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. $G_{51}$ INH INCNCT L R
      If aff OMS FU IN P $\geq$ 225 220
      2. Go to ENG FAIL $\gg$
      If aff OMS FU IN P $\leq$ 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
     o FB 2-15 & FB 2-16
     o FB 2-19 thru FB 2-24
     o 6-1 through 6-4
     o 6-21 through 6-26
     o 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
    o %OMS SIDE was “75” is “74”
    o 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:

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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:

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</table>
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:
     o FS 7-3 & FS 7-4
     o FS 7-89 & FS 7-90
     o FS 7-97 & FS 7-98
     o FS 7-101 through 7-108
     o FS 7-113 through FS 7-116
     o FS 7-119 through FS 7-124
     o FS 7-127 & FS 7-128
     o FS 7-131 through FS 7-136
     o FS 7-143 & FS 7-144
     o 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:
     o On page FS xiii & page FS 7-2, add JEM RMS GROUNDING TABS FS 7-189 to end of section 7 table of contents
     o On FS 7-42, EV1 & EV2 columns, step 14 change "forward" to "aft"
     o On FS 7-43, EV1 & EV2 columns, step 21 change "forward" to "aft"
     o On FS 7-73, EV1 Column, step 7, line thru "and gauntlets"
     o On FS 7-73, EV3 Column, step 22, line thru "and gauntlets"
     o On FS 7-74, EV1 Column, step 4, line thru "and gauntlets"
     o On FS 7-74, EV3 Column, step 6, line thru "and gauntlets"
     o On FS 7-80, step 44, line thru "and gauntlets"
     o 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
     o On FS 7-158, update Z1 Patch panel inhibit from: Z13B to: Z13B B
     o On FS 16-6, under P6 Battery Prep: Line out (delete) Block B
     o On FS 16-121, EV1 step 1, add: "Note: Consider joint range of motion prior to establishing body position"
     o 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:
     o On page FS 7-14, line out in column 3:
       Medium ORU Bag
       Fish Stringer
       JLP GPS Ant
     o On page FS 7-14 in column 2, 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:
     o On page FS 7-31, EV2 column, at the end of step 13 add:
       ☑ √Blk-Blk, pull/twist
     o 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
     o 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:
     o FS 7-13 & FS 7-14
     o FS 7-61 through FS 7-64
     o FS 7-89 through FS 7-92
     o FS 7-97 through FS 7-100
     o FS 7-109 & FS 7-110
     o FS 7-115 & FS 7-116
     o FS 7-127 & FS 7-128
     o FS 7-135 & FS 7-136
     o FS 7-149 through FS 7-152
   • Make the following changes via Pen & Ink:
     o 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

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:
     o 2-3 & 2-4
     o 2-9 & 2-10 (see #4 below)
     o 3-1 & 3-2
     o 8-3 to 8-6
     o 8-9 & 8-10 (see #4 below)
     o 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.
     o 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  

APPROVED BY:  

Michael T. Hurt  
Chairman, Crew Procedures Control Board  

REVIEWED BY:  

Michael T. Hurt  
FDF Manager
**As Flown**

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

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

- This status sheet, associated books and errata package are located on a JSC LAN server at: \Jsc-mod-fs3\fdf\Books\Current Published Documents\STS-119 Specific\119_FDF_CD
- 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

R180

LVLH

\( 0.84 \text{ M} \quad \sqrt{P_c} \rightarrow 72\% \)

\( 1.12 \text{ M} \quad \sqrt{P_c} \rightarrow 104\% \)

PC < 50+5 s

\( \sqrt{\text{SRB SEP (Backup AUTO SEP 2:21)}} \)

\( \sqrt{\text{TMECO}} \)

* If NOT STABLE (10 sec):
  * NO COMM – CSS & MAN THROT

MM103+10 s

\( \sqrt{\text{OMS assist}} \)

* Close suit O2, open visor

3:00

\( \sqrt{\text{EVAP OUT \ (T < 60)}} \)

* If Systems ABORT reqd:
  * RTLS at 3:40 or
  * TAL Select prior to [23900]
  * Otherwise Manual MECO 23700

\( V_1 = 13.2 \text{K} \)

