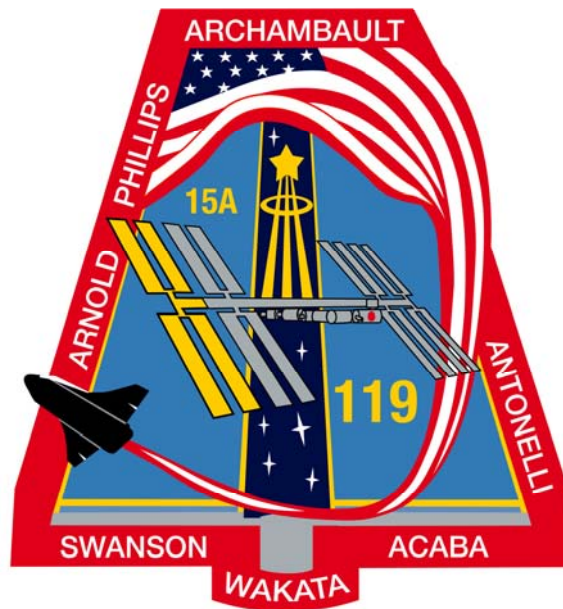


STS-119 ERRATA



CONTENTS:

Section A - Changes That Must Be Uplinked Real Time

Section B - Changes To Be Uplinked Real Time Only If Required

Section C - Changes Made To The Crew's FDF Prior To Launch

Attachment 1 - FDF Status for Flight

Attachment 2 through 16 - Change-out Pages

All technical changes to the SSP FDF, as documented in this errata package, have been approved through the Crew Procedures Control Board (Form 482) process.

Some of the changes apply to future flights also and will be republished after this flight. These changes are denoted by (¥) following the 482 number.

Some of the changes apply to this flight only and will not appear in future publications.

If you choose to incorporate 'flight-specific' changes into your 'generic' book(s), it is recommended that you do so in a manner that allows them to be removed for future flights (e.g., use pencil rather than ink, retain old pages rather than throw them away, etc.).

Refer questions or comments on these changes to the FDF Coordinator, FDF Manager, or Flight Activities Officer.

SECTION A: CHANGES THAT MUST BE UPLINKED REAL-TIME.

The following changes are needed post orbit-insertion but were received too late to be put into the crew books. They must be sent to the crew via voice or OCA.

None

SECTION B: CHANGES APPROVED FOR REAL-TIME UPLINK IF REQUIRED.

The following changes will be implemented in real-time only if the covered situation arises. Each console position should ascertain if his position is affected and be prepared to submit a flight note if uplink is required.

None

SECTION C: CHANGES MADE TO THE CREW'S FDF.

The following changes have been incorporated into the crew's flight copies.

ASC/ENT SYS

1. 482 # AESP-0727 (EZ): 119 AESP Prop Data

- On pages MS A6-4, MS E6-2, FB A11-3 and FB E11-1, under OMS TEMP DURING DUMP, add the appropriate values in the boxes provided so that they read:

1.

G51

 INH INCNCT L R

If aff OMS FU IN P ≥

225	220
-----	-----

 :

 | 2. Go to ENG FAIL >>

If aff OMS FU IN P ≤

205	204
-----	-----

 :

- On pages MS A6-2 and FB A11-1, in step 6, under OMS He TK P LOW add the value "46" in the box provided.
- On pages MS A6-3 and FB A11-2, in step 3, under OMS TK P LOW (↓, OX or FU) NOT DUMPING add the value "74" in the box provided.

ASCENT C/L

1. 482 # ASC -1862 : STS-119 Rendezvous Recovery

- Replace pages FB 2-5 & FB 2-6 with Attachment 2.

2. 482 # ASC -1863 : STS-119 Close to Launch Prop

- Replace the following pages with Attachment 3
 - FB 2-15 & FB 2-16
 - FB 2-19 thru FB 2-24
 - 6-1 through 6-4
 - 6-21 through 6-26
 - CC 10-13 thru CC10-18 (ASC 8aa/8b/8bb/7a/7aa/7b)

- Make the following changes via Pen & Ink:
 - On page FB 2-7, Bottom of graph
 - %OMS SIDE was "75" is "74"
 - DUMP TIME was "1:24" is "1:28"

ASCENT POCKET C/L

1. 482 # APCL-0266 (EZ): Cracked Window Pane PNOM Fix
 - On page 4-14, step 13, change via Pen & Ink
 - From: Floor vlv - 0
 - To: Floor vlv - CL

CONT DEORBIT

1. 482 # MULTI-1832 (EZ): PLB Floodlight Data
 - On page 7-18, block 21, fill in the boxes as shown:

PL BAY FLOOD AFT STBD -	ON
PORT -	ON
MID STBD -	ON
PORT -	ON
FWD STBD -	ON
PORT -	ON
BHD -	N/A

DEORBIT PREP

1. 482 # MULTI-1832 (EZ): PLB Floodlight Data
 - On page 1-33, block 7, and page 2-15, block 1, fill in the boxes as shown:

PL BAY FLOOD AFT STBD -	ON
PORT -	ON
MID STBD -	ON
PORT -	ON
FWD STBD -	ON
PORT -	ON
BHD -	N/A

EVA FS

NOTE: Due to launch slips and the resulting procedure changes, some pages in the EVA book have been affected by multiple 482s. As a result, some pages will be modified/changed-out twice. In order to ensure no changes were missed, the following Errata Package updates have been listed in the order received. This will result in "jumping around" the book and touching some pages multiple times while incorporating the errata package.

1. 482 # EVA FS -0238: EVA 1 Jettison/Attitude change
2. 482 # EVA FS -0239: Add JEMRMS Tabs EVA Getahead
3. 482 # EVA FS -0240: EVA4 and Get Ahead Safety Mods
4. 482 # EVA FS -0241: EVA3 Changeout Pages
5. 482 # EVA FS -0242: Sec 16 P&I updates
6. 482 # EVA FS -0243: Delete EVA 2 Inbrd Gaunt Check
 - Replace the following pages with Attachment 4:
 - FS 7-3 & FS 7-4
 - FS 7-89 & FS 7-90
 - FS 7-97 & FS 7-98
 - FS 7-101 through 7-108
 - FS 7-113 through FS 7-116
 - FS 7-119 through FS 7-124
 - FS 7-127 & FS 7-128
 - FS 7-131 through FS 7-136
 - FS 7-143 & FS 7-144
 - FS 7-183 & FS 7-184
 - Add page FS 7-189 & FS 7-190 after page FS 7-188
 - Make the following changes via Pen & Ink:
 - On page FS xiii & page FS 7-2, add **JEM RMS GROUNDING TABS FS 7-189** to end of section 7 table of contents
 - On FS 7-42, EV1 & EV2 columns, step 14 change "forward" to "aft"
 - On FS 7-43, EV1 & EV2 columns, step 21 change "forward" to "aft"
 - On FS 7-73, EV1 Column, step 7, line thru "and gauntlets"
 - On FS 7-73, EV3 Column, step 22, line thru "and gauntlets"
 - On FS 7-74, EV1 Column, step 4, line thru "and gauntlets"
 - On FS 7-74, EV3 Column, step 6, line thru "and gauntlets"
 - On FS 7-80, step 44, line thru "and gauntlets"
 - On FS 7-151, under the last line of Staging Bag, Fish Stringer #1 after 55-ft Safety Tether add: 85-ft Safety Tether (to strap) and highlight it in yellow
 - On FS 7-158, update Z1 Patch panel inhibit from: Z13B to: Z13B B
 - On FS 16-6, under P6 Battery Prep: Line out (delete) Block B
 - On FS 16-121, EV1 step 1, add: "Note: Consider joint range of motion prior to establishing body position"
 - On FS 16-121: EV1 step 7, Delete "in manual ratchet mode"; add "(6 secs / deg)"
7. 482 # EVA FS -0244 (EZ) & EVA FS-0245 (EZ): EVA Bag Qty change - ISS IMS
 - FOR FLIGHT CONTROL TEAM: No action required. These changes are added via changeout pages in step 13 below.
 - Make the following changes via Pen & Ink:
 - On page FS 7-14, line out in column 3:
 - Medium ORU Bag
 - Fish Stringer
 - JLP GPS Ant
 - On page FS 7-14 in column 2, add to Mesh Bag #1 (119 EVA Tools):
 - Fish Stringer

- On page FS 7-63, line out in column 2:
Medium ORU Bag
Fish Stringer
JLP GPS Ant B
- On page FS 7-63 in column 3, add to Mesh Bag #1 (119 EVA Tools):
 Fish Stringer

8. 482 # EVA FS -0247: EVA Safety Items

- Make the following changes via Pen & Ink:
 - On page FS 7-31, EV2 column, at the end of step 13 add:
 √Blk-Blk, pull/twist
 - On page FS 7-38, EV1 column, change step 12
From: Perform glove check and report status to IV
To: Perform glove/gauntlet check and report status to IV
 - On page FS 7-49, EV1 Step 1, and EV 2 step 3, add:
 √Gate closed
 √Hook locked
 √Safety Tether Reel unlocked

9. 482 # EVA FS -0248: EVA Mission Priority Items

- Replace pages FS 7-21 & FS 7-22, FS 7-25 & FS 7-26, FS 7-183 through FS 7-188 with Attachment 5.

10. 482 # EVA FS -0249 & EVA FS -0250: Add EFBM Inhibit to 15A JEMRMS & RS Inhibit for EVAs

- Replace pages FS 7-143 & FS 7-144, and pages FS 7-189 & FS 7-190 with Attachment 6.

11. 482 # EVA FS -0250: RS Inhibit for EVAs

- On pages FS 7-7, FS 7-56, and FS 16-142 add the following:

RSOS ALL EVAs IMPULSE (ИПИ-100) - Deactivate
--

12. 482 # EVA FS -0246 (EZ): ISS Tool Stow Changes
 482 # EVA FS -0251 (EZ): WETA Stowage update
 482 # EVA FS -0253: ISS Stowage - Tether count
 482 # EVA FS - 0254: Deletion of P1 RPCM R&R
 - Replace the following pages with Attachment 7:
 - FS 7-13 & FS 7-14
 - FS 7-61 through FS 7-64
 - FS 7-89 through FS 7-92
 - FS 7-97 through FS 7-100
 - FS 7-109 & FS 7-110
 - FS 7-115 & FS 7-116
 - FS 7-127 & FS 7-128
 - FS 7-135 & FS 7-136
 - FS 7-149 through FS 7-152
 - Make the following changes via Pen & Ink:
 - Cross out the following pages: 7-131 thru 7-134.

13. 482 # EVA FS - 0255: Add Grease Gun Stow to 15A EVA
 - Add the following via Pen & Ink to pages FS xiii & TEMP FS 8-1:
 15A GREASE GUN CLEANUP.....FS 8-18
 - Replace pages FS 8-17 & FS 8-18 with Attachment 8.

MAL

1. 482 # MAL-1706 : Post Fire QDM Doffing Update
 - On page 6-109, step 11 change the starred block
 FROM: HCN > 4.0 (2.1) ppm, HCL > 2.0 (1.0) ppm
 TO: HCN < 4.0 (2.1) ppm, HCL < 2.0 (1.0) ppm

MAPS

1. 482 # MAPS - 0296 (EZ): Adds Star Charts to FDF
 Info: Adds the Star Charts to Flight Data File Maps and Charts Book, based on a launch date of 2/12/2009.

2. 482 # MAPS - 0297 (EZ): Updated Star Charts
 Info: Updates the Star Charts to reflect a launch date of 2/22/09. Superceeds MAPS-0296.

3. 482 # MAPS - 0298 (EZ): Updated Star Charts 3-12
 Info: Updates the Star Charts to reflect a launch date of 3/12/09. Superceeds MAPS-0297.

ORBIT OPS FS

1. 482 # ORB OPS FS-0117A: Orb Ops FS DAP updates
 - Replace pages FS 3-5 through FS 3-8; FS 4-5 & FS 4-6; and FS CC 10-9 & FS CC 10-10 with Attachment 9.

2. 482 # ORB OPS FS-0118: STS-119 Star Pairs 12/2009/03
 - Replace pages FS 2-1 through FS 2-4 with Attachment 10.

ORBIT PKT C/L

1. 482 # OPCL -0507: OPCL MDM I/O Err String 4 Swap
 - Replace pages 3-7 & 3-8 with Attachment 11.

PDRS GEN C/L

1. 482 # PDRS -1068: LI LCS Characterization ¥
 - Remove "If performing late inspection" dashed block on pages 7-15 & 7-17 via Pen & Ink.

PHOTO/TV

1. 482 # P/TV -0074: P/TV119 Editorial Correction
 - Replace pages FS 1-13 & FS 1-14 and FS 1-21 & FS 1-22 with Attachment 12.
2. 482 # P/TV -0075 (EZ): P/TV119 Worklights Errata
3. 482 # P/TV -0076 (EZ): STS-119 G1 Light Changeout
 - FOR FLIGHT BOOKS ONLY: Replace draft errata pages FS 2-19 through FS 2-24 with pages from PCN-1.
 - FOR FLIGHT CONTROL TEAM: No action required. Above 482s added, then removed pages due to manifesting and demanifesting of worklights.

POST INSERT

1. 482 # PI -0849: PLBD Opening Cue Card
 - Replace pages 1-13 & 1-14 and pages CC 3-3 & CC 3-4 with Attachment 13.

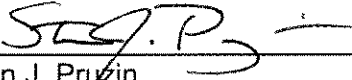
REF FS

1. 482 # REF FS-0029 (EZ): Documentation of 119 eFDF
 - INFO: The following electronic references were provided to the crew on the FDF Books CD and will be available to ground user via the "FLIGHT" status sheet: Draft Flight Plan Timelines, ISS Exterior Photos, and Payload Bay Closeout Photos.
2. 482 # REF FS-0032 (EZ): 119 PIPs - REV B
 - Replace pages FS 4-1 through FS 4-14 with Attachment 14.

SYS AOA

1. 482 # SYS AOA -0294 (EZ): 119 Landing Site Table
2. 482# SYS AOA -0297 (EZ): 119 Prop Data
3. 482# SYS AOA -0303 (EZ): 119 Recovery Prebank Table
 - Replace the following pages with Attachment 15:
 - 2-3 & 2-4
 - 2-9 & 2-10 (see #4 below)
 - 3-1 & 3-2
 - 8-3 to 8-6
 - 8-9 & 8-10 (see #4 below)
 - 9-1 & 9-2
4. 482# SYS AOA -0304 (EZ): 119 Prop Data Updates
 - Replace pages 2-9 & 2-10 and pages 8-9 & 8-10 with Attachment 16.
 - These pages replace the pages changed out above. Pages 2-9 & 8-9 will have page code of GEN Y.

PREPARED BY:



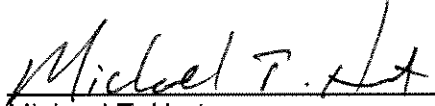
Steven J. Pruzin
FDF Coordinator

REVIEWED BY:



Michael T. Hurt
FDF Manager

APPROVED BY:



Michael T. Hurt
Chairman, Crew Procedures Control Board

STS-119 As Flown

Planned Launch:
03/11/2009

Date Status Changed:
03/10/2009 09:30 AM

FDF Coordinator: [Steve Pruzin](#) call @ 37719
FDF Alt. Coordinator: [Tanya Vaughan](#) call @34180
FDF OPS (CDPA) Flight Lead: [Lamar King](#) call @ 34236
Vehicle: OV103, OI-33

****CDPA Help Line: 32323****

“As Flown” with Final Errata P&I and change-out pages incorporated in electronic files

FDF DOCUMENT ⁽¹⁾	EDITION	REV	PCN ⁽²⁾	FINAL ERRATA ⁽³⁾	COMMENTS
A/E SYS	GEN	O	4	1	
APCL	GEN	N	9	1	
ASC	FIN		3	1^Δ , 2^Δ	
C D/O	GEN	L	8	1	
D/O	GEN	P	9	1	
DPS⁽⁴⁾	GEN	K	8		
ENT FS	FIN		1		
ENT	GEN	H	5		
EPCL	GEN	M	10		
EVA FS⁽⁵⁾ TPS Repair (pdf) (Word)	FIN	A		1^Δ , 2^Δ , 3^Δ , 4^Δ , 5^Δ , 6^Δ , 6 , 7 , 8, 9^Δ , 10^Δ , 11, 12^Δ , 13^Δ	
EVA	GEN	H	16		
FLT PLAN	FIN				Draft Timelines: Detailed , Summary , Overview
IFM	GEN	F	13		
MAL	GEN	J	1	1	
MAPS⁽⁵⁾	GEN	G	4	1 , 2 , 3	Landing Videos
MED	GEN	K	4		
OPCL	GEN	M	9	1^Δ	
ORB OPS FS	FIN			1^Δ , 2^Δ	
ORB OPS⁽⁵⁾	GEN	M	2		Crew Worn Equipment and Crew Escape Systems CBTs
PDRS FS	FIN				
PDRS	GEN	F	6	1	
P/TV FS	FIN		1	1^Δ , 2^Δ , 3^Δ	
P/TV	GEN	I	5		
PI	FIN			1^Δ	
PL PWR	FIN		1		
RNDZ	FIN		1		
REF FS⁽⁵⁾	FIN		1	1 , 2^Δ	Payload Bay Closeout Photos and ISS Exterior Images
REF	GEN	H	10		Access to SSSH (Section 9)
SYS AOA	GEN	K	2	1^Δ , 2^Δ , 3^Δ , 4^Δ	

NOTES: 1 - Linked to book 2 - Only latest applicable PCN given 3 - Linked to errata entries
4 - Paper copy not flown 5 - Has Electronic Supplement (CD)

Δ - Change-out pages included in electronic (linked) copy ↑ - Uplink required

- o This status sheet, associated books and errata package are located on a JSC LAN server at:
\\Jsc-mod-fs3\fd\Books\Current Published Documents\STS-119 Specific\119_FDF_CD
- o The primary purpose of FDF on the CD is to provide the flight crew a copy of those books for which no paper copy is flown (DPS Dictionary and SSSH).

ASCENT PROCEDURES

HOOK

R180	LVLH	
.84M	√P _c → 72%	
1.12M	√P _c → 104%	
P _c < 50+5 s	√SRB SEP (Backup AUTO SEP 2:21)	
	√TMECO	
	* If <u>NOT STABLE</u> (10 sec):	*
	* NO COMM – CSS & MAN THROT	*
MM103+10 s	√OMS assist	
	Close suit O2, open visor	
3:00	√EVAP OUT (T < 60)	
	* If Systems ABORT reqd:	*
	* RTLS at 3:40 or	*
	* TAL Select prior to <u>23000</u>	*
	* Otherwise Manual MECO <u>23700</u>	*
V _I = <u>13.2K</u>	√Roll Heads Up	
	* If Man Throttle (3 eng):	*
	* Man Shutdn at <u>25700</u>	*
	* If 1 eng:	*
	* <u>TRAJ</u> √SERC ON	*
	* When MPS PRPLT = 5%:	*
	MAN THROT	*
	* When MPS PRPLT = 2%:	*
	MIN THROT (P _c → 67%)	*
	* AUTO THROT	*
MECO	√V _I = <u>25819</u>	
MECO+20 s	√ET SEP	
	* If 'SEP INH':	*
	ET SEP – MAN	*
	If Rates > .7,.7,.7:	*
	MPS PRPLT DUMP SEQ – STOP	*
	Null rates	*
	ET SEP – SEP	*
	Post ET Sep -Z xlation:	*
	MPS PRPLT DUMP SEQ – GPC	*
	If Rates < .7,.7,.7:	*
	Assume Feedline Fail	*
	If V _I < <u>25760</u> :	*
	OPS 104 – PRO (√BFS 104)	*
	<u>NOTE</u> : Expect – 'Illegal Entry' (PASS)	*
	'Illegal TIG' (BFS)	*
▶ MM104+2 s	If ET Sep complete and HA > <u>72</u> :	
	+X xlation for 11 sec	
	√TGTS	
	√ASC PKT for failures	
	If OMS 1 not reqd:	
	OMS ENG (two) – OFF	
	Go to <u>POST OMS 1</u>	

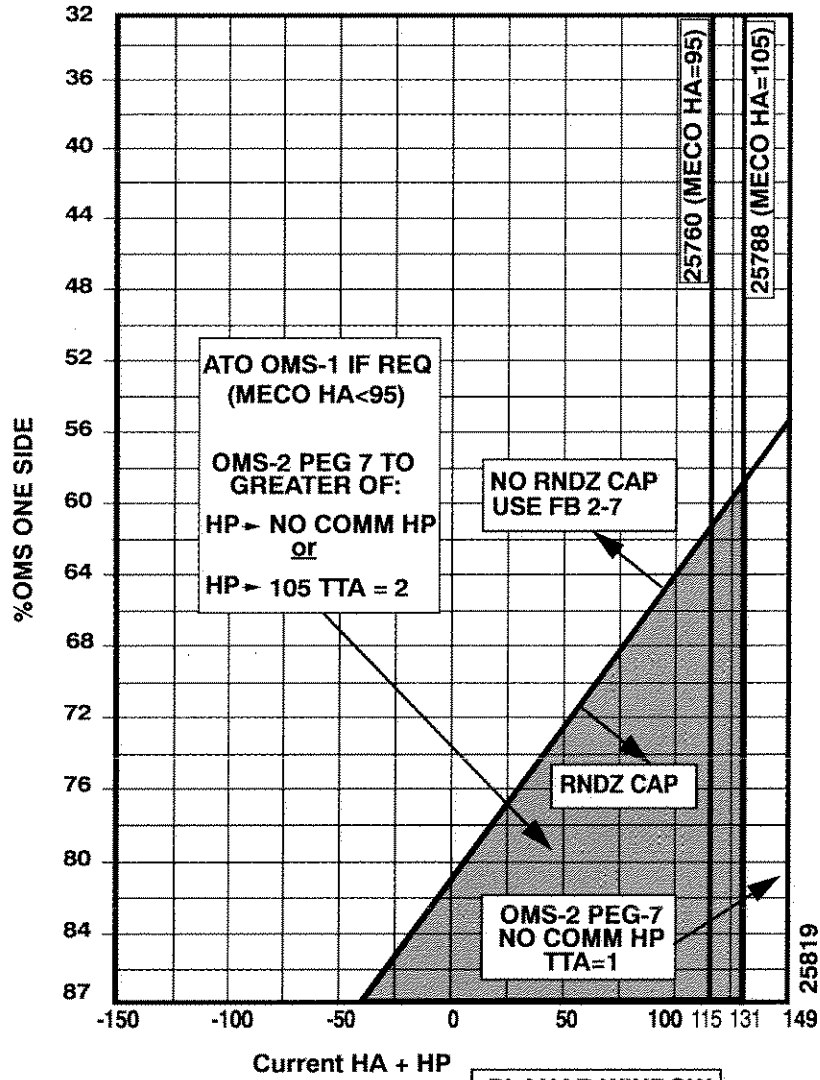
**OMS 1
TGTING**

TOP
BACK OF 'ASCENT PROCEDURES'

PILE

STS-119 OCFR1 CY
OMS 1/2 TGTING
RENDEZVOUS RECOVERY

ASC



	PLANAR WINDOW	
	1	2
NOMINAL OMS-2 HT		
NO COMM OMS-2 HP		

FB 2-6

ASC/119/FIN X

TAL PLT



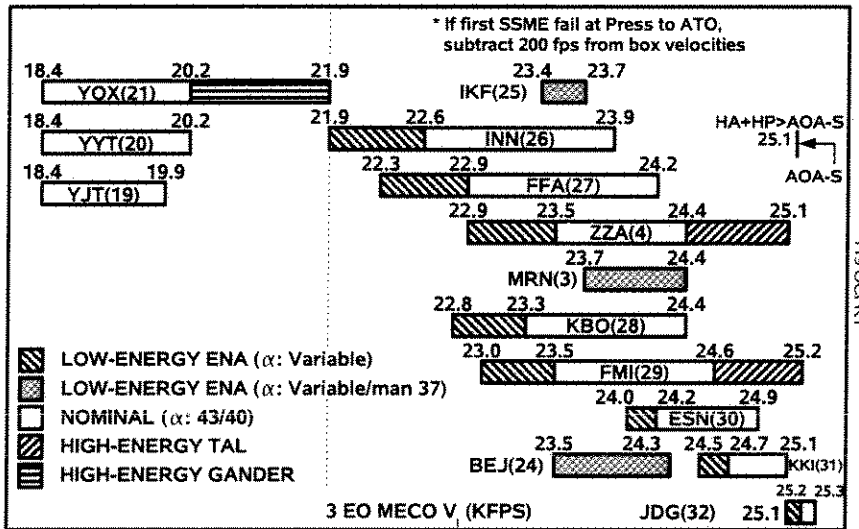
√OMS DUMP

- * If second eng fail: *
- * **G51** DUMP – ITEM 6 (*), 7 (*) *
- * Failed ME SHUTDN pb (two) – push *

√AUTO THROT

- * If STUCK TAL: *
- * When MPS PRPLT = 2%: *
- * MAN THROT, P_c → 67% *
- * AUTO THROT *

----- MECO -- V₁ ~24.0K @ CO mark ----- MECO -----



----- MM304 -----

- √OMS DUMP
- √ET DOORS – Closed and latched (MM304 +1:30)

V = 19K HYD MPS/TVC ISOL VLV (three) – CL
(hold 5 sec, tb-CL)

G50 √GPS, INCORPORATE

- V = 10K * If RCS < **N/A** % either side: *
- * **G51** AFT RCS INH, ITEM 13 EXEC *

V = 7K MLS (three) – ON (√channels)
I/O RESET

Go to ENTRY MANEUVERS (Cue Card)

ECAL

TOP
BACK OF 'TAL PLT'

PILE

POWERED ECAL

G51 √MAX THROT – ITEM 4 (*)


√ADI (two) – REF

√θ → 60°, Yaw → 45°

√Roll to Heads Up

G50 Select SITE and TACAN

When EAS > 4 and incr:

√Yaw to 

√Pitch down at 3°/sec

√MECO, ET SEP

ET SEP + 8s: CSS, pull to α = 58° at 4°/sec, AUTO

√MM602 (BFS, OPS 602 PRO)

Go to ECAL ENTRY

2 E/O ECAL (51.6°)

Velocity (VI)			Location	Site	RWY	TACANs
IP - 2:30	In Plane	IP + 2:30				
*5.3-6.8	*5.3-6.7	*5.3-6.7 6.8-7.3	Wilmington	6	ILM 06	ILM 117
*6.8-8.6	*6.7-6.9 6.9-8.1 *8.1-8.4	*6.7-7.9 *7.9-8.0	Cherry Point	7	NKT 32L	EWN 83 (D)
RTLS *8.6-9.7	RTLS *8.4-8.6 8.6-9.3	RTLS *8.0-8.1 8.1-9.8	Oceana NAS	8	NTU 32R	NGU 48
*9.7-10.5	9.2-9.9 *9.9-10.2	8.6-10.5	Wallops	9	WAL 28	SBY 49
	*10.2-10.5 10.5-12.3	9.5-11.2 10.1-12.7	Atlantic City Gabreski	11 15	ACY 31 FOK 06	CYN 81 HTO 83
*10.5-10.9 10.9-13.3	10.7-13.4	10.5-13.7	Otis ANGB	16	FMH 32	BOS 74
	11.5-13.2	11.1-13.9	Pease Int'l	17	PSM 34	ENE 118

*Probable bailout region

(D) - DME only

3 E/O ECAL (51.6°)

MM 602 Velocity (Vrel)			Location	Site	RWY	TACANs
IP - 2:30	In Plane	IP + 2:30				
*5.3-6.6	*5.3-6.6	*5.3-6.7	Wilmington	6	ILM 06	ILM 117
*6.6-8.9	*6.6-8.7	*6.7-7.3 7.3-8.0 *8.0-8.6	Cherry Point	7	NKT 32L	EWN 83 (D)
*8.9-10.2	*8.7-10.0	*8.6-9.7	Oceana NAS	8	NTU 32R	NGU 48
*10.2-10.9	*10.0-10.7	*9.7-10.6	Wallops	9	WAL 28	SBY 49
	*10.7-11.0	*10.6-11.0	Atlantic City	11	ACY 31	CYN 81
*10.9-11.9 11.9-13.9	*11.0-11.6 11.6-14.4	*11.0-11.2 11.2-14.7	Otis ANGB	16	FMH 32	BOS 74
	11.8-12.4	11.2-13.0	Gabreski	15	FOK 06	HTO 83
	12.8-13.8	12.9-14.2	Pease Int'l	17	PSM 34	ENE 118
13.5-17.2	13.3-17.4	13.1-17.2	Halifax Int'l	18	YHZ 23	UAW 38
15.2-18.0	15.0-18.0	14.9-18.0	Stephenville	19	YJT 09	YJT 78
15.4-18.0	15.3-18.0	15.3-18.0	St. Johns Int'l	20	YYT 29	UYT 23
15.5-18.0	15.4-18.0	15.2-18.0	Gander Int'l	21	YQX 21	YQX 74
		17.3-17.6	Goose Bay	22	YYR 26	UYR 40

*Probable bailout region

(D) - DME only

TAL

FB 2-16

ASC/119/FIN

TOP



HIGH-ENERGY GANDER PLT



-----MM304-----

HI-ENER
TAL

BFS, OPS 301 PRO (√304)

G50 Select Site YQX – ITEM 41 +2 1

TRAJ √BUGS, **HSI** √ \hat{H} , RANGE

√ET DOORS – closed and latched
(MM304 +1:30)

$\dot{H} = -800\uparrow$ Monitor \dot{H} , Nz

**When \dot{H}
stabilizes** Ensure Nz stays < 3.5

**Monitor
Traj** Report when orbiter bug reaches upper line

**Orbiter bug
below
upper line
or V = 6K** Monitor pitchdown at 1°/sec to center needles,
√P,R/Y – AUTO

V = 19K HYD MPS/TVC ISOL VLV (three) – CL
(hold 5 sec, tb-CL)

V = 15K **G50** √RWY, TACAN, S/B, ALTM
(PASS/BFS)

V = 10K * If RCS < **N/A** % either side: * |
* **G51** AFT RCS INH, ITEM 13 EXEC *

V = 10K √SPDBK → 81%
Go to ENTRY MANEUVERS (Cue Card)



FB 2-19

ASC/119/FIN X



TOP
BACK OF 'TAL PLT'



HIGH-ENERGY TAL CDR

MM104

Abort TAL:

√TAL flag set: **G50** ITEM 41 = TAL SITE (any site)
√Rates < .5°/sec; $\theta > 15^\circ$, $Y = 0 \pm 30^\circ$
PASS, OPS 301 PRO (√304)

**HI-ENER
GANDER**

-----**MM304**-----

MM304

P, R/Y – CSS
√VREL

VREL	ROLL (CSS) 4-5°/sec	ALPHA (CSS)
VREL ≥ 23,800	180°	80° ($\theta = 280^\circ$)
23,300 ≤ VREL < 23,800	180°	55°
VREL < 23,300	0°	55°

$\dot{H} = -200 \downarrow$ If Alpha = 80°, push to Alpha = 55° ($\theta = \sim 305^\circ$)

Earlier of
 $\dot{H} = -600 \downarrow$
or Guid Init Roll Heads Up at 4-5°/sec, maintain Alpha = 55°

$\dot{H} = -500 \uparrow$ R/Y – AUTO (√Rolls toward site before $\dot{H} > +200$)
Limit roll to 90° until V = 6K:
TRAJ Roll CMD > 90° R/Y CSS @ 90°
< 90° R/Y AUTO

Orbiter bug below upper line When commanded drag (\leftarrow) < 40:
Pitch down at 0.5°/sec, center pitch needle,
P – AUTO

V = 6K If energy still high:
Pitch down at 1°/sec, center pitch needle,
P, R/Y – AUTO

Go to ENTRY MANEUVERS (Cue Card)

FB 2-20

ASC/119/FIN



HIGH-ENERGY TAL PLT



-----MM304-----

BFS, OPS 301 PRO (√304)

[G50] If [FMI] GO TAL Site – Select [FMI] –
ITEM 41 + [29]

Otherwise, select best Wx site [ZZA] (Site 4)
or [FMI]

[TRAJ] √BUGS, [HSI] √^H, RANGE

√ET DOORS – closed and latched
(MM304 +1:30)

ABORT
DUMPS

Guid Init:
(D = 3, q̄ = 8,
EAS = 48) * If no comm and [ZZA/FMI] *
* initial Commanded Drag (←) ≥ [35] *
* [G50] Select Site [ESN] – ITEM 41 + [30] *

V = 19K HYD MPS/TVC ISOL VLV (three) – CL
(hold 5 sec, tb-CL)

V = 15K [G50] √RWY, TACAN, S/B, ALTM
(PASS/BFS)

V = 10K * If RCS < [N/A] % either side: * |
* [G51] AFT RCS INH, ITEM 13 EXEC *

V = 10K √SPDBK → 81%

V = 7K MLS (three) – ON (√channels)
I/O RESET

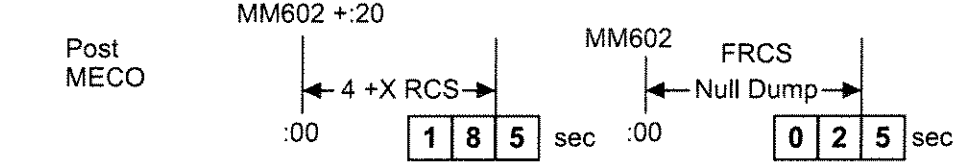
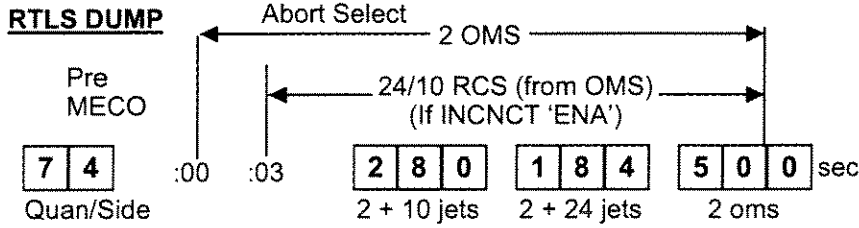
Go to ENTRY MANEUVERS (Cue Card)

TOP
BACK OF 'ECAL ENTRY'

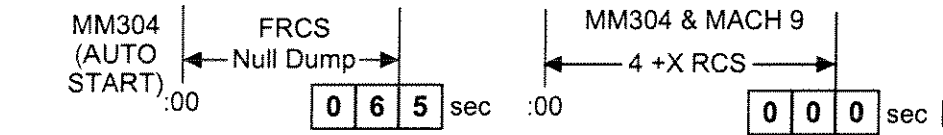
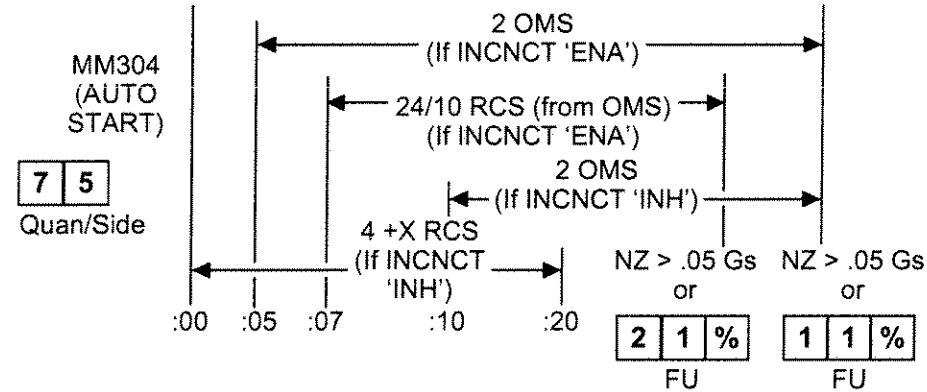
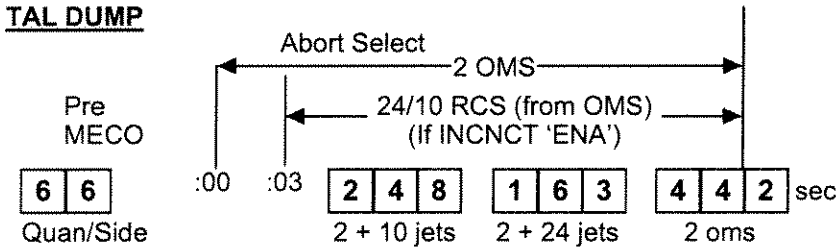


HI-ENER
TAL

RTLS DUMP



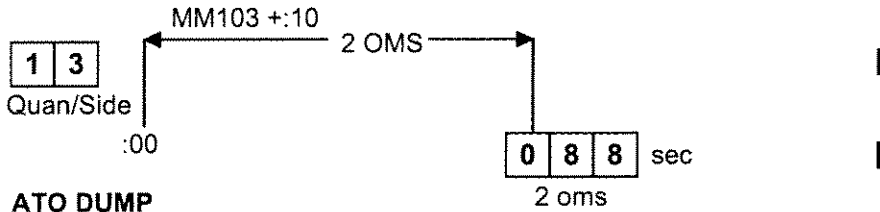
TAL DUMP



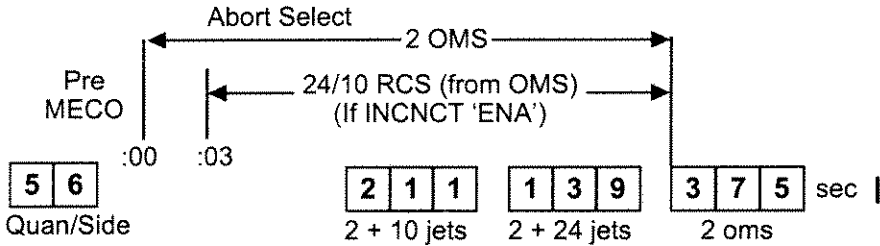
FB 2-22

ASC/119/FIN X

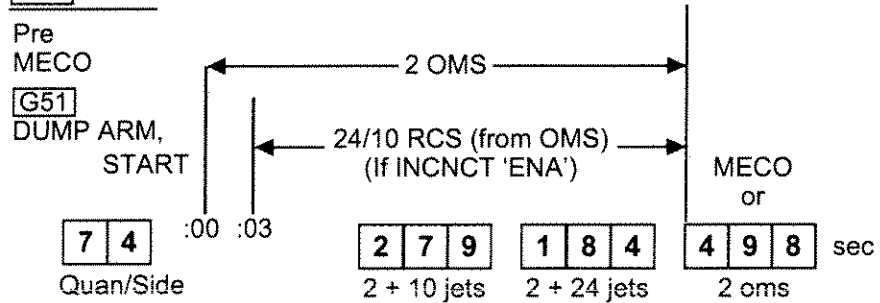
ASSIST/ATO/G51 DUMPS
ASSIST DUMP



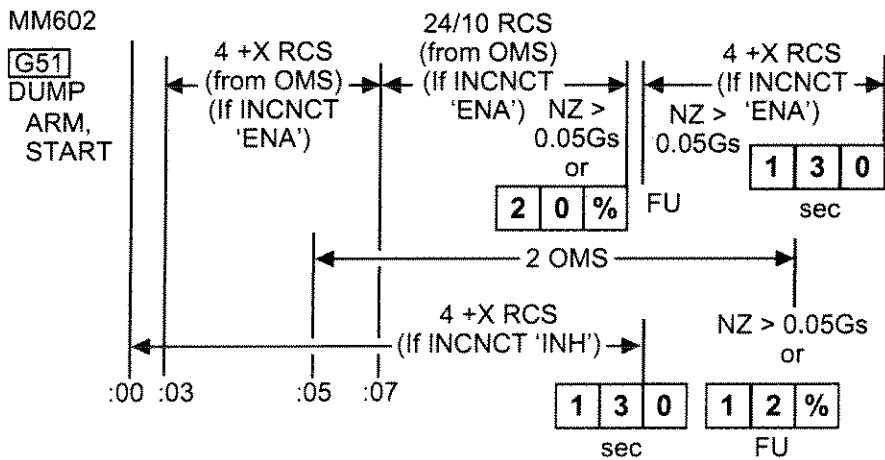
ATO DUMP



G51 DUMP



PWRD
CSS



TOP
BACK OF 'ASSIST/ATO/G51 DUMPS'



POWERED CSS – UPHILL/TAL

CSS & MAN THROT
(IF MET < 1:30, ENGAGE BFS)

Yaw to **E** until 2:30
Then **I** uphill
or **R** if TAL

If TAL \sqrt{HDG}	
ZZA	010
MRN	016
FMI	006

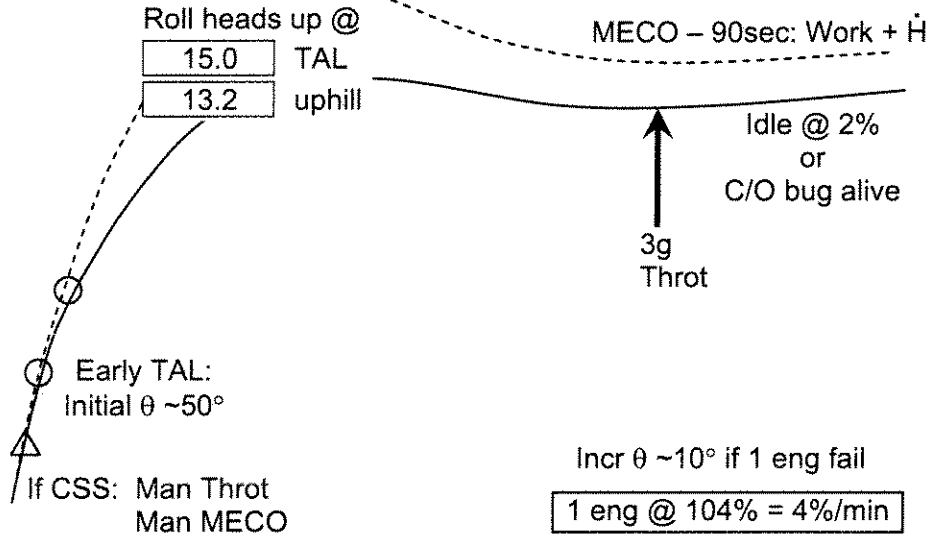
Man MECO @ CO mark

$\dot{H} =$ 272

If TAL: $\dot{H} = +100$

Max H = 400 – 420K
for early TAL

**ABORT
DUMPS**



FB 2-24

ASC/119/FIN



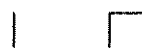


AOA PADS

AOA
PADS

6-1

ASC/119/FIN



DIRECT INSERTION AOA DEL PAD

DEORBIT										
PRPLT	() [] [] [] [] [] [] [] [] []									
BURN CUE CARD:										
OMS ENG FAIL XFEED QTY CUE					%L	[] []	%R	[] []		
TOT AFT QTY 1 (%)							0	9	4	
TOT AFT QTY 2 (%)							5	6		
FLIP ΔV							5	7		
AFT ΔV							3	1		
B/U SITE							N	/	A	
FRCS: DUMP TO % (USE TIME AS CUE)					<input type="checkbox"/> OX	<input type="checkbox"/> FU				
ENTRY / LANDING										
EI - 5 MM303 INRTL ATT (6-30)			R	[] [] []	P	[] [] []	Y	[] [] []		
MM304 PREBANK (ENT MNVR Cue Card)										
					<input type="checkbox"/> L	<input type="checkbox"/> R				
ALTM SET (6-34)										
CLG INIT										
					:	[] [] []	:	[] [] []		
EXPECTED AIL TRIM										
					<input type="checkbox"/> L	<input type="checkbox"/> R				
VREL 1ST REVERSAL										
XCG AT TD										
LAND SITE		[] []	RWY			[] [] [] [] [] []				
<input type="checkbox"/> L	<input type="checkbox"/> OVHD	[] [] [] []	deg	[] []	MLS					
<input type="checkbox"/> R	<input type="checkbox"/> STRT	[] [] [] []	TAC							
ΔT MACH < 1 TO HAC		[] [] []	MAX Nz		[] [] []	Nz LIMIT		[] [] []	WINDS: (ENT MNVR Cue Card)	
ΔT HAC INIT TO H = 20K										
:		[] [] []								
AIMPOINT		SPEEDBRAKE		%		[] []	@ 3K			
<input type="checkbox"/> NOM	<input type="checkbox"/> NOM									
<input type="checkbox"/> CLOSE-IN	<input type="checkbox"/> S.F.									
REMARKS:										

AOA
PADS

W/OMS 1 AOA DEL PAD

DEORBIT																																			
PRPLT					()																														
BURN CUE CARD:																																			
OMS ENG FAIL XFEED QTY CUE					%L		%R																												
TOT AFT QTY 1 (%)							0 9 4																												
TOT AFT QTY 2 (%)							5 6																												
FLIP HP =		()		+		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>						OR		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td>1</td><td>9</td></tr> <tr><td>0</td><td>7</td></tr> </table>		1	9	0	7	STEEP				+		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td>2</td><td>8</td></tr> <tr><td> </td><td> </td></tr> </table>		2	8			=			
1	9																																		
0	7																																		
2	8																																		
		TGT HP				ΔHP		(REDES SITE)		ΔHP		(PRI SITE)		(FLIP ΔV)		2																			
AFT HP =		()		+		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td>1</td><td>6</td></tr> <tr><td> </td><td> </td></tr> </table>		1	6			+		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td>1</td><td>6</td></tr> <tr><td> </td><td> </td></tr> </table>		1	6			=															
1	6																																		
1	6																																		
		TGT HP				(AFT ΔV)		2																											
B/U SITE										N / A																									
FRCS: DUMP TO % (USE TIME AS CUE)										<input type="checkbox"/> OX		<input type="checkbox"/> FU																							
ENTRY / LANDING																																			
EI - 5 MM303 INRTL ATT (6-30)					R		P		Y																										
MM304 PREBANK (ENT MNVR Cue Card)							<input type="checkbox"/> L		<input type="checkbox"/> R																										
ALTM SET (6-34)																																			
CLG INIT																																			
EXPECTED AIL TRIM							<input type="checkbox"/> L		<input type="checkbox"/> R																										
VREL 1ST REVERSAL																																			
XCG AT TD																																			
LAND SITE		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td> </td><td> </td></tr> </table>				RWY		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table>																											
		<input type="checkbox"/> L		<input type="checkbox"/> OVHD		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td> </td><td> </td><td> </td><td> </td></tr> </table>						deg		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td> </td><td> </td></tr> </table>				MLS																	
		<input type="checkbox"/> R		<input type="checkbox"/> STRT		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td> </td><td> </td><td> </td><td> </td></tr> </table>						TAC																							
ΔT MACH < 1 TO HAC					<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td> </td><td> </td><td> </td><td> </td></tr> </table>						MAX Nz		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td> </td><td> </td><td> </td><td> </td></tr> </table>						Nz LIMIT		WINDS:		(ENT MNVR Cue Card)												
ΔT HAC INIT TO H = 20K					<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td> </td><td> </td><td> </td><td> </td></tr> </table>																														
AIMPOINT					<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td> </td><td> </td><td> </td><td> </td></tr> </table>						SPEEDBRAKE		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td> </td><td> </td></tr> </table>				% @ 3K																		
		<input type="checkbox"/> NOM		<input type="checkbox"/> NOM																															
		<input type="checkbox"/> CLOSE-IN		<input type="checkbox"/> S.F.																															
REMARKS:																																			

