ +__ +__ EXEC

When RMS EV stable at jettison position:

DAP: A/AUTO/VERN(ALT)

✓DAP TRANS: PULSE/PULSE/PULSE, LO Z

6. HARDWARE RELEASE

When in jettison attitude with rates damped:

✓MCC GO for release

DAP: FREE

SM 94 PDRS CONTROL

MS

PL ID – ITEM 3 +4 EXEC

INIT ID – ITEM 24 +4 EXEC

RHC
A8

RATE – COARSE (RATE MIN tb-OFF)

BRAKES – OFF (tb-OFF)

MODE – ORB LD, ENTER

NOTE

WY singularity should be monitored during RMS EV back-away.

Expect MA, C/W SINGULAR It – on (WY)

EV
MS

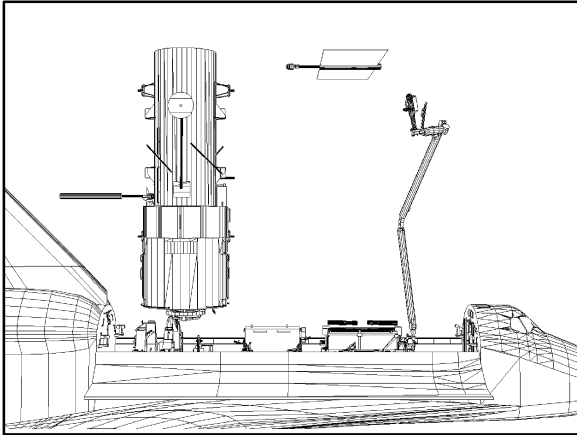
Release Hardware

Mnvr RMS EV 5 ft (minimum) clear of jettisoned hardware

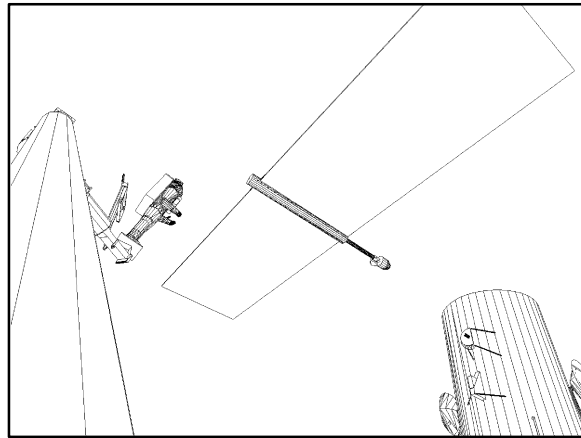
Maintain 5 ft clearance to structure during reboost

RMS EV Back-away posn: (for reference only)

X	Y	Z	PITCH	YAW	ROLL	PL ID
-699	1	-903	350	330	0	3
-715	10	-900	350	330	0	4
SY	SP	EP	WP	WY	WR	
-105.6	+101.2	-74.1	-87.4	+69.2	-113.9	



STARBOARD



ELBOW (30,-20)

7. REBOOST

GNC UNIV PTG

Set DURATION to 0:01:31.0

RBST – ITEM 25 EXEC (CUR-*)

NOTE

Reboost firings will start 14 sec after ITEM 25.

Reboost can be aborted with an ITEM 26 on UNIV PTG.

Expect approximately 16 pulses

Report HHL Range, Rdot to MCC

8. POST-REBOOST CLEANUP

On MCC GO:

DAP: A/LVLH/VERN(ALT)

O14,O15,
O16:E cb DDU (six) – op

O14,O15,
O16:F PRI RJD DRIVER,LOGIC (sixteen) – as reqd

Return to FLIGHT PLAN attitude

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RAPID SAFING WITHOUT HST

1. ✓PL BAY CONFIG
If EVA:
 - ✓BSP pip pin removed prior to EV crew ingress
 - ✓RMS clear of payload envelope
 2. ACTIVATE LOGIC AND MECH POWER
Perform this step only if FSS not stowed for entry, else go to step 7
- A6U ✓PL RETEN LAT 1,2 (two) – OFF
LOGIC PWR SYS 1,2 (two) – ON
✓PL SEL – 1
- R13L PL BAY MECH PWR SYS 1,2 (two) – ON