\( \sqrt{\text{Roll Heads Up}} \)

* If Man Throttle (3 eng):
  * Man Shutdn at 25700
  * If 1 eng:
    * \( \sqrt{\text{TRAJ \ SERC ON}} \)
    * When MPS PRPLT = 5%:
      * MAN THROT
    * When MPS PRPLT = 2%:
      * MIN THROT (PC \to 67\%)
    * AUTO THROT

MECO

\( \sqrt{V_1 = 25819} \)

MECO+20 s

\( \sqrt{\text{ET SEP}} \)

* 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 \( V_1 < 25760 \):
      * OPS 104 – PRO (\sqrt{\text{BF1 104}})
      * NOTE: Expect – 'Illegal Entry' (PASS)
      * 'Illegal TIG' (BFS)

\( \text{MM104+2 s} \)

* If ET Sep complete and HA > [72]:
  +X xlation for 11 sec

\( \sqrt{\text{TGT}} \)

\( \sqrt{\text{ASC PKT for failures}} \)

* If OMS 1 not reqd:
  * OMS ENG (two) – OFF
  * Go to POST OMS 1

FB 2-5

ASC/119/FIN 1
**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** — V_i ~24.0K @ CO mark

---

**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)

FB 2-15  
ASC/119/FIN X
**POWERED ECAL**

- MAX THROT - ITEM 4 (*)
- ADI (two) - REF
- $\phi \rightarrow 60^\circ$, Yaw $\rightarrow 45^\circ$
- Roll to Heads Up
- **G50** Select SITE and TACAN

When EAS > 4 and incr:
- Yaw to $\Delta$
- Pitch down at $3^\circ$/sec
- MECO, ET SEP

ET SEP + 8s: CSS, pull to $\alpha = 58^\circ$ at $4^\circ$/sec, AUTO

- **MM602** (BFS, OPS 602 PRO)
- Go to ECAL ENTRY

### 2 E/O ECAL (51.6°)

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<td>SBY 49</td>
</tr>
<tr>
<td></td>
<td>10.5-12.3</td>
<td>10.1-12.7</td>
<td>Atlantic City</td>
<td>11</td>
<td>ACY 31</td>
<td>CYN 81</td>
</tr>
<tr>
<td><strong>10.5-10.9</strong></td>
<td>10.7-13.4</td>
<td>10.5-13.7</td>
<td>Otis ANGB</td>
<td>16</td>
<td>FMH 32</td>
<td>BOS 74</td>
</tr>
<tr>
<td><strong>10.9-13.3</strong></td>
<td>11.5-13.2</td>
<td>11.1-13.9</td>
<td>Pease Int’l</td>
<td>17</td>
<td>PSM 34</td>
<td>ENE 118</td>
</tr>
</tbody>
</table>

*Probable bailout region

(D) - DME only

### 3 E/O ECAL (51.6°)

<table>
<thead>
<tr>
<th>MM 602 Velocity (Vrel)</th>
<th>IP - 2:30</th>
<th>IP + 2:30</th>
<th>Location</th>
<th>Site</th>
<th>Rwy</th>
<th>TACANs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>5.3-6.6</strong></td>
<td>5.3-6.7</td>
<td>5.3-6.7</td>
<td>Wilmington</td>
<td>6</td>
<td>ILM 06</td>
<td>ILM 117</td>
</tr>
<tr>
<td><strong>6.6-8.9</strong></td>
<td>6.6-8.7</td>
<td>6.7-7.3</td>
<td>Cherry Point</td>
<td>7</td>
<td>NKT 32L</td>
<td>EWN 83 (D)</td>
</tr>
<tr>
<td><strong>8.9-10.2</strong></td>
<td>8.7-10.5</td>
<td>8.6-9.7</td>
<td>Oceana NAS</td>
<td>8</td>
<td>NTU 32R</td>
<td>NGU 48</td>
</tr>
<tr>
<td><strong>10.2-10.9</strong></td>
<td>10.0-10.7</td>
<td>9.7-10.6</td>
<td>Wallops</td>
<td>9</td>
<td>WAL 28</td>
<td>SBY 49</td>
</tr>
<tr>
<td><strong>10.9-11.9</strong></td>
<td>11.0-11.6</td>
<td>11.2-11.5</td>
<td>Atlantic City</td>
<td>11</td>
<td>ACY 31</td>
<td>CYN 81</td>
</tr>
<tr>
<td><strong>11.9-13.9</strong></td>
<td>11.6-14.4</td>
<td>11.2-14.7</td>
<td>Otis ANGB</td>
<td>16</td>
<td>FMH 32</td>
<td>BOS 74</td>
</tr>
<tr>
<td></td>
<td>11.8-12.4</td>
<td>11.2-13.0</td>
<td>Gabreski</td>
<td>15</td>
<td>PSM 34</td>
<td>ENE 118</td>
</tr>
</tbody>
</table>