DEORBIT MNVR PAD

OMS BOTH 1 L 2 R 3 RCS SEL 4 TV ROLL 5 TRIM LOAD P 6 LY 7 RY 8 WT 9 TIG 10 TGT PEG 4 C1 14 C2 15 HT 16 0T 17 PRPLT 18	BURN ATT R 24 P 25 Y 26 REI TXX	AVTOT TGO VGO X VGO Y VGO Z HA HP TGT
---	--	--

RCS I'CNCT: [] [] [] []	L OMS → RCS R OMS → RCS NONE
--------------------------------	------------------------------------

NOTES

HINGE

```

* RCS COMPLETION:
* IF DIRECT INSERTION:
*   THC +X to ΔVTOT = 0 or TOT AFT QTY 1  %
*
*   At AFT QTY 1      THC +X to FLIP ΔV or
*   if CUR ΔVTOT:    TOT AFT QTY 2  % then
*                   FRCS COMPLETION
*
*   FLIP  -----
*   ΔV                                     FRCS COMPLETION
*
*   AFT  -----
*   ΔV                                     THC +X to TGT ΔV
*
*   TGT  -----
*   ΔV
*
* If w/OMS 1:
*   THC +X to TGT HP or TOT AFT QTY 1  %
*
*   At AFT QTY 1      THC +X to FLIP HP or
*   if CUR HP:        TOT AFT QTY 2  % then
*                   FRCS COMPLETION
*
*   FLIP  -----
*   HP                                     FRCS COMPLETION
*
*   AFT  -----
*   HP                                     THC +X to TGT HP
*
*   TGT  -----
*   HP
*
* FRCS COMPLETION:
*   Mnvtr to -X Att (pitch up at 3%/sec to VGOz = +1/4 ΔVTOT)
*   THC -X to ΔVTOT = 0 or FRCS depletion (JETS FAIL OFF)

```

```

CUTOFF
+ :02 OMS ENG(s) – OFF (If < 3 IMU, at  : )
* AFT RCS RECONFIG if INTERCONNECT *
Trim X,Z residuals < 2 fps (< 0.5 fps if shallow)
ASC-8aa/119/A/X

```


HINGE

```

* RCS COMPLETION:
* If DIRECT INSERTION:
*   THC +X to ΔVTOT = 0 or TOT AFT QTY 1 %
*
*   At AFT QTY 1      THC +X to FLIP ΔV or
*   if CUR ΔVTOT:    TOT AFT QTY 2  % then
*                   FRCS COMPLETION
*
*   FLIP -----
*   ΔV                                     FRCS COMPLETION
*
*   AFT -----
*   ΔV                                     THC +X to TGT ΔV
*
*   TGT -----
*   ΔV
*
* If w/OMS 1:
*   THC +X to TGT HP or TOT AFT QTY 1 %
*
*   At AFT QTY 1      THC +X to FLIP HP or
*   if CUR HP:        TOT AFT QTY 2  % then
*                   FRCS COMPLETION
*
*   FLIP -----
*   HP                                     FRCS COMPLETION
*
*   AFT -----
*   HP                                     THC +X to TGT HP
*
*   TGT -----
*   HP
*
* FRCS COMPLETION:
*   Mnvr to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT)
*   THC -X to ΔVTOT = 0 or FRCS depletion (JETS FAIL OFF)

```

CUTOFF

```

+ :02 OMS ENG – OFF (if < 3 IMU, at :  )
* AFT RCS RECONFIG if INTERCONNECT *
Trim X,Z residuals < 2 fps (< 0.5 fps if shallow)

```

ASC-8bb/119/A/X

AOA DEORBIT BURN (RCS)

√MM302 √RCS SEL
√RCS BURN CONFIG (L OMS I'CNCT)

L,R OMS He PRESS/VAP ISOL A (two) – OP
... Wait 2 sec ... B (two) – OP

√DAP – INRTL/DISC
ADI – LVLH(REF)/MED/MED
FLT CNTLR PWR (two) – ON

TIG THC +X
 Maintain PITCH ATT ERR ± 3°
 Monitor ΔVTOT

RCS I'CNCT TK SW at ΔVTOT =
 R OMS XFEED (two) – OP
 L OMS XFEED (two) – CL

┌ OMS PRPLT LOW
├ AFT RCS RECONFIG AT ΔVTOT =
└ RCS COMPLETION

- * **OMS PRPLT FAIL (MULTIPLE JETS FAIL OFF):** *
- * Secure aff OMS *
- * ITEM 18 +0 EXEC *
- * Resel jets *
- * Interconnect good OMS to RCS *
- * THC +X (√OMS% vs RCS Burn Time) *
- * AFT RCS RECONFIG *
- * RCS COMPLETION *
- * **RCS +X JET FAIL OFF:** *
- * ITEM 18 +0 EXEC *
- * Resel jets *

ASC-7a/A/B

HINGE

MS ONLY

6-24

ASC/119/FIN

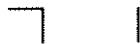
HINGE

* **RCS COMPLETION:** *
* If DIRECT INSERTION: *
* THC +X to $\Delta VTOT = 0$ or TOT AFT QTY 1 % *
* *
* At AFT QTY 1 THC +X to FLIP ΔV or *
* if CUR $\Delta VTOT$: TOT AFT QTY 2 % then *
* FRCS COMPLETION *
* *
* FLIP ----- *
* ΔV FRCS COMPLETION *
* *
* AFT ----- *
* ΔV THC +X to TGT ΔV *
* *
* TGT ----- *
* ΔV *
* *
* If w/OMS 1: *
* THC +X to TGT HP or TOT AFT QTY 1 % *
* *
* At AFT QTY 1 THC +X to FLIP HP or *
* if CUR HP: TOT AFT QTY 2 % then *
* FRCS COMPLETION *
* *
* FLIP ----- *
* HP FRCS COMPLETION *
* *
* AFT ----- *
* HP THC +X to TGT HP *
* *
* TGT ----- *
* HP *
* *
* **FRCS COMPLETION:** *
* Mnv'r to -X Att (pitch up at 3°/sec to VGOz = +1/4 $\Delta VTOT$) *
* THC -X to $\Delta VTOT = 0$ or FRCS depletion (JETS FAIL OFF) *

CUTOFF:
VGOx = 0, release THC
AFT RCS RECONFIG
Trim Inplane X,Z residuals < 2 fps (< 0.5 fps if shallow)
ASC-7aa/119/A/X



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MS ONLY

6-26

ASC/119/FIN



TOP
HINGED AT BOTTOM OF
'AOA DEORBIT BURN (2 ENG)'
HINGE

```

* RCS COMPLETION:
* If DIRECT INSERTION:
*   THC +X to ΔVTOT = 0 or TOT AFT QTY 1  %
*
*   At AFT QTY 1      THC +X to FLIP ΔV or
*   if CUR ΔVTOT:    TOT AFT QTY 2  % then
*                   FRCS COMPLETION
*
*   FLIP  -----
*   ΔV                                     FRCS COMPLETION
*
*   AFT  -----
*   ΔV                                     THC +X to TGT ΔV
*
*   TGT  -----
*   ΔV
*
* If w/OMS 1:
*   THC +X to TGT HP or TOT AFT QTY 1  %
*
*   At AFT QTY 1      THC +X to FLIP HP or
*   if CUR HP:        TOT AFT QTY 2  % then
*                   FRCS COMPLETION
*
*   FLIP  -----
*   HP                                     FRCS COMPLETION
*
*   AFT  -----
*   HP                                     THC +X to TGT HP
*
*   TGT  -----
*   HP
*
* * FRCS COMPLETION:
*   Mnv to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT)
*   THC -X to ΔVTOT = 0 or FRCS depletion (JETS FAIL OFF)
*
* CUTOFF
* + :02 OMS ENG(s) - OFF (If < 3 IMU, at : )
*       * AFT RCS RECONFIG if INTERCONNECT *
*       Trim X,Z residuals < 2 fps (< 0.5 fps if shallow)

```

ASC-8aa/119/A/X

(reduced copy)

FAB USE ONLY

CC 10-13

ASC/119/FIN X

TOP
BACK OF 'AOA DEORBIT BURN (2 ENG)'



- √MM302 √OMS L or R
- √OMS BURN CONFIG (L or R XFEED)
- Enter TGO + 10 sec
- √TRIM: P +0.4, LY +5.2, RY -5.2
- L,R OMS He PRESS/VAP ISOL A (two) – OP
- ... Wait 2 sec ... B (two) – OP
- √DAP – AUTO(PASS)/DISC
- ADI – LVLH(REF)/HI/MED
- FLT CNTLR PWR (two) – ON
- TIG-2 Good OMS ENG – ARM/PRESS
- :15 EXEC
- :15 If OMS AFT QTY < 11%, THC +X to OMS IGN + 1 sec
- :00 Start watch (√P_c, ΔVTOT, ENG VLVs)

OMS XFEED RETURN at ΔVTOT =
 or at %
 L,R OMS TK ISOL (four) – OP
 XFEED (four) – CL

- * **OMS PRPLT FAIL (CONTINUE BURN):** *
- * OMS ENG – OFF *
- * ITEM 18 +0 EXEC *
- * Secure aff OMS *
- * √ADI – LVLH, center needles *
- * Interconnect good OMS to RCS *
- * THC +X (√OMS% vs RCS Burn Time) *
- * AFT RCS RECONFIG *
- * RCS COMPLETION *
- * **OMS ENG FAIL (CONTINUE BURN):** *
- * OMS ENG – OFF *
- * √ADI – LVLH, center needles *
- * Interconnect good OMS to RCS *
- * THC +X (√OMS% vs RCS Burn Time) *
- * RCS I'CNCT TK SW *
- * THC +X (√OMS% vs RCS Burn Time) *
- * AFT RCS RECONFIG *
- * RCS COMPLETION *
- * **RCS +X JET FAIL OFF:** *
- * ITEM 18 +0 EXEC *
- * Resel jet *

ASC-8b/A/B

HINGE

(reduced copy)

FAB USE ONLY

CC 10-14

ASC/119/FIN

TOP
HINGED AT BOTTOM OF
'AOA DEORBIT BURN (1 ENG)'
HINGE

* **RCS COMPLETION:**

If DIRECT INSERTION:
 * THC +X to $\Delta VTOT = 0$ or TOT AFT QTY 1 %
 *
 * At AFT QTY 1 THC +X to FLIP ΔV or
 * if CUR $\Delta VTOT$: TOT AFT QTY 2 % then
 * FRCS COMPLETION
 *
 * FLIP -----
 * ΔV FRCS COMPLETION
 *
 * AFT -----
 * ΔV THC +X to TGT ΔV
 *
 * TGT -----
 * ΔV

If w/OMS 1:
 * THC +X to TGT HP or TOT AFT QTY 1 %
 *
 * At AFT QTY 1 THC +X to FLIP HP or
 * if CUR HP: TOT AFT QTY 2 % then
 * FRCS COMPLETION
 *
 * FLIP -----
 * HP FRCS COMPLETION
 *
 * AFT -----
 * HP THC +X to TGT HP
 *
 * TGT -----
 * HP

* **FRCS COMPLETION:**
 * Mnv'r to -X Att (pitch up at 3°/sec to VGOz = +1/4 $\Delta VTOT$)
 * THC -X to $\Delta VTOT = 0$ or FRCS depletion (JETS FAIL OFF)

CUTOFF
 + :02 OMS ENG - OFF (If < 3 IMU, at :)
 * AFT RCS RECONFIG if INTERCONNECT *
 Trim X,Z residuals < 2 fps (< 0.5 fps if shallow)

ASC-8bb/119/A/X

(reduced copy)

FAB USE ONLY

CC 10-15

ASC/119/FIN X

TOP

**AOA
DEORBIT
BURN (RCS)**

√MM302 √RCS SEL
√RCS BURN CONFIG (L OMS I'CNCT)

L,R OMS He PRESS/VAP ISOL A (two) – OP
... Wait 2 sec ... B (two) – OP

√DAP – INRTL/DISC
ADI – LVLH(REF)/MED/MED
FLT CNTLR PWR (two) – ON

TIG THC +X
Maintain PITCH ATT ERR ± 3°
Monitor ΔVTOT

RCS I'CNCT TK SW at ΔVTOT =
R OMS XFEED (two) – OP
L OMS XFEED (two) – CL

| **OMS PRPLT LOW** |
| AFT RCS RECONFIG AT ΔVTOT = |
RCS COMPLETION

- * **OMS PRPLT FAIL (MULTIPLE JETS FAIL OFF):** *
- * Secure aff OMS *
- * ITEM 18 +0 EXEC *
- * Resel jets *
- * Interconnect good OMS to RCS *
- * THC +X (√OMS% vs RCS Burn Time) *
- * AFT RCS RECONFIG *
- * RCS COMPLETION *
- * **RCS +X JET FAIL OFF:** *
- * ITEM 18 +0 EXEC *
- * Resel jets *

ASC-7a/A/B

HINGE

(reduced copy)

FAB USE ONLY

CC 10-16

ASC/119/FIN

TOP
HINGED AT BOTTOM OF
'AOA DEORBIT BURN (RCS)'
HINGE

```

* RCS COMPLETION:
* If DIRECT INSERTION:
*   THC +X to ΔVTOT = 0 or TOT AFT QTY 1  %
*
*   At AFT QTY 1      THC +X to FLIP ΔV or
*   if CUR ΔVTOT:    TOT AFT QTY 2  % then
*                   FRCS COMPLETION
*
*   FLIP  -----
*   ΔV                                     FRCS COMPLETION
*
*   AFT  -----
*   ΔV                                     THC +X to TGT ΔV
*
*   TGT  -----
*   ΔV
*
* If w/OMS 1:
*   THC +X to TGT HP or TOT AFT QTY 1  %
*
*   At AFT QTY 1      THC +X to FLIP HP or
*   if CUR HP:        TOT AFT QTY 2  % then
*                   FRCS COMPLETION
*
*   FLIP  -----
*   HP                                     FRCS COMPLETION
*
*   AFT  -----
*   HP                                     THC +X to TGT HP
*
*   TGT  -----
*   HP
*
* FRCS COMPLETION:
*   Mvnr to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT)
*   THC -X to ΔVTOT = 0 or FRCS depletion (JETS FAIL OFF)

```

CUTOFF:
VGOx = 0, release THC
AFT RCS RECONFIG
Trim Inplane X,Z residuals < 2 fps (< 0.5 fps if shallow)
ASC-7aa/119/A/X

(reduced copy)

FAB USE ONLY CC 10-17 ASC/119/FIN X



TOP
 BACK OF 'AOA DEORBIT BURN (RCS)'



**HOOK
 VELCRO**

**HOOK
 VELCRO**



HINGE

ASC-7b/A/B



(reduced copy)

FAB USE ONLY

CC 10-18

ASC/119/FIN



119 (15A) EVA OV BASELINE

00:00 01:00 02:00 03:00 04:00 05:00 06:00 07:00

Egr	Setup	Attach S6 to S5	Connect S5 to S6 Umbilicals	PVR Cinches & Winch Release	Keel Pin Release	BGA Release	Unstow Nadir (1B) SABB	SSU ECU MLI	Cleanup	Ing
Egr	Setup	Attach S6 to S5	Connect S5 to S6 Umbilicals	Release SABB Restrains	Release SABB Restrains		Unstow Zenith (3B) SABB	SSU ECU MLI	Cleanup	Ing

EVA 1

Egr	Setup	P6 Battery Prep	P3 Nadir UCCAS	P1 REV/M MLI	P1 FHRC Clamps	S3 Outboard/Zenith PAS		Tool Stanchion Relocate	Cleanup	Ing
Egr	Setup	P6 Battery Prep	P3 Nadir UCCAS	P1/P3 Fluid Jumper	P1 FHRC P-Clamps	S3 Outboard/Zenith PAS		APFR Retrieve	Cleanup	Ing

EVA 2

Egr	Setup	CETA Cart Relocation	SPDM Covers	LEE B Repair		Cleanup	Ing
Egr	Setup	CETA Cart Relocation	S1 Tasks	S0 1A_D RPCM		P1 1A_D RPCM	Cleanup

EVA 3

Egr	Setup	JLP GPS Antenna B Install	S3 Task Setup	CP1 WETA Install	S3 Outboard/Nadir PAS	S3 Inboard/Zenith PAS	Cleanup	Ing
Egr	Setup	S1/P1 Radiator Imaging	S3 Task Setup	CP1 WETA Install	S3 Outboard/Nadir PAS	S3 Inboard/Zenith PAS	Cleanup	Ing

EVA 4

119 (15A) EVA OV BASELINE (Cont)

Get-Aheads	Applicable EVAs:				Constraints:	Completed On:
	EVA 1	EVA 2	EVA 3	EVA 4		
S6 MMOD Shield Bolt Torque Release	X				Stbd SARJ locked	
Nadir/Inboard PAS Deploy		X	X	X	Stbd TRRJ & SARJ locked	
Return Adj Tether to Port Z1 TB	X	X	X	X	None	
Grounding Sleeve Install:						
SSPTS Node 1 FWD		X	X	X	Inhibits: RPCM Z1 3B_A2 and Z1 4B_A2	
SSPTS Lab FWD		X	X	X		
SSPTS PMA2 Port		X	X	X	Inhibits: RPCM LA 1A4A-D3 and Z1 4B_A2	
SSPTS PMA2 Starboard		X	X	X	Inhibits: RPCM LA 2A3B-D1 and Z1 3B_A2	
MBS Cables		X	X	X	For WS4: RPC S0 4B_A1 and S0 3A_A1	
Channel 1/4 CR 8018 Cable (W4148)			X		DDCU S0 1A	
JEM RMS Grounding Tabs				X	Will be completed following JLP GPS Ant	

EVA 3 SUMMARY TIMELINE

PET HR : MIN	IV/SSRMS	EV2 – Arnold	EV3 – Acaba	PET HR : MIN
00:00		<p>EVA 3 POST DEPRESS, EGRESS & SETUP (00:50)</p> <ul style="list-style-type: none"> Post Depress/Egress (00:25) Setup (00:20) Egress w/Med ORU Bag [Crewlock Bags (3) inside] 	<p>EVA 3 POST EGRESS & SETUP (00:50)</p> <ul style="list-style-type: none"> Post Depress/Egress (00:25) Setup (00:20) Egress w/Crewlock Bag, WIF adapter 	00:00
01:00	EV3 – Acaba (SSRMS) for CETA Cart Ops	<p>CETA CART RELOCATION (01:00)</p> <ul style="list-style-type: none"> CETA Cart (01:00) 	<p>CETA CART RELOCATION (01:00)</p> <ul style="list-style-type: none"> CETA Cart (01:00) 	01:00
02:00		<p>SPDM COVERS (01:30)</p> <ul style="list-style-type: none"> OTCM Cover Reconfiguration (00:30) EP1 Cover Removal (00:40) SPDM Cover Cleanup (00:20) 	<p>S1 TASKS (02:10)</p> <ul style="list-style-type: none"> S1/S3 SSAS BBC PNL RECONFIG (00:30) S3 FLUID QD JUMPER INSTALL (00:35) S1 FHRC P CLAMP RELEASE (01:05) <ul style="list-style-type: none"> Stinger (00:25) Hose Box (00:30) FHRC Cleanup (00:10) 	02:00
03:00	EV2 – Arnold (SSRMS) for SPDM & LEE B Lube (EV2 egresses SSRMS prior to LEE REPAIR)	<p>LEE B REPAIR (01:45)</p> <ul style="list-style-type: none"> LEE B Snare Repair (01:15) LEE B Cleanup (00:30) 	<p>S0 1A D RPCM R&R (00:45)</p>	03:00
04:00	<p>EV2 bingo time to start LEE REPAIR: PET= 03:45</p> <p>Begin S0/P1 RPCM powerdown commanding when EV3 completes S1 TASKS</p> <p>EV3 must complete or break out of S1 TASKS to start S0 RPCM R&R by a PET = 04:00</p>			04:00
05:00		<p>CLEANUP AND INGRESS (00:50)</p>	<p>P1 1A A RPCM R&R (00:45)</p>	05:00
06:00	EVA 3 PET = 06:00 hr	<p>PRE-REPRESS (00:05)</p>	<p>CLEANUP AND INGRESS (00:25)</p> <p>PRE-REPRESS (00:05)</p>	06:00
-06:30				-06:30

EVA 3 SUMMARY TIMELINE (Cont)

EVA 3 Constraints and Bingo Times Summary

1. Powerdown required to put inhibits in place for S0-1A_D and P1-1A_A RPCM R&Rs will take approximately 15-20 min of ground commanding to execute; thus, **MCC-H** will begin powerdown operations when EV3/Acaba completes the S1 tasks and starts translation to the RPCM R&R location.
2. The maximum amount of time that the powerdown can be in place is 3:00 hr due to thermal constraints on S-Band ORUs. Thus, the DDCU that provides inhibits for the RPCMs must be powered up within 3:00 hr of powerdown.
3. Some of the ISS cameras that will be powered down in support of the RPCM R&Rs are required to verify that the SSRMS is in a good configuration for the LEE B Lube task and that EV2/Arnold is in good position to begin the EVA task. The cameras will not be de-routed for powerdown until the SSRMS operator verifies the arm is in a good configuration and EV2/Arnold has egressed the APFR.
4. **MCC-H** will proactively make a call to ISS and Discovery that the cameras are about to be de-routed and powered down before it is executed.
5. Per their procedure, crewmembers will confirm w/**MCC-H** that inhibits are in place prior to beginning the RPCM R&R.
6. Per their procedure, crewmembers will notify **MCC-H** that the RPCM R&Rs are complete.
7. **MCC-H** will make a call to the crewmembers confirming that DDCU powerup is beginning, once the RPCM R&Rs are complete.
8. To manage the timeline and ensure LEE B Lube and RPCM R&R tasks are completed, EV2/Arnold needs to stop the SPDM Covers and start the LEE B Lube at an EVA PET of NLT 3:45 hr, and EV3/Acaba needs to stop the S1 Tasks and start the first RPCM R&R at an EVA PET of NLT 4:00 hr.
9. The bingo time to begin the second RPCM R&R is EVA PET of NLT 5:00 hr, to support a nominal EVA PET of 6:30 hr total.
10. If only one RPCM R&R is performed, the priority is the S01A_D RPCM, per the Flight Priorities. Per their procedure, crewmembers will R&R the S0 RPCM first.

EVA 3 NOTES, CAUTIONS, AND WARNINGS (Cont)

WARNING (Cont)

Shuttle Constraints (Cont)

- D. Sharp Edges
 - 1. PRLA grounding wipers [PLB]
 - 2. LDRI baffles (also an entrapment hazard) [OBSS]
 - 3. Keep hands away from SRMS EE opening and snares
 - 4. TCS connector backshells have exposed threads [ODS]
- E. Thermal
 - 1. Illuminated PLB lights; do not touch
 - 2. OBSS grapple fixture shafts/cams may be hot. Limit handling if required
 - 3. Stay 27 ft from PRCS when powered
 - 4. Stay 3 ft from VRCS when powered
 - 5. Stay 3 ft from APU when operating
- F. Contamination
 - 1. Stay out of the immediate vicinity of leaking jet or APU
- G. Lasers
 - 1. Do not look at LDRI diffuser or LCS laser aperture window

EVA 3 TOOL CONFIG

EV2

EMU D-rings

- 2 – Tether Extender
- Waist Tether [on right]
- 85-ft Safety Tether [on right]
- 55-ft Safety Tether (spare) [on right] [to MWS]

MWS

- Small trash bag
- RET (w/PIP pin) [right]
- RET (sm-sm)
- Adj tether [right]
- 2 – Wire ties
- Swing Arm [right side]
- PGT w/6-in wobble s/n _____
- RET (sm-sm)
- Wire tie loop (holster) for Lube Gun

BRT [left side]

- 2 – Wire ties, short
- RET (sm-sm)

SAFER

Use Blue RETs only

RET Counts:	used	total (ISS qty)
RETs (sm-sm)	= 9	(16)
RETs (PIP pin)	= 4	(5)
RETs (lg-sm)	= 5	(8)
Adj Eq Tethers (sm-sm)	= 6	(10)
Adj Eq Tethers (lg-sm)	= 2	(2)
D-ring Tether Extenders	= 5	(6)

NOTE: Prior to use, inspect the following hardware:

- RET cords for fraying
- Safety Tether & Waist Tether load alleviating straps: No red visible
- Sm Trash Bag: Bristle deformation/damage, after stowing tools in trash bag

EV3

EMU D-rings

- 2 – Tether Extender
- Waist Tether [on right]
- 85-ft Safety Tether [on right]
- 55-ft Safety Tether (spare) [on right] [to MWS]

MWS

- Small Trash Bag
- RET (w/PIP pin) [right]
- RET (sm-sm)
- WIF Adapter
- 2 – Wire ties
- Swing Arm [right side]
- PGT w/no socket s/n _____
- 6-in wobble socket
- RET (sm-sm)

BRT [left side]

- 2 – Wire ties, short
- RET (sm-sm)

SAFER

CREWLOCK

- RET (Lg-sm)
- Adj Equip Tether to outside CL bag TP
- LEE B Lube C-Lk Bag (#1)
- *Grease Gun w/Straight Nozzle (Int RET #1, outside of bag)
- EVA Wipe w/Wire Tie (thru wipe TP)
- Adj tether (around Grease Gun)
- Adj tether (Int RET #2)
- 2 – EVA Wipe
- RCC Gap Gauge (Int RET #3)
- Needle Nose pliers (Int RET #4)

*Prime grease gun by disengaging plunger and gently pushing fwd on back of triangle until resistance met

Bag Color Key: 119 EVA Tools, Staging, Crewlock Bag, MWS

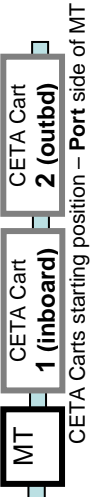
CREWLOCK (Cont)

- RET (Lg-sm)
- Med ORU Bag
- 2 – Adj Equip Tether to outside of bag
- RET (sm-sm) (for EP MLI Cover on outside of bag)
- EP MLI Cover
- RET (sm-sm) (1 hook outside, 1 hook inside ORU bag)
- WIF Adapter
- 2 – EVA Wipes to bag straps (lid)
- RET (sm-sm) to outside CL bag TP
- RET (sm-sm)
- PGT w/6-in wobble s/n _____
- Adj tether (Lg-sm)
- RPCM P1 1A_A Crewlock Bag (#2)
- RPCM for P1 1A_A s/n C326597 (Int RET #1)
- Rnd scoop (Int RET #2)
- Adj tether (Lg-sm)
- RPCM S0 1A_D Crewlock Bag (#4)
- RPCM for S0 1A_D s/n C235299 (Int RET #1)
- Rnd scoop (Int RET #2)
- Cnctr Insul. Sleeve, size 33/37 (Int RET #3)
- Adj tether (sm-sm) (to Med ORU Bag Lid)
- S1 Tasks Crewlock Bag (#3)
- EVA Camera
- RET w/PIP pin
- 6-in ext – 7/16-in wobble socket
- RET w/PIP pin
- 18-in ext – 7/16-in
- Ratchet w/2-in rigid ext (Int RET #1)
- EVA Camera
- RET (sm-sm)
- RET (Lg-sm)
- APFR
- Tether ext on A/L D-ring

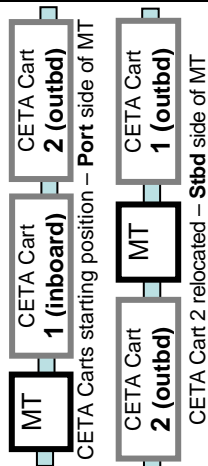
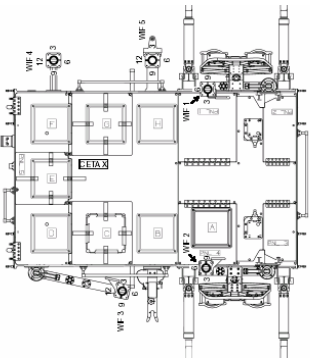
EVA 3 EGRESS (00:25) (Cont)

<p>IV</p>	<p>EV2 – Arnold (FF)</p>	<p>EV3 – Acaba (SSRMS)</p>
<p>EV2 waist tether (R)</p> <p>UIA D-ring</p> <p>EV2 (L)</p> <p>EV2 waist tether</p> <p>EV2 safety tether (85)</p> <p>EV3 (R)</p> <p>EV3 waist tether</p> <p>EV3 safety tether (85)</p> <p>external D-rings, post egress</p> <p>aft</p> <p>fwd</p>	<p><u>EGRESS (Cont)</u> (00:25)</p> <p>9. Verify EV3 SAFER Configuration: <input type="checkbox"/> √R Handle down (HCM door – Closed) <input type="checkbox"/> √L Handle down (MAN ISO Valve – Open)</p> <p>10. Close hatch thermal cover</p>	<p><u>EGRESS (Cont)</u> (00:25)</p> <p>6. Egress Airlock</p> <p>7. Attach LEE Lube Crewlock Bag #1 to BRT</p> <p>8. Verify EV2 SAFER Configuration: <input type="checkbox"/> √R Handle down (HCM door – Closed) <input type="checkbox"/> √L Handle down (MAN ISO Valve – Open)</p>
<p>11. Translate to S0 HR 3528</p>	<p>WARNING Maintain a 2-ft Keep-Out-Zone for floating cables between MT and MBS. Stay on UMA handrails during translation underneath MT</p>	<p>9. Translate to CETA Cart 2 location (outboard) (fairlead, as reqd)</p>
<p>1. Post crew egress: WVS Software: Select page – RF Camera sel 'Advanced controls' S-Band level (two) – max</p>		

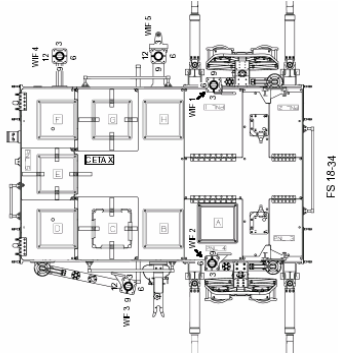
EVA 3 SETUP (00:20)

<p>IV</p> 	<p>EV2 – Arnold (FF)</p>	<p>EV3 – Acaba (SSRMS)</p>
<p><u>SETUP (00:20)</u></p> <ol style="list-style-type: none"> Temp stow med ORU Bag on S0 HR 3528/3517 <p>Time permitting:</p> <ol style="list-style-type: none"> Deploy S1 Tasks Crewlock Bag #3 Temp stow Crewlock Bag Transfer Camera to MWS swingarm <ol style="list-style-type: none"> Translate to CETA Cart's location (MT at WS 4) Assist EV3 with GCA/clearances, as reqd 	<p><u>SETUP (00:20)</u></p> <ol style="list-style-type: none"> Prep CETA Cart 2 for transfer <ul style="list-style-type: none"> <input type="checkbox"/> CETA Cart 2 coupler to UNLOCK <input type="checkbox"/> Translate CETA 2 to Bay 04. Align inboard TFR w/truss marker 8070 <input type="checkbox"/> Engage parking brake (left handle) <input type="checkbox"/> CETA Cart 2 coupler to CAPTURE <input type="checkbox"/> Stow brake handles (4) (forward) <input type="checkbox"/> √Swing arms (3) stowed Temp stow LEE Lube Crewlock Bag #1 on S0 HR 3546 On IV GO: When SSRMS at the EVA 3 Setup position: Give M1/M2 GO ("ready") for APFR install and ingress. Use GCA, as reqd Install WIF adapter on SSRMS (TP toward EE) <ul style="list-style-type: none"> <input type="checkbox"/> √PIP pin installed <input type="checkbox"/> Perform pull test Retrieve APFR from CETA Cart 2 WIF 4 Install APFR [12,PP,F,6] in WIF adapter <ul style="list-style-type: none"> <input type="checkbox"/> √Blk-Blk, pull/twist test Attach 55-ft safety tether to SSRMS EE HR, and perform tether swap. Verify tether configuration: <ul style="list-style-type: none"> <input type="checkbox"/> √Gate closed <input type="checkbox"/> √Hook locked <input type="checkbox"/> √Safety Tether Reel unlocked <input type="checkbox"/> Release EV3 85-ft Safety Tether and transfer to EV2 	<p><u>SETUP (00:20)</u></p> <ol style="list-style-type: none"> Temp stow med ORU Bag on S0 HR 3528/3517 <p>Time permitting:</p> <ol style="list-style-type: none"> Deploy S1 Tasks Crewlock Bag #3 Temp stow Crewlock Bag Transfer Camera to MWS swingarm <ol style="list-style-type: none"> Translate to CETA Cart's location (MT at WS 4) Assist EV3 with GCA/clearances, as reqd <ol style="list-style-type: none"> Stow EV3 airlock Safety Tether stbd of CETA Cart pickup location at HR S0 3530 stand-off (nadir)
<p style="text-align: center;">CAUTION</p> <p style="text-align: center;">Do not impart loads into CETA Cart with less than 3 of 4 wheel bogies latches closed</p>		

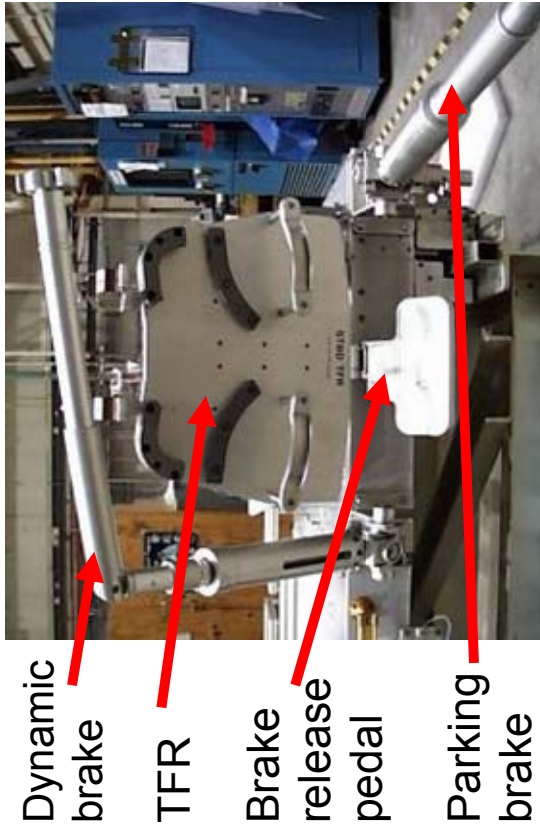
EVA 3 CETA CART RELOCATION (01:00)

<p>IV/RMS</p> 	<p>EV2 – Arnold (FF)</p>	<p>EV3 – Acaba (SSRMS)</p>
<p>1. M1/M2: Receive report from EV3 when APFR ingress is complete</p> <p>2. IV: <input type="checkbox"/> Verify good EV3 glove heaters, visor, and TCV configuration</p> <p>3. M1/M2: On EV3 GO, CETA Cart 2 ready for removal</p> <p>4. M1/M2: On EV3 GO, maneuver CETA Cart 2 to Port Clearance position</p> 	<p>CETA CART 2 REMOVAL FROM P1</p> <ol style="list-style-type: none"> 1. Assist EV3 with APFR ingress, as reqd <p>On EV3 GO: Release brake (tap pedal twice)</p> <ol style="list-style-type: none"> 2. Release wheel bogies (4) <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> 3. Inform EV3 when brakes/wheel bogies are released, and Safety Tethers are clear <p>EV2: Provide GCA to EV3/M1 for clearances, as reqd</p> <ol style="list-style-type: none"> 5. Verify CETA Cart 2 is clear of structure before translating 6. Move camera to MWS swingarm 7. Retrieve S1 Crewlock Bag #3 and put on BRT (keep adj tether w/Crewlock Bag) 8. Verify CETA Cart 1 brake handles forward and locked 9. <p><u>INSTALL CETA CART 2 ON S1</u></p> <ol style="list-style-type: none"> 10. Translate to starboard side of MT (via nadir path) 11. Verify MT coupler is in CAPTURE 12. Temp stow S1 Crewlock Bag #3 on S1 FHRC 13. Temp stow EVA camera outboard of CETA Cart 2 install location 14. Perform Get-Aheads (time permitting): <ul style="list-style-type: none"> <input type="checkbox"/> S1 Tasks: SSAS BBC PNL RECONFIG, FLUID QD JUMPER, FHRC P-CLAMP RELEASE 	<p>CETA CART 2 REMOVAL FROM P1</p> <ol style="list-style-type: none"> 1. Ingress SSRMS APFR. Use GCA, as reqd 2. Attach waist tether to ingress aid <div style="border: 2px solid black; padding: 5px; text-align: center;"> <p>WARNING</p> <p>Do not touch APFR Ingress Aid shaft for more than 2:30 min (after initial 1:30 hr of exposure)</p> </div> <ol style="list-style-type: none"> 3. Inform M1/M2 APFR ingress is complete 4. <input type="checkbox"/>Glove heaters, visor, and TCV setting 5. Tether to CETA Cart 2 using RET. Use GCA, as reqd 6. Grasp CETA Cart 2 at grids B & H (recommended) 7. Give EV2 GO for CETA Cart 2 brake release and wheel bogie release 8. Receive report from EV2 that brakes/wheel bogies release 9. Give M1/M2 GO – Ready for CETA Cart 2 removal 10. Remove CETA Cart 2 from rails: <ul style="list-style-type: none"> Lift CETA Cart 2 from rails (ISS forward), until wheel bogies are clear of structure. Use GCA, as reqd 11. EV3: Inform M1/M2 CETA Cart 2 is separated from rail 12. Give M1/M2 GO for CETA Cart Port Clearance position maneuver <p><u>INSTALL CETA CART 2 ON S1</u></p>

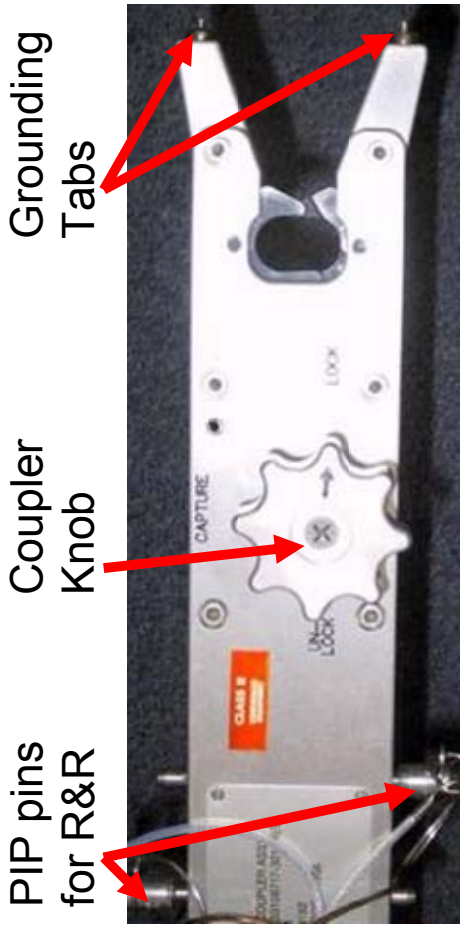
EVA 3 CETA CART RELOCATION (01:00) (Cont)

<p>IV/RMS</p>	<p>EV2 – Arnold (FF)</p>	<p>EV3 – Acaba (SSRMS)</p>
<p>NOTE</p> <p>IV: The next step is for M1/M2 and EV2, and requires no IV action</p> <p>10. M1/M2: On EV2 GO, begin maneuver to OTCM 2 Blanket Setup position</p>  <p>The diagram, labeled FS 1834, shows a top-down view of the EVA 3 CETA cart relocation setup. It features two main mobile units, M1 and M2, positioned on the left side of the frame. To their right is the CETA cart, which is a large, rectangular structure with various components and a central control area. The diagram includes labels for 'M1', 'M2', 'CETA', and 'OTCM 2'. There are also numerical labels (1, 2, 3, 4, 5, 6) indicating specific points or components on the carts. The overall layout shows the relative positions and orientations of the vehicles and the CETA cart in the EVA environment.</p>	<p>26. Give M1/M2 GO to begin maneuver to OTCM 2 Blanket Setup position for SPDM COVERS</p>	<p>COUPLE CETA CART 2 TO MT</p> <p>21. Verify configuration ready for CETA Cart 2 coupling to MT</p> <ul style="list-style-type: none"> <input type="checkbox"/> Brake handles (4) forward <p>22. Release brakes (tap pedal twice)</p> <p>23. Translate CETA Cart 2 to MT</p> <p>24. Couple CETA Cart 2 to MT</p> <ul style="list-style-type: none"> <input type="checkbox"/> Couple CETA Cart 2 to MT, max rate 0.5 ft/sec <input type="checkbox"/> MT coupler to LOCK <p>25. Verify CETA Cart 2 brakes handles forward and locked</p> <p>26. Retrieve EVA camera from temp stow location</p> <p>CLEANUP</p> <p>27. Inspect gloves. Report glove status to IV</p> <p>28. Translate to S1 for S1 TASKS</p>

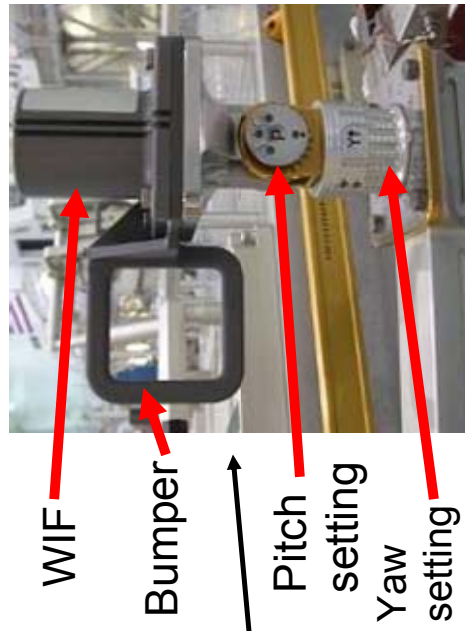
EVA 3 CETA CART RELOCATION – TASK DATA



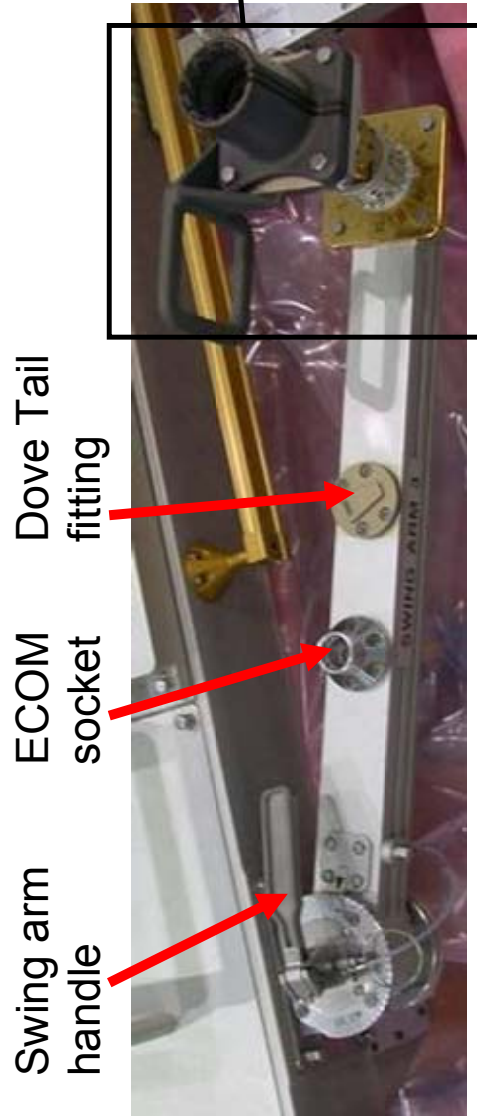
TFR and Brakes



Active coupler



Swing Arm WIF



Swing arm

EVA 3 CETA CART RELOCATION – TASK DATA (Cont)

Tools: None

Foot Restraints:

Task	WIF	APFR Setting
CETA CART Install/Remove	SSRMS	12, PP, F, 6

EVA Fasteners: None

EVA Connectors: None

CETA Cart Mass = 560 lb

Timeline Considerations:

1. CETA carts must be moved to the starboard side of MT for STS-127 (2J/A) P6 Battery R&R (MT WS 8)

Notes:

1. Ensure safety tethers are clear of CETA cart during safety tether swap, CETA cart relocation, and CETA cart install
2. CETA to MT max coupling rate is 0.5 ft/sec; CETA to CETA max coupling rate is 1 in/sec
3. 3 of 4 wheel bogies are required to be installed prior to un-tethering (from a safety, fault tolerance standpoint). Can leave CETA Carts in this configuration – MT okay to translate

Cautions:

1. Do not impart loads into CETA cart with less than 3 of 4 wheel bogies engaged

Warnings:

1. None



Attachment 4


EVA 3 SPDM COVERS (01:30)

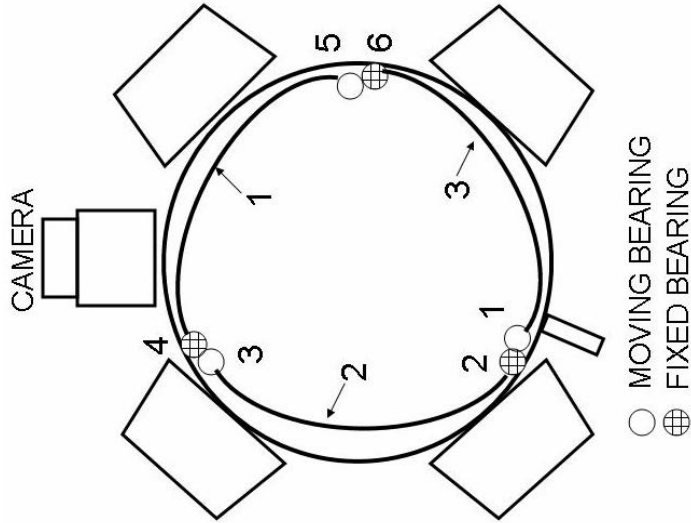
IV/SSRMS	EV2 – Arnold (SSRMS)
<ol style="list-style-type: none"> 1. M1/M2: On EV2 GO, maneuver SSRMS to SPDM OTCM 2 Blanket Maintenance position Expect EV2 GCA to position SSRMS for "2.6 Flaps" access 2. M1/M2: Expect EV2 GCA to position SSRMS for "Wrist Roll Flaps", side 1 access 3. M1/M2: Expect EV2 GCA to position SSRMS/OTCM 2 for "Wrap Blanket" access 4. M1/M2: Expect EV2 GCA to position OTCM 2 for "Wrist Roll Flaps", side 2 access 5. M1/M2: On EV2 GO, maneuver to OTCM 2 Blanket Setup position 6. M1/M2: Expect EV2 GCA to EP1 Blanket Removal position 7. M1/M2: Expect EV2 GCA to release EP1 quarter-turn fasteners 	<p>OTCM COVER RECONFIGURATION (00:30)</p> <ol style="list-style-type: none"> 0. Attach RET to Adj; tether on MWS (for EP cover stowage) 1. Adjust MWS down (increase clearance with SPDM), as reqd 2. Give M1/M2 GO to maneuver to OTCM 2 Blanket Maintenance position 3. GCA SSRMS to the "2.6 Flaps" position, as reqd 4. Mate "2.6 Flaps" (2) to corresponding Velcro patches (see "2.6 Flaps" – see detail on task data sheet) 5. Configure first side (side 2) of "Wrist Roll Flaps" and "Wrap Blanket" to correct rolled-under edges and exposed Velcro, as reqd 6. GCA SSRMS/OTCM 2 to access all affected flaps and blanket on side 2 7. GCA OTCM 2 to second side (side 1) 8. Configure second side (side 1) of "Wrist Roll Flaps" and "Wrap Blanket" to correct rolled-under edges and exposed Velcro, as reqd 9. GCA SSRMS/OTCM 2 to access all affected flaps and blanket on side 1 10. Verify "Wrist Roll Flaps" (4) and "Wrap Blanket" are mated to corresponding Velcro patches (for "Wrist Roll Flaps", solid line and barber pole side must be closed first) 11. When "2.6 Flaps," "Wrist Roll Flaps," and "Wrap Blankets" are reconfigured: Give M1/M2 GO to maneuver to OTCM 2 Blanket Setup position (OTCM 2 Blanket maintenance complete) <p>EP1 THERMAL BLANKET REMOVAL (00:40)</p> <ol style="list-style-type: none"> 12. When maneuver to OTCM 2 Blanket Setup position complete: Expect SSRMS OCAS maneuver to EP 1 Blanket Setup position (zenith) 13. Attach RET to adj tether 14. When maneuver to EP1 Blanket Setup position complete: Use GCA to maneuver SSRMS to the EP 1 Blanket Removal position 15. Release quarter-turn fasteners, as reqd, to fold back nadir end of EP1 cover 16. Attach adj tether to EP1 Blanket tether loop 17. Release quarter-turn fasteners (14 total) and lift corresponding tabs GCA SSRMS into position to reach fasteners, as reqd (see task data sheet) 18. Remove blanket from Electronics Platform 1 19. Wrap EP1 blanket with adjustable tether and stow behind MWS (need hands free for covering grounding patches, in next step) 20. On SPDM, fold over Velcro flaps to cover thermal blanket grounding patches (2) and Velcro patches (3), which are now exposed (see task data sheet for details on grounding patch locations)