SM 212 SSE MECHANISMS

AMSB PWR ON – ITEM 7 EXEC (A(B))

3. ROTATE (DUAL MOTOR DRIVE)
Perform this step only if BSP installed and B/L not aligned with fixed target (+V3 FWD), else go to step 4

NOTE

Rotate to align closest berthing latch to fixed target.
If hardstop encountered, reverse direction

ROTATOR SEL – ITEM 12 EXEC (* RDY)

- A6U PL RETEN LAT 1(2) – REL or LAT as reqd
- L12U FSS FMDM B(A) PWR – ON (tb-gray)

SM 1 DPS UTILITY

PORT ASSIGN STRING PL 1/2 PRI(SEC) – ITEM 23(24) EXEC (*)

SM 212 SSE MECHANISMS

AMSB PWR ON – ITEM 7 EXEC (*)
ROTATOR SEL – ITEM 12 EXEC (* RDY)

- A6U PL RETEN LAT 2(1) – REL or LAT as reqd
- CRT ✓MECH – flashing A,B
Complete rotation to reqd posn
- CCTV
A6U When rotator in posn:
PL RETEN LAT 1,2 (two) – OFF

4. PIVOT DOWN (DUAL MOTOR DRIVE)

SM 212 SSE MECHANISMS

BSP SEL – ITEM 19 EXEC (* SET)
PIVOT LO SEL – ITEM 11 EXEC (* RDY)

A6U L12U If step 3 not performed:
 PL RETEN LAT 1(2) – REL
 FSS FMDM B(A) – ON

SM 1 DPS UTILITY
 PORT ASSIGN STRING PL 1/2 PRI(SEC) – ITEM 23(24) EXEC (*)

SM 212 SSE MECHANISMS
 AMSB PWR ON – ITEM 7 EXEC (*)
 PIVOT LO SEL – ITEM 11 EXEC (* RDY)

A6U CRT PL RETEN LAT 2(1) – REL
 ✓MECH – flashing A,B
 Complete pivot to reqd posn

A6U PL RETEN LAT 1,2 – OFF
 If BSP installed, go to step 5; else go to step 6

PL RETEN LAT 2(1) – REL

SM 1 DPS UTILITY
 PORT ASSIGN STRING PL 1/2 SEC(PRI) – ITEM 24(23) EXEC (*)

SM 212 SSE MECHANISMS
 PIVOT LO SEL – ITEM 11 EXEC (* RDY)

CRT

A6U PL RETEN LAT 1(2) – REL

CRT ✓MECH – flashing A,B
 Complete pivot to reqd posn

A6U PL RETEN LAT 1,2 – OFF

If BSP installed, go to step 5; else go to step 6

5. VERIFY BSP ENGAGED

CRT ✓BSP – ENG *

* If BSP – ENG (no *), ✓MCC *

6. CLOSEOUT

A6U PL RETEN LOGIC PWR SYS 1,2 (two) – OFF
 PL SEL – MON

R13L BAY MECH PWR 1,2 (two) – OFF

7. SSE RAPID DEACT

NOTE
 Expect 'I/O ERROR FLEX' msg; ignore

R1 PL PRI MNC – OFF (mom) (tb–OFF)
 CAB – OFF

DEORBIT PREP

PAYLOAD DEACT 6-2
HPGSCA STOW 6-3
PAYLOAD REACT 6-4
 ENTRY SW LIST/VERIF 6-4

**DEORBIT
PREP**

HPGSCA STOW

- | | | |
|--------|--|--|
| L12L | 1. <u>DISABLE PSP-BYPASS</u>
PSP BYP – DSBL
cb SW PWR – op | |
| PDIP | 2. <u>CONFIGURE PDIP</u>
Disconnect: Y-Cable from HST PI NO 1(2)
Re-install: HST PI NO 1(2) Turn-Around Plug | |
| HPGSCA | 3. <u>POWER OFF AND DISCONNECT HPGSCA</u>
Laptop pwr (side) – off
Expansion Chassis pwr (rear) – off | |
| MO30F | DC UTIL PWR MNC – OFF | |
| | Disconnect:
PWR cable from HPGSCA Expansion Chassis
Y-Cable 'PGSCA INPUT' (DB9) and 'PGSCA OUTPUT' (DB25) | |
| L11A2 | 4. <u>STOW HPGSCA</u>
Stow HPGSCA in middeck locker | |
| | Notify MCC, HPGSCA stowage complete | |