*Probable bailout region

(D) - DME only

---

**FB 2-16**

**ASC/119/FIN**

Attachment 3
HIGH-ENERGY GANDER PLT

--- MM304 ---

BFS, OPS 301 PRO (√304)

[50] Select Site YQX — ITEM 41 +2 1

TRAJ √BUGS, [HSI] √[]} RANGE

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

\( \dot{H} = -800 \) Monitor \( \dot{H}, N_z \)

When \( \dot{H} \) stabilizes
Ensure \( N_z \) stays < 3.5

Monitor Traj

Report when orbiter bug reaches upper line

Orbiter bug below upper line or \( V = 6K \)

\( V = 19K \) Monitor pitchdown at 1°/sec to center needles,
\( \sqrt{P,R/Y} \) — AUTO

\( V = 15K \)

\[ G50 \] \( \sqrt{RWY, TACAN, S/B, ALTM} \)
(PASS/BFS)

\( V = 10K \)

* If RCS < [N/A] % either side:
  * [51] AFT RCS NH, ITEM 13 EXEC *

\( V = 10K \)

\( \sqrt{SPDBK} \rightarrow 81\% \)
Go to ENTRY MANEUVERS (Cue Card)

FB 2-19 ASC/119/FIN X
HIGH-ENERGY TAL CDR

Abort TAL:
\[ \sqrt{TAL} \text{ flag set: ITEM 41 = TAL SITE (any site)} \]
\[ \sqrt{Rates < .5^\circ/sec; } \theta > 15^\circ, Y = 0 \pm 30^\circ \]
PASS, OPS 301 PRO (304)

HI-ENER

GANDER

--- MM304 ---

MM304
P, R/Y - CSS
\[ \sqrt{VREL} \]

<table>
<thead>
<tr>
<th>VREL</th>
<th>ROLL (CSS) 4-5^\circ/sec</th>
<th>ALPHA (CSS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>\text{VREL} \geq 23,800</td>
<td>180^\circ</td>
<td>80^\circ \text{ (} \theta = 280^\circ \text{)}</td>
</tr>
<tr>
<td>23,300 \leq \text{VREL} &lt; 23,800</td>
<td>180^\circ</td>
<td>55^\circ</td>
</tr>
<tr>
<td>\text{VREL} &lt; 23,300</td>
<td>0^\circ</td>
<td>55^\circ</td>
</tr>
</tbody>
</table>

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

Earlier of

\[ \dot{H} = -600 \downarrow \]
or Guid Init

\[ \dot{H} = -500 \uparrow \] R/Y - AUTO (\sqrt{Rolls toward site before } \dot{H} > +200)
Limit roll to 90^\circ until V = 6K;
TRAJ Roll CMD > 90^\circ R/Y CSS @ 90^\circ
< 90^\circ R/Y AUTO

Orbiter bug below upper line

When commanded drag (\[ \square \]) < 40:
Pitch down at 0.5^\circ/sec, center pitch needle,
P - AUTO

\[ V = 6K \] If energy still high:
Pitch down at 1^\circ/sec, center pitch needle,
P, R/Y - AUTO

Go to ENTRY MANEUVERS (Cue Card)

FB 2-20
ASC/119/FIN
TOP

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 ♦ Bugged, [HSI] ♦, RANGE

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

* If no comm and
* initial Commanded Drag (dź) ≥ [35], *
(D = 3, q = 8,
EAS = 48)

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)

FB 2-21 ASC/119/FIN X
TOP
BACK OF 'ECAL ENTRY'