EVA 3 LEE B REPAIR (01:45)

IV/SSRMS

EV2 – Arnold (FF)

1. Ingress APFR
2. Adjust MWS down (increase clearance with SSRMS)
3. Deploy holster
4. Inform M1/M2, APFR ingress is complete/
5. Give M1/M2 GO to maneuver to the LEE Lubrication position
Use GCA to maneuver SSRMS to LEE Lubrication position, as reqd
6.  Take pictures of LEE:
 - Bearings #1 & #2
 - Bearings #3 & #4
 - Bearings #5 & #6
 - Overall view of LEE
7. Stow EVA Camera on swing arm



WARNING
Avoid touching LEE curvic coupling, grounding springs, snares, and internal mechanisms inside LEE with gloved hand

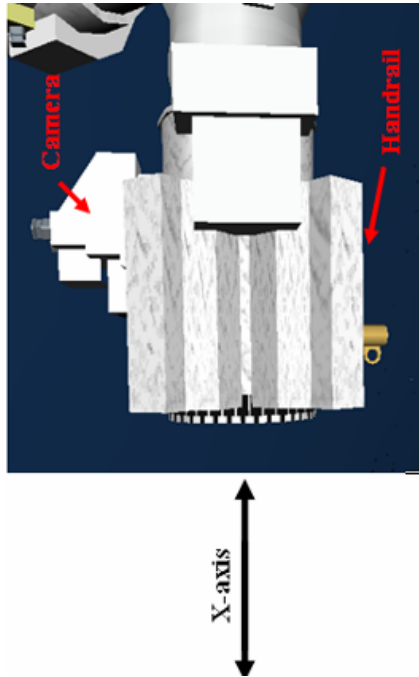
CAUTION
Avoid inadvertent contact with LEE grounding springs, torsional springs, latch covers, shrouds, and camera
Do not stress torsional spring more than 90 deg (rod-end perpendicular to LEE housing) when exercising bearing

NOTE
Grease should not extend more than 1/4 inch from bearing

EVA 3 LEE B REPAIR (01:45) (Cont)

IV/SSRMS

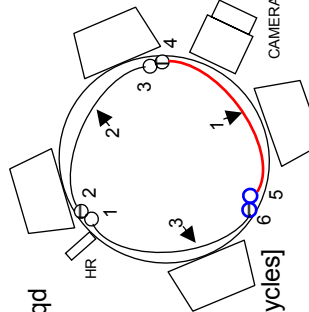
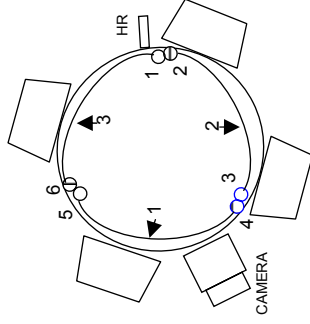
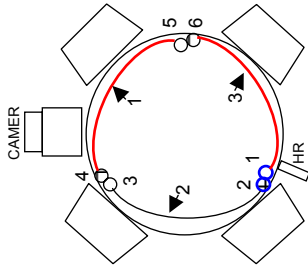
1. M1/M2: Receive GO from EV2 for Snare Checkout
 2. IV/MCC-H: Receive EV2 report on snare condition
- Prep grease gun:**
- Engage teeth by rotating plunger 180 deg (black triangle up)
 - Remove MLI. Stow on gun in way to prevent contact w/LEE
 - Point tip away from LEE
 - Rotate shutoff knob such that FLOW points toward nozzle
- Stow grease gun:**
- Disengage teeth by rot plunger 180 deg (black triangle down)
 - Rotate shutoff knob such that FLOW points ⊥ to nozzle
 - Install MLI tip cover



EV2 – Arnold (FF)

LEE B SNARE REPAIR (00:40)

8. Inform M1/M2, tools and EV crew clear of LEE.
Give **SSRMS** GO for Snare Checkout (Close and Open Snares)
 9. Report to IV/MCC-H: Snare condition (in or out of groove)
 10. Push top right and bottom right snares (#1 & #3) into groove with needle nose pliers, as reqd
 11. Use gap gauge to get left snare (#2) out of groove, as reqd (form "C" curve)
 12. Exercise lower left outer bearing (#2) in x-axis using needle nose pliers [15 sec]
 13. Report to IV/MCC-H: Bearing mobility
(This report is used to calibrate the initial bearing stiffness)
 14. Push left snare (#2) into groove with needle nose pliers
 15. **Prep grease gun**
 16. Apply grease to lower left bearings (#1 & #2) (use box pattern, apply to inside first). Pack grease using gap gauge, as reqd
-
17. Give M1/M2 GO to maneuver a +120 deg (ccw) wrist roll
 18. Apply grease to lower left bearings (#3 & #4) (use box pattern, apply to inside first). Pack grease using gap gauge, as reqd
 19. Give **SSRMS** GO to maneuver a +120 deg (ccw) wrist roll
 20. Apply grease to lower left bearings (#5 & #6) (use box pattern, apply to inside first). Pack grease using gap gauge, as reqd
 21. **Stow grease gun**
 22. **GCA SSRMS** wrist roll to access both sides of lower right snare (#1), as reqd
apply force perpendicular to rod-end
 23. Pull lower right snare (#1) fully out into C-curve with gap gauge,
 24. **Prep grease gun**
 25. Apply grease to rod-end/fork interface to lower left bearing (#5)
 26. Apply grease to rod-end/fork interface to lower right (#4)
 27. **Stow grease gun**
 28. Pack grease using gap gauge, as reqd
 29. Exercise lower left bearing (#5) in x-axis using needle nose pliers [1 min/40 cycles]
 30. Report to IV/MCC-H: Noticeable change in bearing motion
 31. Exercise lower right (#4) in x-axis using needle nose pliers [1 min/40 cycles]
 32. Report to IV/MCC-H: Noticeable change in bearing motion
 33. Push lower right snare (#1) into groove with needle nose pliers



EVA 3 LEE B REPAIR (01:45) (Cont)

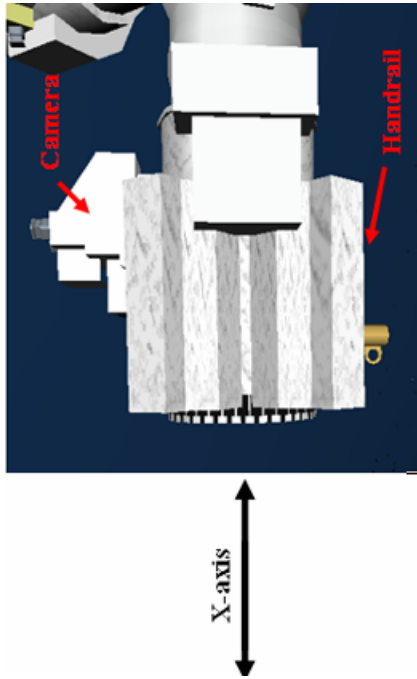
IV/SSRMS

Prep grease gun:

- Engage teeth by rotating plunger 180 deg (black triangle up)
- Remove MLI. Stow on gun in way to prevent contact w/LEE
- Point tip away from LEE
- Rotate shutoff knob such that FLOW points toward nozzle

Stow grease gun:

- Disengage teeth by rot plunger 180 deg (black triangle down)
- Rotate shutoff knob such that FLOW points ⊥ to nozzle
- Install MLI tip cover



EV2 – Arnold (FF)

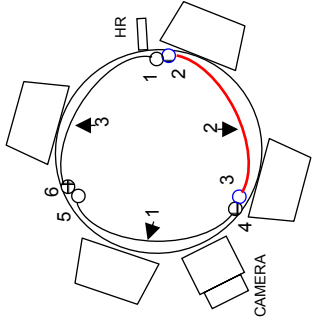
34. Give **SSRMS** GO to maneuver a -120 deg (cw) wrist roll
35. On **SSRMS** GO: Pull lower right snare (#2) fully out into C-curve with gap gauge, apply force perpendicular to rod-end

Prep grease gun

36. Apply grease to rod-end/fork interface to lower left bearing (#3)
37. Apply grease to rod-end/fork interface to lower right bearing (#2)

Stow grease gun

38. Exercise lower left bearing (#3) in x-axis using needle nose pliers [1 min/40 cycles]
39. Report to IV/**MCC-H**: Noticeable change in bearing motion
40. Exercise lower right bearing (#2) in x-axis using needle nose pliers [1 min/40 cycles]
41. Report to IV/**MCC-H**: Noticeable change in bearing motion
42. Exercise lower right bearing (#2) in x-axis using needle nose pliers [1 min/40 cycles]
43. Report to IV/**MCC-H**: Noticeable change in bearing motion
44. Push lower right snare (#2) into groove with needle nose pliers



45. Give **SSRMS** GO to maneuver a -120 deg (cw) wrist roll

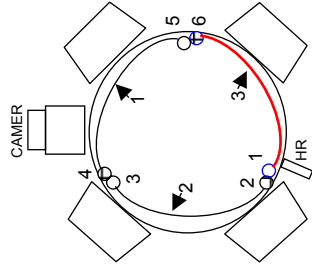
46. On **SSRMS** GO: Pull lower right snare (#3) fully out into C-curve with gap gauge, apply force perpendicular to rod-end

Prep grease gun

47. Apply grease to rod-end/fork interface to lower left bearing (#1)
48. Apply grease to rod-end/fork interface to lower right bearing (#6)

Stow grease gun

49. Exercise lower left bearing (#1) in x-axis using needle nose pliers [1 min/40 cycles]
50. Report to IV/**MCC-H**: Noticeable change in bearing motion
51. Exercise lower right bearing (#6) in x-axis using needle nose pliers [1 min/40 cycles]
52. Report to IV/**MCC-H**: Noticeable change in bearing motion
53. Exercise lower right bearing (#6) in x-axis using needle nose pliers [1 min/40 cycles]
54. Report to IV/**MCC-H**: Noticeable change in bearing motion
55. Push lower right snare (#3) into groove with needle nose pliers




56. Use gap gauge to pack any excess grease into bearings, as reqd
57. Clean tools as necessary with EVA wipe

EVA 3 LEE B REPAIR (01:45) (Cont)

IV/SSRMS

EV2 – Arnold (FF)


- 3. M1/M2: Receive GO from EV2 for Snare Checkout
- 4. IV/MCC-H: Receive EV2 report on snare condition 

- 5. M1/M2: Receive EV2 report: LEE photos, obs complete
- 6. M1/M2: On EV2 GO, maneuver SSRMS to LEE Lubrication Clearance position

Tool Inventory	
<u>MWS</u>	<u>Crewlock Bag</u>
<input type="checkbox"/> Small trash bag	<input type="checkbox"/> Adj tether
<input type="checkbox"/> RET	<input type="checkbox"/> Adj tether
<input type="checkbox"/> RETs w/PIP pin	<input type="checkbox"/> EVA Wipes (2)
<input type="checkbox"/> Adj tether	<input type="checkbox"/> EVA wipe w/ wire tie
<input type="checkbox"/> Wire ties (2)	<input type="checkbox"/> Grease gun
	<input type="checkbox"/> Needle nose pliers
<u>BRT</u>	<input type="checkbox"/> RCC Gap gauge
<input type="checkbox"/> Wire ties (2)	
<input type="checkbox"/> RET	
<u>Swingarm</u>	
<input type="checkbox"/> Wire tie loop (holster)	
<input type="checkbox"/> EVA Camera	

- 7. IV: Record APFR settings: [_, _', _', _'] (S0 WIF 42)
- 8. Receive glove check report from EV2

LEE B CLEANUP (00:30)

- 58. Give **SSRMS** GO for Snare Checkout (Close and Open Snares)
- 59. Report to IV/MCC-H: Snare condition (in or out of groove)
- 60.  Take pictures of LEE:
 - Bearings #1 & #2
 - Bearings #3 & #4
 - Bearings #5 & #6
 - Overall view of LEE
- 61. Stow EVA Camera on MWS swingarm
- 62. Inform M1/M2, LEE photos and observation complete.
 - Give **SSRMS** GO to maneuver SSRMS to LEE Lubrication Clearance position
- 63. Adjust MWS up, as reqd
- 64. Perform tool inventory

- 65. Place EVA wipe over end of grease gun and secure with wire tie
 - 66. Stow grease gun on outside of Crewlock Bag using adj tether
 - 67. Egress APFR
 - 68. Collapse APFR ingress aid
 - 69. Relocate APFR to S0 WIF 42 \Blk-Blk, pull/twist test
 - 70. Adjust APFR to low-profile configuration and report settings to IV

 - 71. Inspect gloves. Report glove check to IV
 - 72. Translate to med ORU Bag (S0 HR 3528)
 - 73. Stow LEE Lube Crewlock Bag #1 near med ORU Bag location
- If EV2 performing P1 1A_A REMOVE/REPLACE:
- 74. Retrieve PGT. Stow PGT on swing arm
 - 75. Go to P1 1A_A RPCM REMOVE/REPLACE

EVA 3 LEE B REPAIR – TASK DATA (Cont)

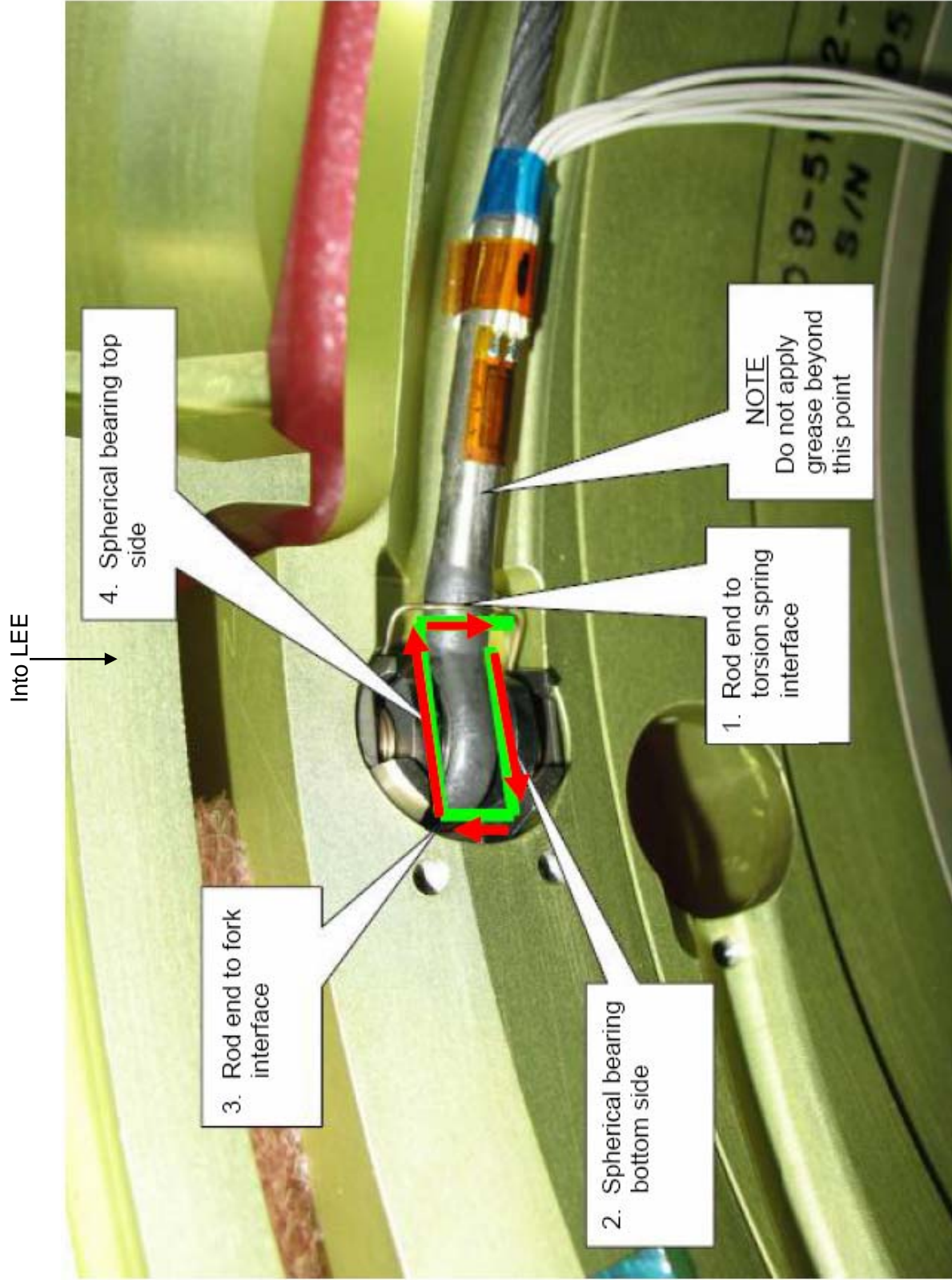
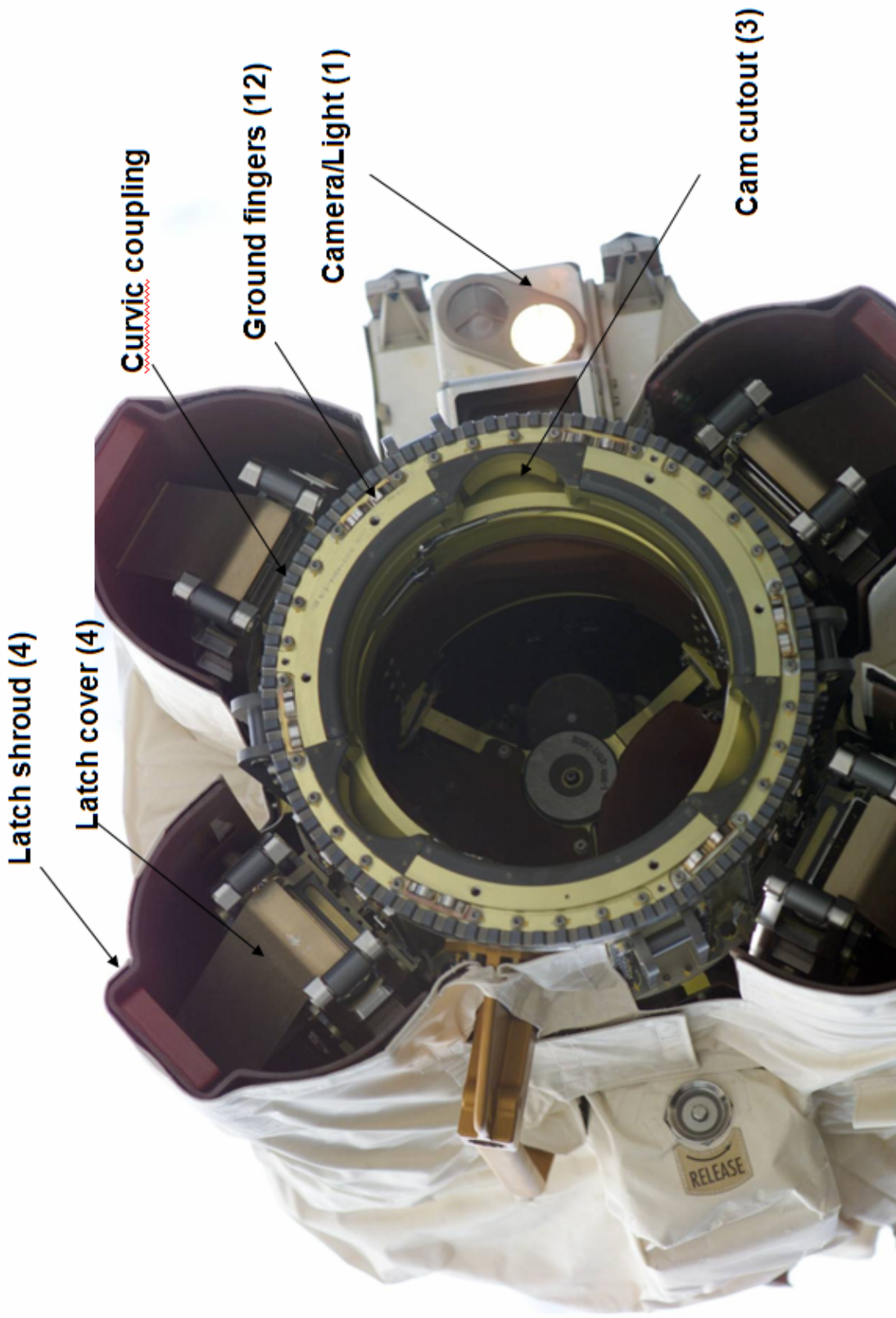


Figure 3. LEE Lubing Pattern



ISS006E19806

Figure 4. LEE Face

EVA 3 LEE B REPAIR – TASK DATA (Cont)

Estimated Task Duration:

	With SSRMS	Without SSRMS
One EV Crew	01:45	N/A
Two EV Crew	N/A	N/A

Tools:

EV3	
Crewlock Bag	RETs (2)
Gap gauge w/Kapton Tape	Grease Gun w/Straight Nozzle
Needle nose pliers w/ Kapton tape	EVA Wipes (5)
EVA Camera	

Foot Restraints:

Task	WIF	Y/P Setting	APFR Setting
LEE B SNARE REPAIR	S0 WIF 45		4, HH, F, 6

EVA Fasteners: N/A

EVA Connectors: N/A

LEE Mass = ~460 lb/209 kg

Notes:

- Grease should not extend more than ¼ inch from bearing

Cautions:

- Avoid inadvertent contact with LEE grounding springs, torsional springs, latch covers, shrouds, and camera
- Do not stress torsional spring more than 90 deg (rod-end perpendicular to LEE housing) when exercising bearing

Warnings:

- Avoid touching LEE curvic coupling, grounding springs, snares, and internal mechanisms inside LEE with gloved hand

Timeline Considerations:

- Photos shall be taken as best effort, noting that it is possible that the LEE may be in an eclipse
- Inhibits for SSRMS brakes and trigger-safe are controlled in Robotics procedures. SSRMS will give EV2 GO each time inhibits are in place and ready for EVA LEE work
- Time permitting, **MCC-H** may request additional cycles for sticky bearings

Grease Gun Steps:



Prep grease gun

- Engage teeth by rotating plunger 180 deg (black triangle up)
- Remove MLI; stow on gun in way to prevent contact with LEE
- Point tip away from LEE
- Rotate shutoff knob such that FLOW points toward nozzle


Stow grease gun

- Rotate shutoff knob such that FLOW points perpendicular to nozzle
- Disengage teeth by rotating plunger 180 deg (black triangle down)
- Install MLI tip cover

EVA 3 S1/S3 SSAS PANEL BBC RECONFIG (00:30)

IV	EV3 – Acaba (FF)
<p>1. Verify with MCC-H that inhibits are in place</p> <p>2. Give EV GO to perform connector swaps</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>S1-S3 SSAS Panel BBC Inhibits (16)</p> <p>A. RPCM S13A G RPC 01 – Open, Close Cmd Inhibit RPC 02 – Open, Close Cmd Inhibit RPC 13 – Open, Close Cmd Inhibit RPC 14 – Open, Close Cmd Inhibit RPC 15 – Open, Close Cmd Inhibit</p> <p>B. RPCM S12B A RPC 05 – Open, Close Cmd Inhibit RPC 11 – Open, Close Cmd Inhibit RPC 13 – Open, Close Cmd Inhibit</p> <p>C. RPCM S14B G RPC 01 – Open, Close Cmd Inhibit RPC 05 – Open, Close Cmd Inhibit RPC 13 – Open, Close Cmd Inhibit RPC 14 – Open, Close Cmd Inhibit RPC 15 – Open, Close Cmd Inhibit</p> <p>D. RPCM S11A A RPC 03 – Open, Close Cmd Inhibit RPC 04 – Open, Close Cmd Inhibit RPC 13 – Open, Close Cmd Inhibit</p> </div> <p>If BRT used on oval HR:</p> <ol style="list-style-type: none"> 3. Request EV3 to perform inspection of oval HR, after BRT is released  4. Receive inspection report from EV3 5. Request EV3 to perform glove check 6. Receive glove check report from EV3 	<p><u>SSAS BBC CONNECTOR SWAPS</u> (00:30)</p> <ol style="list-style-type: none"> 1. Temp stow EVA camera at FHRC worksite. Report location <p style="text-align: center;">NOTE</p> <p>√Connectors for straight pins, no FOD, EMI band intact, and good bend radius.</p> <p>If BRT on oval HR is required, inspect contact area prior to attaching the BRT and again after the BRT is released</p> <p><u>Panel A102</u> (zenith):</p> <ol style="list-style-type: none"> 2. <input type="checkbox"/> Remove cap from J195 3. <input type="checkbox"/> Demate P116 from J116 4. <input type="checkbox"/> Install cap on J116 5. <input type="checkbox"/> Inspect and Mate P116 to J195 6. <input type="checkbox"/> Check good bend radius <p><u>Panel A103</u> (nadir):</p> <ol style="list-style-type: none"> 7. <input type="checkbox"/> Remove cap from J196 8. <input type="checkbox"/> Demate P121 from J121 9. <input type="checkbox"/> Install cap on J121 10. <input type="checkbox"/> Inspect and Mate P121 to J196 <input type="checkbox"/> Check good bend radius 11. If BRT used on oval HR, inspect HR for change at contact area  12. Perform glove check. Report status to IV 13. Translate to S1 – S3 Fluid Jumper Task/worksite

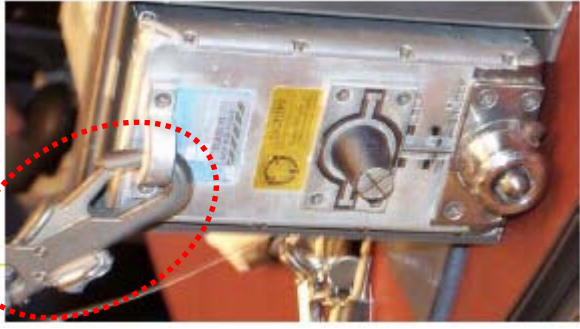
EVA 3 S1/S3 FLUID QD JUMPER INSTALL (00:35)

IV	EV3 – Acaba (FF)
<p>1. Verify with MCC-H that TRRJ inhibits are in place for translation to S1/S3 worksite</p> <p>2. Give GO to EV3 to translate to S1/S3</p> <div data-bbox="454 588 584 756" style="border: 1px solid black; padding: 5px; background-color: #e0ffe0;"> <p>DEMATE QD</p> <ol style="list-style-type: none"> ✓Forward white band visible, button up Demate QD (pull back on release ring) </div> <div data-bbox="600 777 909 1176" style="border: 1px solid black; padding: 5px; background-color: #e0e0ff;"> <p>MATE QD</p> <ol style="list-style-type: none"> Inspect QDs for FOD or damage ✓Detent button is up ✓Forward white band is NOT visible Assess side loads Mate QD. ✓Forward white band is visible Perform snap back test (✓Fwd white band is visible) Perform pull test Perform gap check (visual) </div> <div data-bbox="925 1197 1071 1386" style="border: 1px solid black; padding: 5px; background-color: #ffe0ff;"> <p>OPEN VALVE</p> <ol style="list-style-type: none"> Press button, move bail forward (open valve) ✓Aft white band visible, button up ✓Verify detent button can be depressed </div> <p>3. Receive glove check from EV3</p>	<p><u>S1/S3 FLUID JUMPER INSTALL</u> (00:35)</p> <div data-bbox="349 451 479 630" style="border: 1px solid black; padding: 5px;"> <p>CAUTION</p> <p>QDs exposed to direct sunlight can overtemp in 20 min. Shading by EMU or thermal shroud can lengthen acceptable time with bootie removed</p> </div> <p>On IV GO:</p> <ol style="list-style-type: none"> Translate to S1/S3 Face 6 (nadir) interface Open shroud on S1 nadir umbilical tray Release TA clamps, as reqd For QDs F56, perform DEMATE QD steps in the IV column Open thermal bootie and remove QD cap from M3 on S1 Panel A503. Stow cap in trash bag Open thermal bootie and remove QD cap from M1 on S3 panel A501. Stow cap in trash bag Attach RET to jumper For QDs F57, perform DEMATE QD steps in the IV column BRT to HR 3010 Perform MATE QD steps in IV column to mate QD F57 to M3 on S1 panel A503 For QD F57, perform OPEN VALVE steps in IV column Perform MATE QD steps in IV column to mate QD F56 to M1 on S3 panel A501 For QD F56, perform OPEN VALVE steps in IV column Reinstall thermal booties (2) Close TA clamps, as reqd Perform WVS survey of jumper connections  Replace S1 nadir umbilical tray shroud Inspect EMU gloves. Report glove status to IV Translate to S1 for FHRC P-Clamp Release

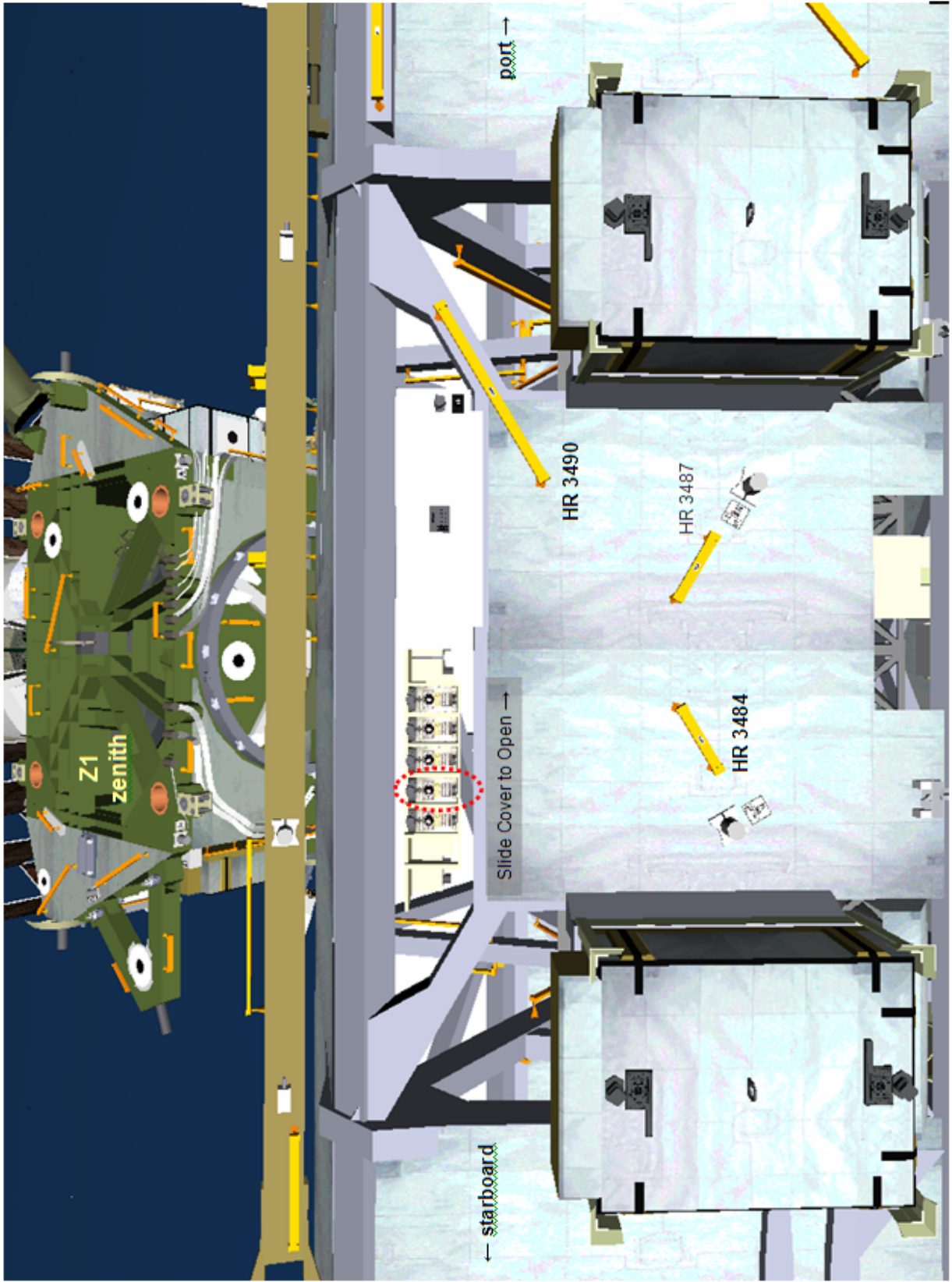
EVA 3 S1 FHRC P-CLAMP RELEASE (01:05)

<p>IV</p>	<p>EV3 – Acaba (FF)</p>		
<p>S1 FHRC P-Clamps: Bay 11 Stinger (6) – diagram on next page Bay 13 Hose Box (6) – diagram on next page</p> <ol style="list-style-type: none"> Request EV3 tool inventory Receive EV3 tool inventory report Request EV3 to perform glove inspection Receive EV3 glove inspection report <div style="border: 1px solid black; padding: 5px;"> <p>Tool Inventory</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top;"> <p>MWS</p> <ul style="list-style-type: none"> <input type="checkbox"/> Sm Trash bag <input type="checkbox"/> 2 – QD caps <input type="checkbox"/> RET w/PIP pin <input type="checkbox"/> RET <input type="checkbox"/> Wire ties (2) Swing_Arm <input type="checkbox"/> PGT <input type="checkbox"/> 6-in wobble ext <input type="checkbox"/> RET </td> <td style="width: 50%; vertical-align: top;"> <p>Crewlock Bag</p> <ul style="list-style-type: none"> <input type="checkbox"/> Ratchet wrench <input type="checkbox"/> 2-in socket ext <input type="checkbox"/> RET w/PIP pin <input type="checkbox"/> 18-in socket ext <input type="checkbox"/> RET w/PIP pin <input type="checkbox"/> EVA Camera <input type="checkbox"/> RET </td> </tr> </table> </div>	<p>MWS</p> <ul style="list-style-type: none"> <input type="checkbox"/> Sm Trash bag <input type="checkbox"/> 2 – QD caps <input type="checkbox"/> RET w/PIP pin <input type="checkbox"/> RET <input type="checkbox"/> Wire ties (2) Swing_Arm <input type="checkbox"/> PGT <input type="checkbox"/> 6-in wobble ext <input type="checkbox"/> RET 	<p>Crewlock Bag</p> <ul style="list-style-type: none"> <input type="checkbox"/> Ratchet wrench <input type="checkbox"/> 2-in socket ext <input type="checkbox"/> RET w/PIP pin <input type="checkbox"/> 18-in socket ext <input type="checkbox"/> RET w/PIP pin <input type="checkbox"/> EVA Camera <input type="checkbox"/> RET 	<p><u>RELEASE FHRC P-CLAMPS</u></p> <p><u>Stinger (Inboard)</u> (00:30)</p> <ol style="list-style-type: none"> Retrieve 18-in ext from Crewlock Bag #3 and install on PGT PGT [A7 9.2 ft-lb, CCW2 30 rpm, MTL 30.5] – 7/16-18-in ext: Release Stinger P-Clamps (6), any order, ~7-12.5 turns Stow 7/16-18-in ext in Crewlock Bag #3 Install 6-in extension on PGT Retrieve ratchet w/2-in from Crewlock Bag #3 to MWS <p><u>Hose Box (Outboard)</u> (00:25)</p> <ol style="list-style-type: none"> PGT [A7 9.2 ft-lb, CCW2 30 rpm, MTL 30.5] – 7/16-6-in ext: Release Hose Box P-clamps (6). Start at end furthest from QD, ~7-12.5 turns Perform tool inventory Stow EVA Camera in Crewlock Bag #3 Inspect gloves. Report glove status to IV Retrieve S1 Tasks Crewlock Bag #3 and attach to BRT
<p>MWS</p> <ul style="list-style-type: none"> <input type="checkbox"/> Sm Trash bag <input type="checkbox"/> 2 – QD caps <input type="checkbox"/> RET w/PIP pin <input type="checkbox"/> RET <input type="checkbox"/> Wire ties (2) Swing_Arm <input type="checkbox"/> PGT <input type="checkbox"/> 6-in wobble ext <input type="checkbox"/> RET 	<p>Crewlock Bag</p> <ul style="list-style-type: none"> <input type="checkbox"/> Ratchet wrench <input type="checkbox"/> 2-in socket ext <input type="checkbox"/> RET w/PIP pin <input type="checkbox"/> 18-in socket ext <input type="checkbox"/> RET w/PIP pin <input type="checkbox"/> EVA Camera <input type="checkbox"/> RET 		
<p><u>FHRC P-CLAMP CLEANUP</u> (00:10)</p> <ol style="list-style-type: none"> Translate to med ORU Bag (S0 Face 2) Verify MED ORU bag deployed Stow S1 Tasks Crewlock Bag #3 at med ORU Bag location Retrieve S0 1A_D RPCM Crewlock Bag #4 Attach S0 RPCM Crewlock Bag #4 to BRT On MCC-H GO, translate to S0 outboard for S0 1A_D RPCM REMOVE/REPLACE 			


EVA 3 S0 1A_D RPCM REMOVE/REPLACE (00:45) (Cont)

IV	EV3 – ACABA (FF)
<p>MCC-H:</p> <ol style="list-style-type: none"> Verify S0 RPCM Inhibits in place (√DDCU S01A Converter – Off), give EV GO for removal Record Failed RPCM s/n _____ (expect s/n C024088) Record Spare RPCM s/n _____ (expect s/n C235299) IV record S0 1A_D RPCM Drive Screw Installation Data Turns: _____ Torque: _____ <input type="checkbox"/> Receive glove check report from EV2 <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Tool Inventory</p> <ul style="list-style-type: none"> <input type="checkbox"/> RPCM S0 1A_D Crewlock Bag (#4) <input type="checkbox"/> RPCM for S0 1A_D s/n C235299 (Int RET #1) <input type="checkbox"/> Rnd scoop (Int RET #2) <input type="checkbox"/> Cncir Insul. Sleeve, size 33/37 (Int RET #3) </div>	<p>On IV GO, perform the following RPCM R&R steps:</p> <ol style="list-style-type: none"> Verify failed RPCM 1A_D is s/n C024088 Tether to RPCM with gate pointing away from RPCM PGT [A6 8.3 ft-lb, CCW2 30 RPM, MTL 30.5]-6ext 7/16 <ul style="list-style-type: none"> <input type="checkbox"/> Release Drive Screw, push while turning, ~8 turns √Status Indicator – UNLOCK Install scoop, as reqd Remove failed RPCM (slide off rail) Stow failed RPCM Retrieve spare RPCM Inspect RPCM connectors and guide rail for debris/damage Verify spare RPCM s/n (expect C235299) Verify proper hook orientation on new RPCM (gate away from RPCM) Install RPCM on guide rail and slide into soft dock √Status Indicator not below UNLOCK PGT [A2 3.8 ft-lb, CW2 30 RPM, MTL 30.5]-6ext 7/16 <ul style="list-style-type: none"> <input type="checkbox"/> Fasten Drive Screw, push while turning, 6-7 turns to hard stop √Status Indicator – LOCK EV3 report torque and turns Slide door closed, verify door does not slide freely and √alignment mark Perform Tool Inventory Close S0 1A_D RPCM Crewlock Bag #4. Attach S0 1A_D Crewlock Bag #4 to BRT Inspect gloves Report glove status to IV Translate to med ORU Bag (S0 HR 3528) Stow S0 1A_D RPCM Crewlock Bag #4 in med ORU Bag <p>If EV3 performing P1 1A_A RPCM R&R: 27. Go to P1 1A_A RPCM R&R</p>
	<p style="text-align: center;">NOTE</p> <p>Equipment Hook shown in correct orientation for R&R.</p> <p style="text-align: center;">Gate away from RPCM</p> <div style="text-align: center;">  </div>

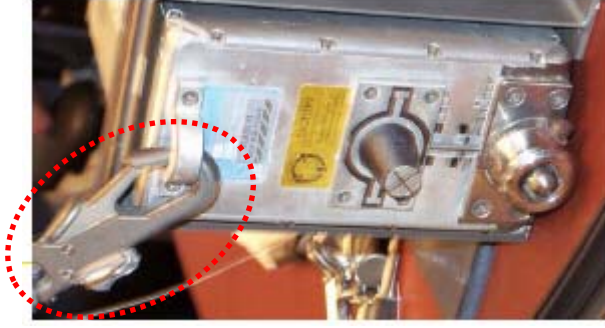
EVA 3 S0 1A_D RPCM REMOVE/REPLACE – TASK DATA



EVA 3 P1 1A_A RPCM REMOVE/REPLACE (00:45)

IV	EV2/EV3 (FF)	
<p>NOTE CETA lights will be turned off due to DDCU power-down</p> <p>1. Verify with MCC-H: P1 RPCM Inhibits in place (√DDCU S01A Converter – Off)</p> <p>or</p> <p>RPCM S01A_A RPC 01 Open, Close Inhibited), then: IV give EV2 GO for RPCM R&R</p>	<div style="border: 2px solid black; padding: 5px; margin-bottom: 10px;"> <p>WARNING Edges of RPCM housing may be sharp, use caution while handling Maintain minimum 1 ft clearance from P1 antenna (radomes) during translation</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p>CAUTION Failure to align and fully seat socket until lock springs have released can result in damage to RPCM Drive Screw Assembly</p> <p>Combined linear and rotational motion on the socket while inserting, can result in damage to RPCM Drive Screw Assembly</p> <p>Failure to use wobble socket, or socket with equivalent outer diameter, to release lock springs can result in damage to the RPCM Drive Screw Assembly</p> <p>Do not operate drive screw with scoop attached to microconical. The wobble socket feature will not extend thru the round scoop</p> </div> <ol style="list-style-type: none"> 1. Translate to med ORU Bag at S0 3528, as reqd 2. Retrieve P1 1A_A Crewlock Bag #2 and stow on BRT 3. Translate to 55-ft Safety Tether at S0 3545 4. Perform Safety Tether swap to 55-ft Safety Tether: <ul style="list-style-type: none"> <input type="checkbox"/> √Gate closed <input type="checkbox"/> √Hook locked <input type="checkbox"/> √Safety Tether Reel unlocked <input type="checkbox"/> Remove 85-ft Safety Tether and stow on S0 HR 3545 5. Translate to P1 1A_A RPCM worksite (access via Fwd Face – zenith) 6. Stow P1 1A_A Crewlock Bag #2 on P1 HR 3680 7. Attach BRT to P1 HR 3672 	<p>NOTE Equipment Hook shown in correct orientation for R&R.</p> <p>Gate away from RPCM</p> 

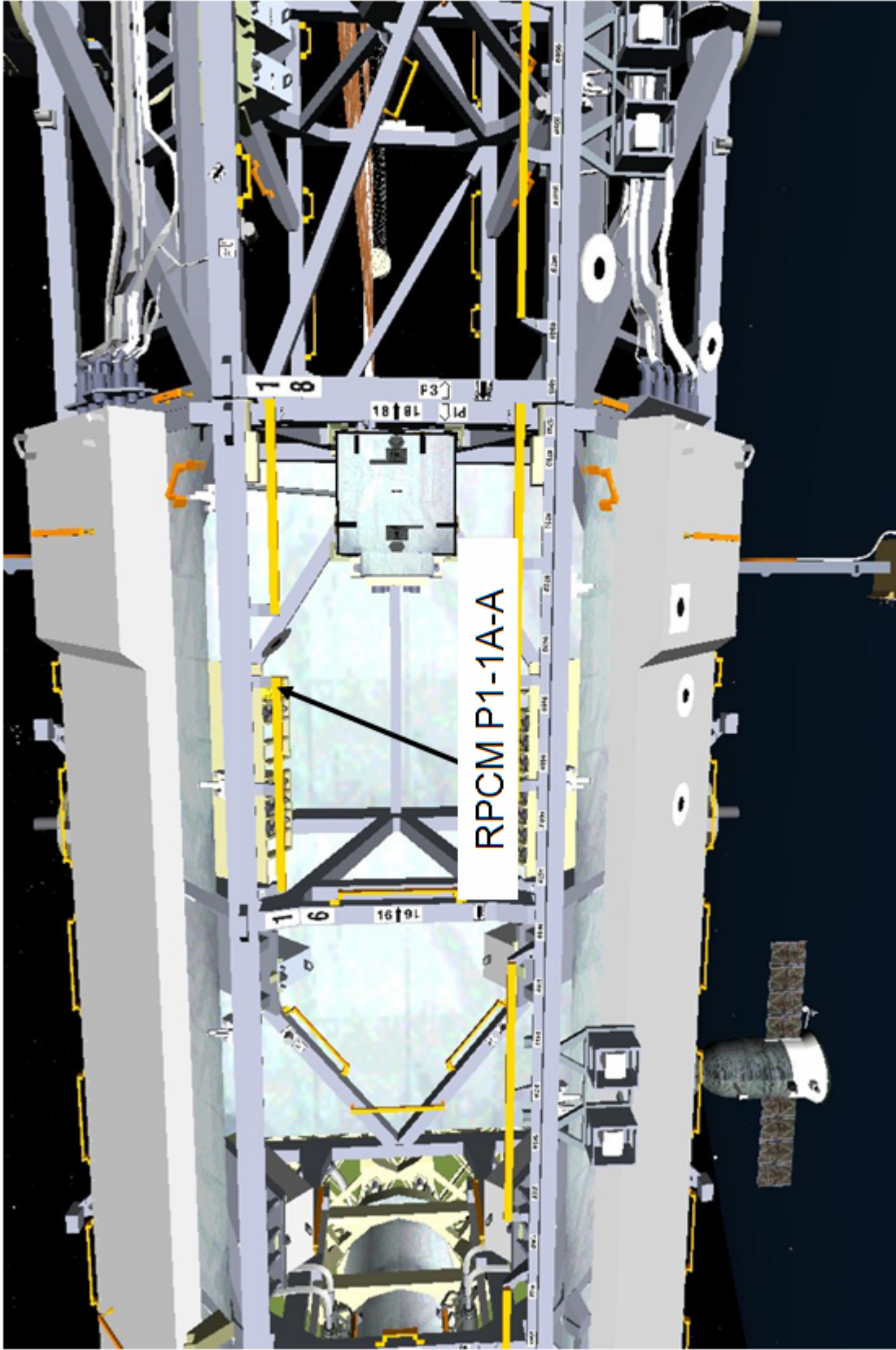
EVA 3 P1 1A_A RPCM REMOVE/REPLACE (00:45) (Cont)

IV	EV2/EV3 (FF)	
<p>2. IV record Failed RPCM s/n _____ (expect s/n C235300)</p> <p>3. IV record Spare RPCM s/n _____ (expect C326597)</p> <p>4. IV record RPCM Drive Screw installation data: Turns= _____ Torque= _____</p> <p><u>NOTE</u> CETA lights may turn on after power-up</p> <p>5. If S0 1A_D RPCM R&R complete: On EV2 GO: Inform MCC-H, EV2 clear GO for DDCU S01A Converter power-up and RPCM checkout(s), as reqd</p>	<p><u>REMOVE FAILED RPCM</u> On IV GO (inhibits complete), perform the following RPCM removal steps:</p> <ol style="list-style-type: none"> 8. Verify failed P1 A_A RPCM is s/n C235300 9. Tether to failed RPCM tether point with gate pointed away from RPCM 10. PGT [A6 8.3 ft-lb, CCW2 30 RPM, MTL 30.5]-6ext 7/16: Release RPCM drive screw, push slightly while turning, ~8 turns 11. Status indicator – UNLOCK 12. Remove failed RPCM (slide off of rail) 13. Use scoop, as reqd 14. Stow failed RPCM in P1 A_A Crewlock Bag #2 <p><u>INSTALL RPCM</u></p> <ol style="list-style-type: none"> 15. Remove spare RPCM from P1 1A_A Crewlock Bag #2 (leave RET connected) 16. Inspect RPCM connectors and guide rail for debris/damage 17. Report spare RPCM s/n (expect C326597) 18. Verify proper hook orientation on new RPCM (gate away from RPCM) 19. Install scoop, as reqd 20. Install RPCM on guide rail, and slide into soft dock 21. Status indicator – not below UNLOCK 22. PGT [A2 3.8 ft-lb, CW2 30 RPM, MTL 30.5]-6ext 7/16: Fasten RPCM drive screw, push slightly while turning, 6-7 turns to hard stop 23. Status indicator – LOCK 24. EV2 report torque and turns to IV 25. Stow PGT on swing arm 26. EV2 inform IV when clear of worksite. (DDCU S01A Converter power-up and RPCM checkout) 27. Retrieve P1 1A_A RPCM Crewlock Bag #2 Attach P1 1A_A Crewlock Bag #2 to BRT 	<p><u>NOTE</u> Equipment Hook shown in correct orientation for R&R.</p> <p>Gate away from RPCM</p> 

EVA 3 P1 1A_A RPCM REMOVE/REPLACE (00:45) (Cont)

IV	EV2/EV3 (FF)	
<p>6. Receive glove check report from EV2</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Tool Inventory</p> <ul style="list-style-type: none"> <input type="checkbox"/> RPCM P1 1A_A Crewlock Bag (#2) <input type="checkbox"/> RPCM for P1 1A_A s/n C326597 (Int RET #1) <input type="checkbox"/> Rnd scoop (Int RET #2) </div>	<p>28. Inspect gloves Report glove status to IV</p> <p>29. Perform tool inventory</p> <p>30. Translate to airlock Safety Tether temp stow location (S0 HR 3545)</p> <p>31. Perform Safety Tether swap to airlock 85-ft Safety Tether:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Gate closed <input checked="" type="checkbox"/> Hook locked <input checked="" type="checkbox"/> Safety Tether Reel unlocked <input type="checkbox"/> Remove 55-ft Safety Tether and stow on MWS <p>32. Perform CLEANUP</p>	

EVA 3 P1 1A_A RPCM REMOVE/REPLACE – TASK DATA



EVA 3 P1 1A_A RPCM REMOVE/REPLACE – TASK DATA (Cont)

Table 1. Tools

EV2/EV3
PGT
7/16 (wobble) Socket-6 ext
Round scoop

Table 2. EVA Fasteners

Fastener Name	Label	Head Size	Qty	Install Torque (ft-lb)	Release Torque (ft-lb)	Failure Torque (ft-lb)	Turns	RPM
RPCM Drive Screw		7/16	1	5.5 (grnd) 3.8 (orbit)	4.5	18.6 (remove) 8.5 (install)	8 (remove) 6-7 (install)	30

* Fastener torque data is derived from INC-9 S0 RPCM R&R task. It will be necessary to reverify data prior to performing this task.