PAYLOAD REACT

SSE

Perform SSE ACTIVATION (SSE ACT/FSS PREP)

PAYLOAD ENTRY SW LIST/VERIF

TIG-1:55

R1	✓PL CAB	- OFF
	✓PRI MNC	- ctr (tb-OFF)
	✓MNB,FC3 (two)	- ctr (tb-OFF)
	✓AUX	- OFF
	✓AFT MNB	- OFF
	✓MNC	- OFF
A6U	✓PL RETEN LAT 1,2 (two)	- OFF (tb-bp)
	✓PL SEL	- MON
	✓LOGIC PWR SYS 1,2 (two)	- OFF
R13L	✓PL BAY MECH PWR SYS 1,2 (two)	- OFF
L12U	(FSS)	
	✓PCU PWR CONTR A	- OFF
	✓B	- OFF
	✓CCTV HTR PWR	- OFF (tb-bp)
	✓FSS FMDM-A PWR	- OFF (tb-bp)
	✓FMDM-B PWR	- OFF (tb-bp)
	✓HTR PWR	- OFF (tb-bp)
	✓cb FSS A SIDE PWR	- op
	✓PDIP PWR 2/Ku BAND	- op
	(TELESCOPE)	
	✓ESS BUS EXT PWR	- ctr (tb-bp)
	✓INT PWR	- ctr (tb-bp)
	✓FHST SHUTTER	- OP (tb-bp)
	✓RSU SURV HTR PWR	- OFF (tb-bp)
	✓MN BUS INT PWR	- ctr
	✓PWR ON tb	- bp
	✓ESS/MN SW ENA	- OFF (tb-bp)
	✓IPCU RLY CL tb	- bp
	✓MAIN BUS EXT PWR	- ctr (tb-bp)
	✓SSM WK LTS	- OFF
	✓cb SPACE TEL SW PWR	- op
	✓PDIP PWR 1	- op
L12L	(PSP BY-PASS)	
	✓PSP BYP	- DSBL
	✓cb SW PWR	- op
	(SAC)	
	✓ASIPE HTR A PWR	- ctr (tb-bp)
	✓B PWR	- ctr (tb-bp)
	✓SAP HTR A PWR	- OFF (tb-bp)
	✓B PWR	- OFF (tb-bp)
	✓SAC B-SIDE PWR ENA	- OFF (tb-bp)
	✓OPA HTR A PWR	- OFF (tb-bp)
	✓B PWR	- OFF (tb-bp)
	✓EPDSU HTR PWR	- OFF (tb-bp)
	✓cb SAC A-SIDE PWR ENA	- op

- L11U (KEEL CAM) |
 - ✓KEEL CAM HTR/ILLUM – OFF
 - ✓ENABLE – OFF
 - ✓cb SW PWR – op
 - (MULE)
 - ✓MULE FMDM–A PWR – OFF (tb–bp)
 - ✓FMDM–B PWR – OFF (tb–bp)
 - ✓SURV HTR A PWR – OFF
 - ✓B PWR – OFF
 - ✓PWR tb – bp
 - ✓ESM HTR A PWR – OFF (tb–bp)
 - ✓B PWR – OFF (tb–bp)
 - ✓SOPE HTR A PWR – OFF (tb–bp)
 - ✓B PWR – OFF (tb–bp)
 - ✓cb MULE SW PWR – op
 - KEEL CAM PWR – op