RTLS/TAL DUMPS

RTLS DUMP
Pre MECO

Abort Select
2 OMS

24/10 RCS (from OMS)
(If INCNCT 'ENA')

2 8 0
2 + 10 jets

1 8 4
2 + 24 jets

5 0 0 sec
2 oms

MM602 +.20

Post MECO

HI-ENER

TAL DUMP
Pre MECO

Abort Select
2 OMS

24/10 RCS (from OMS)
(If INCNCT 'ENA')

2 4 8
2 + 10 jets

1 6 3
2 + 24 jets

4 4 2 sec
2 oms

MM304
(AUTO START)

7 5
Quan/Side

2 OMS
(If INCNCT 'ENA')

24/10 RCS (from OMS)
(If INCNCT 'ENA')

2 OMS
(If INCNCT 'INH')

4 +X RCS
(If INCNCT 'INH')

NZ > .05 Gs
or

NZ > .05 Gs
or

2 1 %
FU

1 1 %
FU

MM304 & MACH 9

FRCS
Null Dump

0 6 5 sec

4 +X RCS

0 0 0 sec

FB 2-22
ASC/119/FIN X
POWERED CSS – UPHILL/TAL

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

Yaw to \( \triangle \) until 2:30
Then \( \downarrow \) uphill
or \( \Rightarrow \) if TAL

If TAL \( \checkmark \) HDG

<table>
<thead>
<tr>
<th>ZZ</th>
<th>MRN</th>
<th>FMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>010</td>
<td>016</td>
<td>006</td>
</tr>
</tbody>
</table>

Man MECO @ CO mark
\( \dot{H} = \frac{272}{100} \)
If TAL: \( \dot{H} = +100 \)

Max H = 400 – 420K for early TAL

Roll heads up @
\[
\begin{array}{c}
15.0 \\
13.2
\end{array}
\]

MECO – 90sec: Work + \( \dot{H} \)

Idle @ 2%
or C/O bug alive
3g
Throt

Early TAL:
Initial \( \theta \sim 50^\circ \)

If CSS: Man Throt
Man MECO

Incr \( \theta \sim 10^\circ \) if 1 eng fail

1 eng @ 104% = 4%/min

FB 2-24
ASC/119/FIN
### DIRECT INSERTION AOA DEL PAD

#### DEORBIT

<table>
<thead>
<tr>
<th>PRPLT</th>
<th>( )</th>
</tr>
</thead>
</table>

#### BURN CUE CARD:

<table>
<thead>
<tr>
<th>OMS ENG FAIL XFEED QTY CUE</th>
<th>%L</th>
<th>%R</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOT AFT QTY 1 (%)</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>TOT AFT QTY 2 (%)</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>FLIP ΔV</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>AFT ΔV</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

#### RCS: DUMP TO % (USE TIME AS CUE)

<table>
<thead>
<tr>
<th>N / A</th>
</tr>
</thead>
</table>

#### ENTRY / LANDING

<table>
<thead>
<tr>
<th>EI - 8 MM303 NRTL ATT (8-30)</th>
<th>R</th>
<th>P</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>MM304 PREBANK (ENT MNVR Cue Card)</td>
<td>L</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>ALTM SET (8-34)</td>
<td>:</td>
<td>:</td>
<td></td>
</tr>
<tr>
<td>CLG INIT</td>
<td>:</td>
<td>:</td>
<td></td>
</tr>
<tr>
<td>EXPECTED AIL TRIM</td>
<td>L</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>VREL 1ST REVERSAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>XCG AT TD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LAND SITE</td>
<td>R</td>
<td>RWY</td>
<td></td>
</tr>
<tr>
<td>□ L</td>
<td>□ OVHD</td>
<td>□ deg</td>
<td>□ MLS</td>
</tr>
<tr>
<td>□ R</td>
<td>□ STRT</td>
<td>□ TAC</td>
<td>□ Winds: 12K</td>
</tr>
<tr>
<td>ΔT MACH &lt; 1 TO HAC</td>
<td>MAX Nz</td>
<td>Nz LIMIT</td>
<td>Winds: 7K</td>
</tr>
<tr>
<td>□ HAC INIT TO H = 20K</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ AMPOINT</td>
<td>□ SPEEDBRAKE</td>
<td>□ % @ 3K</td>
<td>□ SURFACE</td>
</tr>
<tr>
<td>□ NOM</td>
<td>□ NOM</td>
<td>□ Close-in</td>
<td>□ S.F.</td>
</tr>
</tbody>
</table>