Table 3. ORU Identification

	Part Number	Serial Number
Spare RPCM	R077419-61	C326597
Failed RPCM	R077419-61	C235300

RPCM Tether Orientation



EVA 3 CLEANUP (00:50)

IV	EV2 – Arnold (FF)	EV3 – Acaba (FF)
<p>1. Inform EV2/EV3 to begin cold soak, as reqd</p> <div style="border: 1px solid black; padding: 5px;"> <p>Tool Inventory</p> <ul style="list-style-type: none"> <input type="checkbox"/> Med ORU Bag <input type="checkbox"/> 2 – Adj Equip Tether to outside of bag <input type="checkbox"/> RET (sm-sm) (for EP MLI Cover on outside of bag) <input type="checkbox"/> EP MLI Cover <input type="checkbox"/> RET (sm-sm) (1 hook outside, 1 hook inside ORU bag) <input type="checkbox"/> WIF Adapter <input type="checkbox"/> 2 – EVA Wipes to bag straps (lid) <input type="checkbox"/> RET (sm-sm) to outside CL bag TP <input type="checkbox"/> RET (sm-sm) <input type="checkbox"/> PGT w/6-in wobble s/n [REDACTED] <input type="checkbox"/> Adj tether (Lg-sm) <input type="checkbox"/> RPCM P1 1A_A Crewlock Bag (#2) <input type="checkbox"/> RPCM for P1 1A_A s/n C326597 (Int RET #1) <input type="checkbox"/> Rnd scoop (Int RET #2) <input type="checkbox"/> Adj tether (Lg-sm) <input type="checkbox"/> RPCM S0 1A_D Crewlock Bag (#4) <input type="checkbox"/> RPCM for S0 1A_D s/n C235299 (Int RET #1) <input type="checkbox"/> Rnd scoop (Int RET #2) <input type="checkbox"/> Cnctr Insul. Sleeve, size 33/37 (Int RET #3) <input type="checkbox"/> Adj tether (sm-sm) (to Med ORU Bag Lid) <input type="checkbox"/> S1 Tasks Crewlock Bag (#3) <input type="checkbox"/> EVA Camera <input type="checkbox"/> RET w/PIP pin <ul style="list-style-type: none"> <input type="checkbox"/> 6-in ext – 7/16-in wobble socket <input type="checkbox"/> RET w/PIP pin <input type="checkbox"/> 18-in ext – 7/16-in <input type="checkbox"/> Ratchet w/2-in rigid ext (Int RET #1) <input type="checkbox"/> EVA Camera <input type="checkbox"/> RET (sm-sm) </div>	<p><u>CLEANUP</u> (00:50)</p> <p>1. Retrieve LEE Lube Crewlock Bag #1 and attach to BRT (LEE Lube Crewlock Bag #1 near med ORU Bag)</p> <p>2. Adjust TCV to begin cold soak, as reqd</p> <p>3. Translate to Airlock</p>	<p><u>CLEANUP</u> (00:25)</p> <p>1. Open med ORU Bag and stow the following items:</p> <ul style="list-style-type: none"> <input type="checkbox"/> P1 1A_A RPCM Crewlock Bag #2 <input type="checkbox"/> S0 1A_D RPCM Crewlock Bag #4 <input type="checkbox"/> S1 Tasks Crewlock Bag #3 in the med ORU Bag <p>2. Perform Tool Inventory</p> <p>3. Close med ORU Bag and attach to BRT</p> <p>4. Adjust TCV to begin cold soak, as reqd</p> <p>5. Translate to Airlock</p> <p>6. Stow med ORU Bag at Airlock</p>

EVA 4 INHIBIT PAD (Cont)

TASK SPECIFIC INHIBITS

Z1 Patch Panel

- MCC-H**
1. RPCM Z13B B RPC 18 – Open, Close Cmd Inhibit
 2. RPCM S02B D RPC 17 – Open, Close Cmd Inhibit

WETA Inhibits, to be performed prior to WETA installation:

- MCC-H**
1. RPCM S31A_A RPC 15 – Open, Close Cmd Inhibit
RPCM S31A_A RPC 16 – Open, Close Cmd Inhibit
 2. RPCM S32B_A RPC 15 – Open, Close Cmd Inhibit
RPCM S32B_A RPC 16 – Open, Close Cmd Inhibit

Orbiter

ALL EVAs

- TCS**
- L12 1. \sqrt TCS POWER – OFF

KU-BAND ANTENNA

- MCC-H**
1. \sqrt KU-BAND Mask – active
 2. \sqrt KU-BAND EVA Protect Box – active

Ground

ALL EVAs

Ground Radar

- MCC-H** 1. \sqrt TOPO console, ground radar restrictions in place for EVA

COL

EuTEF COL-CC

- Verify PLEGPAY Power Status (ETF_PLEGPAY_
Pwr_Stat) – OFF

JEM

JEMRMS

{JLP GPS Ant} SSIPC

When EV crew working within vicinity of JEMRMS

1. RIP MA Brake – On
 2. MDP Main Mode – Stby Mode
 3. PDB RMS Ext4 Vout: 0.0V
 4. VCU_B TVC WVE Sig Stat – No Signal
 5. VLU EE Pwr – Open
 6. JEU Interlock – Inhibit
 7. JEU RT – Inhibit
 8. MDP Ang/Mtr Cross Ck – Inhibit
- or
1. JEMRMS Rack – OFF

JPM PROX Antenna

{JLP GPS Ant} SSIPC

When EV crew working within 0.3 ft JPM PROX Antenna

1. \sqrt TRX Power – OFF
 2. \sqrt TX Power – OFF
- or
1. JPM PROX Antennas – OFF

JPM Windows

{JLP GPS Ant} IV

When EV crew translating on JPM port end cone, close window shutters

JLP GPS Antenna Install, to be performed prior to opening MLI

- SSIPC
1. PDB A2 RPC4 – OPEN
 2. PDB B1 RPC5 – OPEN

EVA 4 INHIBIT PAD (Cont)

RSOS (1)

ALL EVAs

SM Antennas

IV

1. GTS – Deactivate
2. ARISS (Ham Radio) – Deactivate or VHF (144-146 MHz) TX only

EVAs ON PMA1 OR RSOS (LOCATION DEPENDENT)

FGB Thrusters

MCC-M

1. √FGB MCS unpowered
2. √All FGB Attitude Control Thruster Valves (eighty) – closed
3. √FGB Attitude Control Manifold Valves – closed
КШК1, КШК2, КШК4, КШК5, КШК9, ОК03, ОКГ3, ОК06, ОКГ6, ОК07, ОКГ 7, ОК08, ОКГ8

Soyuz Thrusters

MCC-M

1. √Soyuz manifolds (four) – closed
ЭКО1, ЭКО2, ЭКГ1, ЭКГ2
2. √Soyuz MCS unpowered
3. √Soyuz Attitude Control Thruster Valves (fifty-two) – closed
4. √Soyuz Main Engine Valves (K1, K2, K3, K4, K5, K6) – closed

FGB Antennas

MCC-M

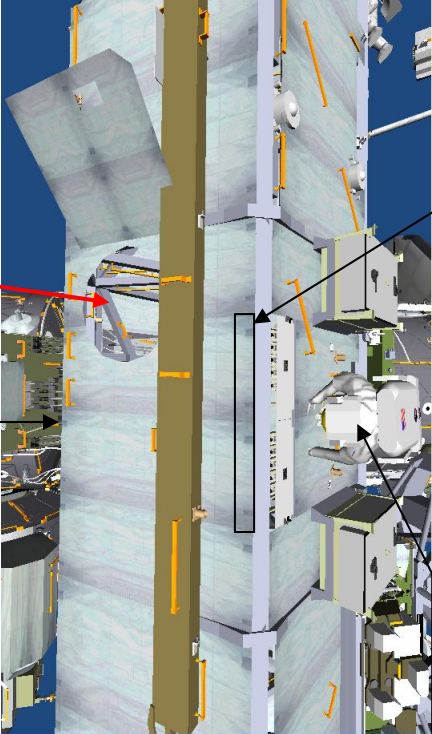
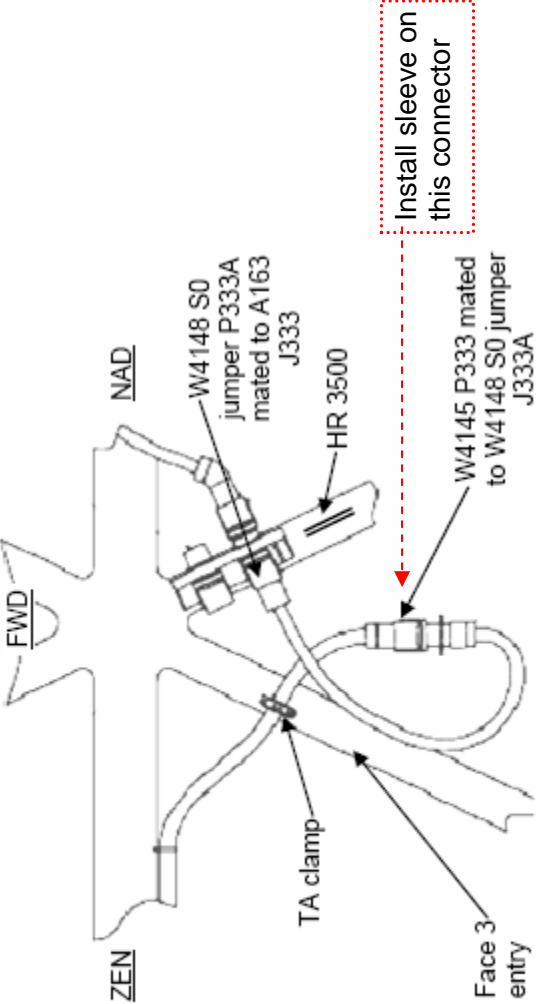
1. √FGB KURS P [KYPC P] – Deactivated

Soyuz Antennas

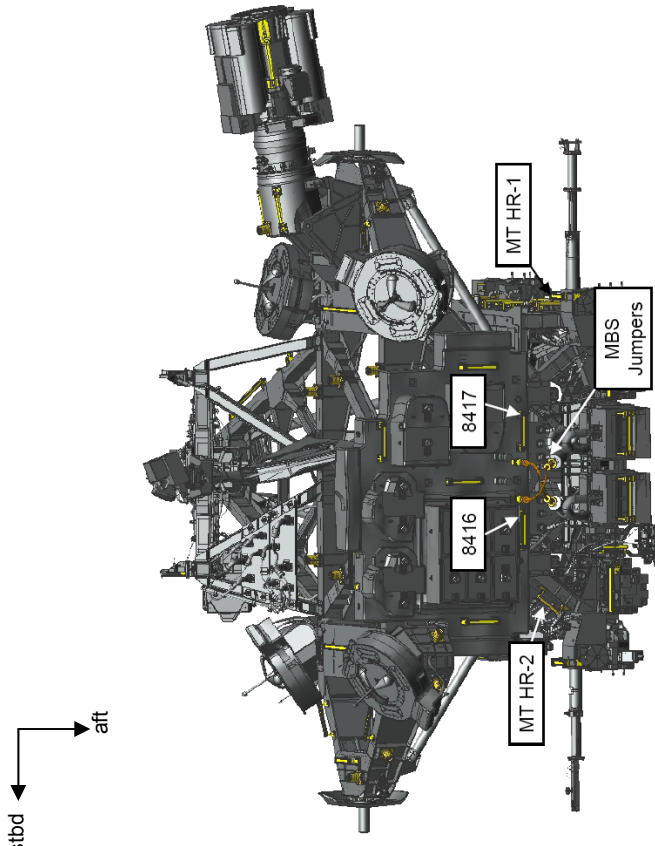
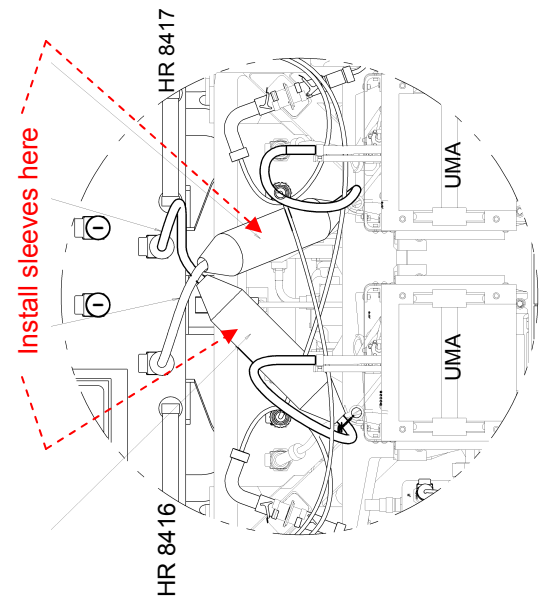
MCC-M

1. √Soyuz KURS A [KYPC A] – Deactivated

CONNECTOR INSULATING SLEEVE – CHANNEL 1/4 (S0)

IV	EV (FF)
<p>1. IV/MCC-H: Verify Inhibits are in place: DDCU S0 1A</p> 	<div data-bbox="284 105 414 583" style="border: 1px solid black; padding: 5px;"> <p>CAUTION Avoid contact with SPDA Radiator (Face 3) and S0 Radiator (Aft Face) to prevent hardware damage</p> </div> <ol style="list-style-type: none"> 1. Retrieve 1 connector sleeve (sz 33/37) 2. On IV GO (Inhibits completed) 3. Translate to S0 Bay 0 Face 3 4. Ingress aft shroud door 5. Install Connector Sleeve over affected connector <ul style="list-style-type: none"> □ Install P333 (W4145)/J333A (W4148) 

CONNECTOR INSULATING SLEEVE – MBS

IV	EV (FF)
<p>1. IV/MCC-H: Verify Inhibits are in place:</p> <p>Worksite Dependent WS1: RPCM S3-4B_F RPCM S3-3A_F WS4: RPC S0-4B_A1 RPC S0-3A_A1</p> 	<p>1. Retrieve 2 connector sleeves (sz 21/25) 2. On IV GO (Inhibits completed) 3. Translate to nadir side of MT/MBS 4. Install Connector Sleeves (2) over affected connectors</p> <ul style="list-style-type: none"> □ J2 (W9181)/P2 (A1W8031) □ J2 (W9182)/P2 (A2W8031) 

JEM RMS GROUNDING TABS (00:30)

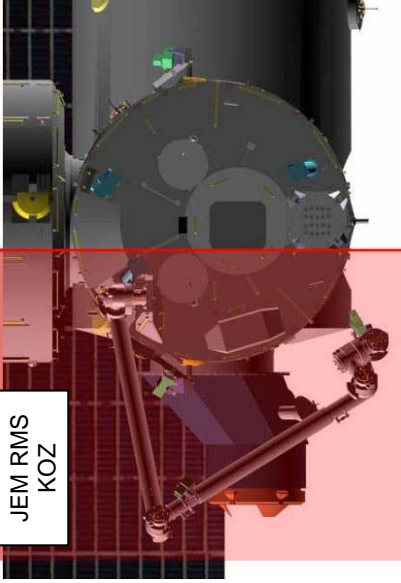
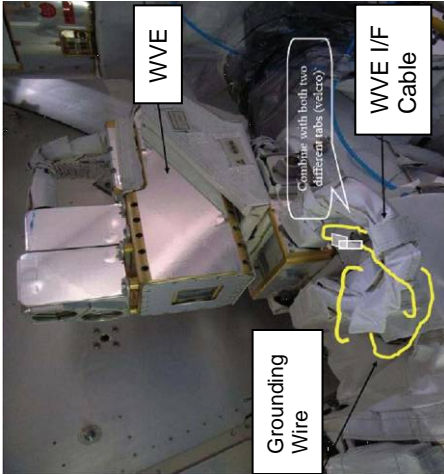
JEMRMS GROUNDING TABS (00:30)

1. Translate to JEMRMS EE
2. Temp stow Med ORU bag on JEM HR _____
3. BRT to JEM HR 1201

WARNING

If JEM RMS movement required, EV crew must stay aft of fwd JEM window

4. Wrap protruding EE grounding tabs (2) around Wrist Vision Equipment Interface (WVE I/F) cables
5. Attach grounding tabs (2) to each other via Velcro
6. If reqd, use wire tie around grounding tabs to secure in place



7. If reqd, tuck each tab (grounding wire) under permanent MLI near EDF on the arm/EE
8. WVS Survey of grounding tabs
9. Give **MCC-H GO** to check grounding tabs
10. Return to nominal timeline

Inhibits

JEMRMS
SSIPC

RIP MA Brake – On
MDP Main Mode – Stby Mode
PDB RMS Ext4 Vout: 0.0V
VCU_B TVC WVE Sig Stat – No Signal
VLU EE Pwr – Open
JEU Interlock – Inhibit
JEU RT – Inhibit
MDP Ang/Mtr Cross Ck – Inhibit

JEM RMS GROUNDING TABS – TASK DATA

Estimated Task Duration:

	With RMS	Without RMS
One EVA Crew	N/A	00:30
Two EVA Crew	N/A	N/A

Tools:

EV1
Wire Tie

Notes:

1. Grounding tabs Velcro must be orientated so that will stick to each other

Cautions:

None

Warnings:

1. If JEM RMS movement required, EV crewmember must be outside KOZ illustrated in Figure 3 (aft of the fwd JEM window)



Figure 2. Grounding Tabs



Figure 1. Grounding Tab Obstructing Camera View

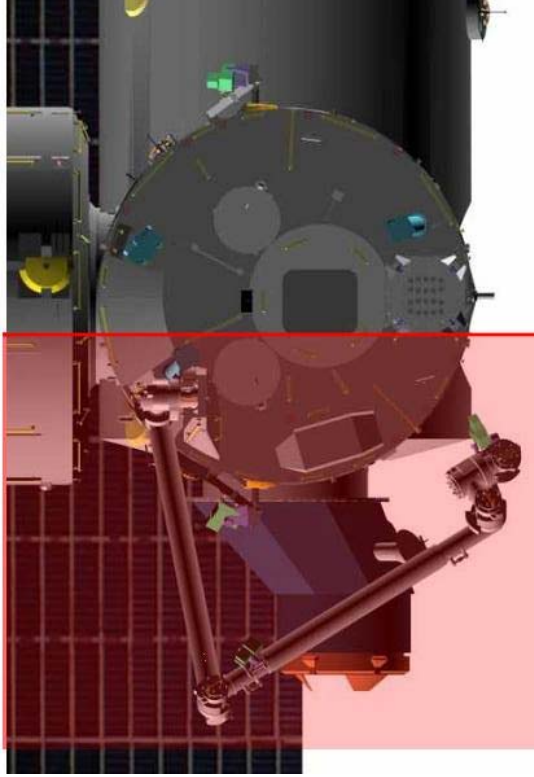


Figure 3. JEM RMS KOZ

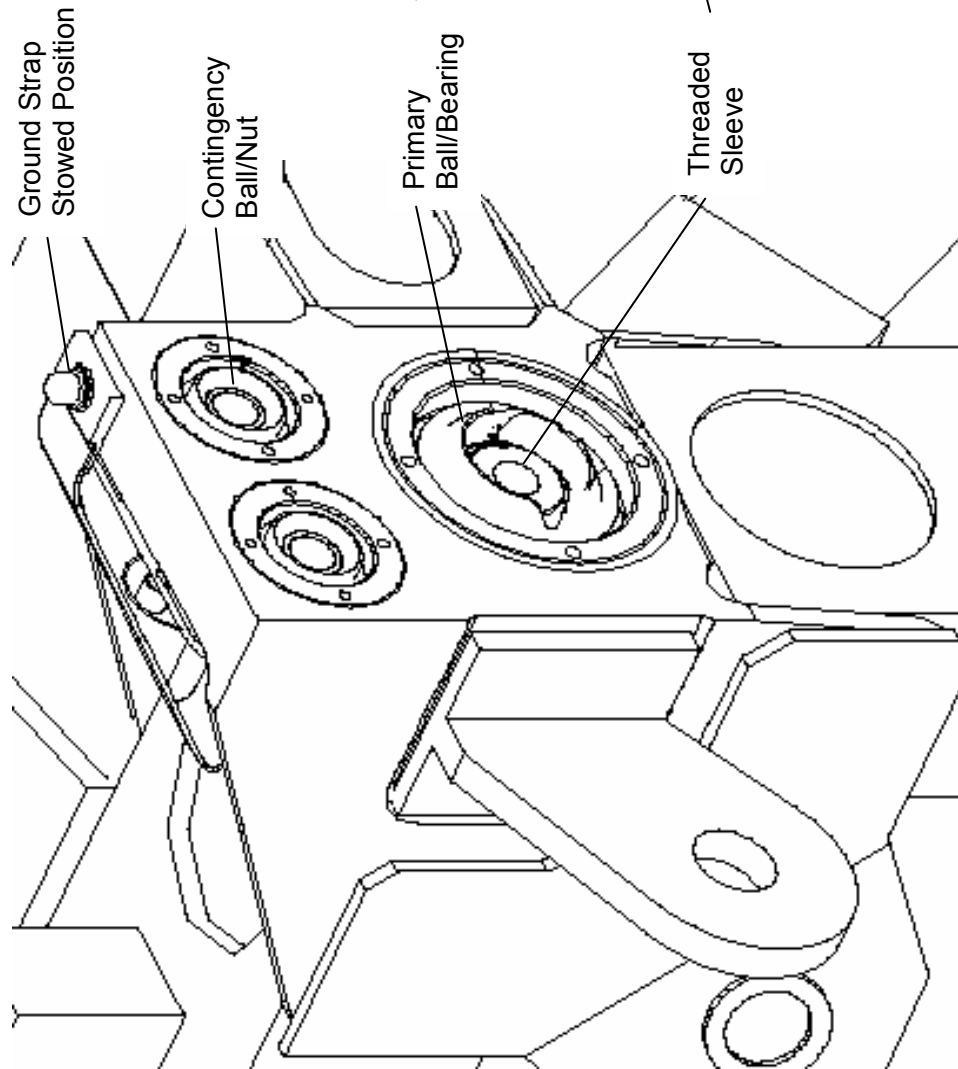
EVA 1 ATTACH S6 TO S5 (01:05) (Cont)

IV	EV1 – Swanson (FF)	EV2 – Arnold (FF)																								
<p>Torque wrench out of bag GMT: _____ : _____</p> <p>8. Give EV1 and EV2 GO for translation on S6 truss</p> <p>_____</p> <p>Once all RTAS bolts (4) at final torque and verified tools and tethers clear, give SSRMS GO for S6 ungrapple</p> <p>9. Obtain glove inspection report from EV1</p> <p>Torque wrench re-stowed GMT: _____ : _____</p>	<p>6. Retrieve torque wrench from Crewlock Bag</p> <p>7. Transfer 5/8-7.8-in ext from PGT to torque wrench</p> <p>8. On IV call: EV1 has GO for translation on S6 truss</p> <p><u>RTAS BOLT 3 AND 4 FINAL TORQUE</u></p> <p>9. Torque RTAS Bolts 3 and 4 (any order)</p> <p>Torque Wrench, 5/8-7.8-in ext: 57 ft-lb cw, to torque</p> <p>√Gap with small equip hook <input type="checkbox"/></p> <table border="1" data-bbox="560 766 738 1354"> <thead> <tr> <th>Bolt Order</th> <th>BRT HR</th> <th>*Turns to Torque</th> <th>Gap Check</th> </tr> </thead> <tbody> <tr> <td>Bolt 3 – zenith/aft</td> <td>2138 2135</td> <td>_____</td> <td><input type="checkbox"/></td> </tr> <tr> <td>Bolt 4 – zenith/fwd</td> <td>2129 2131</td> <td>_____</td> <td><input type="checkbox"/></td> </tr> </tbody> </table> <p>*Turn count record reqd only when not ~27 turns to hard stop</p> <p>10. Transfer torque wrench to EV2</p> <p>11. Retrieve tools from Crewlock Bag and stow on MWS:</p> <ul style="list-style-type: none"> <input type="checkbox"/> 7/16-6-in ext from socket caddy (for PVR) Install wobble socket on PGT <input type="checkbox"/> Canon Connector Tools (2) <p>(Use MWS RETs on connector tools.)</p> <p>Leave crewlock RETs on connector tool)</p> <p>12. EV1 perform glove/gauntlet inspection, report status to IV</p> <p>13. Translate to S5/S6 umbilical worksite (radiator side)</p>	Bolt Order	BRT HR	*Turns to Torque	Gap Check	Bolt 3 – zenith/aft	2138 2135	_____	<input type="checkbox"/>	Bolt 4 – zenith/fwd	2129 2131	_____	<input type="checkbox"/>	<p>5. On IV call: EV2 has GO for translation on S6 truss</p> <p><u>RTAS BOLT 2 AND 1 FINAL TORQUE</u></p> <p>6. Receive torque wrench from EV1</p> <p>Attach torque wrench to left MWS RET</p> <p>7. Torque RTAS Bolts 2 and 1 (any order):</p> <p>Torque Wrench, 5/8-7.8-in ext: 57 ft-lb cw, to torque</p> <p>√Gap with small equip hook <input type="checkbox"/></p> <p><u>NOTE:</u> Once 3 of 4 RTAS bolts at final torque, inform M1/M2 on RTAS bolt status</p> <table border="1" data-bbox="1006 126 1185 724"> <thead> <tr> <th>Bolt Order</th> <th>BRT HR</th> <th>Turns to Torque</th> <th>Gap Check</th> </tr> </thead> <tbody> <tr> <td>Bolt 2 – nadir/fwd</td> <td>2128 2140</td> <td>_____</td> <td><input type="checkbox"/></td> </tr> <tr> <td>Bolt 1 – nadir/aft</td> <td>2126 2103</td> <td>_____</td> <td><input type="checkbox"/></td> </tr> </tbody> </table> <p>8. Translate to crewlock bag</p> <p>9. Remove 5/8-7.8-in socket; stow in trash bag</p> <p>10. Stow torque wrench in torque wrench bag on Crewlock Bag with RET</p>	Bolt Order	BRT HR	Turns to Torque	Gap Check	Bolt 2 – nadir/fwd	2128 2140	_____	<input type="checkbox"/>	Bolt 1 – nadir/aft	2126 2103	_____	<input type="checkbox"/>
Bolt Order	BRT HR	*Turns to Torque	Gap Check																							
Bolt 3 – zenith/aft	2138 2135	_____	<input type="checkbox"/>																							
Bolt 4 – zenith/fwd	2129 2131	_____	<input type="checkbox"/>																							
Bolt Order	BRT HR	Turns to Torque	Gap Check																							
Bolt 2 – nadir/fwd	2128 2140	_____	<input type="checkbox"/>																							
Bolt 1 – nadir/aft	2126 2103	_____	<input type="checkbox"/>																							

EVA 1 ATTACH S6 TO S5 (01:05) (Cont)

IV	EV1 – Swanson (FF)	EV2 – Arnold (FF)
<p>10. Obtain glove inspection report from EV2</p>		<p><u>RELEASE S5 CAPTURE LATCH PRE-LOAD</u></p> <ol style="list-style-type: none"> Once all 4 RTAS bolts are torqued, drive S5 CLA: PGT, 7/16-6-in ext: [A6 8.3 ft-lb, CCW3 60 rpm, MTL 30.5], ~60 turns EV2 perform glove/gauntlet inspection, report status to IV Translate to S5/S6 umbilical worksite (radiator side)

EVA 1 ATTACH S6 TO S5 – TASK DATA (Cont)

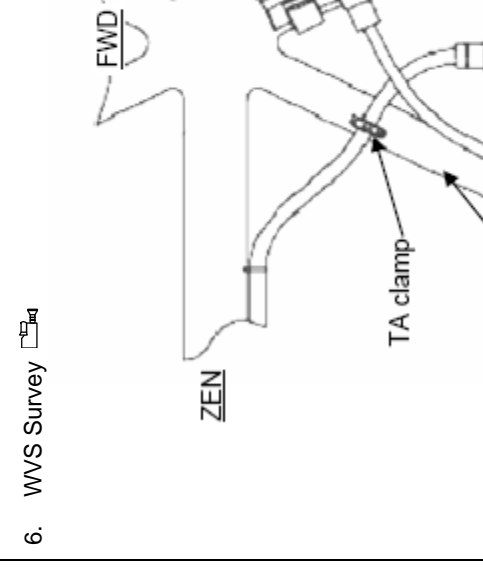

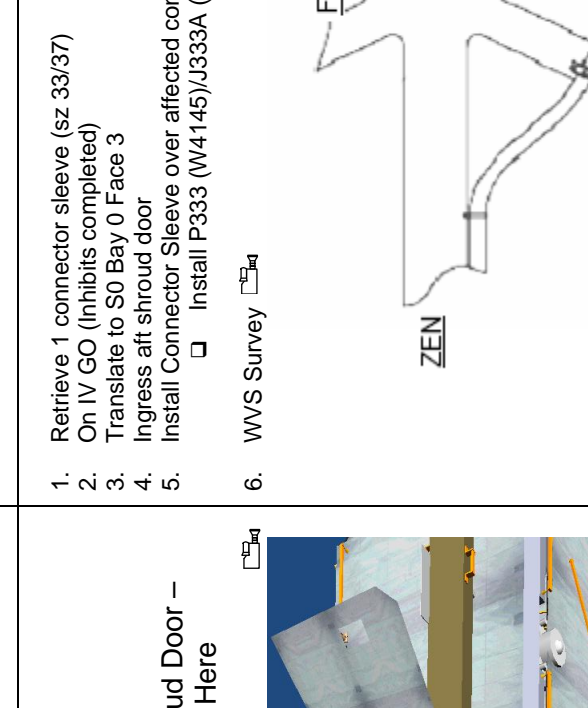


RTAS S6 SIDE

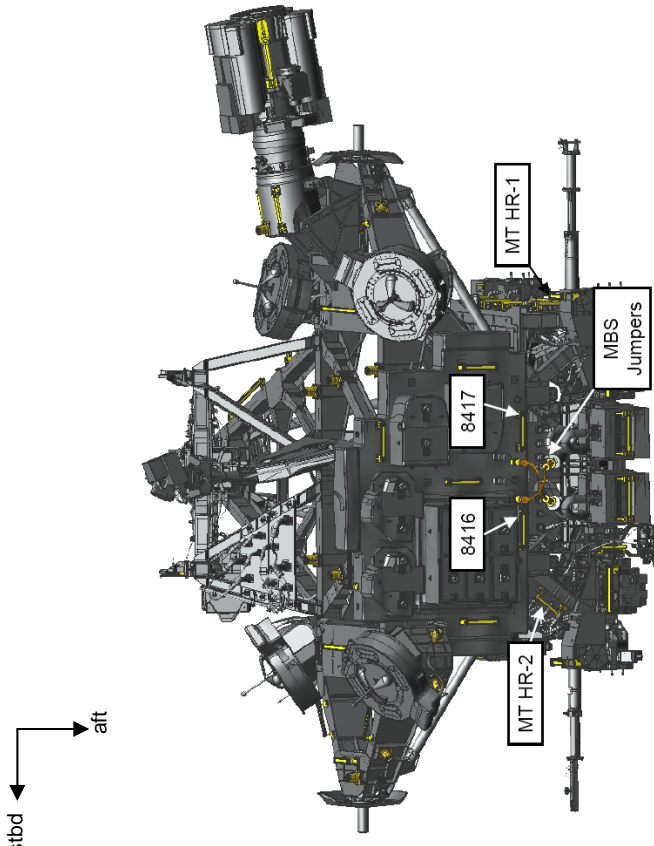

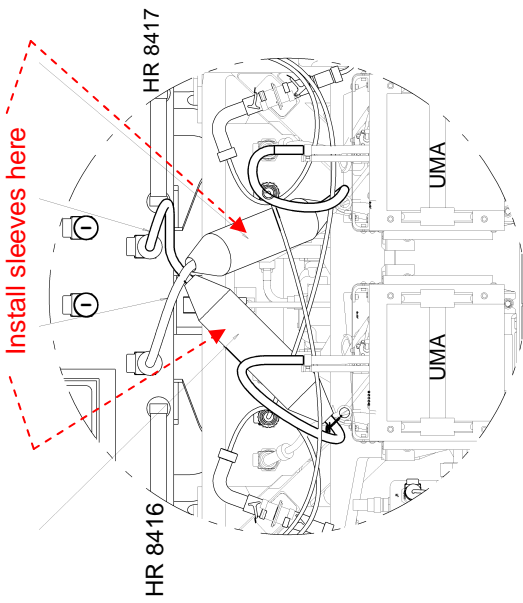
EVA 1 CONNECT S5 TO S6 UMBILICALS (00:55)

	EV1 – Swanson (FF)	EV2 – Arnold (FF)									
<p>IV</p> <p>S6 TO S5 INHIBITS (see Task Data for reqd inhibits)</p> <ol style="list-style-type: none"> <input type="checkbox"/> IV verify with MCC-H S5-S6 inhibits in place Give EV GO for P253 demate 	<p>CONNECT S6 UMBILICALS</p> <ol style="list-style-type: none"> Stow cannon connector tools on HR 2140 and HR 2142 Open TA clamps (10): P253 (2) <input type="checkbox"/>, P254 (2) <input type="checkbox"/>, P259 (3) <input type="checkbox"/>, P260 (3) <input type="checkbox"/> <p style="text-align: center;">NOTE</p> <p>Connectors for straight pins, no FOD, EMI band intact, and good bend radius.</p> <p>RET to caps when both connector tools are in use, as reqd</p>	<p>CONNECT S6 UMBILICALS</p> <ol style="list-style-type: none"> Assist EV1, as reqd 									
<ol style="list-style-type: none"> <input type="checkbox"/> IV verify with MCC-H S5-S6 inhibits in place Give EV GO for P253 demate 	<p>3. On IV GO, perform the following 1553 Bus A demate/mates and swap connector cap from S5 to S6 dummy connector:</p> <table border="1" data-bbox="625 840 722 1449"> <tr> <td>EV2 – Demate cap from S6</td> <td>EV1 – Demate cable from S5</td> <td>EV2 – Insp/Mate cable to S6</td> <td>EV1 – Insp/Mate cap on S5</td> </tr> <tr> <td><input type="checkbox"/> S6 cap ← → S6 J153</td> <td><input type="checkbox"/> S5 P253 ← → S5 J153</td> <td><input type="checkbox"/> S5 P253 → ← S6 J153</td> <td><input type="checkbox"/> S6 cap → ← S5 J153</td> </tr> </table>	EV2 – Demate cap from S6	EV1 – Demate cable from S5	EV2 – Insp/Mate cable to S6	EV1 – Insp/Mate cap on S5	<input type="checkbox"/> S6 cap ← → S6 J153	<input type="checkbox"/> S5 P253 ← → S5 J153	<input type="checkbox"/> S5 P253 → ← S6 J153	<input type="checkbox"/> S6 cap → ← S5 J153	<p>3. On IV GO, perform the following 1553 Bus A demate/mates and swap connector cap from S5 to S6 dummy connector:</p>	
EV2 – Demate cap from S6	EV1 – Demate cable from S5	EV2 – Insp/Mate cable to S6	EV1 – Insp/Mate cap on S5								
<input type="checkbox"/> S6 cap ← → S6 J153	<input type="checkbox"/> S5 P253 ← → S5 J153	<input type="checkbox"/> S5 P253 → ← S6 J153	<input type="checkbox"/> S6 cap → ← S5 J153								
<ol style="list-style-type: none"> <input type="checkbox"/> Notify MCC-H P253 mated to S6: Give MCC-H GO to reconfigure S6/S5 – 1553 buses to Bus A. Reconfiguration to Bus A must be completed prior to performing 1553 bus reconfiguration in EV1 step 7 	<p>4. Give IV/MCC-H GO for 1553 bus reconfiguration. Continue with power cap/connector demates:</p> <table border="1" data-bbox="836 840 933 1449"> <tr> <td>EV2 – Demate cap from S6</td> <td>EV1 – Demate cable from S5</td> <td>EV1 – Insp and mate cable to S6</td> </tr> <tr> <td><input type="checkbox"/> S6 cap ← → S6 J160</td> <td><input type="checkbox"/> S5 P260 ← → S5 J160</td> <td><input type="checkbox"/> S5 P260 → ← S6 J160</td> </tr> <tr> <td colspan="3">EV2: Keep cap on tool</td> </tr> </table>	EV2 – Demate cap from S6	EV1 – Demate cable from S5	EV1 – Insp and mate cable to S6	<input type="checkbox"/> S6 cap ← → S6 J160	<input type="checkbox"/> S5 P260 ← → S5 J160	<input type="checkbox"/> S5 P260 → ← S6 J160	EV2: Keep cap on tool			<p>4. Give IV/MCC-H GO for 1553 bus reconfiguration. Continue with power cap/connector demates:</p>
EV2 – Demate cap from S6	EV1 – Demate cable from S5	EV1 – Insp and mate cable to S6									
<input type="checkbox"/> S6 cap ← → S6 J160	<input type="checkbox"/> S5 P260 ← → S5 J160	<input type="checkbox"/> S5 P260 → ← S6 J160									
EV2: Keep cap on tool											
<ol style="list-style-type: none"> <input type="checkbox"/> IV verify with MCC-H, GO for P254 demate (EV1 step 7) Give EV1 GO to demate P254 	<p>5. Ingress APFR, as reqd. Continue with power cap/connector swap:</p> <table border="1" data-bbox="1047 840 1144 1449"> <tr> <td>EV2 – Demate cap from S6</td> <td>EV1 – Demate cable from S5</td> <td>EV1 – Insp/Mate cable to S6</td> </tr> <tr> <td><input type="checkbox"/> S6 cap ← → S6 J159</td> <td><input type="checkbox"/> S5 P259 ← → S5 J159</td> <td><input type="checkbox"/> S5 P259 → ← S6 J159</td> </tr> <tr> <td colspan="3">EV2: Keep cap on RET/tool</td> </tr> </table>	EV2 – Demate cap from S6	EV1 – Demate cable from S5	EV1 – Insp/Mate cable to S6	<input type="checkbox"/> S6 cap ← → S6 J159	<input type="checkbox"/> S5 P259 ← → S5 J159	<input type="checkbox"/> S5 P259 → ← S6 J159	EV2: Keep cap on RET/tool			<p>5. Ingress APFR, as reqd. Continue with power cap/connector swap:</p>
EV2 – Demate cap from S6	EV1 – Demate cable from S5	EV1 – Insp/Mate cable to S6									
<input type="checkbox"/> S6 cap ← → S6 J159	<input type="checkbox"/> S5 P259 ← → S5 J159	<input type="checkbox"/> S5 P259 → ← S6 J159									
EV2: Keep cap on RET/tool											
<ol style="list-style-type: none"> <input type="checkbox"/> IV verify with MCC-H, GO for P254 demate (EV1 step 7) Give EV1 GO to demate P254 	<p>6. Mate connector caps (2) to S5 P260 <input type="checkbox"/> and S5 P259 <input type="checkbox"/></p>	<p>6. Mate connector caps (2) to S5 P260 <input type="checkbox"/> and S5 P259 <input type="checkbox"/></p>									
<ol style="list-style-type: none"> <input type="checkbox"/> Notify MCC-H P254 mated (Give GO for S6 activation) 	<p>7. Egress APFR, as reqd. On IV GO, perform 1553 Bus B cap/connector swap:</p> <table border="1" data-bbox="1469 840 1567 1449"> <tr> <td>EV2 – Demate cap from S6</td> <td>EV1 – Demate cable from S5</td> <td>EV2 – Insp/Mate cable to S6</td> <td>EV1 – Insp/Mate cap on S5</td> </tr> <tr> <td><input type="checkbox"/> S6 cap ← → S6 J154</td> <td><input type="checkbox"/> S5 P254 ← → S5 J154</td> <td><input type="checkbox"/> S5 P254 → ← S6 J154</td> <td><input type="checkbox"/> S6 cap → ← S5 J154</td> </tr> </table>	EV2 – Demate cap from S6	EV1 – Demate cable from S5	EV2 – Insp/Mate cable to S6	EV1 – Insp/Mate cap on S5	<input type="checkbox"/> S6 cap ← → S6 J154	<input type="checkbox"/> S5 P254 ← → S5 J154	<input type="checkbox"/> S5 P254 → ← S6 J154	<input type="checkbox"/> S6 cap → ← S5 J154	<p>7. Egress APFR, as reqd. On IV GO, perform 1553 Bus B cap/connector swap:</p>	
EV2 – Demate cap from S6	EV1 – Demate cable from S5	EV2 – Insp/Mate cable to S6	EV1 – Insp/Mate cap on S5								
<input type="checkbox"/> S6 cap ← → S6 J154	<input type="checkbox"/> S5 P254 ← → S5 J154	<input type="checkbox"/> S5 P254 → ← S6 J154	<input type="checkbox"/> S6 cap → ← S5 J154								
<ol style="list-style-type: none"> <input type="checkbox"/> Notify MCC-H P254 mated (Give GO for S6 activation) 	<ol style="list-style-type: none"> Retrieve APFR Stow APFR on BRT (preset APFR [NN,E,1]) 	<ol style="list-style-type: none"> Verify TA clamps closed, as reqd Clean up worksite. Retrieve connector tools (2) 									



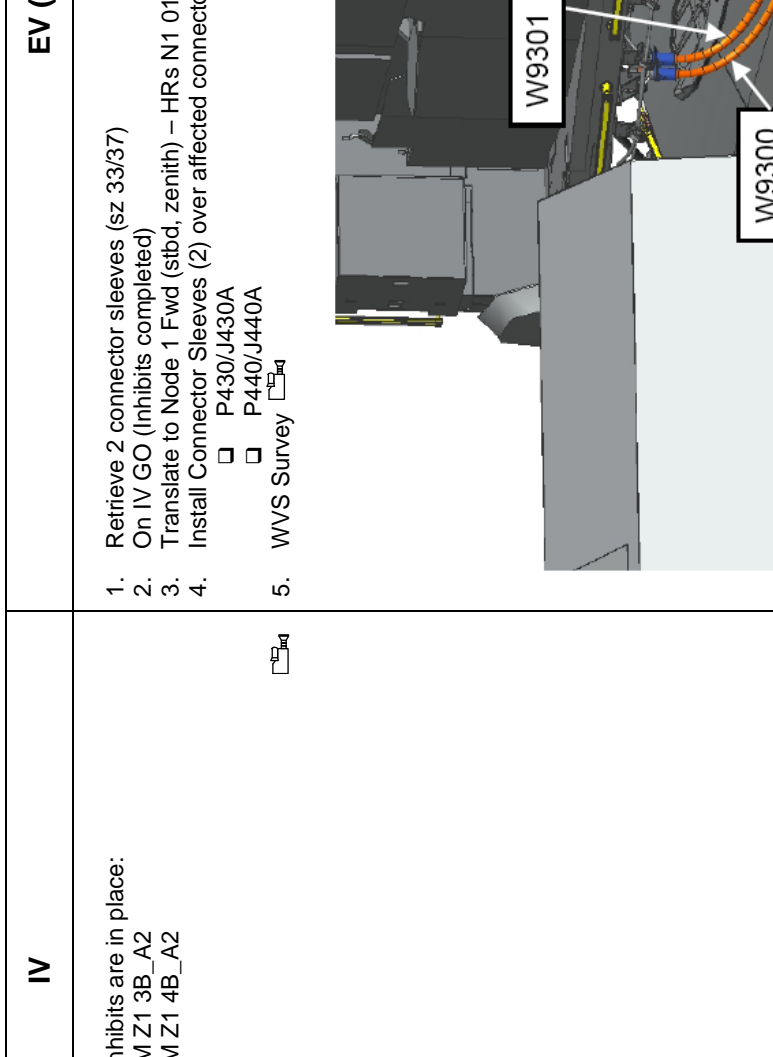
CONNECTOR INSULATING SLEEVE – CHANNEL 1/4 (S0)