- L12L (PDIP)
 - ✓Ku BAND RATE – LO
 - ✓DC PWR 1,2 CAB PL (two) – OFF

- ML86B ✓cb MNB MAR 1 – op |
 - ✓2 – op

- ML85E ✓AC S1 – OFF
 - ✓cb AC CB1 – op
 - ✓DC 10 AMP MNB S2,S3,S4 (three) – OFF
 - ✓cb DC 10 AMP MNB CB2,CB3,CB4 (three) – op
 - ✓DC 10 AMP MNB S5 – ON
 - ✓cb DC 10 AMP MNB CB5 – cl
 - ✓PUMPS – OFF
 - ✓cb PUMPS 1,2 (two) – op

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HST QUICK RESPONSE

SA SLEW (INADVERTENT) 7-2
'S210 DCE +(-) WING' 7-2

HST QUICK
RESPONSE

SA SLEW (INADVERTENT)

SM 210 HST SYS

SADE OFF – ITEM 11 +9 9 EXEC (OFF)

DAP: FREE

Notify MCC

'S210 DCE +(-) WING'

SM 210 HST SYS

DCE PWR OFF – ITEM 10 +9 9 EXEC

DAP: FREE

Notify MCC

HST QUICK
RESPONSE

REFERENCE DATA

DPC ON/OFF INDEX NUMBERS 8-2
EXPECTED STATIC TWIST 8-3
DYNAMIC DEFLECTION LIMITS (PV2 FWD) 8-4
 (+V2 FWD) 8-5
WORST-CASE STATIC TWIST (-V2 FWD) 8-6
 (+V2 FWD) 8-7