#### REMARKS

<table>
<thead>
<tr>
<th>6-2</th>
<th>ASC/119/FIN X</th>
</tr>
</thead>
</table>

Attachment 3
## W/OMS 1 AOA DEL PAD

### DEORBIT

| PRPLT | () | () |
| BURN CUE CARD: | OMS ENG FAIL XFEED QTY CUE | %L | %R | 0 9 4 | 5 5 |
| TOT AFT QTY 1 (%) | FLIP HP | 1 | 9 | STEEP | AMP (RED G SITE) | AMP (PR SITE) | 2 3 | FLIP AX 2 |
| TOT AFT QTY 2 (%) | AFT HP | 1 | 6 | MIN AX 2 |
| BU SITE | FRCS: DUMP TO % (USE TIME AS CUE) | N / A |
| ENTRY / LANDING | OX | FU |

### ENTRY / LANDING

| EI - 5 MM303 INRTL ATT (6-30) | MM304 PREBANK (ENT MNVR Cue Card) | ALTM SET (6-34) | CLG INIT | EXPECTED AIL TRIM |
| R | P | Y | L | R |
| VREL 1ST REVERSAL | XCG AT TD | LAND SITE | RWY | 50K | /
| 38K | /
| 28K | /
| 20K | /
| 12K | /
| 7K | /
| 3K | /
| 1K | /
| AIMPOINT | SPEEDBRAKE | SURFACE | NOM | NOM | % @ 3K |
| CLOSE-IN | S.F. |
HINGE

* RCS COMPLETION:
* If DIRECT INSERTION:
  THC +X to ΔVTOT = 0 or TOT AFT QTY 1 0 9 4 %
* ...
* FLIP ΔV
  5
  7
  ...
  FRCS COMPLETION
AFT ΔV
  3
  1
  ...
  THC +X to TGT ΔV
TGT ΔV
  0
  0
...

If w/OMS 1:
THC +X to TGT HP or TOT AFT QTY 1 0 9 4 %
...

  THC +X to FLIP HP or TOT AFT QTY 2 5 6 % then
  if CUR HP:  FRCS COMPLETION
FLIP HP
  ...
  FRCS COMPLETION
AFT HP
  ...
  THC +X to TGT HP
TGT HP
  ...

FRCS COMPLETION:
  Minvr 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
+0.02 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

MS ONLY 6-21 ASC/119/FIN X
AOA DEORBIR BURN (1 ENG)
\sqrt{MM302} \sqrt{OMS L or R}
\sqrt{OMS BURN CONFIG (L or R XFEED)}
Enter TGO + 10 sec
\sqrt{TRIM: P +0.4, LY +5.2, RY -5.2}
\sqrt{L,R OMS He PRESS/VAP ISOL A (two) – OP}
\ldots \text{Wait 2 sec} \ldots \quad B \text{ (two) – OP}
\sqrt{VTAP – AUTO(PASS)/DISC}
\sqrt{ADI – LVHL(REF)/HI/MED}
\sqrt{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 (\sqrt{P_c}, \Delta VTOT, ENG VLVs)

OMS XFEED RETURN at \Delta VTOT = \boxed{\text{ }}
or \boxed{\text{ }} \text{ at } \boxed{\text{ }}

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  
  * \sqrt{ADI – LVHL}, center needles  
  * Interconnect good OMS to RCS  
  * THC +X (\sqrt{OMS\%} vs RCS Burn Time)  
  * AFT RCS RECONFIG  
  * RCS COMPLETION  

* OMS ENG FAIL (CONTINUE BURN):  
  * OMS ENG – OFF  
  * \sqrt{ADI – LVHL}, center needles  
  * Interconnect good OMS to RCS  
  * THC +X (\sqrt{OMS\%} vs RCS Burn Time)  
  * RCS I/CNCT TK SW  
  * THC +X (\sqrt{OMS\%} vs RCS Burn Time)  
  * AFT RCS RECONFIG  
  * RCS COMPLETION  