IV	EV (FF)
<p>1. IV/MCC-H: Verify Inhibits are in place: DDCU S0 1A</p> 	<div data-bbox="284 367 446 577" style="border: 1px solid black; padding: 5px;"> <p>CAUTION Avoid contact with SPDA Radiator (Face 3) and S0 Radiator (Aft Face) to prevent hardware damage</p> </div> <ol style="list-style-type: none"> 1. Retrieve 1 connector sleeve (sz 33/37) 2. On IV GO (Inhibits completed) 3. Translate to S0 Bay 0 Face 3 4. Ingress aft shroud door 5. Install Connector Sleeve over affected connector <ul style="list-style-type: none"> <input type="checkbox"/> Install P333 (W4145)/J333A (W4148) 6. WWS Survey  

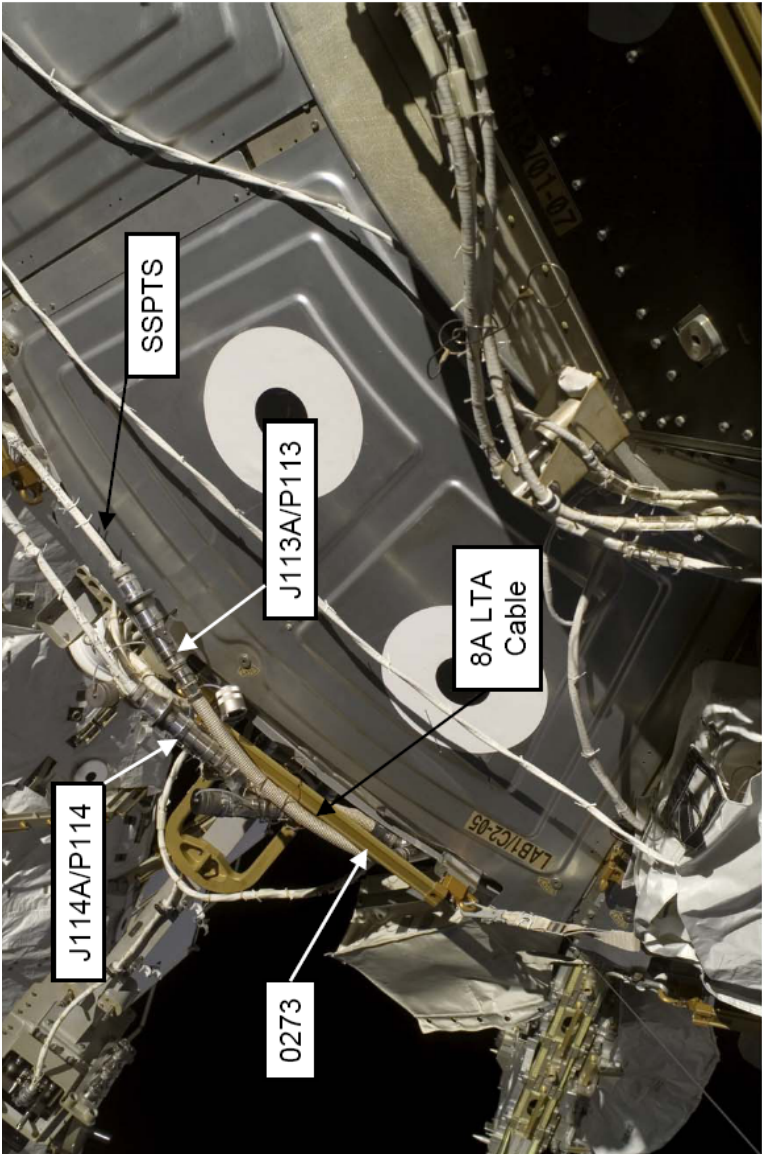
CONNECTOR INSULATING SLEEVE – MBS

IV	EV (FF)
<p>1. IV/MCC-H: Verify Inhibits are in place:</p> <p>Worksite Dependent</p> <p>WS1: RPCM S3-4B_F RPCM S3-3A_F WS4: RPC S0-4B_A1 RPC S0-3A_A1</p> 	<p>1. Retrieve 2 connector sleeves (sz 21/25)</p> <p>2. On IV GO (Inhibits completed)</p> <p>3. Translate to nadir side of MT/MBS</p> <p>4. Install Connector Sleeves (2) over affected connectors</p> <ul style="list-style-type: none"> □ J2 (W9181)/P2 (A1W8031) □ J2 (W9182)/P2 (A2W8031) <p>5. WVS Survey </p> 



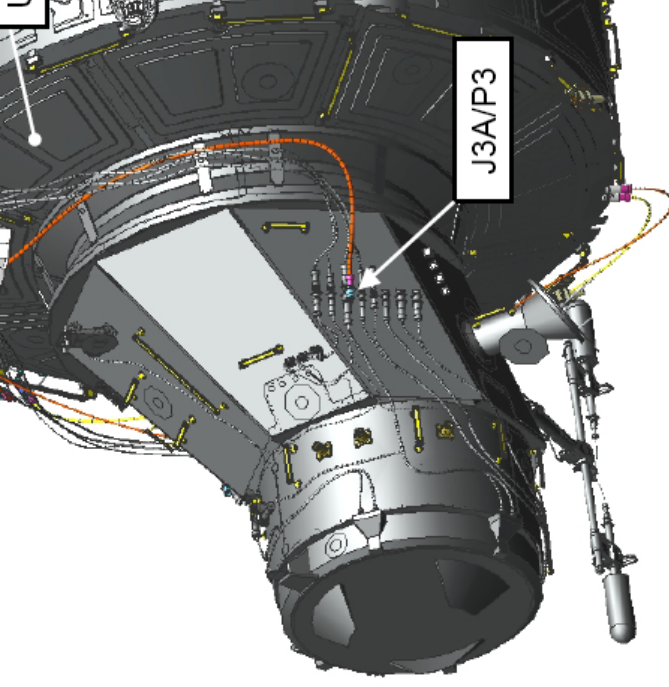
CONNECTOR INSULATING SLEEVE – SSPTS (NODE 1 FWD)

IV	EV (FF)
<p>1. IV/MCC-H: Verify Inhibits are in place: RPCM Z1 3B_A2 RPCM Z1 4B_A2</p>	<p>1. Retrieve 2 connector sleeves (sz 33/37) 2. On IV GO (Inhibits completed) 3. Translate to Node 1 Fwd (stbd, zenith) – HRs N1 0137 & N1 0130 4. Install Connector Sleeves (2) over affected connectors □ P430/J430A □ P440/J440A 5. WVS Survey </p>
<p></p>	



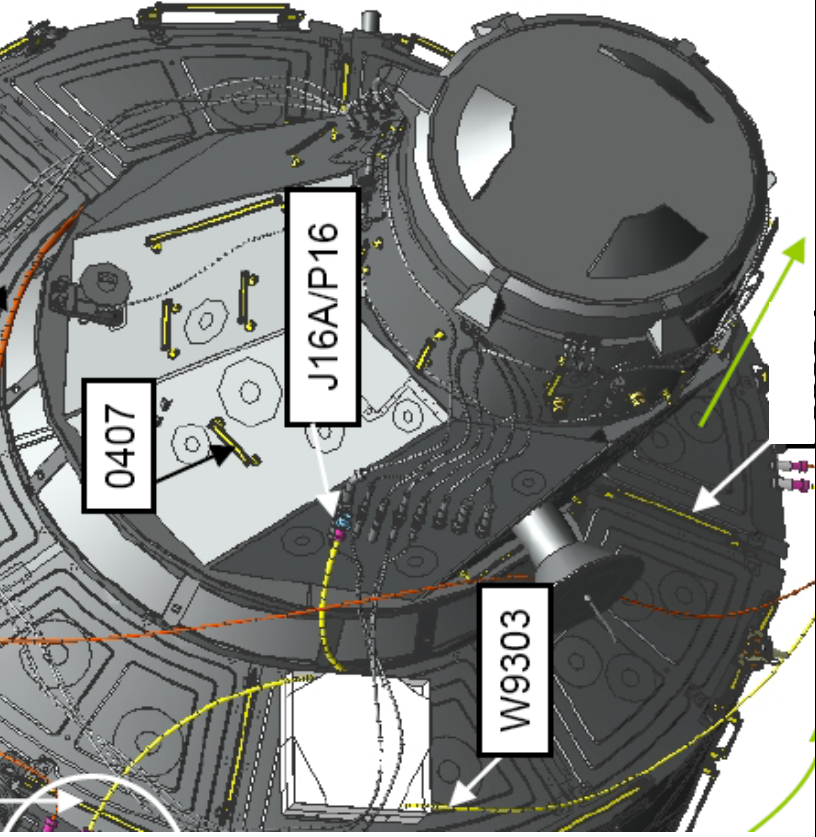
CONNECTOR INSULATING SLEEVE – SSPTS (LAB FWD)

IV	EV (FF)
<p>1. IV/MCC-H: Verify Inhibits are in place: RPCM Z1 3B_A2 RPCM Z1 4B_A2</p> <p><input type="checkbox"/></p>	<p>1. Retrieve 2 connector sleeves (sz 21/25) 2. On IV GO (Inhibits completed) 3. Translate to Lab Fwd (stbd) – HR Lab 0273 4. Install Connector Sleeves (2) over affected connectors <input type="checkbox"/> P113/J113A <input type="checkbox"/> P114/J114A 5. WVS Survey <input type="checkbox"/></p>  <p>ISS014E13476</p>

CONNECTOR INSULATING SLEEVE – SSPTS (PMA2 PORT)

IV	EV (FF)
<p>1. IV/MCC-H: Verify Inhibits are in place: RPCM LA 1A4A_D3 RPCM Z1 4B_A2</p> <p></p>	<p>1. Retrieve 1 connector sleeve (sz 21/25) 2. On IV GO (Inhibits completed) 3. Translate PMA2 port (midway) 4. Install Connector Sleeve over affected connector □ P3/J3A 5. WVS Survey </p> 

CONNECTOR INSULATING SLEEVE – SSPTS (PMA2 STBD)

IV	EV (FF)
<p>1. IV/MCC-H: Verify Inhibits are in place: RPCM LA 2A3B_D1 RPCM Z1 3B_A2</p> <p></p>	<ol style="list-style-type: none"> 1. Retrieve 1 connector sleeve (sz 21/25) 2. On IV GO (Inhibits completed) 3. Translate to PMA2 stbd (midway) – HR 0407 4. Install Connector Sleeve over affected connector <input type="checkbox"/> P16/J16A 5. WVS Survey 
	

EVA 4 INHIBIT PAD (Cont)

TASK SPECIFIC INHIBITS

Z1 Patch Panel

- MCC-H**
1. RPCM Z13B B RPC 18 – Open, Close Cmd Inhibit
 2. RPCM S02B D RPC 17 – Open, Close Cmd Inhibit

WETA Inhibits, to be performed prior to WETA installation:

- MCC-H**
1. RPCM S31A_A RPC 15 – Open, Close Cmd Inhibit
RPCM S31A_A RPC 16 – Open, Close Cmd Inhibit
 2. RPCM S32B_A RPC 15 – Open, Close Cmd Inhibit
RPCM S32B_A RPC 16 – Open, Close Cmd Inhibit

Orbiter

ALL EVAs

- TCS**
- L12 1. √TCS POWER – OFF

KU-BAND ANTENNA

- MCC-H**
1. √KU-BAND Mask – active
 2. √KU-BAND EVA Protect Box – active

Ground

ALL EVAs

- Ground Radar**
- MCC-H** 1. √TOPO console, ground radar restrictions in place for EVA

COL

- EuTEF**
- COL-CC** Verify PLEGPAY Power Status (ETF_PLEGPAY_Pwr_Stat) – OFF

JEM

JEMRMS

{JLP GPS Ant}
SSIPC

When EV crew working within vicinity of JEMRMS

1. RIP MA Brake – On
 2. MDP Main Mode – Stby Mode
 3. PDB RMS Ext4 Vout: 0.0V
 4. VCU_B TVC WVE Sig Stat – No Signal
 5. VLU EE Pwr – Open
 6. JEU Interlock – Inhibit
 7. JEU RT – Inhibit
 8. MDP Ang/Mtr Cross Ck – Inhibit
- or
1. JEMRMS Rack – OFF

JPM PROX Antenna

{JLP GPS Ant}

SSIPC

When EV crew working within 0.3 ft JPM PROX Antenna

1. √TRX Power – OFF
 2. √TX Power – OFF
- or
1. JPM PROX Antennas – OFF

JPM Windows

{JLP GPS Ant}

IV

When EV crew translating on JPM port end cone, close window shutters

JLP GPS Antenna

SSIPC

Install, to be performed prior to opening MLI

1. PDB A2 RPC4 – OPEN
2. PDB B1 RPC5 – OPEN

EFBM Inhibits

{JEMRMS Grounding Tabs}

IV

1. √P011B on jumper cable disconnected for BEP

SSIPC 2. PDB A2 RPC01 – Open

EVA 4 INHIBIT PAD (Cont)

RSOS (1)

ALL EVAs

SM Antennas

IV

1. GTS – Deactivate
2. ARISS (Ham Radio) – Deactivate or VHF (144-146 MHz) TX only

EVAs ON PMA1 OR RSOS (LOCATION DEPENDENT)

FGB Thrusters

MCC-M

1. √FGB MCS unpowered
2. √All FGB Attitude Control Thruster Valves (eighty) – closed
3. √FGB Attitude Control Manifold Valves – closed
КШК1, КШК2, КШК4, КШК5, КШК9, ОК03, ОКГ3, ОК06, ОКГ6, ОК07, ОКГ 7, ОК08, ОКГ8

Soyuz Thrusters

MCC-M

1. √Soyuz manifolds (four) – closed
ЭКО1, ЭКО2, ЭКГ1, ЭКГ2
2. √Soyuz MCS unpowered
3. √Soyuz Attitude Control Thruster Valves (fifty-two) – closed
4. √Soyuz Main Engine Valves (K1, K2, K3, K4, K5, K6) – closed

FGB Antennas

MCC-M

1. √FGB KURS P [KYPC P] – Deactivated

Soyuz Antennas

MCC-M

1. √Soyuz KURS A [KYPC A] – Deactivated

JEM RMS GROUNDING TABS (00:30)

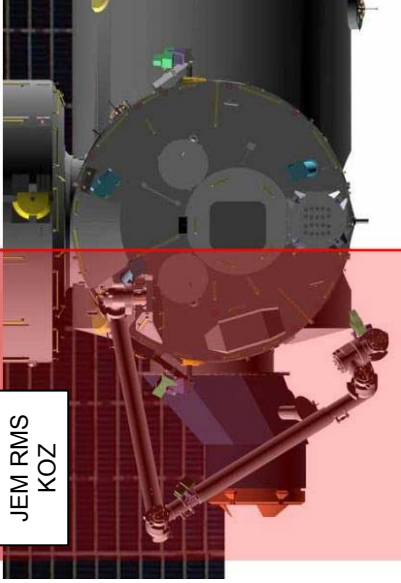
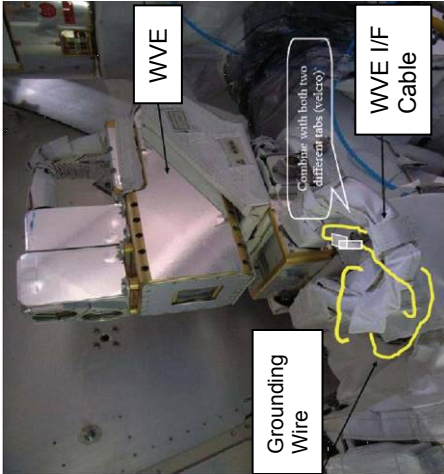
JEMRMS GROUNDING TABS (00:30)

1. Translate to JEMRMS EE
2. Temp stow Med ORU bag on JEM HR _____
3. BRT to JEM HR 1201

WARNING

If JEM RMS movement required, EV crew must stay aft of fwd JEM window

4. Wrap protruding EE grounding tabs (2) around Wrist Vision Equipment Interface (WVE I/F) cables
5. Attach grounding tabs (2) to each other via Velcro
6. If reqd, use wire tie around grounding tabs to secure in place



7. If reqd, tuck each tab (grounding wire) under permanent MLI near EDF on the arm/EE
8. WVS Survey of grounding tabs
9. Give **MCC-H** GO to check grounding tabs
10. Return to nominal timeline

Inhibits

<p>JEMRMS SSIPC</p> <p>RIP MA Brake – On MDP Main Mode – Stby Mode PDB RMS Ext4 Vout: 0.0V VCU_B TVC WVE Sig Stat – No Signal</p> <p>VLU EE Pwr – Open JEU Interlock – Inhibit JEU RT – Inhibit MDP Ang/Mtr Cross Ck – Inhibit</p>	<p>EFBM Inhibits IV SSIPC</p> <p>√P011B on jumper cable disconnected for BEP PDB A2 RPC01 – Open</p>
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JEM RMS GROUNDING TABS – TASK DATA

Estimated Task Duration:

	With RMS	Without RMS
One EVA Crew	N/A	00:30
Two EVA Crew	N/A	N/A

Tools:

EV1
Wire Tie

Notes:

1. Grounding tabs Velcro must be orientated so that will stick to each other

Cautions:

None

Warnings:

1. If JEM RMS movement required, EV crewmember must be outside KOZ illustrated in Figure 3 (aft of the fwd JEM window)



Figure 2. Grounding Tabs



Figure 1. Grounding Tab Obstructing Camera View

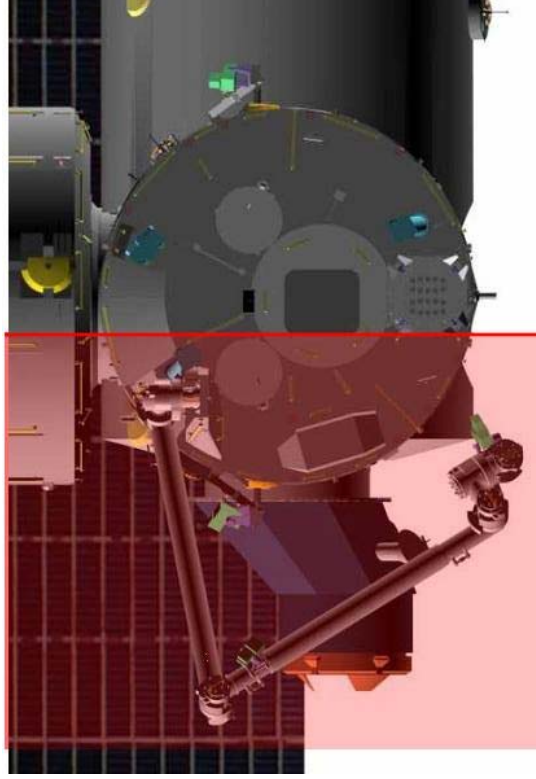


Figure 3. JEM RMS KOZ

EVA 1 TOOL CONFIG (00:30)

EV1

EMU D-rings

- 2 – D-ring Tether Extenders
- 1 – Waist Tethers [right D-ring extender]
- 1 – 85-ft Safety Tether [right D-ring extender]

MWS

- Small trash bag [right inside]
- 1 – Adj tether
- 1 – RET (sm-sm) [left]
- 1 – 5/8-7.8-in socket ext
- 1 – RET w/PIP pin
- 2 – Wire ties
- Swing Arm [right side]
- PGT (no socket installed) s/n _____
- 1 – RET (sm-sm)
- BRT [left side]
- 2 – Wire ties (short)
- 1 – RET (sm-sm)

- SAFER

EV2

EMU D-rings

- 2 – D-ring Tether Extenders
- 1 – Waist Tethers [right D-ring extender]
- 1 – 85-ft Safety Tether [right D-ring extender]

MWS

- Small trash bag [right inside]
- 1 – RET (sm-sm) [left]
- 1 – RET(w/PIP pin) [right]
- 2 – Wire ties
- Swing Arm [right side]
- PGT w/7/16-6-in wobble ext s/n _____
- 1 – RET (sm-sm)
- BRT [left side]
- 2 – Wire ties (short)
- 1 – RET (sm-sm)

- SAFER

CREWLOCK

- RET (Lg-Sm) [between Crewlock Bag outside TP and Crewlock internal HR]
- Crewlock Bag #1
- 2 – Adjustable Tethers to outside TPs [tethers used to secure Torque Wrench MLI Bag to outside of Crewlock Bag]
- Torque Wrench (preset to 57 ft-lb) [int RET #1 to Torque Wrench handle]
 - Torque Wrench Bag
- EV1 spare 85-ft ST [outside TPs]
- EV2 spare 85-ft ST [outside TPs]
- Ratchet Wrench [int RET #2]
- 5/8-7.8-in extension
- Socket Caddy [int RET #3]
 - 7/16-6-in wobble extension
 - 7/16-2-in rigid ext
- Round TM w/5/8 Prd Socket [int RET #4]
- Cannon connector tools (2)
- 2 – RET (sm-sm) to int TPs
- EVA Camera w/bracket & int RET
- 1 – RET (sm-sm) to int TP
- Adj tether on outside of bag (temp stow)

- Tether ext on A/L D-ring

NOTE: Prior to use, inspect the following hardware:

- RET cords for fraying
- Safety Tether & Waist Tether load alleviating straps: No red visible, no damage
- Sm Trash Bag: Bristle deformation/damage, after stowing tools in trash bag

Use Blue RETs only
RET Counts (blue group): used (total)
(ISS qty)

RETs (sm-sm) = 10 (16)
RETs (PIP pin) = 2 (5)
RETs (lg-sm) = 1 (8)

Adj Eq Tethers = 4 (10)
8 Adj (sm-sm) on ISS, 2 from STS
D-ring Tether Extenders = 5 (6)

Bag Color Key: 119 EVA Tools, Staging, Crewlock, MWS

Shuttle

EVA 1 TOOL CONFIG (00:30) (Cont)

CREWLOCK (Cont)

Staging Bag

- Fish Stringer #1
- Wire Tie Caddy (hook #1)
- 9 wire ties
- Velcro/Tape Caddy (hook #2)
- PGT (hook #3) s/n 1008
- PGT Battery s/n _____
- 7/16-in (wobble) Socket-6 ext
- Vise Grips (hook #4)
- Ratchet Wrench (hook #5)
- 7/16-in (rigid) Socket-9 ext
- Cheater Bar (hook #6)
- Hammer (hook #7)
- Spare 55-ft Safety Tether (to strap)
- Fish Stringer #2
- Connector Cleaner Tool Kit (hook #1)
- Pin Straightener Assy (hook #2)
- Probe (hook #3)
- Pry Bar (hook #4)
- Needle Nose Pliers (hook #5)
- Spare Torque Wrench w/bag (set @ 57 ft-lb) (hook #6)
- Locking Strut Aid #1 s/n _____ (hook #7)
- RET (between Locking Strut Aid TPs) s/n _____
- Locking Strut Aid #2 s/n _____
- 2 Long-Duration Tie-Down Tethers (to strap)
- MWS Key Strap Assy (on wire tie, to strap)

CREWLOCK (Cont)

IV Bag

- 2 – Towels
- Contamination Detection Kit
- 2 – GP Caddy
- 2 – Adjustable Thermal Mittens
- Socket Caddy (hatch cont) w/RET (sm-sm, blk)
- 1/2-in Socket-8 ext
- 7/16-in (wobble) Socket-6 ext (spare)
- 2 – DCM Plug (SAFER Hardmount)
- 2 – RET (sm-sm, black)

Crewlock Bag #3

- Ratchet Wrench
- 7/16-in x 2 ext socket
- RET w/PIP pin
- 7/16-in x 18 ext socket
- Gap Spanner 72 (2)
- Gap Spanner 45 (2)

Crewlock Bag #4

- Round Scoop
- RPCM s/n C235299

EQUIPMENT LOCK

Mesh Bag #1 (119 EVA Tools)

- WIF Adapter
- 4 – EVA Wipes
- Ratchet Wrench
- 7/16-in x 2 ext socket
- RCC Gap Gauge
- Gap Spanner (72-in)
- Sm Trash bag
- Grease Gun
- EVA Wipe & WireTie
- Ziplock Bag w/grease gun caps
- 2 – Wire Ties (short)
- 2 – Wire Ties (long)
- BRS Pin Tool
- BRS Pin Tool Sheath
- Fish Stringer
- RAD
- Rnd Scoop

Mesh Bag #2 Done Tools

Empty

Mesh Bag #3 Transfer to Shuttle

- Locking Strut Aids (2)

Bag Color Key: 119 EVA Tools, Staging, Crewlock MWS

Shuttle

- Review PGT ops
 - Report "green light" (for torque down ops)
 - Report torque and turns
 - Expect LOTORQ fault msg, Fault LED and Red LED for bolt release ops

Medium ORU Bag

Empty

EVA 2 NOTES, CAUTIONS, AND WARNINGS (Cont)

WARNING (Cont)

Shuttle Constraints (Cont)

- D. Sharp Edges
 - 1. PRLA grounding wipers [PLB]
 - 2. LDRI baffles (also an entrapment hazard) [OBSS]
 - 3. Keep hands away from SRMS EE opening and snares
 - 4. TCS connector backshells have exposed threads [ODS]
- E. Thermal
 - 1. Illuminated PLB lights; do not touch
 - 2. OBSS grapple fixture shafts/cams may be hot. Limit handling if required
 - 3. Stay 27 ft from PRCS when powered
 - 4. Stay 3 ft from VRCS when powered
 - 5. Stay 3 ft from APU when operating
- F. Contamination
 - 1. Stay out of the immediate vicinity of leaking jet or APU
- G. Lasers
 - 1. Do not look at LDRI diffuser or LCS laser aperture window

EVA 2 TOOL CONFIG

EV1

- EMU D-rings
- Ext on left side
- Ext on right side
- Waist Tether [right D-ring extender]
- 85-ft Safety Tether [right D-ring extender]

MWS

- Small Trash Bag [right inside]
- Adj tether
- RET (sm-sm) [left]
- RET (w/PIP pin) [right]
- 2 – Wire ties
- Swing Arm [right side]
- PGT **w/7/16-6-in ext** s/n _____
- RET (sm-sm)
- BRT [left side]
- 2 – Wire ties (short)
- RET (sm-sm)

- SAFER

EV3

- EMU D-rings
- Ext on left side
- Ext on right side
- Waist Tether [right D-ring extender]
- 85-ft Safety Tether [right D-ring extender]

MWS

- Small Trash Bag [left inside]
- Adj tether
- Gap Spanner, 72-in
- Adj tether
- Small Trash Bag [right inside]
- RET (sm-sm) [left]
- RET (w/PIP pin) [right]
- 2 – Wire ties
- Swing Arm [right side]
- PGT w/7/16-6-in ext s/n _____
- RET (sm-sm)
- BRT [left side]
- 2 – Wire ties (short)
- RET (sm-sm)

- SAFER

NOTE: Prior to use, inspect the following hardware:

- RET cords for fraying
- Safety Tether & Waist Tether load alleviating straps: No red visible, no damage
- Sm Trash Bag: Bristle deformation/damage, after stowing tools in trash bag

CREWLOCK

- Tether Ext on A/L D-ring
- RET (Lg-sm)
- Crewlock Bag #3
- Adj tether [to outside of bag]
- EV1 spare 85-ft ST [outside TPs]
- EV3 spare 85-ft ST [outside TPs]
- Ratchet Wrench (Int RET #1)
- 7/16-2-in rigid ext
- Ratchet Wrench (Int RET #2)
- 7/16-2-in rigid ext
- RET (w/PIP pin)
- 7/16-18-in ext
- RET (sm-sm)
- EVA Camera w/bracket
- RET (w/PIP pin) (for 6-in wobble)
- Gap Spanners, 72-in
- Gap Spanners, 45-in
- Gap Spanners, 72-in
- Gap Spanners, 45-in (buckles in the middle)
- RET (Lg-sm) (Attach to A/L D-ring ext)
- APFR

Use Blue RETs Only
Tether Count: (used) (total)
ISS qty

RET (sm-sm)	9	16
RET (w/PIP pin)	4	5
RET (Lg-sm)	3	8

Adj Tethers (sm-sm)	4	10
Adj Tethers (Lg-sm)	0	2
D-ring Extenders	5	6

Bag Color Key: 119 EVA Tools, Staging, Crewlock, MWS

EVA 2 TOOL CONFIG (Cont)

CREWLOCK (Cont)

Staging Bag

- Fish Stringer #1
- Wire Tie Caddy (hook #1)
- 9 wire ties
- Velcro/Tape Caddy (hook #2)
- PGT (hook #3) s/n 1008
- PGT Battery s/n _____
- 7/16-in (wobble) Socket – 6 ext
- Vise Grips (hook #4)
- Ratchet Wrench (hook #5)
- 7/16-in (rigid) Socket – 9 ext
- Cheater Bar (hook #6)
- Hammer (hook #7)
- 55-ft Safety Tether (to strap)
- Fish Stringer #2
- Connector Cleaner Tool Kit (Hook #1)
- Pin Straightener Tool (Hook #2)
- Probe (Hook #3)
- Prybar (Hook #4)
- Needle Nose Pliers (Hook #5)
- Torque Wrench w/bag**
- (set to 31) (Hook #6)
- Right Angle Drive** (Hook #7)
- Long-Duration Tie-Down Tether (to strap)
- Long-Duration Tie-Down Tether (to strap)
- MWS Key Strap Assy (on Wire Tie to strap)
- EVA Camera (Int RET to strap)

- RET (Lg-sm)
- CL Bag #2
- Cnctr Insulating Sleeve Size 21/25** (Int RET #1)
- Cnctr Insulating Sleeve Size 21/25** (Int RET #2)
- Cnctr Insulating Sleeve Size 21/25** (Int RET #3)
- Cnctr Insulating Sleeve Size 21/25** (Int RET #4)
- RET (sm-sm) to outside
- Cnctr Insulating Sleeve Size 33/37**
- RET (sm-sm) to outside
- Cnctr Insulating Sleeve Size 33/37**

CREWLOCK (Cont)

IV Bag

- 2 – Towel
- Contamination Detection Kit
- 2 – GP Caddy
- Thermal Mittens (1 pair)
- RET (sm-sm) (Black)
- Socket Caddy
- 1/2-in (wobble) Socket – 8 ext
- 7/16-in (wobble) Socket – 6 ext
- 2 – DCM Plug (SAFER Hardmount)
- 2 – RET (sm-sm, black)

EQUIPMENT LOCK

Med ORU Bag

Empty

EQUIPMENT LOCK(Cont)

Mesh Bag #1 (119 EVA Tools)

- WIF Adapter
- 2 – EVA Wipes
- Grease Gun
- EVA Wipe & Wire Tie
- 2 – Wire Ties (short)
- 2 – Wire Ties (long)
- BRS Pin Tool w/Sheath
- Ziplock w/Grease Gun Caps
- Fish Stringer
- Rnd Scoop

Mesh Bag #2 (Done Tools)

- 5/8-7.8-in extension
- 5/8-7.8-in extension
- Round TM w/5/8-in Prd Socket
- Socket Caddy
- Torque Wrench Bag
- Cannon Connector Tool
- Cannon Connector Tool
- Cnctr Insulating Sleeve Size 33/37**

Mesh Bag #3 (Transfer to Shuttle)

- Locking Strut Aid
- Locking Strut Aid
- Locking Strut Aid**
- Locking Strut Aid**
- Torque Wrench (s/n 1007)**

Crewlock Bag #1 (EVA 3)

- RCC Gap Gauge (Int RET #1)**
- Adj tether (Int RET #2)
- EVA Wipe
- EVA Wipe

Crewlock Bag #4 (EVA 3)

- RPCM (Int RET #1)
- Round Scoop (Int RET #2)
- Cnctr Sleeve Size 33/37** (Int RET #3)

- Review PGT ops
- Report “green light” (for torque down ops)
- Report torque and turns
- Expect LOTORQ fault msg, Fault LED and Red LED for bolt release ops

Shuttle

MWS

Crewlock

119 EVA Tools, Staging

Bag Color Key:

EVA 3 SUMMARY TIMELINE

PET HR : MIN	IV/SSRMS	EV2 – Arnold	EV3 – Acaba	PET HR : MIN
00:00		<p>EVA 3 POST DEPRESS, EGRESS & SETUP (00:50)</p> <ul style="list-style-type: none"> • Post Depress/Egress (00:25) • Setup (00:20) • Egress w/Med ORU Bag [Crewlock Bags (3) inside] 	<p>EVA 3 POST EGRESS & SETUP (00:50)</p> <ul style="list-style-type: none"> • Post Depress/Egress (00:25) • Setup (00:20) • Egress w/Crewlock Bag, WIF adapter 	00:00
01:00	EV3 – Acaba (SSRMS) for CETA Cart Ops	<p>CETA CART RELOCATION (01:00)</p> <ul style="list-style-type: none"> • CETA Cart (01:00) 	<p>CETA CART RELOCATION (01:00)</p> <ul style="list-style-type: none"> • CETA Cart (01:00) 	01:00
02:00		<p>SPDM COVERS (01:30)</p> <ul style="list-style-type: none"> • OTCM Cover Reconfiguration (00:30) • EP1 Cover Removal (00:40) • SPDM Cover Cleanup (00:20) 	<p>S1 TASKS (02:10)</p> <ul style="list-style-type: none"> • S1/S3 SSAS BBC PNL RECONFIG (00:30) • S3 FLUID QD JUMPER INSTALL (00:35) • S1 FHRC P CLAMP RELEASE (01:05) <ul style="list-style-type: none"> ◦ Stinger (00:25) ◦ Hose Box (00:30) ◦ FHRC Cleanup (00:10) 	02:00
03:00	EV2 – Arnold (SSRMS) for SPDM & LEE B Lube (EV2 egresses SSRMS prior to LEE REPAIR)	<p>LEE B REPAIR (01:45)</p> <ul style="list-style-type: none"> • LEE B Snare Repair (01:15) • LEE B Cleanup (00:30) 		03:00
04:00	<p>EV2 bingo time to start LEE REPAIR: PET= 03:45</p> <p>Begin S0 RPCM powerdown commanding when EV3 completes S1 TASKS</p> <p>EV3 must complete or break out of S1 TASKS to start S0 RPCM R&R by a PET = 04:00</p>		<p>S0 1A D RPCM R&R (00:45)</p>	04:00
05:00		<p>CLEANUP AND INGRESS (00:50)</p>	<p>GET AHEADS (00:45)</p>	05:00
06:00	EVA 3 PET = 06:00 hr	<p>PRE-REPRESS (00:05)</p>	<p>CLEANUP AND INGRESS (00:25)</p> <p>PRE-REPRESS (00:05)</p>	06:00
-06:30				-06:30

EVA 3 SUMMARY TIMELINE (Cont)

EVA 3 Constraints and Bingo Times Summary

1. Powerdown required to put inhibits in place for S0-1A_D and R&R will take approximately 15-20 min of ground commanding to execute; thus, **MCC-H** will begin powerdown operations when EV3/Acaba completes the S1 tasks and starts translation to the RPCM R&R location.
2. The maximum amount of time that the powerdown can be in place is 3:00 hr due to thermal constraints on S-Band ORUs. Thus, the DDCU that provides inhibits for the RPCM must be powered up within 3:00 hr of powerdown.
3. Some of the ISS cameras that will be powered down in support of the RPCM R&R are required to verify that the SSRMS is in a good configuration for the LEE B Lube task and that EV2/Arnold is in good position to begin the EVA task. The cameras will not be de-routed for powerdown until the SSRMS operator verifies the arm is in a good configuration and EV2/Arnold has egressed the APFR.
4. **MCC-H** will proactively make a call to ISS and Discovery that the cameras are about to be de-routed and powered down before it is executed.
5. Per their procedure, crewmembers will confirm w/**MCC-H** that inhibits are in place prior to beginning the RPCM R&R.
6. Per their procedure, crewmembers will notify **MCC-H** that the RPCM R&R is complete.
7. **MCC-H** will make a call to the crewmembers confirming that DDCU powerup is beginning, once the RPCM R&R is complete.
8. To manage the timeline and ensure LEE B Lube and RPCM R&R tasks are completed, EV2/Arnold needs to stop the SPDM Covers and start the LEE B Lube at an EVA PET of NLT 4:30 hr, and EV3/Acaba needs to stop the S1 Tasks and start the first RPCM R&R at an EVA PET of NLT 4:45 hr.
9. As time permits, the Channel 1/4 connector sleeve get ahead will be performed. This task requires the same inhibits so powerup will be delayed as required to complete the task within the 3 hr constraints above.

EVA 3 INHIBIT PAD

Orbiter (1)

ALL EVAS
TCS L12 1. √TCS POWER – OFF
KU-BAND ANTENNA {Performed during egress}
MCC-H 1. √KU-BAND Mask – active 2. √KU-BAND EVA Protect Box – active

Ground

ALL EVAS
Ground Radar MCC-H 1. √TOPO console, ground radar restrictions in place for EVA

USOS (1)

ALL EVAS	
PCU	<p style="text-align: center;">NOTE</p> <p>PCUs may require up to a 1-hr warmup period before they are operational</p> <p>MCC-H 1. √PCUs (two) operational in discharge mode and one of the following:</p> <ol style="list-style-type: none"> CCS PCU EVA hazard control FDIR enabled No more than two arrays unshunted and oriented < 105° from velocity vector <p>If one or both PCUs failed</p> <ol style="list-style-type: none"> No more than two arrays unshunted and oriented < 105° from velocity vector
EuTEF COL-CC	Verify PLEGPay Power Status (ETF_PLEGPAY_Pwr_Stat) – OFF
LOCATION DEPENDENT INHIBITS	
Lab Window	{On call, EV crew not expected to be in this area} IV If EV crew less than 10 ft from window or in window FOV, close window shutter
KU-Band (SGANT) Antenna	{On call, EV crew not expected to be in this area}
MCC-H	If EV crew < 3.3 ft from KU-BAND antenna
	1. Park KU-BAND:
	1.1 Pointing Mode – Inhibit
	1.2 PLC – Reset
	1.3 Autotrack Continuous Retry – Inhibit
Mobile Transporter	
MCC-H	1. √MT latched

EVA 3 INHIBIT PAD (Cont)

USOS (2)

EVA 3 SPECIFIC INHIBITS

RPCM R&R

{Prior to performing S0 1A_D R&R}

NOTE

Phalcon plan is to take DDCU S01A Converter – Off, prior to the first RPCM R&R task, and leave in off until both RPCM R&Rs are complete

RPCM S01A_D

MCC-H 1. Verify DDCU S01A Converter – Off

S1-S3 SSAS Panel BBC Inhibits (16)

1. RPCM S13A G:
 - RPC 01 – Open, Close Cmd Inhibit
 - RPC 02 – Open, Close Cmd Inhibit
 - RPC 13 – Open, Close Cmd Inhibit
 - RPC 14 – Open, Close Cmd Inhibit
 - RPC 15 – Open, Close Cmd Inhibit
2. RPCM S12B A:
 - RPC 05 – Open, Close Cmd Inhibit
 - RPC 11 – Open, Close Cmd Inhibit
 - RPC 13 – Open, Close Cmd Inhibit
3. RPCM S14B G:
 - RPC 01 – Open, Close Cmd Inhibit
 - RPC 05 – Open, Close Cmd Inhibit
 - RPC 13 – Open, Close Cmd Inhibit
 - RPC 14 – Open, Close Cmd Inhibit
 - RPC 15 – Open, Close Cmd Inhibit
4. RPCM S11A A:
 - RPC 03 – Open, Close Cmd Inhibit
 - RPC 04 – Open, Close Cmd Inhibit
 - RPC 13 – Open, Close Cmd Inhibit

RSOS (1)

ALL EVAS

IMPULSE (ИПИ-100) – Deactivate

SM Antennas

1. GTS – Deactivate
2. ARISS (Ham Radio) – Deactivate or VHF (144-146 MHz) TX only

USOS (3)

LOCATION DEPENDENT INHIBITS

S-Band (SASA) Antennas

{On call, EV crew not expected to be in this area}

MCC-H If EV crew < 3.6 ft from S1 SASA [P1 SASA]

1. P1 SASA (S1 SASA) – Active
2. S1 SASA [P1 SASA] – Powered down

SARJ

{On call, EV crew not expected to be in this area}

MCC-H If EV crew working within 2 ft or outboard of SARJ

1. √DLA (1) – LOCKED
2. All motor setpoints set to zero
3. All motors deselected

TRRJ

For S1/S3 Fluid QD Jumper & FHRC P-Clamps:

While EV crew working within 2 ft of S1 TRRJ rotation envelope

1. √DLA (1) – LOCKED (locked at 0 deg for FHRC P-Clamps)

FPMU

{On call, EV crew not expected to be in this area}

MCC-H If EV crew working within 5 ft of Floating Potential Measurement Unit

1. FPMU power – Off

SSPTS

{On call, EV crew not expected to be in this area}

MCC-H If EV crew working within 2 ft of SSPTS cables

1. RPCM LA1A4A D RPC 3 – Open, Close Cmd Inhibit
2. RPCM LA2A3B D RPC 1 – Open, Close Cmd Inhibit
3. RPCM Z14B A RPC 2 – Open, Close Cmd Inhibit
4. RPCM Z13B A RPC 2 – Open, Close Cmd Inhibit

EVA 3 NOTES, CAUTIONS, AND WARNINGS (Cont)

WARNING (Cont)

Shuttle Constraints (Cont)

- D. Sharp Edges
 - 1. PRLA grounding wipers [PLB]
 - 2. LDRI baffles (also an entrapment hazard) [OBSS]
 - 3. Keep hands away from SRMS EE opening and snares
 - 4. TCS connector backshells have exposed threads [ODS]
- E. Thermal
 - 1. Illuminated PLB lights; do not touch
 - 2. OBSS grapple fixture shafts/cams may be hot. Limit handling if required
 - 3. Stay 27 ft from PRCS when powered
 - 4. Stay 3 ft from VRCS when powered
 - 5. Stay 3 ft from APU when operating
- F. Contamination
 - 1. Stay out of the immediate vicinity of leaking jet or APU
- G. Lasers
 - 1. Do not look at LDRI diffuser or LCS laser aperture window

EVA 3 TOOL CONFIG

EV2

EMU D-rings

- 2 – Tether Extender
- Waist Tether [on right]
- 85-ft Safety Tether [on right]

MWS

- Small trash bag
- RET (w/PIP pin) [right]
- RET (sm-sm)
- Adj tether [right]
- 2 – Wire ties
- Swing Arm [right side]
- EVA Camera
- RET (sm-sm)
- Wire tie loop (holster) for Lube Gun

BRT [left side]

- 2 – Wire ties, short
- RET (sm-sm)

SAFER

Use Blue RETS only

RET Counts:	used	total (ISS qty)
RETs (sm-sm)	= 13	(16)
RETs (PIP pin)	= 4	(5)
RETs (lg-sm)	= 4	(8)
Adj Eq Tethers (sm-sm)	= 9	(10)
Adj Eq Tethers (lg-sm)	= 1	(2)
D-ring Tether Extenders	= 5	(6)

NOTE: Prior to use, inspect the following hardware:

- RET cords for fraying
- Safety Tether & Waist Tether load alleviating straps: No red visible, no damage
- Sm Trash Bag: Bristle deformation/damage, after stowing tools in trash bag

EV3

EMU D-rings

- 2 – Tether Extender
- Waist Tether [on right]
- 85-ft Safety Tether [on right]
- 55-ft Safety Tether (spare) [on right] [to MWS]

MWS

- Small Trash Bag
- RET (w/PIP pin) [right]
- RET (sm-sm)
- WIF Adapter
- 2 – Wire ties
- Swing Arm [right side]
- PGT w/no socket s/n _____
- 6-in wobble socket
- RET (sm-sm)

BRT [left side]

- 2 – Wire ties, short
- RET (sm-sm)

SAFER

CREWLOCK

- RET (Lg-sm)
- Adj Equip Tether to outside CL bag TP
- LEE B Lube C-Lk Bag (#1)
- *Grease Gun w/Straight Nozzle (Int RET #1, outside of bag)
- EVA Wipe w/Wire Tie (thru wipe TP)
- Adj tether (around Grease Gun)
- Adj tether (Int RET #2)
- 2 – EVA Wipe
- RCC Gap Gauge (Int RET #3)
- Needle Nose pliers (Int RET #4)

*Prime grease gun by disengaging plunger and gently pushing fwd on back of triangle until resistance met

Bag Color Key: 119 EVA Tools, Staging, Crewlock Bag, MWS

CREWLOCK (Cont)

- RET (Lg-sm)
- Med ORU Bag
- 2 – Adj Equip Tether to outside of bag
- RET (sm-sm) (for EP MLI Cover on outside of bag)
- EP MLI Cover
- RET (sm-sm) (1 hook outside, 1 hook inside ORU bag)
- WIF Adapter
- 2 – RET (sm-sm)
- 2 – EVA Wipes to bag straps (lid)
- RET (sm-sm)
- 55-ft Safety Tether (spare)
- Adj tether (Lg-sm)
- RPCM S0 1A_D Crewlock Bag (#4)
- RPCM for S0 1A_D s/n C235299 (Int RET #1)
- Rnd scoop (Int RET #2)
- Cnctr Insul. Sleeve, size 33/37 (Int RET #3)
- Adj tether (sm-sm) (to Med ORU Bag Lid)
- S1 Tasks Crewlock Bag (#3)
- EVA Camera
- RET (sm-sm) on outside
- RET w/PIP pin
- 6-in ext – 7/16-in wobble socket
- RET w/PIP pin
- 18-in ext – 7/16-in
- Ratchet w/2-in rigid ext (Int RET #1)
- EVA Camera
- RET (sm-sm)
- RET (Lg-sm)
- APFR
- Tether ext on AL D-ring

EVA 3 TOOL CONFIG (Cont)

CREWLOCK (Cont)

Staging Bag

- Fish Stringer #1
- Wire Tie Caddy (hook #1)
- 9 – wire ties
- Velcro/Tape Caddy (hook #2)
- PGT s/n 1008 (hook #3)
- PGT Battery s/n _____
- 7/16-in (wobble) Socket-6 ext
- Vise Grips (hook #4)
- Ratchet Wrench (hook #5)
- 7/16-in (rigid) Socket-9 ext
- Cheater Bar (hook #6)
- Hammer (hook #7)
- Spare 55-ft Safety Tether (to strap)
- Fish Stringer #2
- Connector Cleaner Tool Kit (hook #1)
- Pin Straightener Assy (hook #2)
- Probe (hook #3)
- Pry Bar (hook #4)
- Sm Trash Bag (hook #5)
- Adj Tether
- 72-in Gap Spanner
- Adj Tether
- Torque Wrench (preset to 31 ft-lb) (hook #6) w/bag
- RAD (hook #7)
- Long-Duration Tie-Down Tether #1 (to strap)
- Long-Duration Tie-Down Tether #2 (to strap)
- MWS Key Strap Assy (on wire tie, to strap)
- RET (lg-sm)
- CL Bag #2
- Cnctr Insulating Sleeve, size 21/25 (Int RET #1)
- Cnctr Insulating Sleeve, size 21/25 (Int RET #2)
- Cnctr Insulating Sleeve, size 21/25 (Int RET #3)
- Cnctr Insulating Sleeve, size 21/25 (Int RET #4)
- RET (sm-sm) on outside
- Cnctr Insulating Sleeve, size 33/37
- RET (sm-sm) on outside
- Cnctr Insulating Sleeve, size 33/37