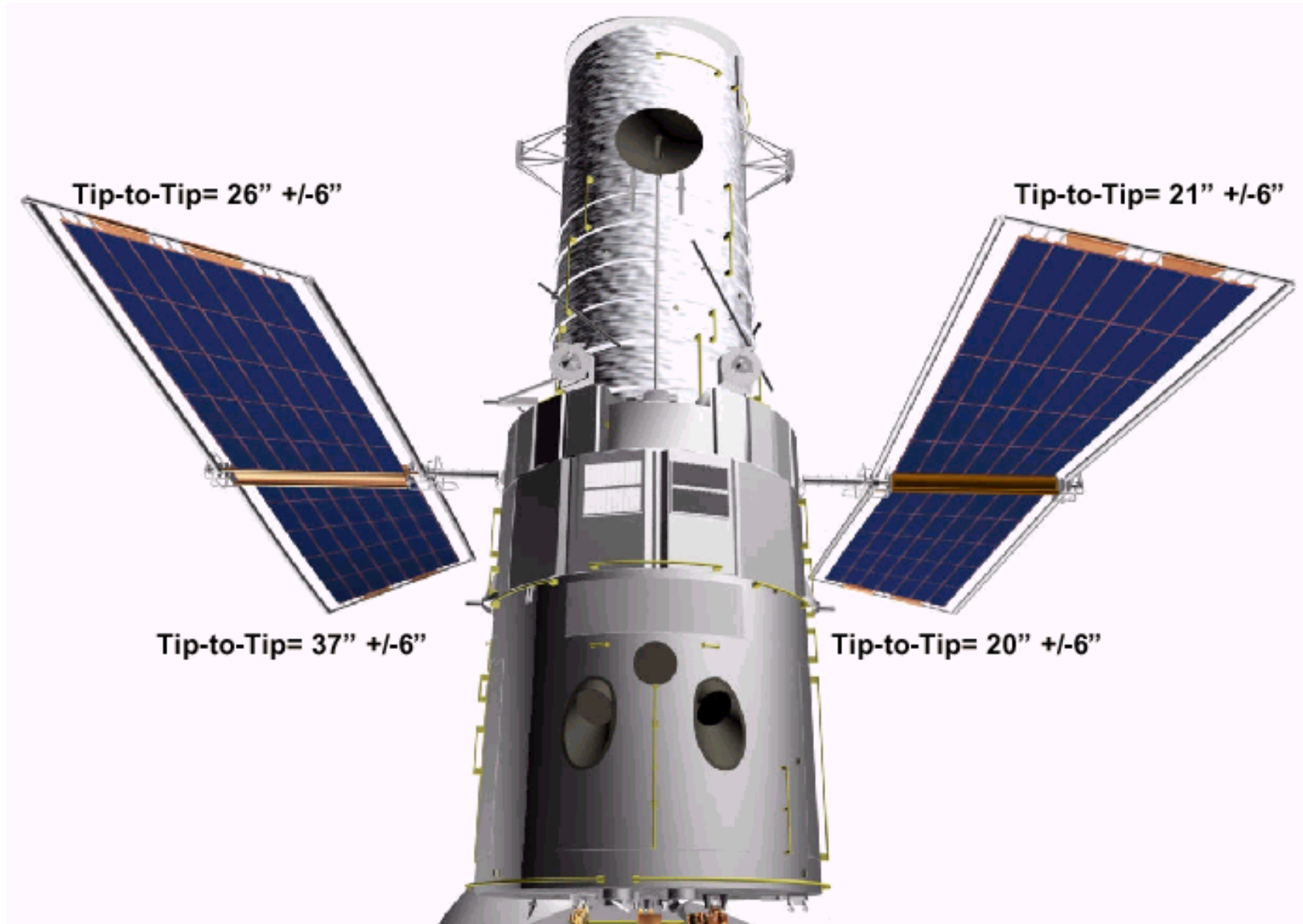
REF DATA

DPC ON/OFF INDEX NUMBERS

	DPC ON – ITEM 23 + <u>X</u> <u>X</u>	DPC OFF – ITEM 24 + <u>X</u> <u>X</u>
DPC	X X	X X
1	01	71
2	02	72
3	03	73
4	04	74
5	05	75
6	06	76
7	07	77
8	08	78
9	09	79
10	10	80
11	11	81
12	12	82