* RCS +X JET FAIL OFF:  
  * ITEM 18 +0 EXEC  
  * [G23] Resel jet  

HINGE

MS ONLY 6-22 ASC/119/FIN

Attachment 3
HINGE

* RCS COMPLETION:
  * If DIRECT INSERTION:
    THC +X to \( \Delta V_{TOT} = 0 \) or TOT AFT QTY 1 \( 0\quad 9\quad 4 \) %
    THC +X to FLIP \( \Delta V \) or
    At AFT QTY 1 TOT AFT QTY 2 \( 5\quad 6 \) % then
    if CUR \( \Delta V_{TOT} \): FRCS COMPLETION

  * FLIP \( \Delta V \) 5 7
  * FRCS COMPLETION

  * AFT \( \Delta V \) 3 1
  * THC +X to TGT \( \Delta V \)

  * TGT \( \Delta V \) 0 0

  * If w/OMS 1:
    THC +X to TGT HP or TOT AFT QTY 1 \( 0\quad 9\quad 4 \) %

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

  * FLIP HP
  * FRCS COMPLETION

  * AFT HP
  * THR +X to TGT HP

  * TGT HP

  * FRCS COMPLETION:
  * Mnvr to -X Att (pitch up at 3°/sec to VGOz = +1/4 \( \Delta V_{TOT} \))
  * THC -X to \( \Delta V_{TOT} = 0 \) or FRCS depletion (JETS FAIL OFF)

CUTOFF
+ :02 OMS ENG OFF (if < 3 IMU, at \[ \underline{\underline{\text{X}}} \])
  * AFT RCS RECONFIG if INTERCONNECT *
  Trim X,Z residuals < 2 fps (< 0.5 fps if shallow)

ASC-8bb/119/A/X

MS ONLY 6-23 ASC/119/FIN X
AOA DEORBIT BURN (RCS)

\( \sqrt{\text{MM302}} \quad \sqrt{\text{RCS SEL}} \)
\( \sqrt{\text{RCS BURN CONFIG (L OMS I'CNCT)}} \)

L,R OMS He PRESS/VAP ISOL A (two) – OP

... Wait 2 sec ... B (two) – OP

\( \sqrt{\text{DAP}} \quad \sqrt{\text{INRTL/DISC}} \)

ADI – LVLH(REF)/MED/MED

FLT CNTLR PWR (two) – ON

TIG

THC +X

Maintain PITCH ATT ERR \pm 3^\circ

Monitor \( \Delta VTOT \)

RCS I'CNCT TK SW at \( \Delta VTOT = \_\_\_\_ \)

R OMS XFEED (two) – OP

L OMS XFEED (two) – CL

---

**OMS PRPLT LOW**

AFT RCS RECONFIG AT \( \Delta VTOT = \_\_\_\_ \)

RCS COMPLETION

---

**OMS PRPLT FAIL (MULTIPLE JETS FAIL OFF):**

* Secure aff OMS
* ITEM 18 +0 EXEC
* [G23] Resel jets
* Interconnect good OMS to RCS
* THC +X (\( \sqrt{\text{OMS}} \) vs RCS Burn Time)
* AFT RCS RECONFIG
* RCS COMPLETION

**RCS +X JET FAIL OFF:**

* ITEM 18 +0 EXEC
* [G23] Resel jets

---

ASC-7a/A/B

HINGE

MS ONLY 6-24 ASC/119/FIN
HINGE

* RCS COMPLETION:
* If DIRECT INSERTION:
  * THC +X to ΔVTOT = 0 or TOT AFT QTY 1 [9 4] %
  * THC +X to FLIP ΔV or
  * At AFT QTY 1 TOT AFT QTY 2 [5 6] % then
  * if CUR ΔVTOT: FRCS COMPLETION

FLIP ΔV

AFT ΔV

TGT ΔV

If w/OMS 1:
  * THC +X to TGT HP or TOT AFT QTY 1 [9 4] %

At AFT QTY 1

if CUR HP:
  * THC +X to FLIP HP or
  * TOT AFT QTY 2 [5 6] % then

FLIP HP

AFT 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:

VGOx = 0, release THC
AFT RCS RECONFIG
Trim Inplane X,Z residuals < 2 fps (< 0.5 fps if shallow)

ASC-7aa/119/A/X

MS ONLY 6-25 ASC/119/FIN X
**RCS COMPLETION:**

- **If DIRECT INSERTION:**
  - THC +X to AVT = 0 or TOT AFT QTY 1 [0 9 4 %]
  - TOT AFT QTY 2 [5 6 %]
  - THC +X to FLIP AV or
  - if CUR AVTOL:
    - FRCS COMPLETION

- **FLIP AV**
  - FRCS COMPLETION

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

- **TGT AV**
  - FRCS COMPLETION

- **If w/OMS 1:**
  - THC +X to TGT HP or TOT AFT QTY 1 [0 9 4 %]

- **At AFT QTY 1**
  - THC +X to FLIP HP or
  - if CUR HP:
    - FRCS COMPLETION

- **FLIP HP**
  - FRCS COMPLETION

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

- **TGT HP**
  - FRCS COMPLETION

**FRCS COMPLETION:**

- Mnr to -X Att (pitch up at 3°/sec to VGoz = +1/4 AVTOL)
- THC -X to AVTOL = 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/FINX
TOP
BACK OF 'AOA DEORBIT BURN (2 ENG)'

HOOK VELCRO

AOA DEORBIT BURN (1 ENG)

HOOK VELCRO

\^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 (\^Pc, \^VTOT, ENG VLVs)

OMS XFEED RETURN at \^VTOT = \[\[\]
 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 aft 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
  * [G23] Resel jet

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 ΔVTOT = 0 or TOT AFT QTY 1 \[10.4\] %

At AFT QTY 1
if CUR ΔVTOT:
THC +X to FLIP ΔV or
TOT AFT QTY 2 \[5.6\] % then
FRCS COMPLETION

FLIP ΔV

AFT ΔV

TGT ΔV

If w/OMS 1:
THC +X to TGT HP or TOT AFT QTY 1 \[10.4\] %

At AFT QTY 1
if CUR HP:
THC +X to FLIP HP or
TOT AFT QTY 2 \[5.6\] % then
FRCS COMPLETION

FLIP HP

AFT 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
- +0.02 OMS ENG - OFF (If < 3 IMU; at \[\square: \square\])
  - AFT RCS RECONFIG if INTERCONNECT
- Trim X,Z residuals < 2 fps (< 0.5 fps if shallow)

FAB USE ONLY  CC 10-15  ASC/119/FIN X

(reduced copy)
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 '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 off OMS
  - ITEM 18 ±0 EXEC
  - [G23] 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
  - [G23] Resel jets

ASC-7a/A/B

HINGE

(reduced copy)

FAB USE ONLY

CC 10-16

ASC/119/FIN

Attachment 3
TOP
HINGED AT BOTTOM OF
'AOA DEORBIT BURN (RCS')
HINGE

**RCS COMPLETION:**

**IF DIRECT INSERTION:**
- THC +X to ΔVTOT = 0 or TOT AFT QTY 1 094%

- At AFT QTY 1 THC +X to FLIP ΔV or
  if CUR ΔVTOT:
  TOT AFT QTY 2 56%

- FLIP ΔV

- AFT ΔV

- TGT ΔV

**IF w/OMS 1:**
- THC +X to TGT HP or TOT AFT QTY 1 094%

- At AFT QTY 1 THC +X to FLIP HP or
  if CUR HP:
  TOT AFT QTY 2 56%

- FLIP HP

- AFT HP

- TGT HP

**FRCS COMPLETION:**
- Mnr 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)

---

(reduced copy)