CREWLOCK (Cont)

IV Bag

- 2 – Towels
- Contamination Detection Kit
- 2 – GP Caddy
- 2 – Adjustable Thermal Mittens
- Skt Caddy (hatch cont) w/RET (sm-sm) (black)
- 1/2-in Socket-8 ext
- 7/16-in (wobble) Socket-6 ext (spare)
- 2 – DCM Plug (SAFER Hardmount)
- 2 – RET (sm-sm, black)

Mesh Bag #3 (Transfer to Shuttle)

- Locking Strut Aid
- Locking Strut Aid
- Locking Strut Aid
- Locking Strut Aid
- Torque Wrench (s/n 1007)

EQUIPMENT LOCK

Mesh Bag #1 (119 EVA Tools Bag)

- Fish Stringer
- ORU Tether
- Rnd Scoop
- BRS Pin Tool w/sheath
- Ziploc bag w/grease gun caps
- PGT w/6"

- Review PGT ops
 - Report “green light” (for torque down ops)
 - Report torque and turns
 - Expect LOTORQ fault msg, Fault LED and Red LED for bolt release ops

Mesh Bag #2 (EVA Done Bag)

- Socket ext 5/8-in, 7.8-in
- Socket ext 5/8-in, 7.8-in
- Rnd TM w/5/8-in prd socket
- Socket Caddy
- Torque Wrench Bag
- Cannon Connector Tool
- Cannon Connector Tool
- Ratchet Wrench
- Socket ext 7/16-in, 2-in
- Cnctr Insulating Sleeve 33/37

- Empty Trash Bag into Ziplock bag
 - Place Ziplock bag into EVA Done Bag

- Check Trash Bag zipper is closed

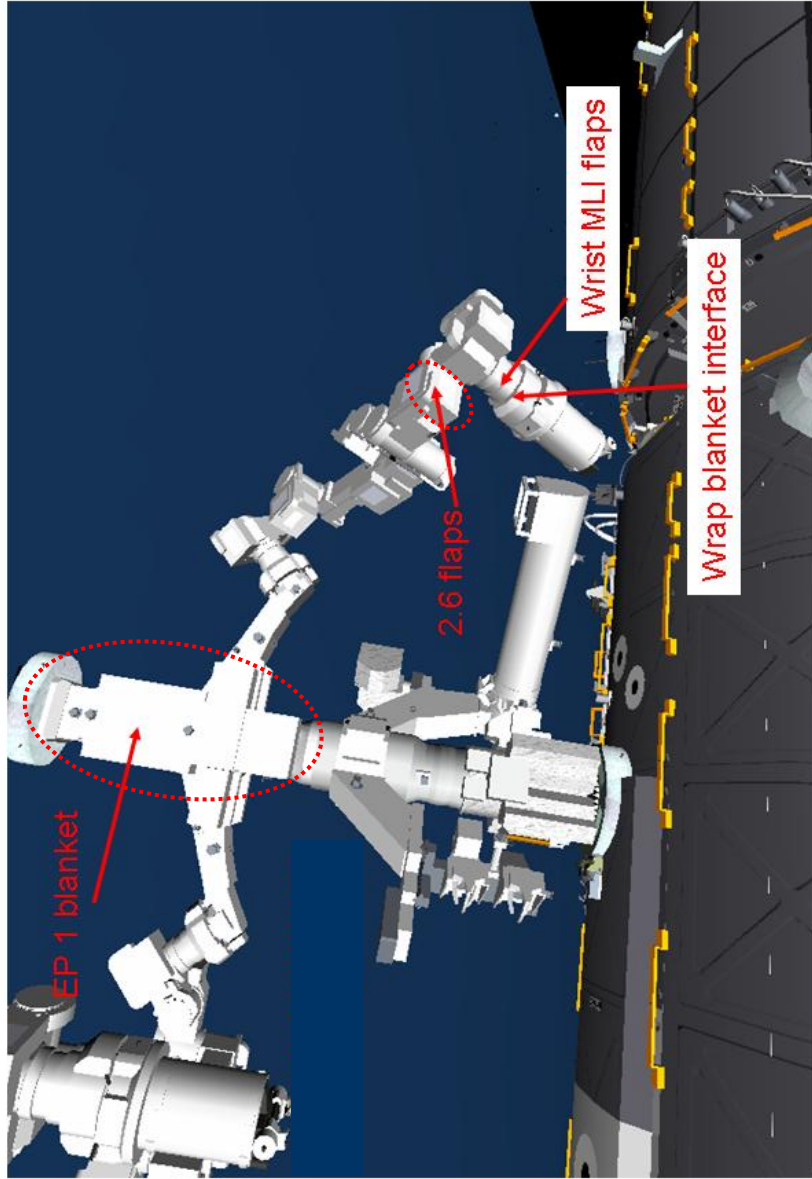
Bag Color Key: 119 EVA Tools, Staging, Crewlock Bag, MWS

EVA 3 SPDM COVERS (01:30) (Cont)

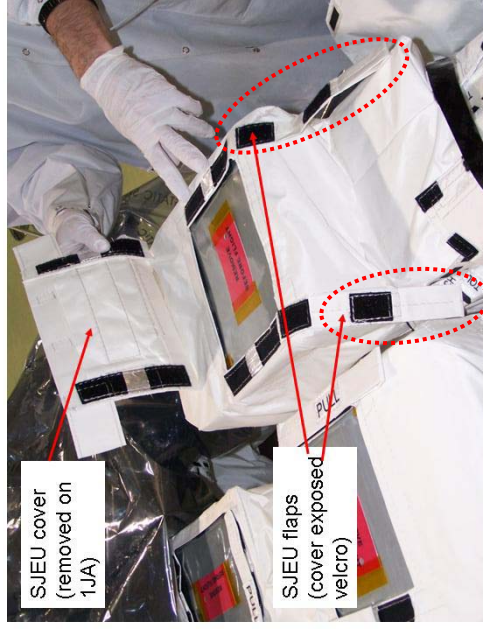
IV/SSRMS	EV2 – Arnold (SSRMS)
<p>8. M1/M2: On EV2 GO, maneuver SSRMS to EP1 Blanket Setup position</p> <p>9. M1/M2: Inform EV2, maneuvering SSRMS to egress location (S0 HR 3416) Expect EV2 GCA during SSRMS maneuver to APFR egress position (EV2 airlock safety tether located at S0 3530 – port-nadir from HR 3416)</p> <p>10. Expect EV2 GCA for APFR Removal</p> <p>11. On EV2 GO: Maneuver SSRMS LEE Lube Clearance position</p>	<p><u>SPDM CLEANUP (00:20)</u></p> <p>21. When EP1 Blanket Removal complete: Give M1/M2 GO to maneuver to EP1 Blanket Setup position</p> <p>22. Adjust MWS up, as reqd</p> <p>23. Perform glove check</p> <p>24. Expect M1/M2 to maneuver to EV2 SSRMS egress position Use GCA for maneuver to APFR egress position, as reqd</p> <p>25. Inform M1/M2: EV2 is ready for APFR egress Egress APFR</p> <p>26. Translate to S0 HR 3530</p> <p>27. Perform Safety Tether Transfer to EV3 airlock 85-ft Safety Tether: <input type="checkbox"/> √Gate closed <input type="checkbox"/> √Hook locked <input type="checkbox"/> √Safety Tether Reel unlocked</p> <p>28. Use GCA to position SSRMS for APFR Removal, as reqd</p> <p>29. Release/remove APFR from WIF adapter</p> <p>30. Install APFR [4,HH,F,6] at WIF S0 WIF 45 (located on Face 6) <input type="checkbox"/> √Blk-Blk, pull/twist test</p> <p>31. RET to and remove WIF adapter from SSRMS</p> <p>32. Remove 55-ft Safety Tether hook from SSRMS and attach to MWS</p> <p>33. When APFR and Safety Tether removed from LEE: Give M1/M2 GO to maneuver to LEE Lube Clearance position</p> <p>34. Stow 55-ft Safety Tether in med ORU bag</p> <p>35. Stow EP1 Blanket on RET in med ORU bag</p> <p>36. Stow WIF adapter on RET in med ORU Bag</p> <p>37. Retrieve LEE B Lube Crewlock Bag #1 from HR 3546</p> <p>38. Stow LEE Lube Crewlock Bag #1 on BRT</p>

Post 1JA SPDM Configuration – Overview

Post 1JA SPDM Configuration



2.6 Flaps (SJEU) – Detail



Wrap Blanket – Detail 1



EVA 3 LEE B REPAIR (01:45) (Cont)

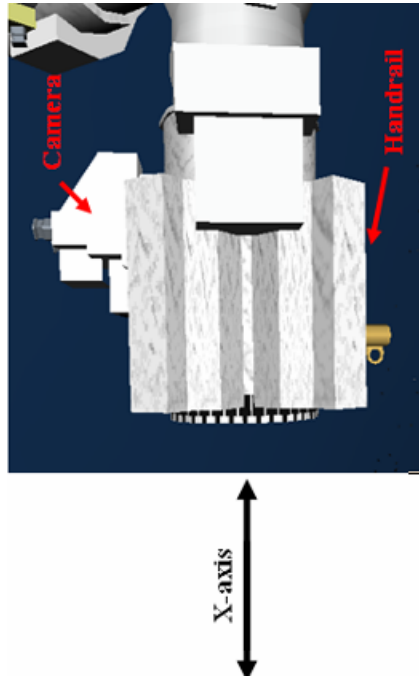
IV/SSRMS

Prep grease gun:

- Engage teeth by rotating plunger 180 deg (black triangle up)
- Remove MLI. Stow on gun in way to prevent contact w/LEE
- Point tip away from LEE
- Rotate shutoff knob such that FLOW points toward nozzle

Stow grease gun:

- Disengage teeth by rot plunger 180 deg (black triangle down)
- Rotate shutoff knob such that FLOW points ⊥ to nozzle
- Install MLI tip cover



EV2 – Arnold (FF)

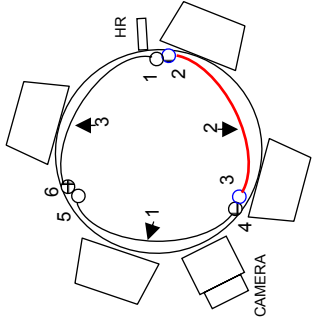
34. Give **SSRMS** GO to maneuver a -120 deg (cw) wrist roll
35. On **SSRMS** GO: Pull lower right snare (#2) fully out into C-curve with gap gauge, apply force perpendicular to rod-end

Prep grease gun

36. Apply grease to rod-end/fork interface to lower left bearing (#3)
37. Apply grease to rod-end/fork interface to lower right bearing (#2)

Stow grease gun

38. Exercise lower left bearing (#3) in x-axis using needle nose pliers [1 min/40 cycles]
39. Report to IV/**MCC-H**: Noticeable change in bearing motion
40. Exercise lower right bearing (#2) in x-axis using needle nose pliers [1 min/40 cycles]
41. Report to IV/**MCC-H**: Noticeable change in bearing motion
42. Exercise lower right snare (#2) into groove with needle nose pliers
43. Report to IV/**MCC-H**: Noticeable change in bearing motion
44. Push lower right snare (#2) into groove with needle nose pliers



45. Give **SSRMS** GO to maneuver a -120 deg (cw) wrist roll

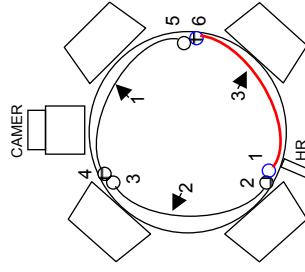
46. On **SSRMS** GO: Pull lower right snare (#3) fully out into C-curve with gap gauge, apply force perpendicular to rod-end

Prep grease gun

47. Apply grease to rod-end/fork interface to lower left bearing (#1)
48. Apply grease to rod-end/fork interface to lower right bearing (#6)

Stow grease gun

49. Exercise lower left bearing (#1) in x-axis using needle nose pliers [1 min/40 cycles]
50. Report to IV/**MCC-H**: Noticeable change in bearing motion
51. Exercise lower right bearing (#6) in x-axis using needle nose pliers [1 min/40 cycles]
52. Report to IV/**MCC-H**: Noticeable change in bearing motion
53. Exercise lower right snare (#3) into groove with needle nose pliers
54. Report to IV/**MCC-H**: Noticeable change in bearing motion
55. Push lower right snare (#3) into groove with needle nose pliers



56. Use gap gauge to pack any excess grease into bearings, as reqd
57. Clean tools as necessary with EVA wipe


EVA 3 LEE B REPAIR (01:45) (Cont)

IV/SSRMS

EV2 – Arnold (FF)

- 3. M1/M2: Receive GO from EV2 for Snare Checkout
- 4. IV/MCC-H: Receive EV2 report on snare condition 

LEE B CLEANUP (00:30)

- 58. Give **SSRMS** GO for Snare Checkout (Close and Open Snares)
- 59. Report to IV/MCC-H: Snare condition (in or out of groove)
- 60.  Take pictures of LEE:
 - Bearings #1 & #2
 - Bearings #3 & #4
 - Bearings #5 & #6
 - Overall view of LEE
- 61. Stow EVA Camera on MWS swingarm
- 62. Inform M1/M2, LEE photos and observation complete.
 - Give **SSRMS** GO to maneuver SSRMS to LEE Lubrication Clearance position
- 63. Adjust MWS up, as reqd
- 64. Perform tool inventory

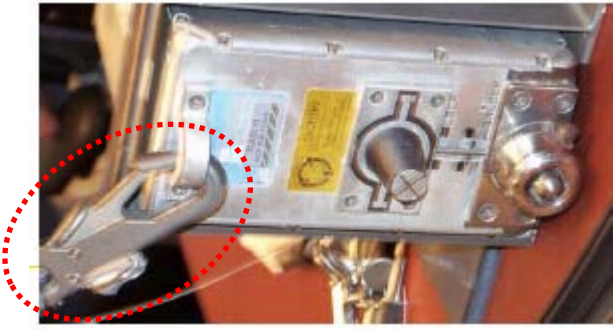
- 5. M1/M2: Receive EV2 report: LEE photos, obs complete
- 6. M1/M2: On EV2 GO, maneuver SSRMS to LEE Lubrication Clearance position

Tool Inventory	
<u>MWS</u>	<u>Crewlock Bag</u>
<input type="checkbox"/> Small trash bag	<input type="checkbox"/> Adj tether
<input type="checkbox"/> RET	<input type="checkbox"/> Adj tether
<input type="checkbox"/> RET w/PIP pin	<input type="checkbox"/> EVA Wipes (2)
<input type="checkbox"/> Adj tether	<input type="checkbox"/> EVA wipe w/ wire tie
<input type="checkbox"/> Wire ties (2)	<input type="checkbox"/> Grease gun
	<input type="checkbox"/> Needle nose pliers
<u>BRT</u>	<input type="checkbox"/> RCC Gap gauge
<input type="checkbox"/> Wire ties (2)	
<input type="checkbox"/> RET	
<u>Swingarm</u>	
<input type="checkbox"/> Wire tie loop (holster)	
<input type="checkbox"/> EVA Camera w/RET	

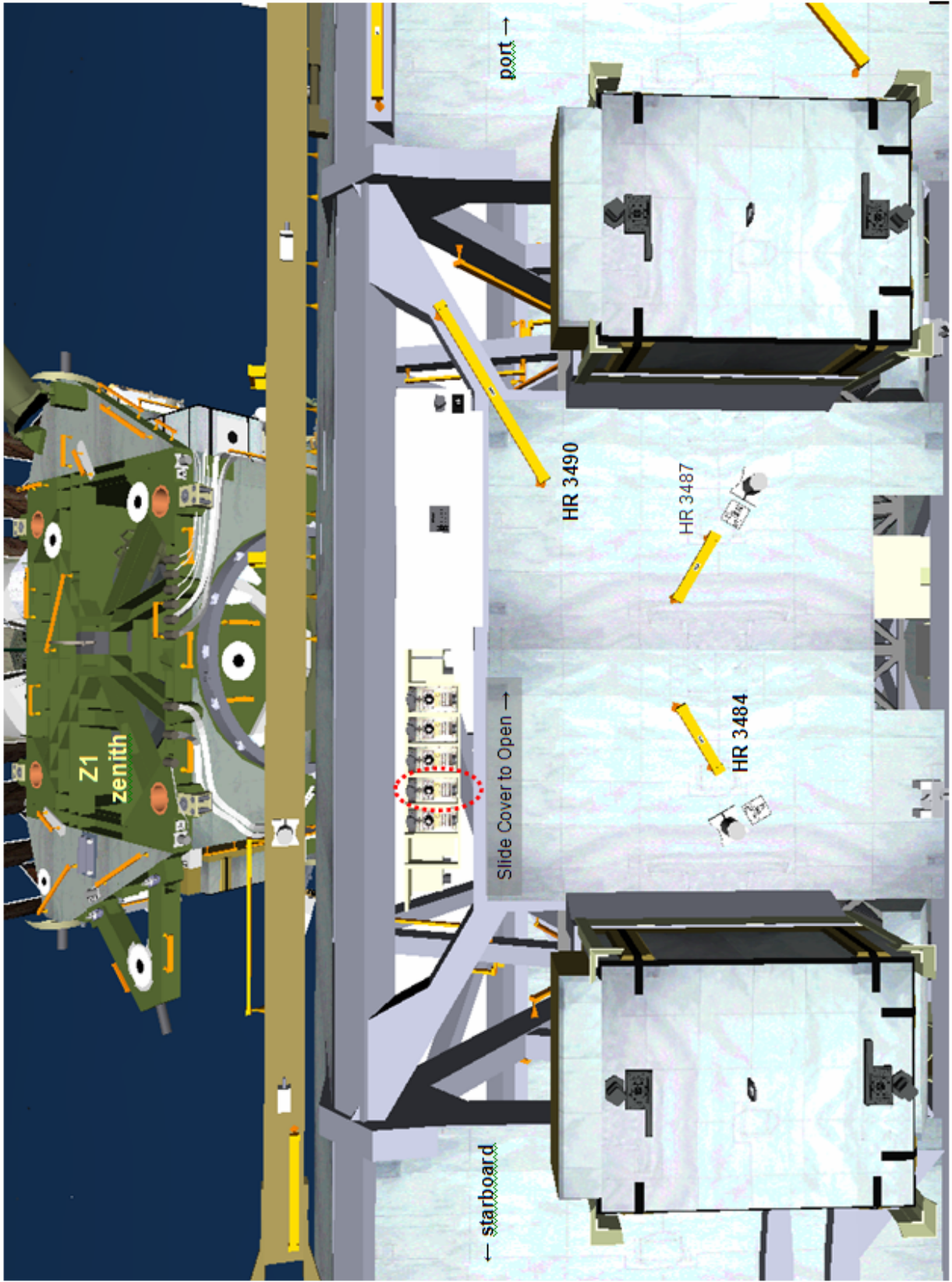
- 7. IV: Record APFR settings: [_, _', _', _'] (S0 WIF 42)
- 8. Receive glove check report from EV2

- 65. Place EVA wipe over end of grease gun and secure with wire tie
- 66. Stow grease gun on outside of Crewlock Bag using adj tether
- 67. Egress APFR
- 68. Collapse APFR ingress aid
- 69. Relocate APFR to S0 WIF 42 \Blk-Blk, pull/twist test
- 70. Adjust APFR to low-profile configuration and report settings to IV
- 71. Inspect gloves. Report glove check to IV
- 72. Translate to Airlock
- 73. Stow LEE Lube Crewlock Bag #1 at Airlock

EVA 3 S0 1A_D RPCM REMOVE/REPLACE (00:45) (Cont)

IV	EV3 – ACABA (FF)
<p>MCC-H:</p> <ol style="list-style-type: none"> Verify S0 RPCM Inhibits in place (√DDCU S01A Converter – Off), give EV GO for removal Record Failed RPCM s/n _____ (expect s/n C024088) Record Spare RPCM s/n _____ (expect s/n C235299) IV record S0 1A_D RPCM Drive Screw Installation Data Turns: _____ Torque: _____ <input type="checkbox"/> Receive glove check report from EV2 <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Tool Inventory</p> <ul style="list-style-type: none"> <input type="checkbox"/> RPCM S0 1A_D Crewlock Bag (#4) <input type="checkbox"/> RPCM for S0 1A_D s/n C235299 (Int RET #1) <input type="checkbox"/> Rnd scoop (Int RET #2) <input type="checkbox"/> Cnctr Insul. Sleeve, size 33/37 (Int RET #3) </div> 	<p>On IV GO, perform the following RPCM R&R steps:</p> <ol style="list-style-type: none"> Verify failed RPCM 1A_D is s/n C024088 Tether to RPCM with gate pointing away from RPCM PGT [A6 8.3 ft-lb, CCW2 30 RPM, MTL 30.5]-6ext 7/16 <ul style="list-style-type: none"> <input type="checkbox"/> Release Drive Screw, push while turning, ~8 turns √Status Indicator – UNLOCK Install scoop, as reqd Remove failed RPCM (slide off rail) Stow failed RPCM Retrieve spare RPCM Inspect RPCM connectors and guide rail for debris/damage Verify spare RPCM s/n (expect C235299) Verify proper hook orientation on new RPCM (gate away from RPCM) Install RPCM on guide rail and slide into soft dock √Status Indicator not below UNLOCK PGT [A2 3.8 ft-lb, CW2 30 RPM, MTL 30.5]-6ext 7/16 <ul style="list-style-type: none"> <input type="checkbox"/> Fasten Drive Screw, push while turning, 6-7 turns to hard stop √Status Indicator – LOCK EV3 report torque and turns Slide door closed, verify door does not slide freely and alignment mark Perform Tool Inventory Close S0 1A_D RPCM Crewlock Bag #4. Attach S0 1A_D Crewlock Bag #4 to BRT Inspect gloves Report glove status to IV Translate to med ORU Bag (S0 HR 3528) Stow S0 1A_D RPCM Crewlock Bag #4 in med ORU Bag <p>If time permits:</p> <ol style="list-style-type: none"> Perform CONNECTOR INSULATING SLEEVE – CHANNEL 1/4 (S0) Perform CLEANUP
	<p style="text-align: center;">NOTE</p> <p>Equipment Hook shown in correct orientation for R&R.</p> <p style="text-align: center;">Gate away from RPCM</p> 

EVA 3 S0 1A_D RPCM REMOVE/REPLACE – TASK DATA



EVA 3 P1 1A_A RPCM REMOVE/REPLACE – TASK DATA (Cont)

Table 1. Tools

EV2/EV3
PGT
7/16 (wobble) Socket-6 ext
Round scoop

Table 2. EVA Fasteners

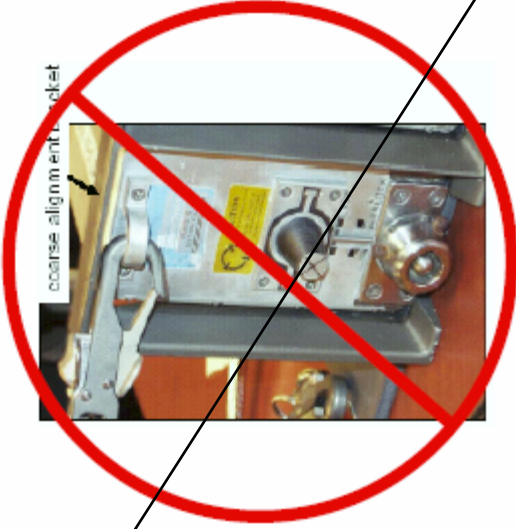
Fastener Name	Label	Head Size	Qty	Install Torque (ft-lb)	Release Torque (ft-lb)	Failure Torque (ft-lb)	Turns	RPM
RPCM Drive Screw		7/16	1	5.5 (grnd) 3.8 (orbit)	4.5	18.6 (remove) 8.5 (install)	8 (remove) 6-7 (install)	30

* Fastener torque data is derived from INC-9 S0 RPCM R&R task. It will be necessary to reverify data prior to performing this task.

Table 3. ORU Identification

	Part Number	Serial Number
Spare RPCM	R077419-61	C326597
Failed RPCM	R077419-61	C235300

RPCM Tether Orientation



EVA 3 CLEANUP (00:50)

IV	EV2 – Arnold (FF)	EV3 – Acaba (FF)
<p>1. Inform EV2/EV3 to begin cold soak, as reqd</p> <div style="border: 1px solid black; padding: 5px;"> <p>Tool Inventory</p> <ul style="list-style-type: none"> <input type="checkbox"/> Med ORU Bag <input type="checkbox"/> 2 – Adj Equip Tether to outside of bag <input type="checkbox"/> RET (sm-sm) (for EP MLI Cover on outside of bag) <input type="checkbox"/> EP MLI Cover <input type="checkbox"/> RET (sm-sm) (1 hook outside, 1 hook inside ORU bag) <input type="checkbox"/> WIF Adapter <input type="checkbox"/> 2 – EVA Wipes to bag straps (lid) <input type="checkbox"/> RET (sm-sm) to outside CL bag TP <input type="checkbox"/> 55 ft Safety Tether <input type="checkbox"/> Adj tether (Lg-sm) <input type="checkbox"/> RPCM S0 1A_D Crewlock Bag (#4) <input type="checkbox"/> RPCM for S0 1A_D s/n C235299 (Int RET #1) <input type="checkbox"/> Rnd scoop (Int RET #2) <input type="checkbox"/> Cnctr Insul. Sleeve, size 33/37 (Int RET #3) <input type="checkbox"/> Adj tether (sm-sm) (to Med ORU Bag Lid) <input type="checkbox"/> S1 Tasks Crewlock Bag (#3) <input type="checkbox"/> EVA Camera <input type="checkbox"/> RET w/PIP pin <ul style="list-style-type: none"> <input type="checkbox"/> 6-in ext – 7/16-in wobble socket <input type="checkbox"/> RET w/PIP pin <input type="checkbox"/> 18-in ext – 7/16-in <input type="checkbox"/> Ratchet w/2-in rigid ext (Int RET #1) </div>	<p><u>CLEANUP</u> (00:50)</p> <p>If time permits:</p> <ol style="list-style-type: none"> 1. Perform GET AHEADS, per MCC-H <ol style="list-style-type: none"> 2. Adjust TCV to begin cold soak, as reqd 3. Translate to Airlock 	<p><u>CLEANUP</u> (00:25)</p> <ol style="list-style-type: none"> 1. Translate to med ORU Bag 2. Open med ORU Bag and stow the following items: <ul style="list-style-type: none"> <input type="checkbox"/> S0 1A_D RPCM Crewlock Bag #4 <input type="checkbox"/> S1 Tasks Crewlock Bag #3 in the med ORU Bag 3. Perform Tool Inventory 4. Close med ORU Bag and attach to BRT 5. Adjust TCV to begin cold soak, as reqd 6. Translate to Airlock 7. Stow med ORU Bag at Airlock <p>If time permits:</p> <ol style="list-style-type: none"> 8. Perform GET AHEADS, per MCC-H 9. Adjust TCV to begin cold soak, as reqd 10. Translate to Airlock

EVA 4 NOTES, CAUTIONS, AND WARNINGS (Cont)

WARNING (Cont)

Shuttle Constraints (Cont)

- D. Sharp Edges
 - 1. PRLA grounding wipers [PLB]
 - 2. LDRI baffles (also an entrapment hazard) [OBSS]
 - 3. Keep hands away from SRMS EE opening and snares
 - 4. TCS connector backshells have exposed threads [ODS]
- E. Thermal
 - 1. Illuminated PLB lights; do not touch
 - 2. OBSS grapple fixture shafts/cams may be hot. Limit handling if required
 - 3. Stay 27 ft from PRCS when powered
 - 4. Stay 3 ft from VRCS when powered
 - 5. Stay 3 ft from APU when operating
- F. Contamination
 - 1. Stay out of the immediate vicinity of leaking jet or APU
- G. Lasers
 - 1. Do not look at LDRI diffuser or LCS laser aperture window

EVA 4 TOOL CONFIG

EVI

- EMU D-rings
- Ext on left side
- Ext on right side
- Waist Tether [right D-ring extender]
- 85-ft Safety Tether [right D-ring extender]
- 85-ft Safety Tether [MWS]

MWS

- Small Trash Bag
- Adj tether s/n _____
- 2 – Wire ties as tether loops
- RET (w/PIP pin)
- RET (sm-sm)
- Adj Tether
- RET (sm-sm) (WETA MLI)
- Swing Arm (right side)
- PGT w/6-in ext s/n _____
- RET (sm-sm)

- BRT (left side)
- RET (sm-sm)
- 2 – Wire ties

SAFER

NOTE: Prior to use, inspect the following hardware:

- RET cords for fraying
- Safety Tether & Waist Tether load alleviating straps: No red visible, no damage
- Sm Trash Bag: Bristle deformation/damage, after stowing tools in trash bag

Use Blue RETs Only

Tether Count:	(used)	(total)
RET (sm-sm)	13	ISS qty 16
RET (w/PIP pin)	2	5
RET (Lg-sm)	5	8
Adj Tethers (sm-sm)	8	10
Adj Tethers (Lg-sm)	0	2
D-ring Extenders	5	6

EVI2

- EMU D-rings
- Ext on left side
- Ext on right side
- Waist Tether [right D-ring extender]
- 85-ft Safety Tether [right D-ring extender]

MWS

- Small Trash Bag [left inside]
- Adj tether
- Gap Spanner, 72-in
- Adj tether
- Small Trash Bag [right inside]
- 2 – Wire ties as tether loops
- RET (w/PIP pin)
- RET (sm-sm)

SAFER

- Swing Arm (right side)
- PGT w/6-in ext s/n _____
- EVA Camera w/bracket & 50mm lens
- RET (sm-sm)

- BRT (left side)
- RET (sm-sm)
- 2 – Wire ties

SAFER

CREWLOCK

- RET (Lg-sm)
- IR Camera w/EHIP Bat

NOTE

Prior to egress, turn IR camera Master Switch ON. Wait until LED on back of camera is solid green (~45 sec). Hold enable switch UP for 5 sec, verify LED – OFF. Cover Master Switch with Kapton Tape.

Remove IVA covers from JLP GPS Antenna and WETA shown in section 18

CREWLOCK (Cont)

- Tether Ext on A/L D-ring
- RET (Lg-sm)
- Med ORU Bag
- Adj Tether (outside – tie down)
- Adj Tether (outside – tie down)
- 55-ft Safety Tether
- RET (sm-sm) (to inside tether point)
- Round Scoop
- JLP GPS Antenna B
- Fish Stringer
- 2 – Connector Caps (GPS Ant)
- 2 – Connector Caps (JLP)
- MLI (JLP GPS)
- Long Wiretie

RET (Lg-sm)

- Crewlock bag #3
- Adj Tether (outside – tie down)
- Dummy Box (WETA) (Int RET #1)
- Round Scoop (WETA) (Int RET #2)
- Adj Tether (Int RET #3)
- MLI (WETA)
- EVA Camera w/bracket & 28mm lens
- RET (sm-sm)

RET (Lg-sm) on Scoop

- WETA (with MLI)
- RET (sm-sm) on opposite tether point (right side when looking at Scoop)
- Round Scoop

RET (sm-sm) (On UJA D-ring)

- PGT w/6-in ext
- EVA Camera w/bracket & 50mm lens
- RET (sm-sm) (On UJA D-ring)
- BRS Pin Tool w/Sheath

JLP

MWS

Bag Color Key: **119 EVA Tools**, **Staging**, **Crewlock**, **Crewlock**, **MWS**, **JLP**, **JPM**

EVA 4 TOOL CONFIG (Cont)

CREWLOCK (Cont)

Staging Bag

- Fish Stringer #1
- Wire Tie Caddy (hook #1)
- 9 wire ties
- Velcro/Tape Caddy (hook #2)
- PGT (hook #3) s/n 1008
- PGT Battery s/n _____
- 7/16-in (wobble) Socket – 6 ext
- Vise Grips (hook #4)
- Ratchet Wrench (hook #5)
- 7/16-in (rigid) Socket – 9 ext
- Cheater Bar (hook #6)
- EVA Hammer (hook #7)
- 55-ft Safety Tether (to strap)
- 85-ft Safety Tether (to strap)
- Fish Stringer #2
- Connector Cleaner Tool Kit (Hook #1)
- Pin Straightener Tool (Hook #2)
- Probe (Hook #3)
- Prybar (Hook #4)
- Needle Nose Pliers (Hook #5)**
- Torque Wrench w/bag (set to 31) (Hook #6)
- Right Angle Drive (Hook #7)
- Long-Duration Tie-Down Tether (to strap)
- Long-Duration Tie-Down Tether (to strap)
- MWS Key Strap Assy (on Wire Tie to strap)
- RET (Lg-sm)
- CL Bag #2
- Cnctr Insulating Sleeve Size 21/25 (Int RET #1)
- Cnctr Insulating Sleeve Size 21/25 (Int RET #2)
- Cnctr Insulating Sleeve Size 21/25 (Int RET #3)
- Cnctr Insulating Sleeve Size 21/25 (Int RET #4)
- RET (sm-sm) on outside
- Cnctr Insulating Sleeve Size 33/37
- RET (sm-sm) on outside
- Cnctr Insulating Sleeve Size 33/37

CREWLOCK (Cont)

IV Bag

- 2 – Towel
- Contamination Detection Kit
- 2 – GP Caddy
- Thermal Mittens (1 pair)
- RET (sm-sm) (Black)
- Socket Caddy
- 1/2-in (wobble) Socket – 8 ext
- 7/16-in (wobble) Socket – 6 ext
- 2 – DCM Plug (SAFER Hardmount)
- 2 – RET (sm-sm, black)

JLP GPS Antenna

- Potential sharp edge exists on underside of GPS Antenna bracket
- The plate nut retainers have sharp edges that have been taped over with Glass Tape P213 (BETA Cloth Tape)

Review PGT ops

- Report "green light" (for torque down ops)
- Report torque and turns
- Expect LOTORQ fault msg, Fault LED and Red LED for bolt release ops

EQUIPMENT LOCK

Crewlock Bag #1

Empty

Crewlock Bag #4

- Failed RPCM (Int RET #1)

Mesh Bag #1 (119 EVA Tools)

Empty

Mesh Bag #2 (Done Tools)

- 5/8-7.8-in extension
- 5/8-7.8-in extension
- Round TM w/5/8-in Prd Socket
- Socket Caddy
- Torque Wrench bag
- Cannon Connector Tool
- Cannon Connector Tool
- Ratchet Wrench
- 7/16-2-in rigid ext
- Cnctr Insulating Sleeve Size 33/37
- SPDM EP1 Cover**
- RCC Gap Gauge**
- WIF Adapter**
- 7/16-18-in ext**
- Clean wipes _____

Mesh Bag #3 (Transfer to Shuttle)

- Locking Strut Aid
- Locking Strut Aid
- Locking Strut Aid
- Locking Strut Aid
- Torque Wrench (s/n 1007)
- Used Wipes _____ (in Ziplock)**
- Grease Gun Cartridge (pending manifest)**

Bag Color Key: **119 EVA Tools**, **Staging**, **Crewlock**, **MWS**

EVA 4 A/L EGRESS (00:20)

<p>IV</p> <p>EVA hatch D-ring w/extender</p> <p>UJA D-ring not used</p> <p>EV2</p> <p>EV1</p> <p>EV2 safety tether (85)</p> <p>EV1 waist tether</p> <p>EV1 safety tether (85) (to MWS)</p> <p>fwd aft</p> <div style="border: 1px solid black; padding: 5px; width: fit-content;"> <p>2 - 85-ft A/L tether - EV1 1 - 85-ft A/L tether - EV2 1 - 55-ft tether - EV1</p> <p>Med ORU Bag</p> </div> <p>NOTE</p> <p>Sunrise/Sunset checks</p> <ul style="list-style-type: none"> • ✓Helmet lts, visor, as reqd • ✓Gloves • ✓Tool, MWS tethers • ✓MWS, BRT latches <p>IR Camera Warmup start: _____</p>	<p>EV1 – Swanson (FF)</p> <p><u>INITIAL CONFIG</u></p> <p>Verify:</p> <ul style="list-style-type: none"> <input type="checkbox"/> EV1 right waist tether connected to EV2's 85-ft safety tether <input type="checkbox"/> ✓Gate closed (both hooks) <input type="checkbox"/> ✓Hook locked (both hooks) <p><u>EGRESS</u></p> <ol style="list-style-type: none"> Open hatch thermal cover Egress crewlock Attach EV1 safety tether to fwd A/L D-ring <ul style="list-style-type: none"> <input type="checkbox"/> ✓Gate closed <input type="checkbox"/> ✓Hook locked <input type="checkbox"/> ✓Reel unlocked Fairlead safety tether as reqd Attach EV2's safety tether anchor end to aft A/L D-ring <ul style="list-style-type: none"> <input type="checkbox"/> ✓Gate closed <input type="checkbox"/> ✓Hook locked <input type="checkbox"/> Release EV1 waist tether Give EV2 GO to release waist tether Receive Med ORU bag and place on BRT As EV2 egresses monitor IR camera clearance 	<p>EV2 – Arnold (FF)</p> <p><u>INITIAL CONFIG</u></p> <p>Verify:</p> <ul style="list-style-type: none"> <input type="checkbox"/> EV2 right waist tether connected to Airlock D-ring extender <input type="checkbox"/> ✓Gate closed <input type="checkbox"/> ✓Hook locked <input type="checkbox"/> ✓Reel unlocked <p><u>EGRESS</u></p> <ol style="list-style-type: none"> On EV1 GO, release waist tether from A/L D-ring Hand Med ORU bag to EV1, Leave RET on A/L D-ring ext <ul style="list-style-type: none"> NOTE IR Camera requires 5-min warm up after power up and prior to use ✓sw MASTER – ON, ✓LED – OFF Press and release ENABLE switch to initiate camera warmup (IV start 5-min timer), ✓LED – ON Place IR camera on BRT Egress crewlock
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7. Slide second tie-wrap onto first tie-wrap and snug tight



8. Perform pull test (~5-7 lb) on tie-wrap; verify it remains captive in MLI
9. Cut off ends of tie-wraps



10. Wrap exposed edges of tie-wrap with Kapton tape



15A GREASE GUN CLEANUP

PARTS:

Straight Nozzle Gun (Grease) (Crewlock Bag #1)
Grease Cartridge Ziplock (JPM1A5, SARJ Hardware, 3.0 CTB 1061)
EVA Wipes (Crewlock Bag & Med ORU Bag)
Ziplock w/Red Grease Cartridge Caps (119 EVA Tools Mesh Bag)

MATERIALS:

Dry towel
Nitrile gloves (NOD104_C1, 0.5 CTB 1159)
Ziplock bags

1. Retrieve the following hardware:
 - a. Dry towel
 - b. Ziplock bags (2); label ziplock bags "STS" and "ISS"
 - c. Nitrile gloves (NOD104_C1, 0.5 CTB 1159)
 - d. Grease Cartridge Ziplock (JPM1A5, SARJ Hardware, 3.0 CTB 1061)
2. Don Nitrile gloves
3. Retrieve Ziplock bag w/grease gun cartridge caps (119 EVA Tools Mesh Bag)
4. Retrieve EVA 3 EVA wipes
5. Stow used wipes in ziplock "STS" and stow clean wipes in SARJ Hardware, 3.0 CTB 1061
6. Verify plunger disengaged (black triangle down)
7. Verify valve closed (shutoff knob perpendicular to nozzle)
8. Remove MLI cover from grease gun
9. Fully extend plunger
10. Remove nozzle/shutoff valve from used cartridge (ccw); note valve will be full of grease
11. Wipe any excess grease around nozzle using towel; stow towel in ziplock "STS"
12. Temp stow nozzle/shutoff valve in ziplock "ISS"
13. Unscrew grease cartridge housing from trigger assembly (ccw)
14. Remove used cartridge from grease gun housing
15. Attach red caps to used grease cartridge
16. Estimate if cartridge is > 1/4 full (~1.5" of grease)

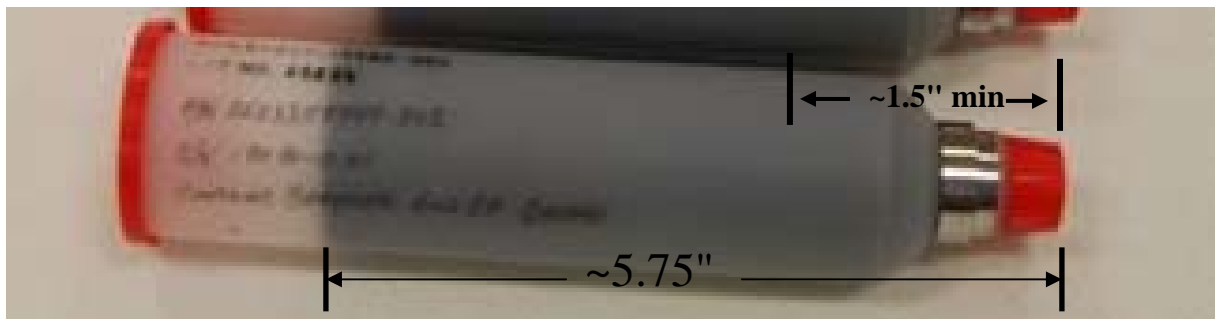


Figure 1. Grease Cartridge Measurement (Full Cartridge Shown)

17. Stow used grease cartridge in ziplock "STS" if < 1/4 full, and in ziplock with other cartridges if > 1/4 full
18. Screw trigger assembly onto grease gun housing
19. Install MLI cover on grease gun
20. Install MLI tip cover
21. Stow grease gun in ziplock "ISS"
22. Doff Nitrile gloves; stow in ziplock "STS"
23. Inform **MCC-H**: Number of wipes, towels, and grease cartridges in "STS" ziplock
24. Stow ziplock "STS" in "Transfer to Shuttle" Mesh Bag
25. Stow ziplock "ISS" and grease cartridge ziplock in SARJ Hardware, 3.0 CTB 1061

STS-119 DAP A9 – DAP A14 CONFIGURATIONS

	ITEM #	A9	A10	A11	A12	A13	A14
PRI							
ROT RATE	10 (50)	0.1300	0.0500	0.0500	0.0500	0.0500	0.2000
ATT DB	11 (51)	2.00	0.60	10.00	5.00	5.00	5.00
RATE DB	12 (52)	0.10	0.10	0.20	0.20	0.20	0.20
ROT PLS	13 (53)	0.100	0.100	0.100	0.040	0.040	0.100
COMP	14 (54)	.000	.000	.000	.000	.000	.000
P OPTION	15 (55)	TAIL	TAIL	TAIL	TAIL	TAIL	TAIL
Y OPTION	16 (56)	TAIL	TAIL	TAIL	TAIL	TAIL	TAIL
TRAN PLS	17 (57)	0.050	0.050	0.100	0.010	0.010	0.100
ALT							
RATE DB	18 (58)	0.100	0.100	0.035 ¹	0.020 ¹	0.020 ¹	0.200
JET OPT	19 (59)	TAIL	TAIL	TAIL	TAIL	TAIL	TAIL
# JETS	20 (60)	2	2	1	1	1	1(2) ⁴
ON TIME	21 (61)	0.08	0.08	0.08	0.08	0.08	0.08
DELAY	22 (62)	0.00	0.00	7.04	7.04	7.04	6.00
VERN							
ROT RATE	23 (63)	0.1300	0.0500	0.1000	SEE NOTE 2	0.1000	0.2000
ATT DB	24 (64)	1.000	0.500	5.000	3.000	3.000	3.000
RATE DB	25 (65)	.020	.020	.050	SEE NOTE 2	.050	.200
ROT PLS	26 (66)	0.050	0.050	0.010	0.002	0.002	0.010
COMP	27 (67)	.000	.000	.000	.000	.000	.000
CNTL ACC	28 (68)	0	0	2(5) ³	SEE NOTE 2	2	1
PURPOSE		PROX/OPS FLYAROUND	DOCKING	AUTO REBOOST	MATED STACK (MINVRS)		ORBITER ALONE SRMS/OBSS

BOLD/ITALIC indicates change from I-Load.

- ¹ I-loaded below keyboard limit; do not change
- ² DAP CA, ROT RATE and RATE DB will require updating during mated ops. Refer to DOCKED DAP REFERENCE (REBOOST/DAP) for appropriate values
- ³ Use CA 2 Post Dock and before S6 Ops OR use CA 5 Post S6 Install
- ⁴ Use 1 for OBSS scan and 2 for Orbiter attitude maneuvers

STS-119 DAP B CONFIGURATIONS

STS-119 DAP B1 – DAP B8 CONFIGURATIONS

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

BOLD/ITALIC indicates change from I-Load.

STS-119 DAP B9 – DAP B13 CONFIGURATIONS

	ITEM #	B9	B10	B12	B13
PRI					
ROT RATE	30 (50)	0.1300	0.0500	0.0100 ¹	0.0100 ¹
ATT DB	31 (51)	2.00	0.60	1.00	1.00
RATE DB	32 (52)	0.10	0.10	0.20	0.20
ROT PLS	33 (53)	0.040	0.040	0.040	0.040
COMP	34 (54)	.000	.000	.000	.000
P OPTION	35 (55)	TAIL	TAIL	TAIL	TAIL
Y OPTION	36 (56)	TAIL	TAIL	TAIL	TAIL
TRAN PLS	37 (57)	0.010	0.010	0.010	0.010
ALT					
RATE DB	38 (58)	0.100	0.100	0.020 ¹	0.020 ¹
JET OPT	39 (59)	TAIL	TAIL	TAIL	TAIL
# JETS	40 (60)	2	2	1	1
ON TIME	41 (61)	0.08	0.08	0.08	0.08
DELAY	42 (62)	10.00	0.00	7.04	7.04
VERN					
ROT RATE	43 (63)	0.1300	0.0500	0.0100	0.0100
ATT DB	44 (64)	1.000	0.500	1.000	1.000
RATE DB	45 (65)	.020	.020	SEE NOTE 2	0.020
ROT PLS	46 (66)	0.020	0.020	0.002	0.002
COMP	47 (67)	.000	.000	.000	.000
CNTL ACC	48 (68)	0	0	SEE NOTE 2	2
PURPOSE		PROXOPS/ FLYAROUND	DOCKING	MATED STACK (ATT HOLD)	

BOLD/ITALIC indicates change from I-Load.