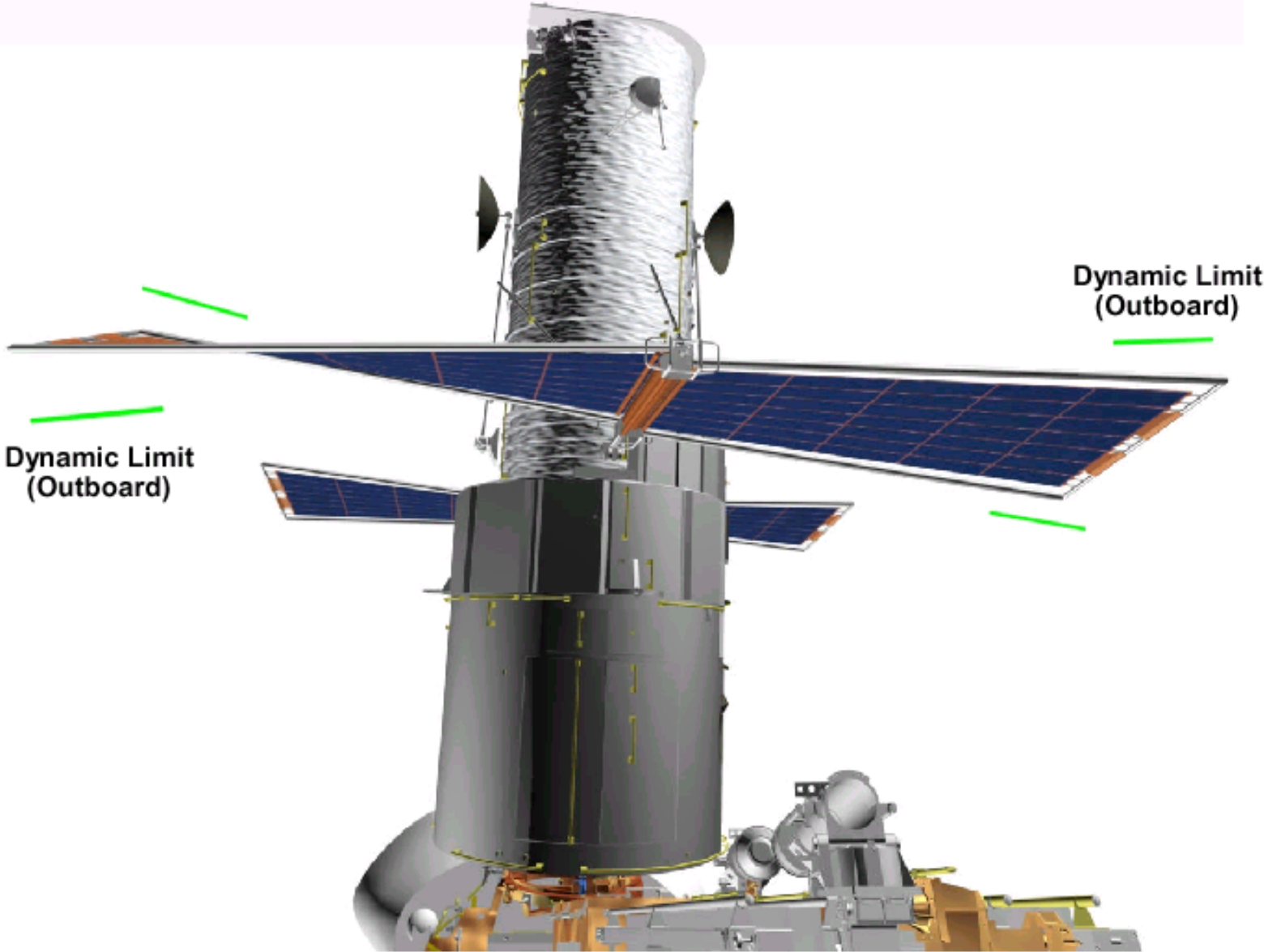
REF DATA

EXPECTED STATIC TWIST



Expected SA2 Twist (-V3 Forward) View