¹ I-loaded below keyboard limit; do not change

² DAP CA, ROT RATE and RATE DB will require updating during mated ops.
Refer to DOCKED DAP REFERENCES (REBOOST/DAP) for appropriate values



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FS 3-8

ORB OPS/119/FIN



DOCKED DAP REFERENCE

NOTE

Shuttle mated attitude control is not certified when the Shuttle Airlock is depressurized (<3.45 psia)

DOCKED DAPs

	ITEM #	A12	B12
PRI			
ROT RATE	10 (50)	0.0500	0.0100 ¹
ATT DB	11 (51)	5.00	1.00
RATE DB	12 (52)	0.20	0.20
ROT PLS	13 (53)	0.040	0.040
COMP	14 (54)	.000	.000
P OPTION	15 (55)	TAIL	TAIL
Y OPTION	16 (56)	TAIL	TAIL
TRAN PLS	17 (57)	0.010	0.010
ALT			
RATE DB	18 (58)	0.020 ¹	0.020 ¹
JET OPT	19 (59)	TAIL	TAIL
# JETS	20 (60)	1	1
ON TIME	21 (61)	0.08	0.08
DELAY	22 (62)	7.04	7.04
VERN			
ROT RATE	23 (63)	SEE NOTE 2	0.0100
ATT DB	24 (64)	3.000	1.000
RATE DB	25 (65)	SEE NOTE 2	SEE NOTE 2
ROT PLS	26 (66)	0.002	0.002
COMP	27 (67)	.000	.000
CNTL ACC	28 (68)	SEE NOTE 2	SEE NOTE 2
PURPOSE		MATED STACK (MNVRS)	MATED STACK (ATT HOLD)

BOLD/ITALIC indicates change from I-Load.

¹ I-loaded below keyboard limit; do not change

² DAP CA, ROT RATE and RATE DB will require updating during mated ops.
Refer to DOCKED DAP CONFIGs for appropriate values

Cont next page

FS 4-5

ORB OPS/119/FIN X

DOCKED DAP CONFIGS

WHEN AVAILABLE		PURPOSE	DAP MODE		CA ^{a,b}	RATE DB ^a	ROT RATE ^a
Post Dock (before S6 ops)		Maneuvers	A12	VERN	2	0.050	0.10
		Att Hold Only	B12	VERN	2	0.020	0.01
		Maneuvers	A12	ALT	2	0.020	0.05
		Att Hold Only	B12	ALT	2	0.020	0.01
S 6 O p s	at S6 Unberth Posn at Int S6 Handoff posn at S6 Handoff	Maneuvers	A12	VERN	2	0.050	0.10
	at S6 SRMS to SSRMS Handback Posn at S6 Overnight Park Posn	Maneuvers	A12	VERN	3	0.050	0.10
	at S6 Overnight Park Posn	Att Hold Only	B12	VERN	3	0.030	0.01
	at S6 Install Int 1 Posn at Install Int 2 Posn at S6 Pre-install Posn	Maneuvers	A12	VERN	4	0.060	0.04
S6 Installed		Maneuvers	A12	VERN	5	0.050	0.10
		Att Hold Only	B12	VERN	5	0.020	0.01
		Maneuvers	A12	ALT	5	0.020	0.05
		Att Hold Only	B12	ALT	5	0.020	0.01

^a DAP CA, ROT RATE and RATE DB settings need to be updated to match this table before use

^b CA updates should be performed in FREE. Wait 30 sec after updating a CA before returning to active control

RATE DAMPING

RATE DAMPING	DAP: LVLH(INRTL)
If RATE DAMPING takes > 2 min (continuous jet activity)	DAP: FREE, then return to RATE DAMPING (select FREE on the DAP every two minutes until rates are damped)
When rates damped (jet activity stopped)	When rates are below rate deadband (jet activity stopped), DAP: FREE > 2 sec, then AUTO

TOP
 BACK OF 'STS-119 DAP A1 - DAP A8 CONFIGURATIONS'

PILE
 VELCRO

ORB OPS-41b/119/O/X

STS-119 DAP A9 - DAP A14 CONFIGURATIONS

ITEM#	A9	A10	A11	A12	A13	A14
PRI						
ROT RATE	0.1300	0.0500	0.0500	0.0500	0.0500	0.2000
ATT DB	2.00	0.80	10.00	5.00	5.00	5.00
RATE DB	0.10	0.10	0.20	0.20	0.20	0.20
ROT PLS	0.100	0.100	0.100	0.040	0.040	0.100
COMP	.000	.000	.000	.000	.000	.000
P OPTION	TAIL	TAIL	TAIL	TAIL	TAIL	TAIL
Y OPTION	TAIL	TAIL	TAIL	TAIL	TAIL	TAIL
TRAN PLS	0.050	0.050	0.100	0.010	0.010	0.100
ALT						
RATE DB	0.100	0.100	0.035 ¹	0.020 ¹	0.020 ¹	0.200
JET OPT	TAIL	TAIL	TAIL	TAIL	TAIL	TAIL
# JETS	2	2	1	1	1	1(2) ⁴
ON TIME	0.08	0.08	0.08	0.08	0.08	0.08
DELAY	0.00	0.00	7.04	7.04	7.04	6.00
VERN						
ROT RATE	0.1300	0.0500	0.1000	SEE NOTE 2	0.1000	0.2000
ATT DB	1.000	0.500	5.000	3.000	3.000	3.000
RATE DB	.020	.020	.050	SEE NOTE 2	.050	.200
ROT PLS	0.050	0.050	0.010	0.002	0.002	0.010
COMP	.000	.000	.000	.000	.000	.000
CNTL ACC	0	0	2(5) ³	SEE NOTE 2	.000	.000
PURPOSE	PROX OPS FLARGOARD	DOCKING	AUTO REBOUST	MATED ATA (ATV/S)		ORBITER FLAME SIZES/DBS

BOLDITALIC indicates change from h-load.

¹ h-load not below keyboard limit; do not change

² DAP CA, ROT RATE and RATE DB will require updating during mated ops.

³ Refer to DOCKED DAP REFERENCE (REBOUST/DAP) for appropriate values

⁴ Use CA 2 Post Dock and before S6 Ops OR Use CA 5 Post S6 Install

Use 1 for CBSS scan and 2 for Orbiter attitude maneuvers

HINGE

(reduced copy)

NOT FLOWN

FS CC 10-9

ORB OPS/119/FIN X

TOP
 BACK OF 'STS-119 DAP B1 - DAP B8 CONFIGURATIONS'
 HINGED AT BOTTOM OF 'STS-119 DAP A9 - DAP A14 CONFIGURATIONS'
 HINGE

STS-119 DAP B9 - DAP B13 CONFIGURATIONS

PRI	ITEM#	B9	B10	B12	B13
ROT RATE	30 (60)	0.1300	0.0500	0.0100 ¹	0.0100 ¹
ATT DB	31 (51)	2.00	0.60	1.00	1.00
RATE DB	32 (52)	0.10	0.10	0.20	0.20
ROT PLS	33 (53)	0.040	0.040	0.040	0.040
COMP	34 (54)	.000	.000	.000	.000
P OPTION	35 (55)	TAIL	TAIL	TAIL	TAIL
Y OPTION	36 (56)	TAIL	TAIL	TAIL	TAIL
TRAN PLS	37 (57)	0.010	0.010	0.010	0.010
ALT					
RATE DB	38 (58)	0.100	0.100	0.020 ¹	0.020 ¹
JET OPT	39 (59)	TAIL	TAIL	TAIL	TAIL
# JETS	40 (60)	2	2	1	1
ON TIME	41 (61)	0.08	0.08	0.08	0.08
DELAY	42 (62)	10.00	0.00	7.04	7.04
VERN					
ROT RATE	43 (63)	0.1300	0.0500	0.0100	0.0100
ATT DB	44 (64)	1.000	0.500	1.000	1.000
RATE DB	45 (65)	.020	.020	SEE NOTE 2	0.020
ROT PLS	46 (66)	0.020	0.020	0.002	0.002
COMP	47 (67)	.000	.000	.000	.000
CNTL ACC	48 (68)	0	0	SEE NOTE 2	.000
PURPOSE		FRXGFS/FLYAROUND	DOCKING	MATED STACK (RTI HOLD)	2

BOLD/ITALIC indicates change from I-Load.
¹ I-loaded below keyboard limit; do not change.
² DAP CA, ROT RATE and RATE DB will require updating during mated ops.
 Refer to DOCKED DAP REFERENCES (REBOOS/DAP) for appropriate values

HOOK
VELCRO

ORB OPS-41bb/119/O/X

HOOK
VELCRO

(reduced copy)

NOT FLOWN

FS CC 10-10

ORB OPS/119/FIN X

PTG

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

PTG

FS 2-1

ORB OPS/119/FIN

PTG

STAR PAIRS PAD

STAR PAIR	SEP ANGLE	ATTITUDE SET 1				ATTITUDE SET 2			
		DUAL S TRK		SINGLE S TRK		DUAL S TRK		SINGLE S TRK	
		-Z	-Y	-Z	-Y	-Z	-Y	-Z	-Y
A	84.3	-Y:43 R+ 1 -Z:47 P+ 74 Y+ 335	R+ 272 -Y:47 P+ 83 Y+ 347	-Z:43 P+ 61 Y+ 343	R+ 89 -Y:47 P+ 83 Y+ 347	-Y:47 R+ 274 -Z:43 P+ 241 Y+ 12	R+ 186 -Z:47 P+ 249 Y+ 24	-Y:43 R+ 357 P+ 253 Y+ 3	
B	84.0	-Y:51 R+ 285 -Z:22 P+ 186 Y+ 331	R+ 282 -Y:22 P+ 202 Y+ 327	R+ 18 -Y:22 P+ 202 Y+ 327	R+ 18 -Y:22 P+ 202 Y+ 327	-Y:22 R+ 343 -Z:51 P+ 15 Y+ 13	R+ 261 -Z:22 P+ 5 Y+ 24	R+ 64 -Y:51 P+ 28 Y+ 21	
C	85.3	-Y:95 R+ 74 -Z:89 P+ 331 Y+ 5	R+ 349 -Y:89 P+ 322 Y+ 17	R+ 161 -Y:89 P+ 322 Y+ 17	R+ 161 -Y:89 P+ 322 Y+ 17	-Y:89 R+ 197 -Z:95 P+ 136 Y+ 3	R+ 111 -Z:89 P+ 150 Y+ 359	R+ 282 -Y:95 P+ 130 Y+ 350	
D	81.9	-Y:97 R+ 113 -Z:21 P+ 242 Y+ 346	R+ 28 -Y:21 P+ 227 Y+ 350	R+ 194 -Y:21 P+ 227 Y+ 350	R+ 194 -Y:21 P+ 227 Y+ 350	-Y:21 R+ 161 -Z:97 P+ 54 Y+ 30	R+ 73 -Z:21 P+ 63 Y+ 19	R+ 250 -Y:97 P+ 41 Y+ 22	

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

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

NET Applicable 00/00:40:00 to 16/00:00:00
Liftoff Date: 03/13/09
Liftoff GMT: 072/00:54:27.000

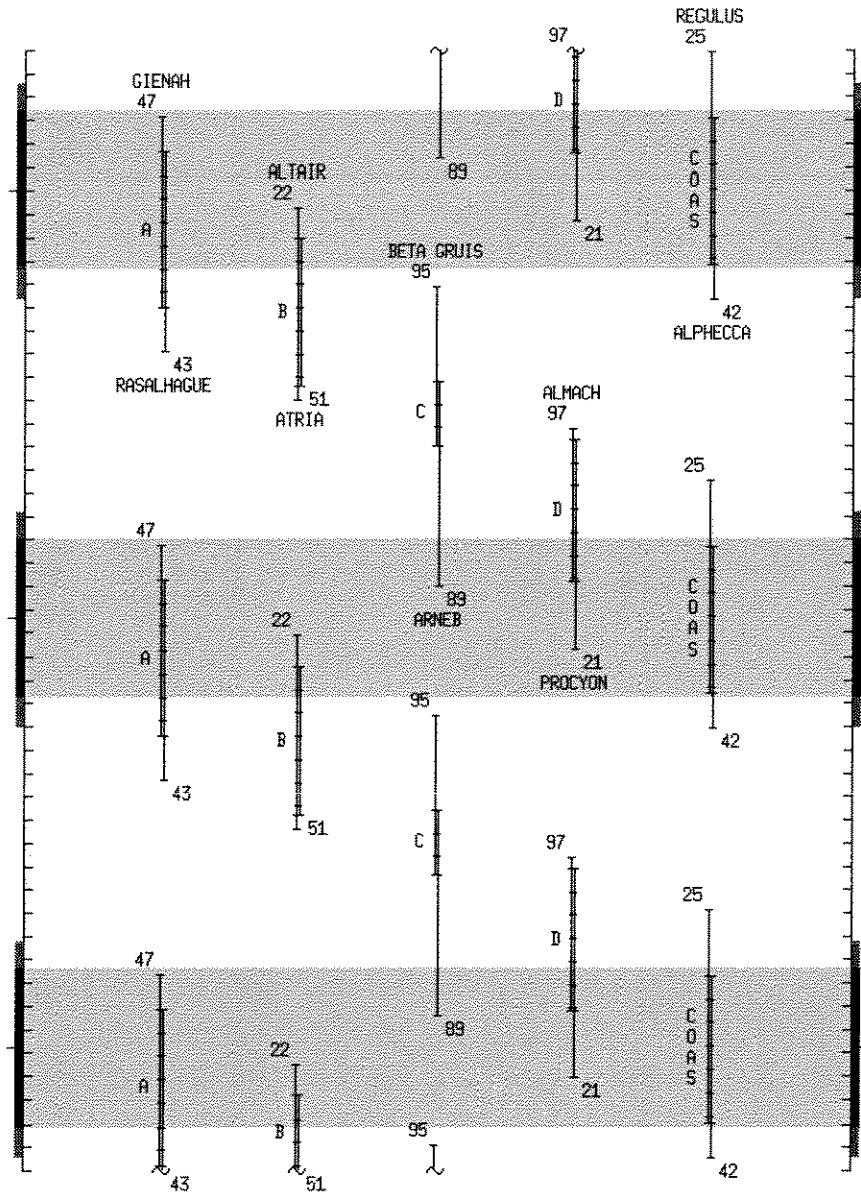
COAS ALIGN ANB COAS ALIGN
ATTITUDE 1 SEP ATTITUDE 2

PAIR	+X HHD	ATTITUDE 1		NOSE UP	77.2	ATTITUDE 2	
		R+ 287 P+ 194 Y+ 23	R+ 296 P+ 221 Y+ 310			R+ 248 P+ 9 Y+ 320	
C							
O							
A							
S	-Z COAS	R+ 121 P+ 230 Y+ 303	R+ 248 P+ 9 Y+ 320	TAIL UP			

FS 2-2

ORB OPS/119/FIN X

STAR PAIRS



MET Applicable: 00/00:40:00 to 16/00:00:00
 Liftoff Date: 03/13/09
 Liftoff GMT: 072/00:54:27.000

FS 2-3

ORB OPS/119/FIN X



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FS 2-4

ORB OPS/119/FIN



FF(FA) MDM I/O ERROR

- ◆ 1. GNC I/O RESET; if recovered >>
If simo 'I/O ERR' msgs for mult MDMs (possible GPC prob):
 2. √MCC/restring as reqd >>
 3. If FF1-3 or FA4: Check ADI (aff String)
 4. If ADI 'OFF' flag (GPC prob): Go to step 16
 5. **GNC 1 DPS UTILITY**
Aff String – port mode; if recovered >>
If alt msg on aff string (GPC prob):
 6. Go to step 16
- If MCC GO for pwr cycle:
 7. If FF:
 - GNC 21 IMU ALIGN**
Aff IMU – desel
 8. (Aff) MDM – OFF,ON (FF: may cage IMU)
 9. GNC I/O RESET
 10. If recovered: resel IMU if desel >>
 11. Resel orig ports
 12. If recovered: resel IMU if desel >>
 13. If not: Go to MAL, DPS, 5.3a, I/O ERROR FF(FA) **17** >>
- If MCC NO-GO for pwr cycle:
 14. If FF:
 - GNC 21 IMU ALIGN**
Aff IMU – desel >>
 15. If FA1 or FA2, then:
R OMS TK ISOL A – CL (tb-CL) >>
16. Sel desired FF/FA MDM:
17. **GNC 1 DPS UTILITY**
Port mode as reqd
If FF MDM not chosen:
 18. **GNC 21 IMU ALIGN**
Aff IMU – desel
19. When time permits restring (with possible F-T-S):
Go to MAL, DPS, 5.3a, I/O ERROR FF(FA) **1**

OPCL/ALL/GEN M,X

FF(FA) MDM OUTPUT

3-7

FF(FA) MDM I/O ERROR

PASS GNC GPC (1st FAIL)

NOTE

If Group B(C) LOW LEVEL (MSN EXT) pwrn config,
MMU 2 – ON

NOTE

No keyboard entries or sw throws 10 sec:
Before and after moding PASS GPCs to RUN
Before OPS transition or set expansion/contraction
requests until new OPS base page is displayed

If no active GNC GPC and G2FD GPC avail:

| 1. Go to GNC RECOVERY VIA G2FD >>

If no active GNC GPC and no FD GPC avail:

| 2. Go to BFS ENGAGE >>

If failure is CS split and GPC config is one GNC and one SM:

| 3. Go to MAL, DPS, 5.1a, CS SPLIT 1 >>

If Dual G2 and RS split (CS intact) but both GPCs appear functional
(check DPS and ADI displays, MODE tb):

| 4. Retain GPC with two IMUs

If Triple G2 and RS split but GPCs appear functional

(check DPS and ADI displays, MODE tb):

5. Retain GPC with two strings

6. (Aff) GPC PWR – OFF

If FF1 PWR cycled:

7. GNC 21 IMU ALIGN
IMU 1 (caged) – desel

8. Reassign failed GPC IDPs: GPC/CRT as reqd

9. GNC 0 GPC MEMORY

Check downlist to active GNC GPC:

DOWNLIST GPC – ITEM 44 +X EXEC

If redundant GNC GPCs reqd and G2FD avail:

10. √(G2FD) GPC MODE – HALT
√OUTPUT – NORM
√PWR – ON
MODE – STBY (tb-RUN), RUN

11. IDP/CRTX MAJ FUNC – PL

12. GPC/CRT – (G2FD) GPC/X EXEC

If GNC OPS 202:

13. GNC, OPS 201 PRO

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FS 1-13

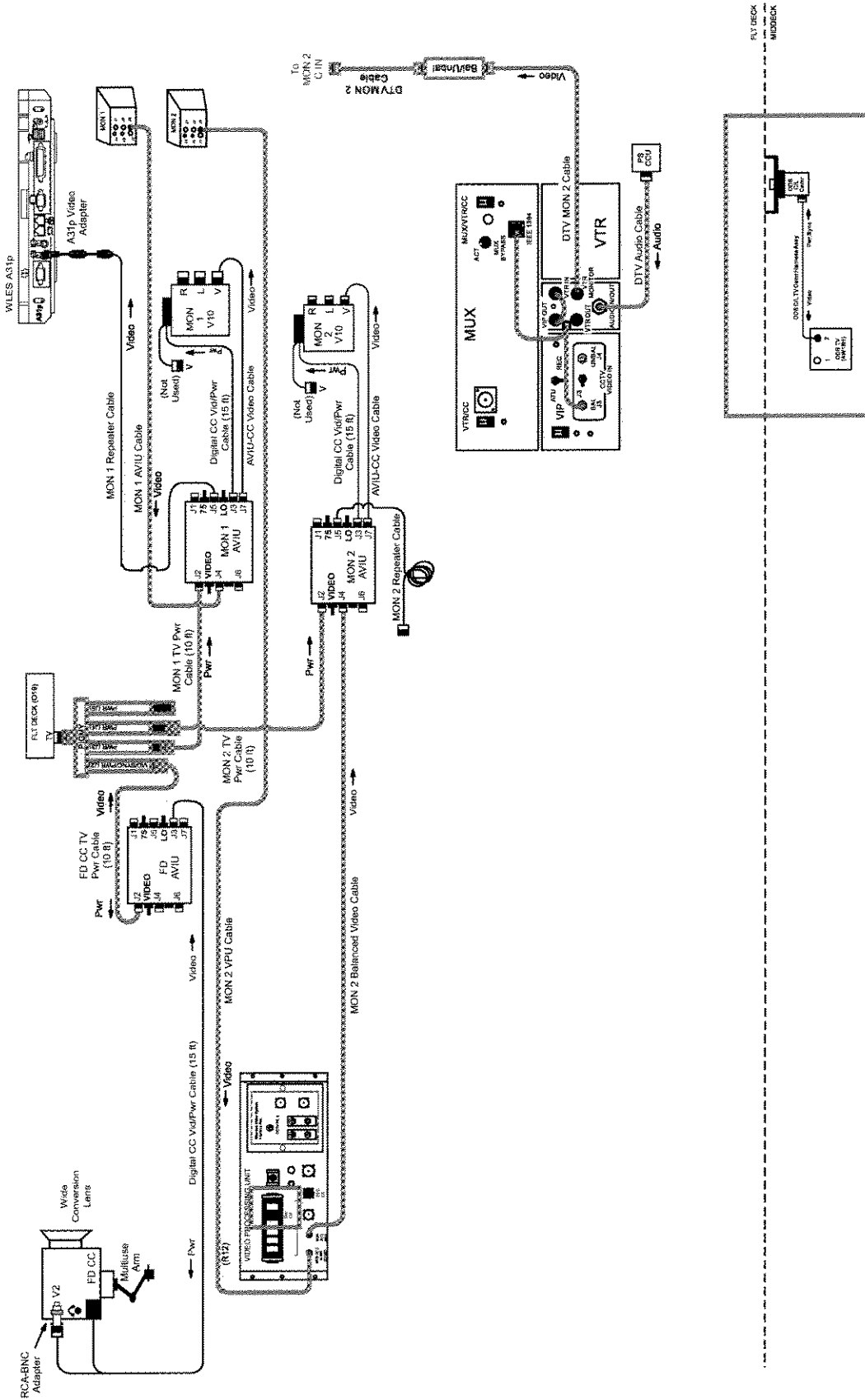
**P/TV02
DOCK**

P/TV/119/FIN

P/TV02 DOCK

P/TV02 DOCK

H/W SUMMARY



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FS 1-21

P/TV/119/FIN

P/TV03
UNDOCK

AFT FLIGHT DECK RECONFIGURATION

AFT STATION CONFIG 3

O14:D POST SEAT EGRESS - op
 cb MNA CAB VENT ISOL - op

A14 RCS/OMS HTR FWD RCS - A AUTO
 L POD (two) - A AUTO, B OFF
 R POD (two) - A AUTO, B OFF
 OMS CRSFD LINES (two) - A AUTO, B OFF
 √FWD,AFT RCS JET (ten) - AUTO
 KU BAND RATE - LO

PDIP 1 APU HTR LUBE OIL LN (three) - A AUTO

A12 ON-ORBIT CONFIG
 Don headset (if reqd)
 If WCCS flown, perform STD WCCS CONFIG (ORB OPS,
 COMM/INST)

R10 If flight deck handheld mic/speaker operation:
 MS AUD PWR - AUD/TONE
 A/G1 - T/R, tw - 2
 A/G2 - RCV, tw - 2
 A/A - RCV, tw - 2
 ICOM A - T/R, tw - 2
 B - RCV, tw - 2

A11 XMIT/ICOM MODE sel - PTT/PTT
 - OFF

R6, L5 MS COMM CCU PWR
 Connect H/MIC to MHA

A13 MS COMM CCU PWR
 CCU PWR - ON
 OS AUD SPKR PWR sel - OFF
 MSTR SPKR VOL sel - SPKR
 HIU VOL (two) - as reqd
 S-BD PM MODE - minimum, full c/w

A1L NSP DATA RATE RCV - HI
 XMIT - HI

A1R CODING (two) - ON
 S-BD FM DATA SOURCE sel - MMU 2 (rot)
 AUD CTR VOICE RCD SEL CH 1 sel - OFF
 2 sel - OFF

R14:C cb MNB KU ANT HTR - cl
 UHF EVA (two) - cl
 Close left to right all cbs
 Close left to right all cbs

R11L IDP/CRT 4 PWR - ON
 R12 VPU PWR - ON (LED on)
 AFD 1 - ON (if desired)

L10 Remove, stow VIP, VTR covers

A15 cb CNTL PWR PTU 1,2 (two) - cl
 PTU/MAIN BUS A,B (two) - ON (fb-ON)
 OPCU 1,2 V-ADJ (two) - CMD

O17:A ATVC (four) - OFF
 :B EIU (three) - OFF
 :D MEC 1 - OFF, wait 2 sec, then
 2 - OFF

L12 √PL BUS ACTIVATION complete

SSP1 cb PDIP 1 PWR 2/KU BAND RLY - cl
 SW PWR 2 - cl

SSP2 cb PDIP 2 PWR 2 - cl
 PDIP 2 PWR 1 - cl

R12 (OPP) cb OBSS SW PWR - cl
 (OBSS) OBSS SW PWR - ON
 RSC PWR - ON

Unstow, deploy reqd FDF

MET	MS AFT ACTIONS
00:51	SPECIALIST SEAT EGRESS
00:59	AFT STATION CONFIG 3
01:03	CONFIG FOR PLBD OPERATIONS 4
01:41	CLOTHING CONFIG 10
01:54	SPECIALIST SEAT REMOVAL/STOWAGE
02:01	AIRLOCK SETUP FOR INGRESS 15
02:21	RESET C/W 16

AFT FLIGHT DECK RECONFIGURATION

CONFIG FOR PLBD OPERATIONS 4

A6U SET UP LIGHTS
ANNUN BUS SEL – MNC

NOTE

Minimum operating time for PLB Floodlights is 10 min.
Light must be OFF for minimum of 10 min UNBLOCKED,
16 min BLOCKED prior to reuse. ~3 min to full bright

A7U PL BAY FLOOD AFT (two) – OFF
MID (two) – ON
FWD (two) – ON
BHD – N/A

Record MET: ____ / ____ : ____ :

- * if PLB Floodlight not ON to full bright within 5 min: *
- * (Aft) PL BAY FLOOD – OFF *

SET UP P/TV

Perform ACTIVATION, OPERATION (Cue Card, IV), AUTO
OPS only for camera A(D)
Prepare minicam and V10 for recording PLBD opening

RESET C/W 16

R13U			
PARAMETER NAME	C/W CH	UPPER LIMIT	
FREON LOOP EVAP OUT T1	107	1.90V/64.8 deg	
T2	117	1.90V/64.8 deg	
CABIN O2 FLOW 2	24	4.65V/4.65 LBM/HR	

R13U			
PARAMETER NAME	C/W CH	ENAV/INH	
MPS He TK P C	9	INH	
L	19	INH	
R	29	INH	
MPS He REG P C	39	INH	
L	49	INH	
R	59	INH	
HYD P 1	109	INH	
2	119	INH	
3		INH	

CLOTHING CONFIG 10

Doff, stow:
Harness, Boots, LES
Stow gloves in Helmet
Remove radiation dosimeter from LES and insert in inflight garments

Doff, stow in Wet Trash:
UCD (clamp if used)
Emesis Bag, if used (unstow new bag)

TOP

AFT FLIGHT DECK RECONFIGURATION

AFT STATION CONFIG 3

O14:D POST SEAT EGRESS
cb MNA CAB VENT - op ISOL - op

A14 RCS/OMS HTR FWD RCS - A AUTO
L POD (two) - A AUTO, B OFF
R POD (two) - A AUTO, B OFF
OMS CRSFD LINES (two) - A AUTO, B OFF
√FWD,AFT RCS JET (ten) - AUTO
KU BAND RATE - LO

A12 APU HTR LUBE OIL LN (three) - A AUTO
ON-ORBIT CONFIG
Don headset (if reqd)
If WCCS flown, perform STD WCCS CONFIG (ORB OPS,
COMM/INST)

R10 If flight deck handheld mic/speaker operation:
MS AUD PWR - AUD/TONE
A/G1 - TR, tw - 2
A/G2 - RCV, tw - 2
A/A - RCV, tw - 2
ICOM A - TR, tw - 2
B - RCV, tw - 2
XMIT/ICOM MODE sel - PTT/PTT
- OFF

A11 MS COMM CCU PWR
Connect IHMIC to MHA
MS COMM CCU PWR - ON
CCU PWR - OFF
OS AUD SPKR PWR sel - as reqd
MSTR SPKR VOL sel - minimum, full c/w

R6, L5 HIJ VOL (two)
A13 S-BD PM MODE - TDORS DATA
NSP DATA RATE RCV - HI
XMIT - HI
CODING (two) - ON

A1R S-BD FM DATA SOURCE sel - MMU 2 (rot)
AUD CTR VOICE RCD SEL CH 1 sel - OFF
2 sel - OFF

R14:C cb MNB KU ANT HTR - cl
UHF EVA (two) - cl
Close left to right all cbs
Close left to right all cbs

:D
:E

R11L IDP/CRT 4 PWR - ON
R12 VPU PWR - ON (LED on)
AFD 1 - ON (if desired)

L10 Remove, stow VIP, VTR covers

A15 cb CNTL PWR PTU 1,2 (two) - cl
PTU/MAIN BUS A,B (two) - ON (tb-ON)
OPCU 1,2 V-ADJ (two) - CMD

O17:A ATVC (four) - OFF
:B EIU (three) - OFF
:D MEC 1 - OFF, wait 2 sec, then
2 - OFF

L12 √PL BUS ACTIVATION complete

SSP1 cb PDIP 1 PWR 2/KU BAND RLY - cl
PDIP 1 PWR 1 - cl
SW PWR 2 - cl

SSP2 cb PDIP 2 PWR 2 - cl
PDIP 2 PWR 1 - cl
cb OBSS SW PWR - cl
cb OBSS SW PWR - ON
RSC PWR - ON

R12 (OPP) (OBSS)

Unstow, deploy reqd FDF

MET	MS AFT ACTIONS
00:51	SPECIALIST SEAT EGRESS
00:59	AFT STATION CONFIG <input type="checkbox"/> 3
01:03	CONFIG FOR PLBD OPERATIONS <input type="checkbox"/> 4
01:41	CLOTHING CONFIG <input type="checkbox"/> 10
01:54	SPECIALIST SEAT REMOVAL/STOWAGE
02:01	AIRLOCK SETUP FOR INGRESS <input type="checkbox"/> 15
02:21	RESET C/W <input type="checkbox"/> 16

PI-1a/119/O/B

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CC 3-3

PI/119/FIN

TOP

AFT FLIGHT DECK RECONFIGURATION

CONFIG FOR PLBD OPERATIONS [4]

A6U SET UP LIGHTS
ANNUN BUS SEL - MNC

NOTE
Minimum operating time for PLB Floodlights is 10 min.
Light must be OFF for minimum of 10 min UNBLOCKED,
16 min BLOCKED prior to reuse. -3 min to full bright

A7U PL BAY FLOOD AFT (two) - OFF
MID (two) - ON
FWD (two) - ON
BHD - N/A

Record MET: _____
* If PLB Floodlight not ON to full bright within 5 min: * *
* (Aft) PL BAY FLOOD - OFF

SET UP P/T/V
Perform ACTIVATION, OPERATION (Cue Card, IV), AUTO
OPS only for camera A(D)
Prepare minicam and V10 for recording PLBD opening

CLOTHING CONFIG [10]

DoFF,slow:
Harness, Boots, LES
Stow gloves in Helmet
Remove radiation dosimeter from LES and insert in Inflight garments
DoFF,slow in Wet Trash:
UCD (clamp if used)
Emesis Bag, if used (unslow new bag)

RESET C/W [16]

PARAMETER NAME	R13U C/W CH	UPPER LIMIT
FREON LOOP EVAP OUT T1	107	1.90V/64.8 deg
T2	117	1.90V/64.8 deg
CABIN O2 FLOW 2	24	4.65V/4.65 LBM/HR

PARAMETER NAME	R13U C/W CH	ENA/INH
MPS He TK P C	9	INH
L	19	INH
R	28	INH
MPS He REG P C	39	INH
L	49	INH
R	59	INH
HYD P 1	99	INH
2	109	INH
3	119	INH

PI-1b/119/OIX

(reduced copy)

CC 3-4

PI/119/FIN X

UTILITY OUTLET PLUG-IN PLAN

PWR: PANEL REFERENCE

FLT DECK..... FS 4-2
MIDDECK..... FS 4-3

PWR/DATA/VIDEO: PRE-ROUTED CONFIG

FLT DECK..... FS 4-4
MIDDECK..... FS 4-5

PWR/DATA/VIDEO: ASCENT CONFIG

FLT DECK..... FS 4-6
MIDDECK..... FS 4-7

PWR/DATA/VIDEO: ENTRY CONFIG

FLT DECK..... FS 4-8
MIDDECK..... FS 4-9

PWR: ON-ORBIT CONFIG

FLT DECK..... FS 4-10
MIDDECK..... FS 4-11

PWR: CREW RESCUE COOLING CONFIG

FLT DECK..... FS 4-12
MIDDECK..... FS 4-13

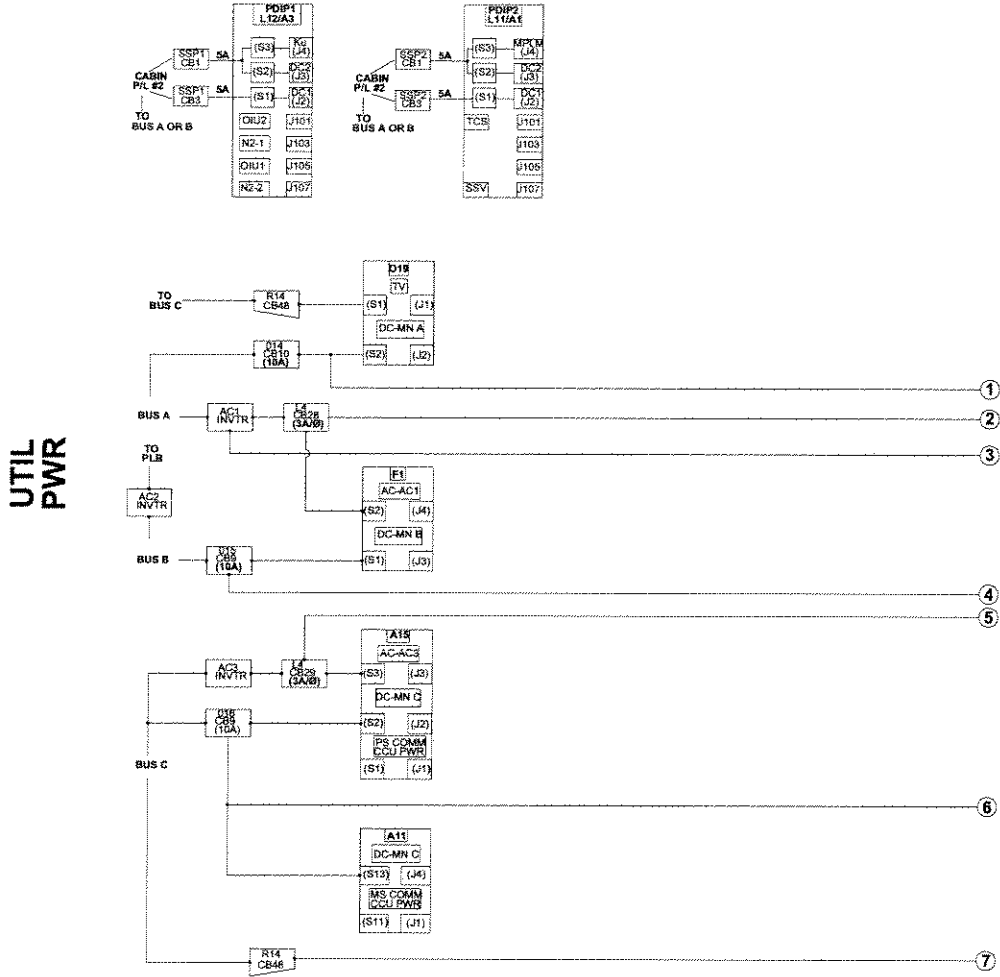
UTIL
PWR

FS 4-1

REF/119/FIN

PWR: PANEL REFERENCE – FLT DECK

REV B
2/18/09

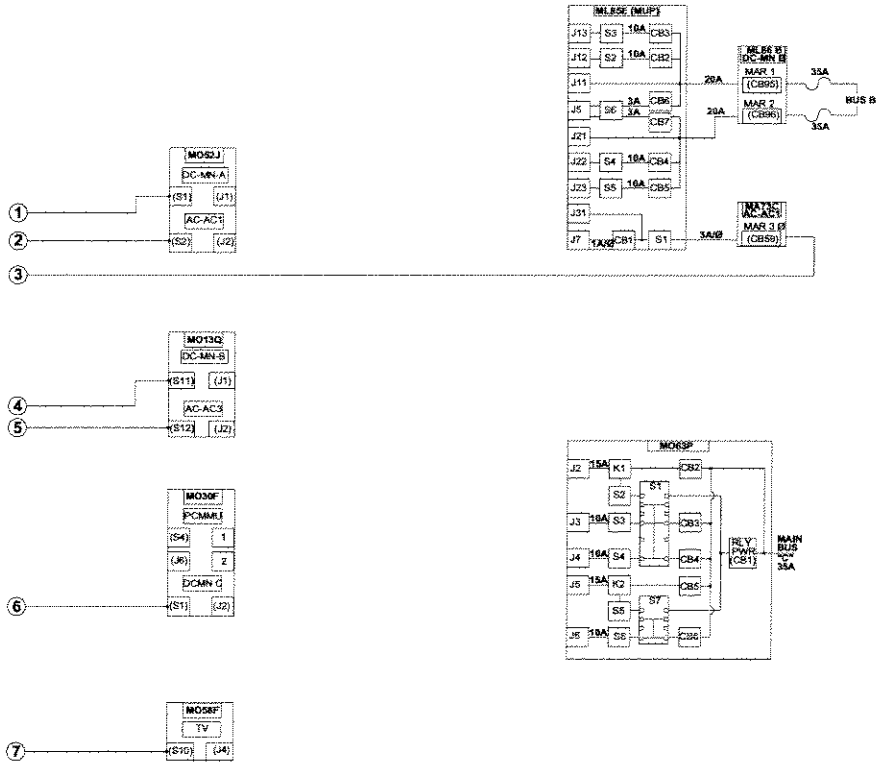


FS 4-2

REF/119/FIN X

PWR: PANEL REFERENCE – MIDDECK

REV B
2/18/09

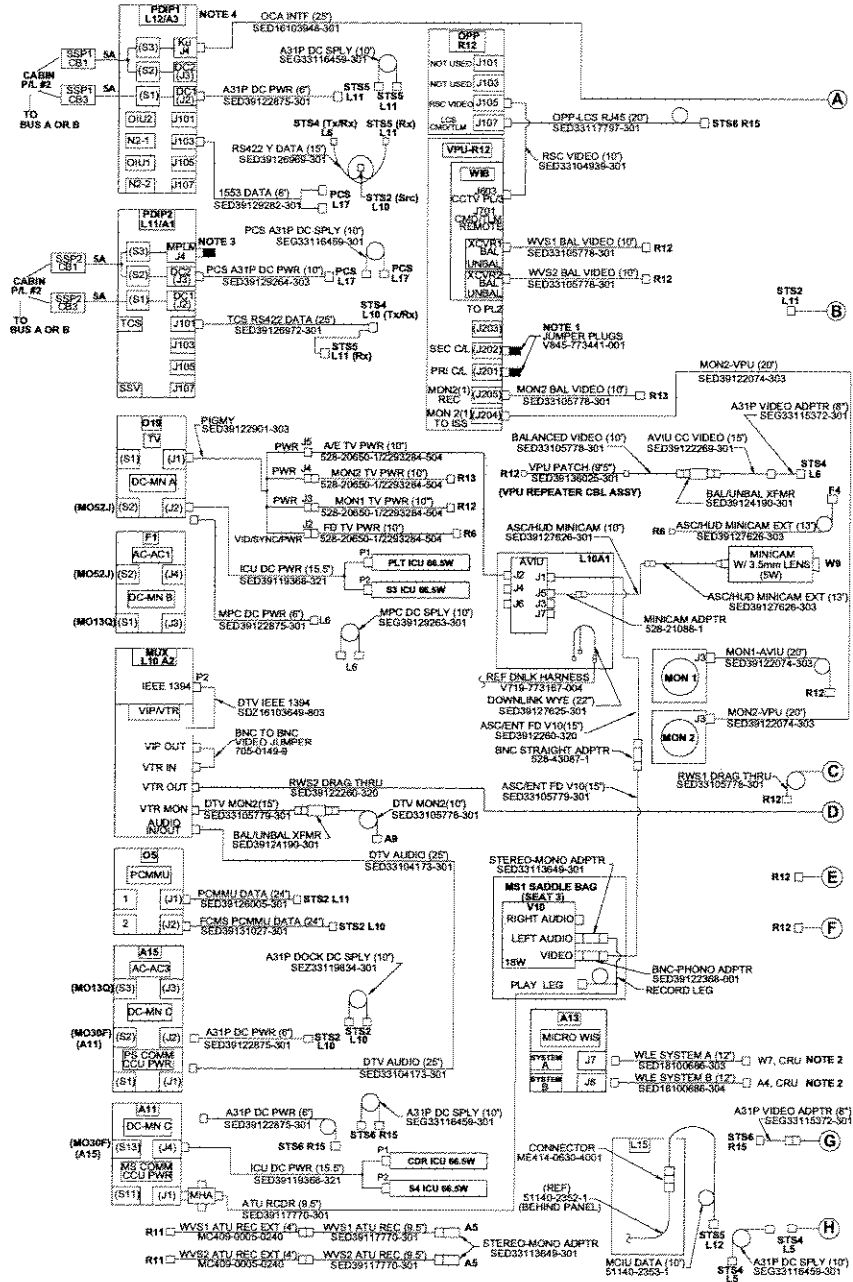


FS 4-3

REF/119/FIN X

PWR/DATA/VIDEO: PRE-ROUTED CONFIG - FLT DECK I

REV B
2/18/09

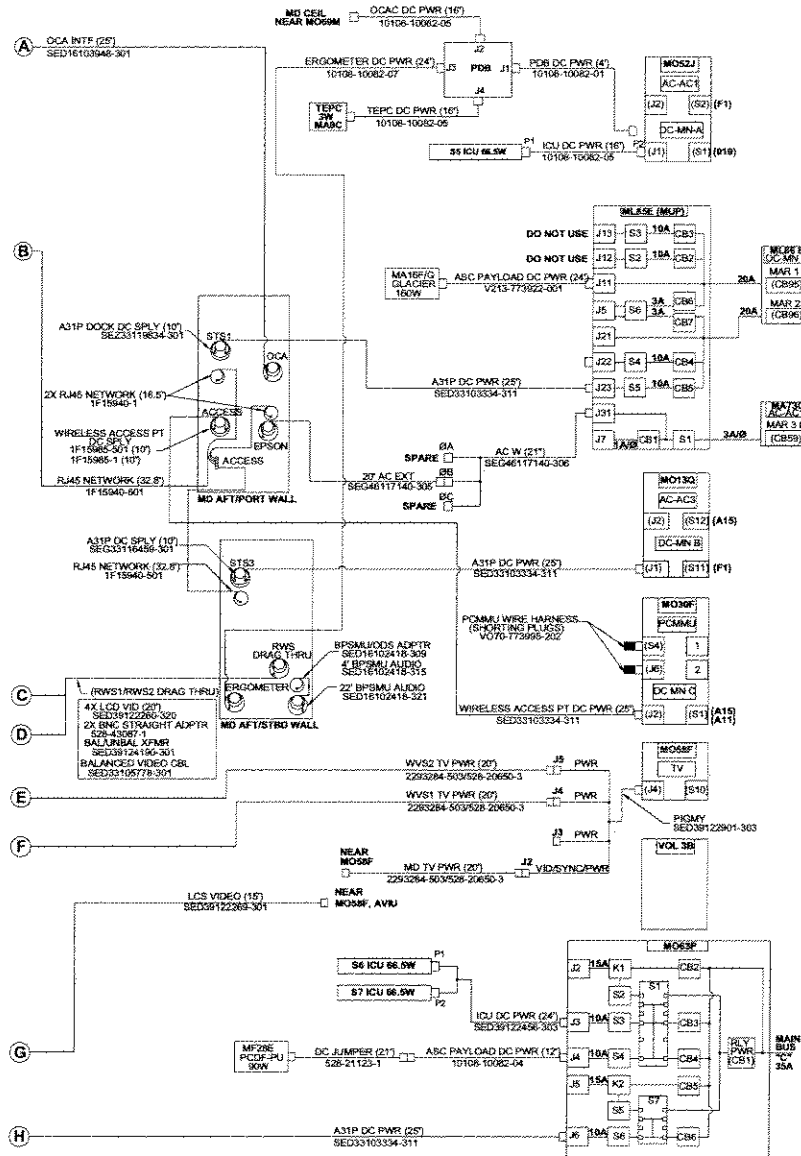


FS 4-4

REF/119/FIN X

PWR/DATA/VIDEO: PRE-ROUTED CONFIG – MIDDECK I

REV B
2/18/09



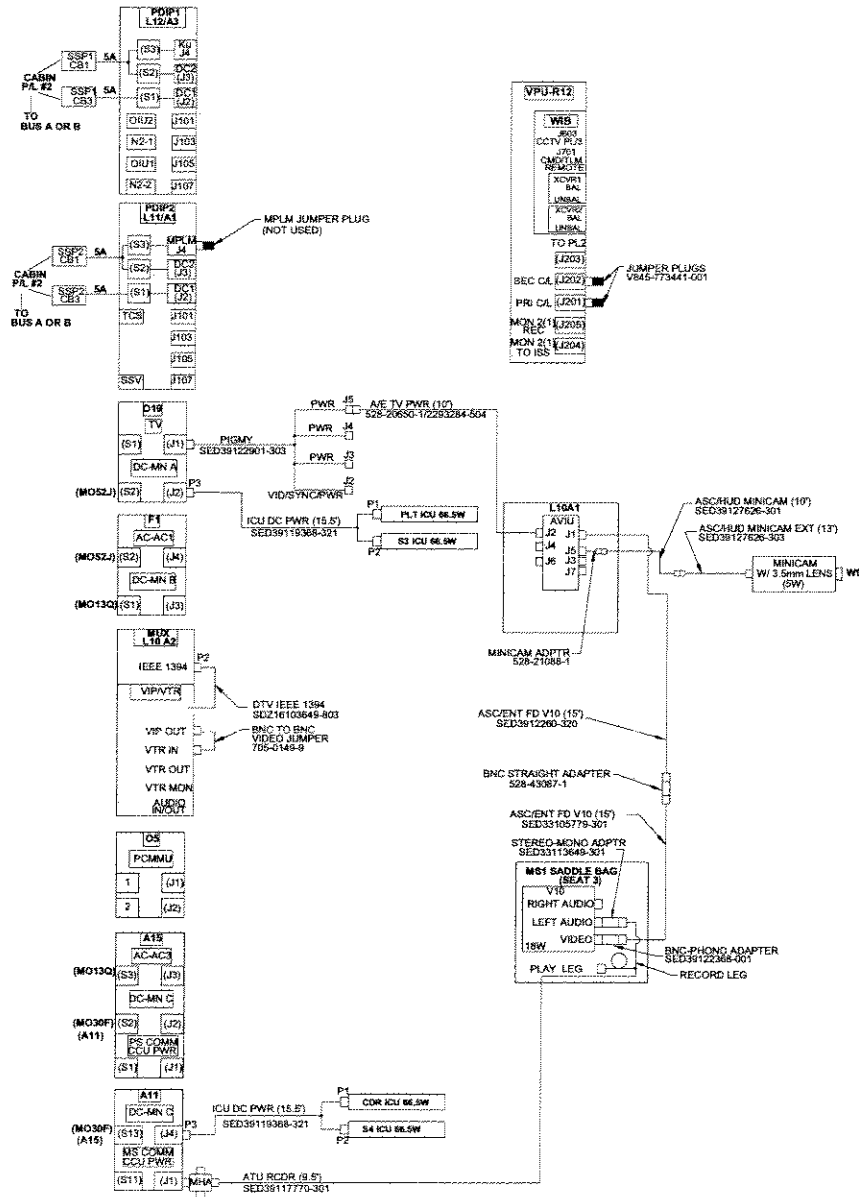
- NOTE:**
1. GREEN JUMPER INSERTED AT VPU LDRU/ITVC CONNECTOR
 2. NO PHYSICAL CONNECTION BETWEEN WLES CABLES AND CABIN RELAY UNIT (CRU)
 3. MPLM JUMPER FLUG (NOT USED).
 4. OCA LEGS P3 AND P4 WILL BE PRE-ROUTED CLOSE TO L10A2 (DTV/MUX)