from Aft Flight Deck

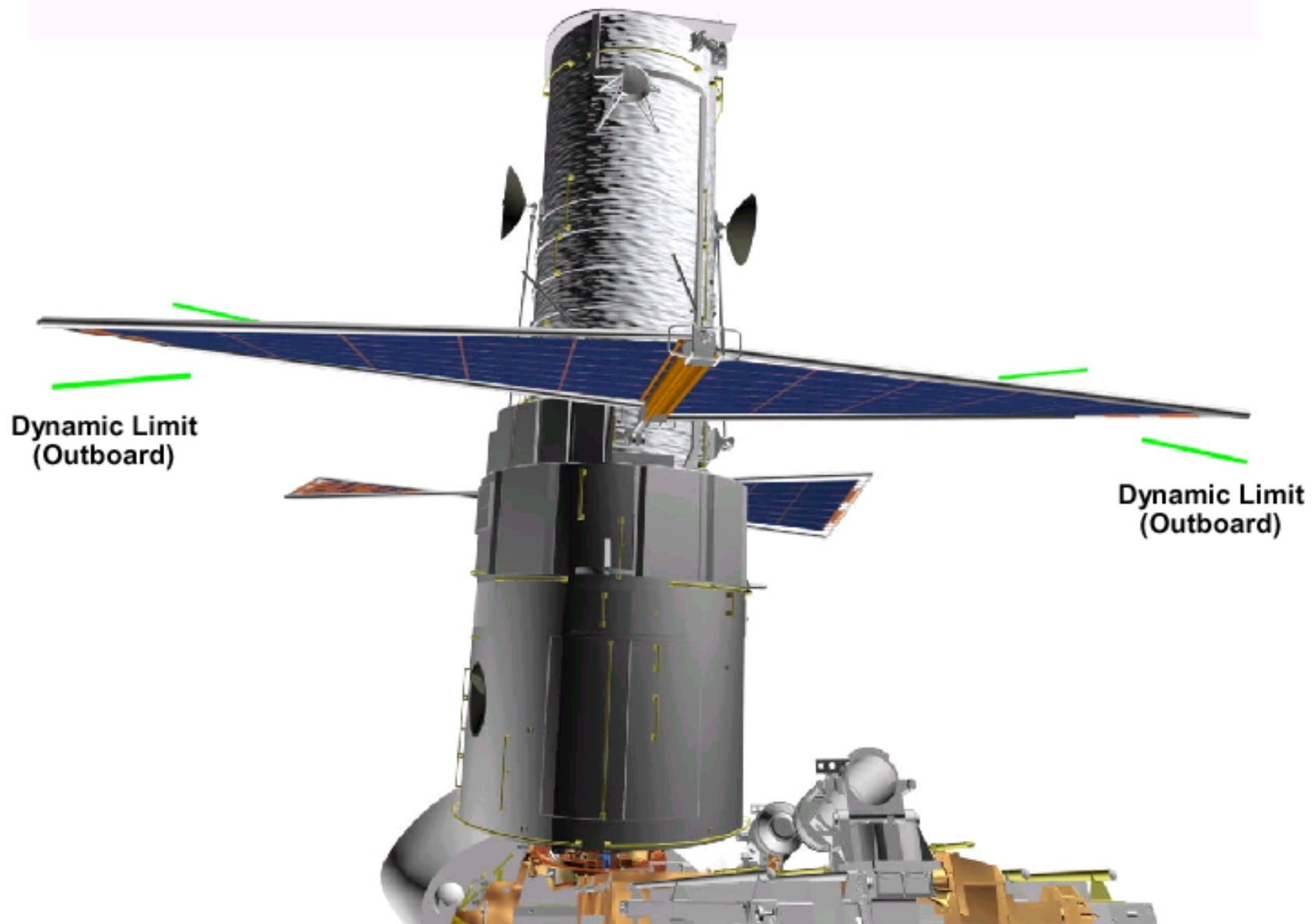
DYNAMIC DEFLECTION LIMITS (-V2 FWD)