FS 4-5

REF/119/FIN X

PWR/DATA/VIDEO: ASCENT CONFIG – FLT DECK

REV B
2/18/09

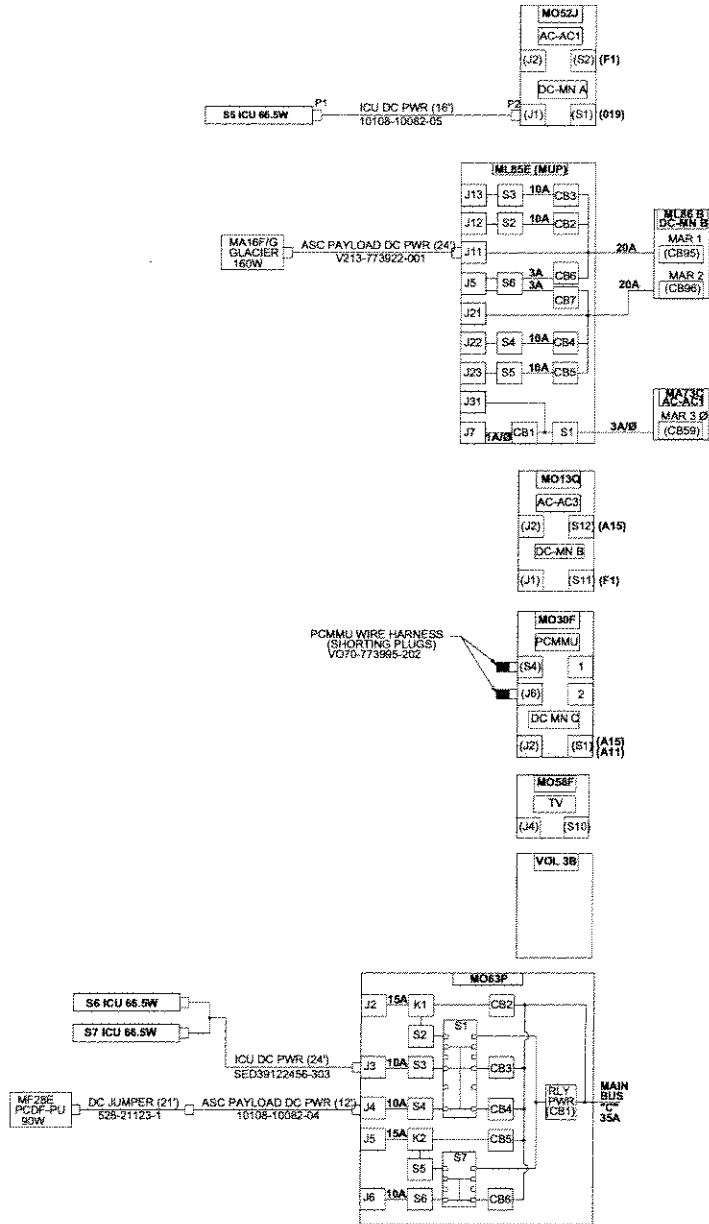


FS 4-6

REF/119/FIN X

PWR/DATA/VIDEO: ASCENT CONFIG – MIDDECK

REV B
2/18/09

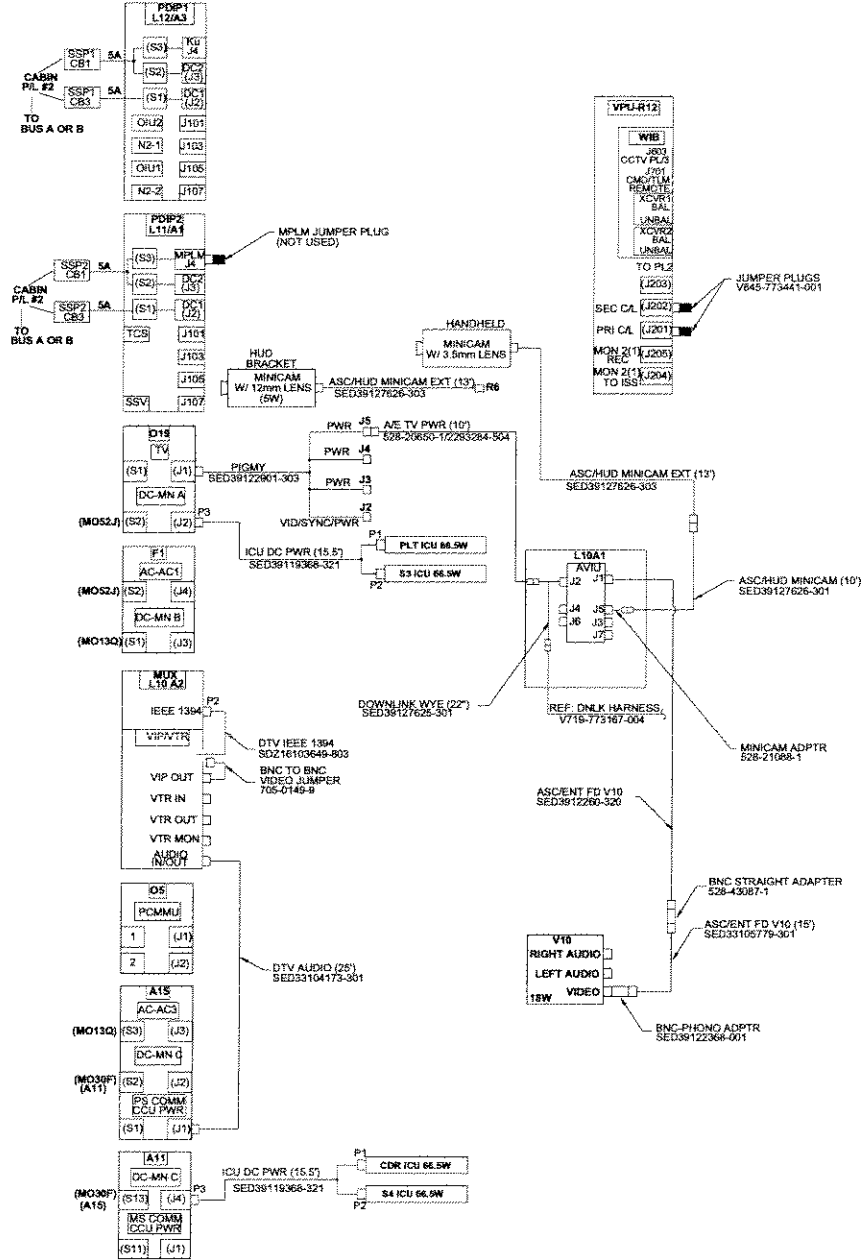


FS 4-7

REF/119/FIN X

PWR/DATA/VIDEO: ENTRY CONFIG – FLT DECK

REV B
2/18/09

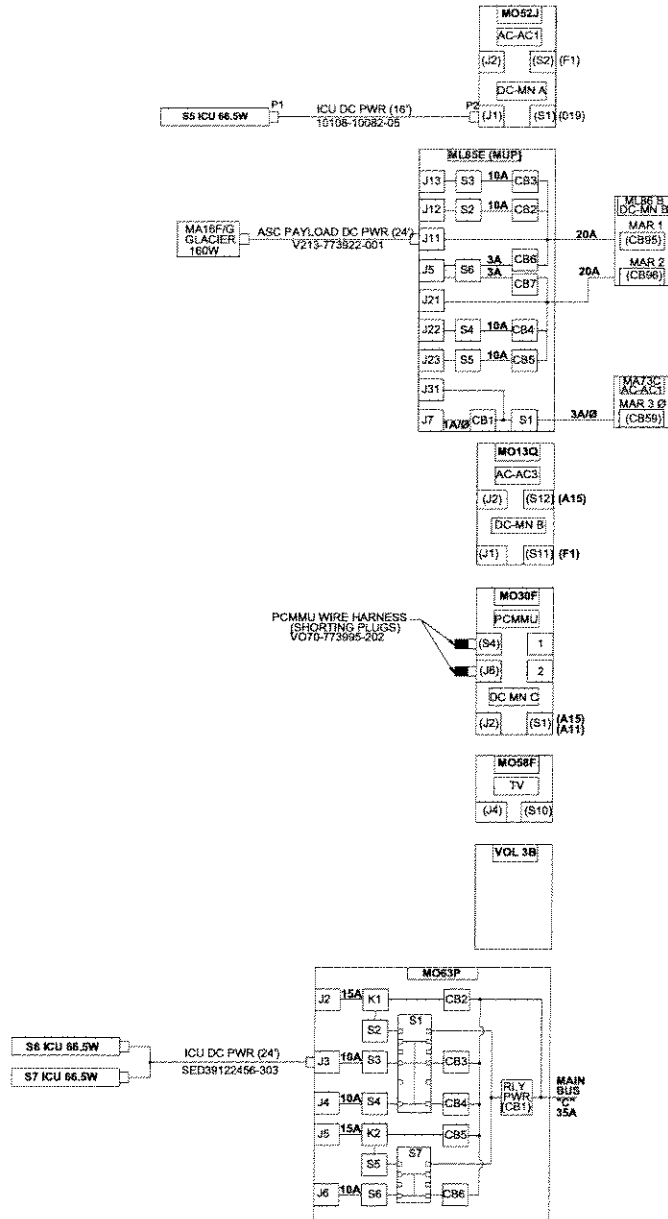


FS 4-8

REF/119/FIN X

PWR/DATA/VIDEO: ENTRY CONFIG – MIDDECK

REV B
2/18/09

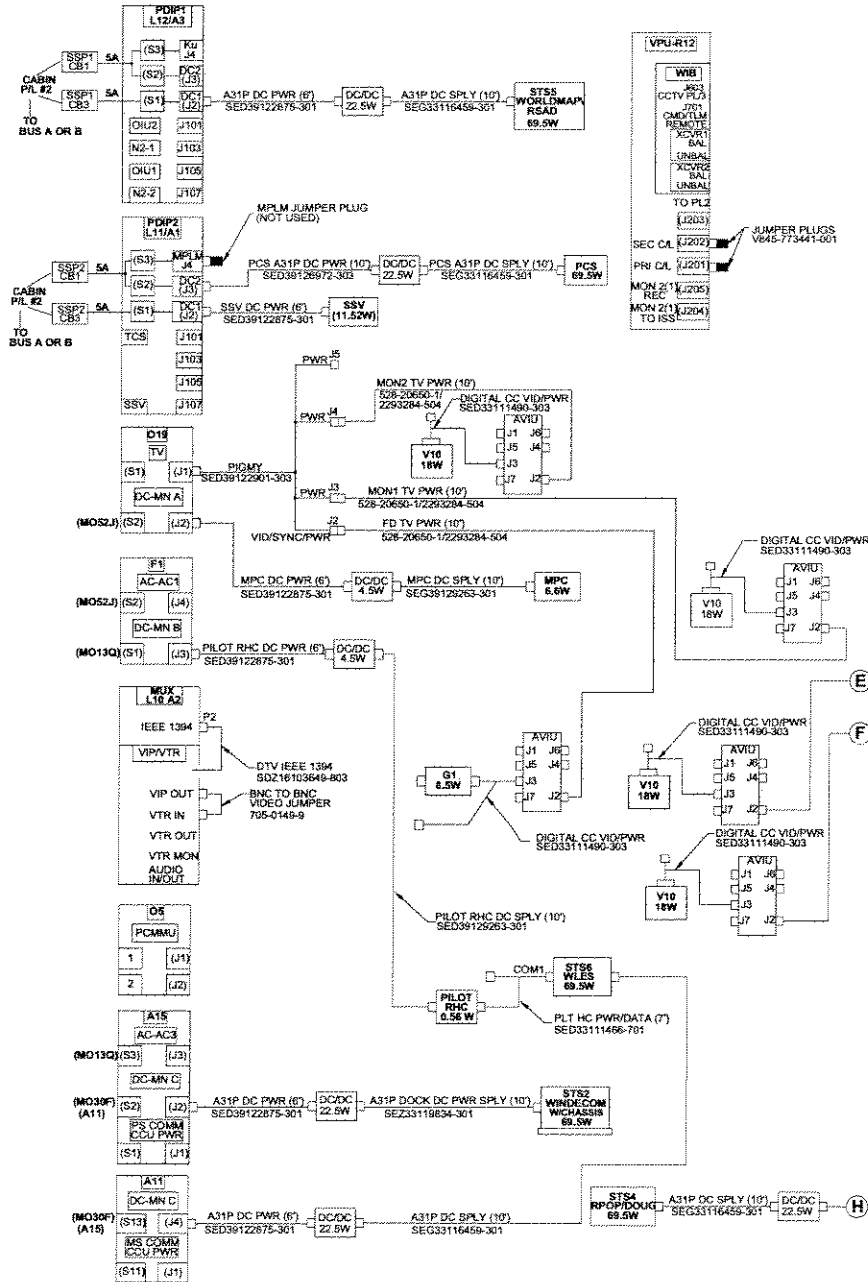


FS 4-9

REF/119/FIN X

PWR: ON-ORBIT CONFIG – FLT DECK

REV B
02/18/09

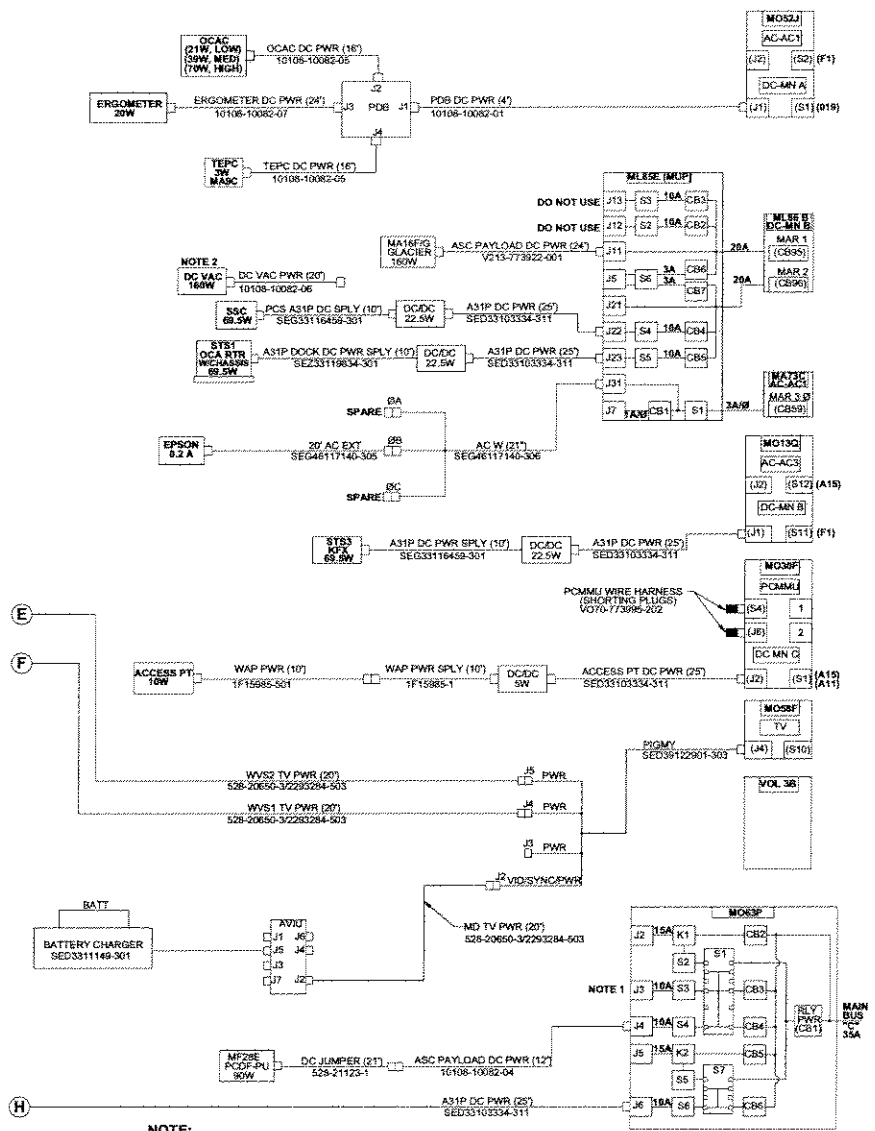


FS 4-10

REF/119/FIN X

PWR: ON-ORBIT CONFIG – MIDDECK

REV B
02/18/09



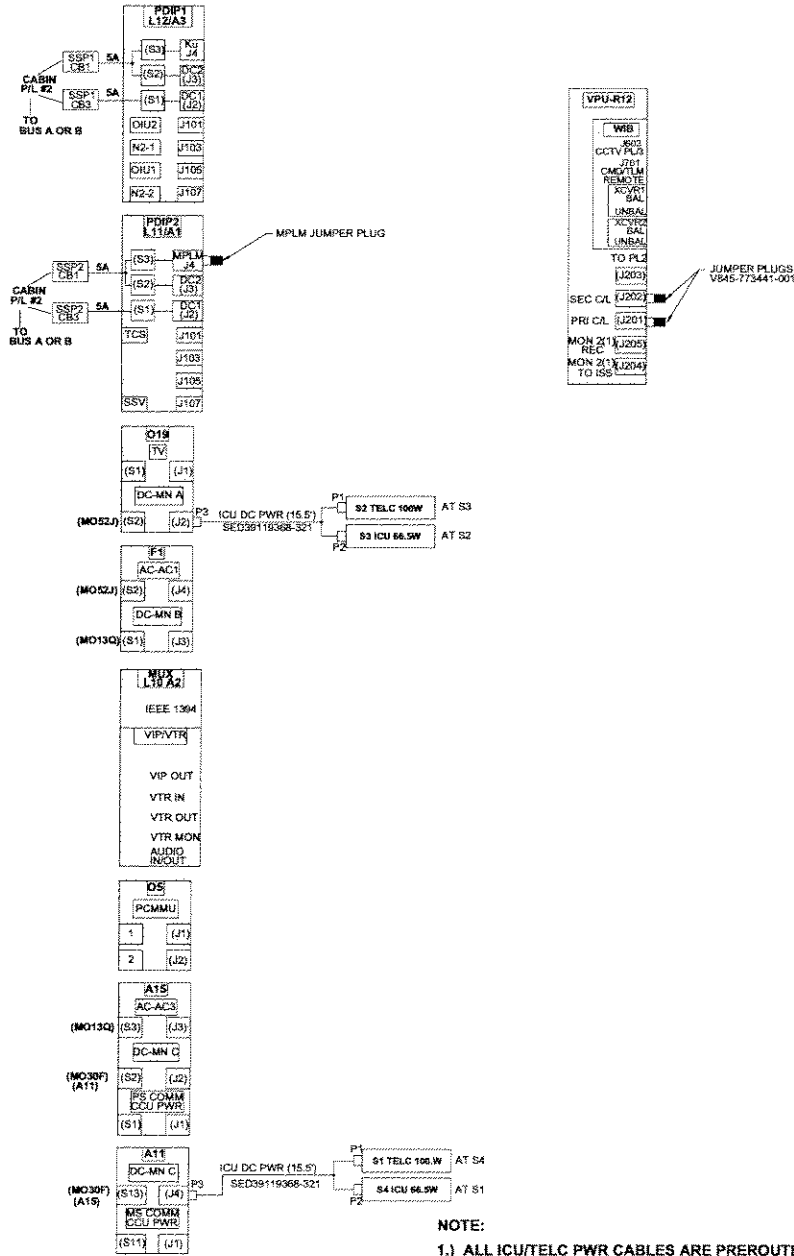
- NOTE:**
1. S6 AND S7 COOLING UNITS REMAIN CONNECTED ON-ORBIT AT MO63P DC (J3)
 2. DC VACUUM TO TIMESHARE POWER AT MUP (J22) DC WITH THE SSC COMPUTER TRANSFERRED FROM ISS TO MIDDECK.

FS 4-11

REF/119/FIN X

PWR: CREW RESCUE COOLING CONFIG – FLT DECK

REV B
2/18/09

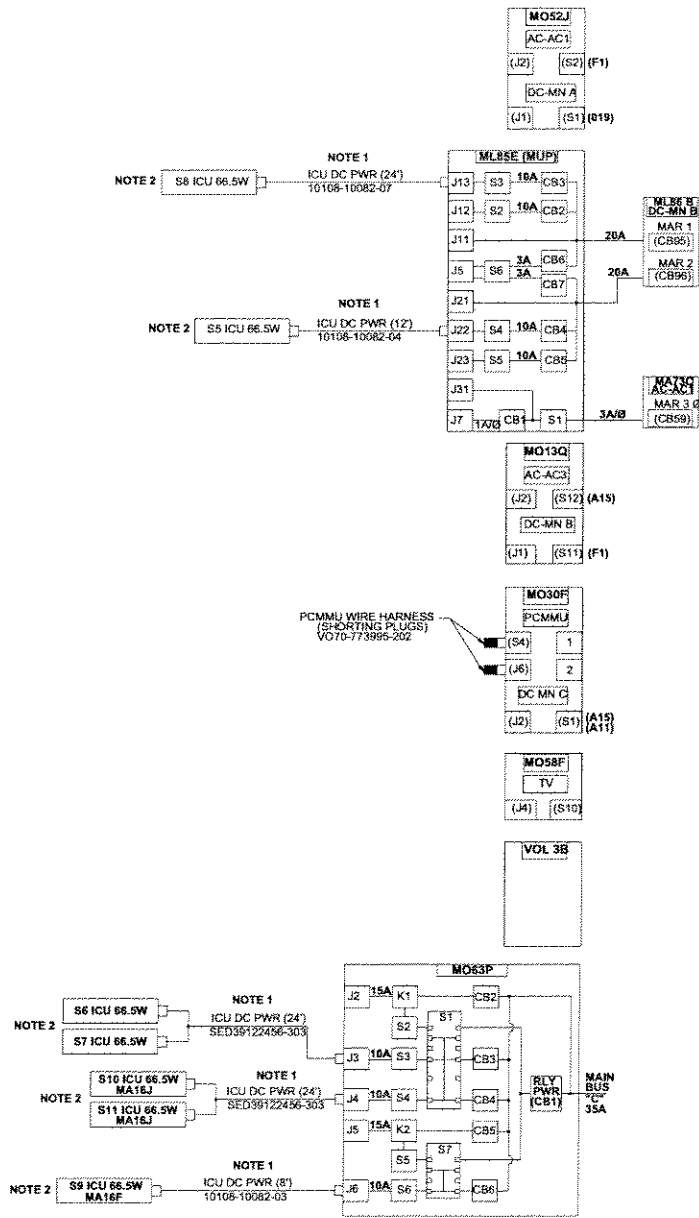


FS 4-12

REF/119/FIN X

PWR: CREW RESCUE COOLING CONFIG – MIDDECK

REV B
2/18/09



FS 4-13

REF/119/FIN X

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FS 4-14

REF/119/FIN

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MAJOR MODE CHANGE

ET UMBILICAL DOOR CLOSURE

CRT 1. GNC, OPS 105 PRO

* If Feedline fail, √MCC before closure *

WARNING

ET CTRLINE LATCHES must be stowed prior to L,R DR closure to prevent door drive damage

* If ET Doors will not manually close and latch, *
* prior to OPS 3 transition: *

2: GNC 51 OVERRIDE

* ET UMB DR CLOSE - ITEM 40(30) *
* EXEC *

NOTE

Double times for single motor operation

R2

ET UMB DR

MODE

- GPC/MAN

CTRLINE LAT

- STO

√After 6 sec, CTRLINE LAT tb - STO

* If CTRLINE LAT does not stow within 12 sec: *

* CTRLINE LAT - GND *

* √MCC *

CTRLINE LAT

- GND

L,R DR (two)

- CL (tb-bp)

√After 24 sec, L,R DR tb (two) - CL

* If doors do not close within 48 sec: *

* L,R DR (two) - OFF *

* √MCC *

L,R LAT (two)

- LAT (tb-bp)

√After 6 sec, L,R LAT tb (two) - LAT

* If doors do not latch within 12 sec: *

* L,R DR (two) - OFF *

* LAT (two) - OFF *

* √MCC *

L,R DR (two) - OFF

LAT (two) - OFF

MODE - GPC

CDR

DEORBIT FDF CONFIG

- C4F 1. Unstow ENT PKT
Stow ASC PKT
- R3A 2. Stow ASC Cue Cards
C1 Use DEORBIT BURN MONITOR (LOSS OF 2 FREON LOOPS AOA) (DEORBIT BURN), 2-6

CDR DEORBIT CONFIG

- 1. Select AOA_L_TGT (3-12) to set AOA flag, but DO NOT LOAD until OPS 3
- NOTE
Manually entered tgt data will be carried over to OPS 3 except: PASS, BFS ITEMS 5,18 (ILL ENTRY)
- 2. √MS: MS OVHD, AFT, & MIDDECK PNL PWRDN complete
 - 3. √FCS CH (four) – AUTO
 - 4. √RGA 2,3 – ON

MS/O15:F, 5. √ASA 2,3 – ON

O16:A
MS/O16:F
CRT 6. GNC, OPS 301 PRO
√DAP: AUTO [A/E PFD]

MS/O15:F 7. MMU 2 – OFF

8. ASA 2 – OFF
MS/O16:F 9. 3 – OFF

GNC 50 HORIZ SIT
AOA RWY OPTIONS

ALL INCLINATIONS				
SITE	RWY	TACANS	ITEM 5	MLS
1	KSC 15	TTS 59Y	COF 97	8
42	NOR 17	SNG 121Y	HMN 92	6
	NOR 33			6

- If other runways reqd, use AOA RWY OPTIONS (ASC, AOA)
- 10. √RWY selection
 - 11. CAB FAN A – ON
 - 12. IMU FAN (three) – OFF

PLT

DEORBIT FDF CONFIG

Post MM105:
Fill-in AOA DEORBIT BURN CARDS from
AOA DEL PAD (ASC)

- R3F 1. Unstow ENT PKT
Stow ASC PKT
- R3A 2. Stow ASC Cue Cards
C1 Use DEORBIT BURN MONITOR (LOSS OF 2 FREON LOOPS AOA) (DEORBIT BURN), 2-6

VACUUM INERTING TERMINATE

NOTE
TERM no sooner than 2 min after ACT

- R2 1. MPS PNEU He ISOL – OP
- R4 2. FILL/DRAIN LO2, LH2 OUTBD (two) – CL
Wait 15 sec
- R2 3. MPS FILL/DRAIN LO2, LH2 OUTBD (two) – GND
4. PNEU He ISOL – CL

* **RCS COMPLETION:** *

* If DIRECT INSERTION: *

* THC +X to $\Delta VTOT = 0$ or TOT AFT QTY 1 % *

* At AFT QTY 1 THC +X to FLIP ΔV or
 * if CUR $\Delta VTOT$: TOT AFT QTY 2 % then
 * FRCS COMPLETION *

* FLIP -----
 * ΔV FRCS COMPLETION *

* AFT -----
 * ΔV THC +X to TGT ΔV *

* TGT -----
 * ΔV *

* If w/OMS 1: *

* THC +X to TGT HP or TOT AFT QTY 1 % *

* At AFT QTY 1 THC +X to FLIP HP or
 * if CUR HP: TOT AFT QTY 2 % then
 * FRCS COMPLETION *

* FLIP -----
 * HP FRCS COMPLETION *

* AFT -----
 * HP THC +X to TGT HP *

* TGT -----
 * HP *

* **FRCS COMPLETION:** *

- * Perform FRCS REACTIVATION, 3-3, steps 1 thru 4
- * Mnv'r to -X Att (pitch up at 3°/sec to VGOz = +1/4 $\Delta VTOT$)
- * THC -X to $\Delta VTOT = 0$ or FRCS depletion (JET FAIL OFF)

CUTOFF

- + :02 OMS ENG(s) – OFF (If < 3 IMU, at :)
- * AFT RCS RECONFIG if INTERCONNECT *
- Trim X,Z residuals < 2 fps (< 0.5 fps if shallow)

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POST BURN ACTIONS

- 1. √CDR AND PLT TIME CRITICAL PROCEDURES complete
 - 2. Use one IDP with two MDUs max
 - 3. L FLT CNTLR PWR – OFF
 - 4. IMU 2 – ON
 - 5. cb MNA DDU L – op
 - 6. MNB DDU L – op
 - 7. MDM FA4 – OFF
 - 8. DAP: AUTO A/E PFD
- F6
 CM O15:A
 MS O14:E
 O15:E
 CM O6
 C3

NOTE

Prebank is applicable ONLY if OMS 1 reqd

- 9. Determine PREBANK
 Determine ΔHP (CUR HP – TGT HP)
 Use RECOVERY PREBANK TABLES

* **RECOVERY PREBANK TABLES (KSC)** *

* NOTE: APPLICABLE ONLY IF OMS 1 REQD *

* (ATO/AOA steep entries) KSC *

ΔHP	0	3	6	9	12	15	19	23	27
PREBANK	0	45	75	90	100	105	115	135	180

* (ATO/AOA shallow entries) KSC *

ΔHP	0	1	2	3	4	5	6	7	9
PREBANK	90	105	110	115	125	135	145	155	175

119 ocfr1

Record PREBANK on LOSS OF 2 FREON LOOPS ENTRY
 MANEUVERS (ENT MNVR/BAILOUT), 4-1

- R2 10. BLR PWR 2,3 (two) – ON
 CNTLR/HTR 2,3 (two) – A

OMS/RCS POST BURN RECONFIG

- O7 1. √AFT L,R RCS He PRESS (four) – OP (tb-OP)
 √TK ISOL (six) – GPC (tb-OP)
 √XFEED (four) – GPC (tb-CL)
- O8 2. L,R OMS He PRESS/VAP ISOL (four) – CL
 TK ISOL (four) – OP (tb-OP)
 XFEED (four) – CL (tb-CL)

POST BURN ACTIONS

DPS POST BURN CONFIG

- O6 1. GPC PWR 3 – ON
 MODE 3 – STBY (tb-RUN)
 – RUN
- O15:F 2. ASA 2 – ON
 O16:F 3 – ON

EXPAND RS AND ASSIGN ALL STRINGS TO GPC 3

3. GNC, OPS 301 PRO

GNC 0 GPC MEMORY
 CONFIG – ITEM 1 +3 EXEC

Modify MC3 per table →

GNC, OPS 301 PRO

GNC 50 HORIZ SIT

4. √RWY selection

Reselect AOA RWY

5. GNC, OPS 302,303 PRO

6. For any forward IDP that is OFF:

GPC/CRT3/X EXEC

GNC 0 GPC MEMORY

7. DOWNLIST GPC – ITEM 44 +3 EXEC

- O6 8. GPC MODE 1 – STBY (tb-bp)
 – HALT
 PWR 1 – OFF

- O15:F 9. ASA 2 – OFF
 O16:F 3 – OFF

CONFIG	3	
GPC	10300	
STR	1	3
	2	3
	3	3
	4	3
PL	1/2	3
CRT	1	3
	2	3
	3	3
	4	0
L	1	0
	2	0
MM	1	3
	2	3

NOTE

Keep one AV Bay fan active in each bay with a GPC in RUN

- L1 10. AV BAY 1 FAN B – OFF
 3 FAN B – ON

IMU POST BURN CONFIG

GNC 21 IMU ALIGN

1. √IMU 2 DES – ITEM 8 (*)

 √OPER – ITEM 5 (*)

2. GNC I/O RESET

3. Align IMU 2 using IMU 3 as reference

REF IMU – ITEM 14 +3 EXEC

√TYPE, ITEM 15 – TORQUE

ALIGN IMU 2 – ITEM 11 EXEC (*)

EXEC – ITEM 16 (*)

When align complete (3 to 6 min):

4. Reselect IMU 2

 IMU 2 DES – ITEM 8 EXEC (no *)

- O16:A 5. 3 – OFF

CDR

FES ACTIVATION/PL MDM CONFIG

- L1 1. √FLASH EVAP CNTLR PRI A – ON
- O6 2. MDM PL 1,2 (two) – OFF

MAJOR MODE CHANGE

- CRT 1. GNC, OPS 105 PRO

PLT

ET UMBILICAL DOOR CLOSURE

* If Feedline fail, √MCC before closure *

WARNING

ET CTRLINE LATCHES must be stowed prior to L,R DR closure to prevent door drive damage

- * If ET Doors will not manually close and latch, prior to OPS 3 transition: *
- * [2: GNC 51 OVERRIDE] *
- * ET UMB DR CLOSE – ITEM 40(30) *
- * EXEC *

NOTE

Double times for single motor operation

R2

ET UMB DR

MODE

CTRLINE LAT

– GPC/MAN

– STO

√After 6 sec, CTRLINE LAT tb – STO

* If CTRLINE LAT does not stow within 12 sec: *

* CTRLINE LAT – GND *

* √MCC *

CTRLINE LAT

– GND

– CL (tb-bp)

√After 24 sec, L,R DR tb (two) – CL

* If doors do not close within 48 sec: *

* L,R DR (two) – OFF *

* √MCC *

L,R LAT (two)

– LAT (tb-bp)

√After 6 sec, L,R LAT tb (two) – LAT

* If doors do not latch within 12 sec: *

* L,R DR (two) – OFF *

* LAT (two) – OFF *

* √MCC *

L,R DR (two) – OFF

LAT (two) – OFF

MODE – GPC

CDR

PLT

DEORBIT FDF CONFIG

C4F 1. Unstow ENT PKT
Stow ASC PKT

R3A 2. Stow ASC Cue Cards
C1 Use DEORBIT BURN MONITOR (LOSS OF 2 H2O LOOPS AOA) (DEORBIT BURN), 8-6

CDR DEORBIT CONFIG

1. Select AOA_L_TGT (3-12) to set AOA flag, but DO NOT LOAD until OPS 3

NOTE
Manually entered tgt data will be carried over to OPS 3 except: PASS, BFS ITEMS 5,18 (ILL ENTRY)

2. √MS: MS OVHD & AFT PNL PWRDN
3. GNC, OPS 301 PRO (√DAP)
4. √GPC PWR 5 – ON
MODE 5 – STBY (tb-RUN) – RUN

5. OUTPUT 5 – B/U
BFS: GNC, OPS 301 PRO
GNC 51 OVERRIDE

6. VENT DOOR CNTL CLOSE – ITEM 44 EXEC (*)
Wait 1 min, then:
GNC, OPS 302 PRO
GNC 50 HORIZ SIT
AOA RWY OPTIONS

ALL INCLINATIONS				
SITE	RWY	TACANS	ITEM 5	MLS
1	KSC 15	TTS 59Y	COF 97	8
	KSC 33			6
42	NOR 17	SNG 121Y	HMN 92	6
	NOR 23			6

If other runways reqd, use AOA RWY OPTIONS (ASC, AOA)

7. √RWY selection
8. CAB FAN A – ON
AV BAY 2 FAN A – ON

DEORBIT FDF CONFIG

Post MM105:
Fill in AOA DEORBIT BURN CARDS from AOA DEL PAD (ASC)

R3F 1. Unstow ENT PKT
Stow ASC PKT

R3A 2. Stow ASC Cue Cards
C1 Use DEORBIT BURN MONITOR (LOSS OF 2 H2O LOOPS AOA) (DEORBIT BURN), 8-6

VACUUM INERTING TERMINATE

R4 1. MPS FILL/DRAIN LO2,LH2 OUTBD (two) – CL
Wait 15 sec
MPS FILL/DRAIN LO2,LH2 OUTBD (two) – GND
INBD (two) – GND

R2 2. MPS PNEU He ISOL – GPC

CDR

PLT

DEORBIT BURN PREP

DEORBIT BURN PREP

GNC DEORB MNVR EXEC

- TRIM LOAD - ITEM 6 +0.4, -5.7, +5.7 EXEC
 - * If single engine burn:
 - * TRIM LOAD LY - ITEM 7 +5.2 EXEC *
 - * RY - ITEM 8 -5.2 EXEC *
 - * OMS L - ITEM 2 EXEC *
 - * R - ITEM 3 EXEC *

2. Check or enter Target from OMS TGTS and AOA PADS (ASC, OMS TGTS and AOA PADS)

3. LOAD - ITEM 22 EXEC
 TIMER - ITEM 23 EXEC
 √BFS TGT

4. OMS BURN TIG ADJUST (if reqd)
 Determine ΔTIG (REI - REF > 50) from (ASC, OMS TGTS):

Enter new TIG
 LOAD - ITEM 22 EXEC
 TIMER - ITEM 23 EXEC
 Repeat until ΔRANGE < 50
 √BFS TGT

TIG-5 min

O14:E 5. cb MNA DDU L - cl
 O15:E MNB DDU L - cl

At TIG-3

Use only two IDPs with three MDUs, L FLT CNTLR
 PWR for burn as reqd

BFS, GNC SYS SUMM 2
OI PCMMU PWR - 2

C3

OMS GMBL CHECK

- Perform L,R SEC GMBL CK, then:
 L PRI GMBL CK

- * If R SEC TVC problem, repower *
- * MDM FF4 (I/O RESET) and select *
- * R PRI TVC *

CRT

MNVR TO DEORBIT BURN ATTITUDE

GNC DEORB MNVR EXEC

- MNVR - ITEM 27 EXEC (*)
- √ADI ATT - INRTL
- √ERR - MED
- √RATE - MED

F8

NOTE

If time to attitude (TTG) double overbright,
 manual mnvr may be reqd

At TIG-3

Use only two IDPs with three MDUs, L FLT CNTLR
 PWR for burn as reqd

GO TO DEORBIT BURN

8-5

DEORBIT BURN

**DEORBIT BURN MONITOR
(LOSS OF 2 H2O LOOPS AOA)**

OMS TEMP* FU IN P	L R	
		≥ 225 220
		OMS ENG FAIL
		≤ 205 204
		OMS PRPLT FAIL
		or No FU IN P
OMS PC* & OMS ↓ (BFS: √accel)		
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:
		He PRESS/VAP ISOL (two) – CL
		At PC < 72 or OMS TEMP:
		OMS PRPLT FAIL
		OX & FU HIGH
		He PRESS/VAP ISOL (two) – CL
		Cycle He A(B) to maintain TK P 234-284
OMS GMBL	PRI fail	L OMS GMBL – SEC
	SEC fail	If high RCS usage: OMS ENG FAIL
GPC 1		BFS Engage
I/O ERROR FA	1	L OMS GMBL – SEC
		◆ I/O RESET (if recov: BFS I/O RESET)
		If high RCS usage: OMS ENG FAIL
	2 FAs lost	√MAN SHUTDN
BCE STRG D		I/O RESET (if recov >>)
	1	If high RCS usage:
		L OMS GMBL – SEC
	3	If high RCS usage:
		R OMS ENG FAIL
RM DLMA IMU		After C/O: √timer
		G21
		If any IMU ACC > 0.03: aff IMU – desel
		I'cncnt OMS to RCS (√RCS Burn Time)
		THC + X (3.5 X timer at C/O)
I/O ERROR PCM		OI PCMMU PWR – 1
*If XFD, BLDN, or sensor fail, monitor ENG IN P for off-nominal performance		

**DEORBIT
BURN**

* **RCS COMPLETION:** *

* If DIRECT INSERTION: *

* THC +X to $\Delta VTOT = 0$ or TOT AFT QTY 1 % *

* At AFT QTY 1 THC +X to FLIP ΔV or
* if CUR $\Delta VTOT$: TOT AFT QTY 2 % then
* FRCS COMPLETION *

* FLIP -----
* ΔV FRCS COMPLETION *

* AFT -----
* ΔV THC +X to TGT ΔV *

* TGT -----
* ΔV *

* If w/OMS 1: *

* THC +X to TGT HP or TOT AFT QTY 1 % *

* At AFT QTY 1 THC +X to FLIP HP or
* if CUR HP: TOT AFT QTY 2 % then
* FRCS COMPLETION *

* FLIP -----
* HP FRCS COMPLETION *

* AFT -----
* HP THC +X to TGT HP *

* TGT -----
* HP *

* **FRCS COMPLETION:** *

* Perform FRCS REACTIVATION, 9-3, steps 1 thru 7 *

* Mnv'r to -X Att (pitch up at 3°/sec to VGOz = +1/4 $\Delta VTOT$) *

* THC -X to $\Delta VTOT = 0$ or FRCS depletion (JET FAIL OFF) *

CUTOFF

+ :02 OMS ENG(s) – OFF (If < 3 IMU, at :)

* AFT RCS RECONFIG if INTERCONNECT *

Trim X,Z residuals < 2 fps (< 0.5 fps if shallow)

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POST BURN ACTIONS

- 1. √CDR AND PLT TIME CRITICAL PROCEDURES complete
 - 2. Use only one IDP with one MDU, max
 - 3. L FLT CNTLR PWR – OFF
 - 4. IMU 1 – ON (already ON if IMMEDIATE AOA DEORBIT BURN STEPS performed)
 - 5. cb MNA DDU L – op
 - 6. MNB DDU L – op
 - 7. OI PCMMU PWR – OFF
 - 8. √DAP: AUTO A/E PFD
- F7
 CM O14:A
 MS O14:E
 O15:E
 C3

NOTE

Prebank is applicable ONLY if OMS 1 reqd

- 9. Determine PREBANK
 Determine ΔHP (CUR HP – TGT HP)
 Use RECOVERY PREBANK TABLES

RECOVERY PREBANK TABLES (KSC)

* NOTE: APPLICABLE ONLY IF OMS 1 REQD *

* (ATO/AOA steep entries) KSC *

ΔHP	0	3	6	9	12	15	19	23	27
PREBANK	0	45	75	90	100	105	115	135	180

* (ATO/AOA shallow entries) KSC *

ΔHP	0	1	2	3	4	5	6	7	9
PREBANK	90	105	110	115	125	135	145	155	175

19 oct 1

Record PREBANK on LOSS OF 2 H2O LOOPS ENTRY
 MANEUVERS (ENT MNVR/BAILOUT), 10-1, then:

OMS/RCS POST BURN RECONFIG

- O7 1. √AFT L,R RCS He PRESS (four) – OP (tb-OP)
 √TK ISOL (six) – GPC (tb-OP)
 √XFEED (four) – GPC (tb-CL)
- O8 2. L,R OMS He PRESS/VAP ISOL (four) – CL
 TK ISOL (four) – OP (tb-OP)
 XFEED (four) – CL (tb-CL)

POST BURN ACTIONS

C **DPS POST BURN CONFIG**

GNC, OPS 303 PRO

IMU POST BURN CONFIG

If IMMEDIATE AOA DEORBIT BURN STEPS, 7-1, performed:

O16:A

1. **BFS, GNC 51 OVERRIDE**
IMU 3 DES – ITEM 27 EXEC (*)
– OFF

If IMMEDIATE AOA DEORBIT BURN STEPS, 7-1, NOT performed:

2. **BFS, GNC 51 OVERRIDE**
IMU 1 DES – ITEM 25 EXEC (*)
3. **GNC 21 IMU ALIGN**
√IMU 1 DES – ITEM 7 EXEC
OPER – ITEM 4 EXEC (*)
Wait for asterisk (*) to appear (~ 90 sec from power on), then
4. GNC I/O RESET
Align IMU 1 and 2 using IMU 3 as reference:
 5. REF IMU – ITEM 14 +3 EXEC
√TYPE, ITEM 15 – TORQUE
ALIGN IMU 1(2) – ITEM 10(11) EXEC (*)
EXEC – ITEM 16
When no asterisk (*) align complete (3 to 6 min):
Reselect IMU 1 (PASS and BFS)
 6. IMU 1 DES – ITEM 7 EXEC (no*)
BFS, GNC 51 OVERRIDE
IMU 1 DES – ITEM 25 EXEC (no*)
3 DES – ITEM 27 EXEC (*)
PWRDN IMU 3
7. IMU 3 – OFF

O16:A

```

* RCS COMPLETION:
* If DIRECT INSERTION:
*   THC +X to  $\Delta VTOT = 0$  or TOT AFT QTY 1  %
*
*   At AFT QTY 1      THC +X to FLIP  $\Delta V$  or
*   if CUR  $\Delta VTOT$ :  TOT AFT QTY 2  % then
*                   FRCS COMPLETION
*
*   FLIP  -----
*    $\Delta V$                                      FRCS COMPLETION
*
*   AFT  -----
*    $\Delta V$                                      THC +X to TGT  $\Delta V$ 
*
*   TGT  -----
*    $\Delta V$ 
*
* If w/OMS 1:
*   THC +X to TGT HP or TOT AFT QTY 1  %
*
*   At AFT QTY 1      THC +X to FLIP HP or
*   if CUR HP:        TOT AFT QTY 2  % then
*                   FRCS COMPLETION
*
*   FLIP  -----
*   HP                                     FRCS COMPLETION
*
*   AFT  -----
*   HP                                     THC +X to TGT HP
*
*   TGT  -----
*   HP
*
* FRCS COMPLETION:
* Perform FRCS REACTIVATION, 3-3, steps 1 thru 4
* Mnv to -X Att (pitch up at 3°/sec to VGOz = +1/4  $\Delta VTOT$ )
* THC -X to  $\Delta VTOT = 0$  or FRCS depletion (JET FAIL OFF)

```

CUTOFF

```

+ :02 OMS ENG(s) – OFF (If < 3 IMU, at :  )
* AFT RCS RECONFIG if INTERCONNECT *
Trim X,Z residuals < 2 fps (< 0.5 fps if shallow)

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* **RCS COMPLETION:** *

* If DIRECT INSERTION: *

* THC +X to $\Delta VTOT = 0$ or TOT AFT QTY 1 % *

* At AFT QTY 1 if CUR $\Delta VTOT$: THC +X to FLIP ΔV or TOT AFT QTY 2 % then FRCS COMPLETION *

* FLIP ΔV ----- FRCS COMPLETION *

* AFT ΔV ----- THC +X to TGT ΔV *

* TGT ΔV ----- *

* If w/OMS 1: *

* THC +X to TGT HP or TOT AFT QTY 1 % *

* At AFT QTY 1 if CUR HP: THC +X to FLIP HP or TOT AFT QTY 2 % then FRCS COMPLETION *

* FLIP HP ----- FRCS COMPLETION *

* AFT HP ----- THC +X to TGT HP *

* TGT HP ----- *

* **FRCS COMPLETION:** *

- * Perform FRCS REACTIVATION, 9-3, steps 1 thru 7 *
- * Mvnr to -X Att (pitch up at 3°/sec to VGOz = +1/4 $\Delta VTOT$) *
- * THC -X to $\Delta VTOT = 0$ or FRCS depletion (JET FAIL OFF) *

CUTOFF

- + :02 OMS ENG(s) – OFF (If < 3 IMU, at :) *
- * AFT RCS RECONFIG if INTERCONNECT *
- Trim X,Z residuals < 2 fps (< 0.5 fps if shallow)

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