Expected SA2 Twist (-V2 Forward) View from Camera D

DYNAMIC DEFLECTION LIMITS (+V2 FWD)

|



Expected SA2 Twist (+V2 Forward) View from Camera D

WORST-CASE STATIC TWIST (-V2 FWD)

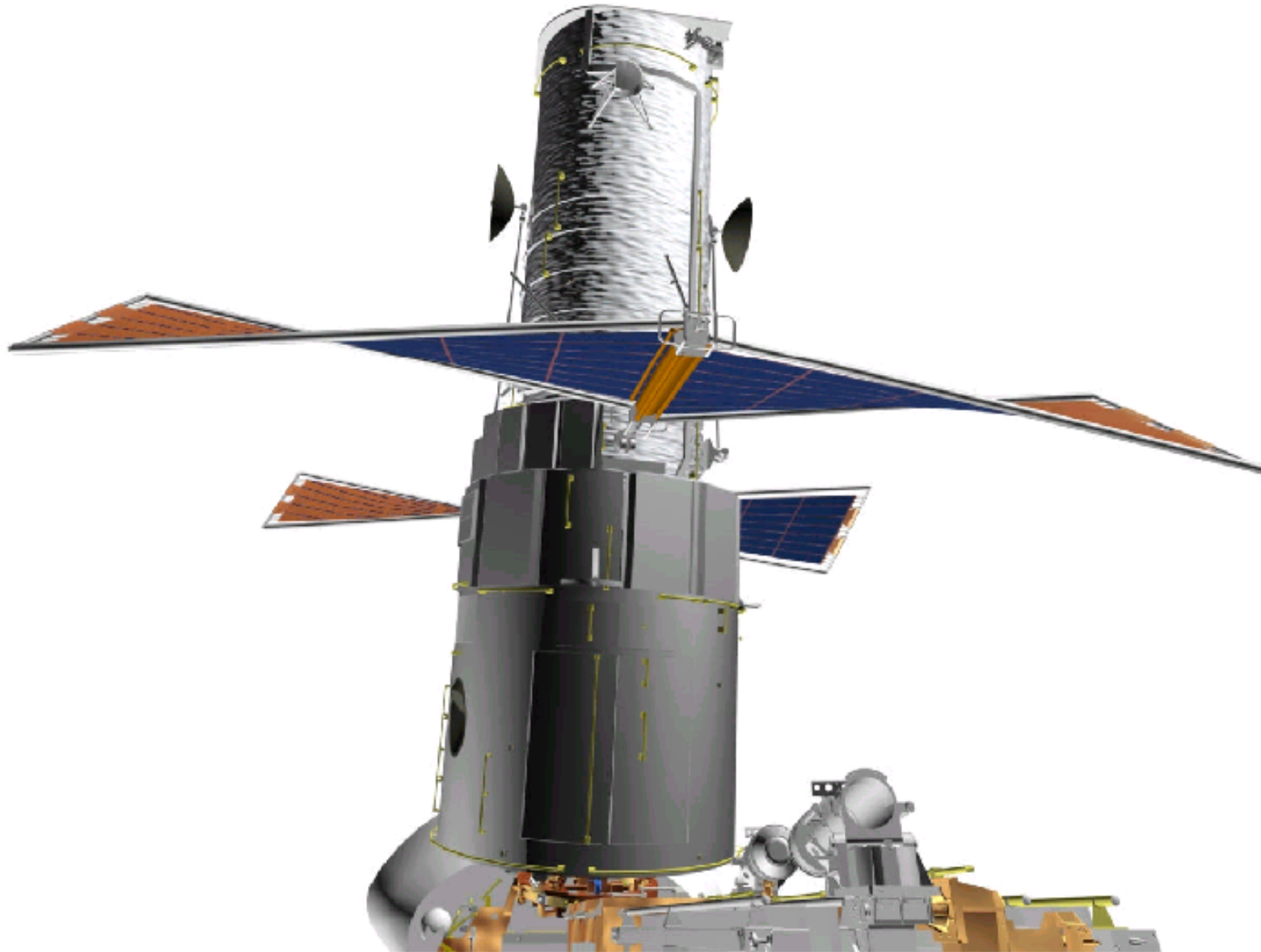
|



Limit of SA2 Twist (-V2 Forward) View from Camera D

WORST-CASE STATIC TWIST (+V2 FWD)

|



Limit of SA2 Twist (+V2 Forward) View from Camera D

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CUE CARD CONFIGURATION

CUE CARD
CONFIG

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HPGSCA RESTART

On MCC notification, recycle HPGSCA

1. HPGSCA PWR OFF
 HPGSCA laptop pwr (side) – off
 Expansion Chassis pwr (rear) – off
2. VERIFY HPGSCA Y-CABLE AND PWR CABLE CONNECTIONS
 PDIP ✓HST PI NO 1(2) connector secure
 MO30F ✓DC UTIL PWR MNC – ON
 ✓DC UTIL PWR MNC outlet connector secure
 HPGSCA ✓Y-Cable 'PGSC INPUT' (DB9), 'PGSC OUTPUT' (DB25) and pwr
 connectors secure
3. HPGSCA PWR ON
 Expansion Chassis pwr (rear) – on
 HPGSCA laptop pwr (side) – on

 Allow 'Windows'/'Hubble1' to start
4. CONFIGURE HPGSCA TO CURRENT HST DATA RATE
 ✓MCC for current data rate (if unknown)
 Depress hot key (F1–F6) for correct rate

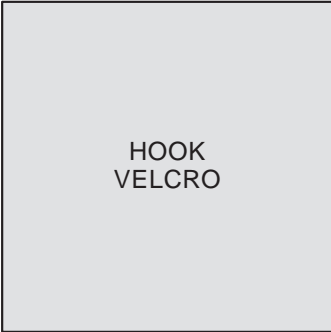
5. VERIFY STATUS INDICATORS

Signal Status

- ✓Sync Status Green
- ✓Signal Present Green
- ✓Overload Green
- ✓Offset Green

Report status to MCC

TOP
BACK OF 'HPGSCA RESTART'



PL OPS-1b/109/O/A





PAYLOAD OPS CHECKLIST

STS
109