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

---

Attachment 3
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

Attachment 3
### 119 (15A) EVA OV BASELINE

<table>
<thead>
<tr>
<th>Time</th>
<th>Egr</th>
<th>Task</th>
<th>Task</th>
<th>Task</th>
<th>Task</th>
<th>Task</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>00:00</td>
<td>Egr</td>
<td>Setup</td>
<td>Attch S6 to S5</td>
<td>Connect S5 to S6 Umbilicals</td>
<td>PVR Cinches &amp; Winch Release</td>
<td>Keel Pin</td>
<td>BGA Release</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01:00</td>
<td>Egr</td>
<td>Setup</td>
<td>Attch S6 to S5</td>
<td>Connect S5 to S6 Umbilicals</td>
<td>Release SABB Restraints</td>
<td>Unstow Nadir (1B) SABB</td>
<td>SSU ECUL MLI Cleanup</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>02:00</td>
<td>Egr</td>
<td>Setup</td>
<td>P6 Battery Prep</td>
<td>P3 Nadir UCCAS</td>
<td>P1 FHRC Clamps</td>
<td>S3 Outboard/Zenith PAS</td>
<td>Tool Stanchion Relocate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>03:00</td>
<td>Egr</td>
<td>Setup</td>
<td>P6 Battery Prep</td>
<td>P3 Nadir UCCAS</td>
<td>P1/P3 Fluid Jumper</td>
<td>S3 Outboard/Zenith PAS</td>
<td>APFR Retrieve</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>04:00</td>
<td>Egr</td>
<td>Setup</td>
<td>CETA Cart Relocation</td>
<td>SPDM Covers</td>
<td>LEE B Repair</td>
<td>Cleanup</td>
<td>Ing</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>05:00</td>
<td>Egr</td>
<td>Setup</td>
<td>CETA Cart Relocation</td>
<td>S1 Tasks</td>
<td>S0 1A_D RPCM</td>
<td>P1 1A_D RPCM</td>
<td>Clean-up</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06:00</td>
<td>Egr</td>
<td>Set-up JLP GPS Antenna B</td>
<td>S3 Task Setup</td>
<td>CP1 WETA Install</td>
<td>S3 Outboard/Nadir PAS</td>
<td>S3 Inboard/ Zenith PAS</td>
<td>Cleanup</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Install</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>07:00</td>
<td>Egr</td>
<td>Set-up S1/P1 Radiator Imaging</td>
<td>S3 Task Setup</td>
<td>CP1 WETA Install</td>
<td>S3 Outboard/Nadir PAS</td>
<td>S3 Inboard/ Zenith PAS</td>
<td>Cleanup</td>
</tr>
<tr>
<td>Get-Aheads</td>
<td>Applicable EVAs:</td>
<td>Constraints:</td>
<td>Completed On:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-------------------</td>
<td>--------------</td>
<td>---------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EVA 1</td>
<td>EVA 2</td>
<td>EVA 3</td>
<td>EVA 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S6 MMOD Shield Bolt Torque Release</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>Stbd SARJ locked</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nadir/Inboard PAS Deploy</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Stbd TRRJ &amp; SARJ locked</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return Adj Tether to Port Z1 TB</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grounding Sleeve Install:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SSPTS Node 1 FWD</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SSPTS Lab FWD</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>Inhibits: RPCM Z1 3B_A2 and Z1 4B_A2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SSPTS PMA2 Port</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>Inhibits: RPCM LA 1A4A-D3 and Z1 4B_A2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SSPTS PMA2 Starboard</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>Inhibits: RPCM LA 2A3B-D1 and Z1 3B_A2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MBS Cables</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>For WS4: RPC S0 4B_A1 and S0 3A_A1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Channel 1/4 CR 8018 Cable (W4148)</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>DDCU S0 1A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>JEM RMS Grounding Tabs</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>Will be completed following JLP GPS Ant</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**EVA 3 SUMMARY TIMELINE**

<table>
<thead>
<tr>
<th>PET HR: MIN</th>
<th>IV/SSRMS</th>
<th>EV2 – Arnold</th>
<th>EV3 – Acaba</th>
<th>PET HR: MIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>00:00</td>
<td></td>
<td>EVA 3 POST DEPRESS, EGRESS &amp; SETUP (00:50)</td>
<td>EVA 3 POST EGRESS &amp; SETUP (00:50)</td>
<td>00:00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Post Depress/Egress (00:25)</td>
<td>- Post Depress/Egress (00:25)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Setup (00:20)</td>
<td>- Setup (00:20)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Egress w/Med ORU Bag [Crewlock Bags (3) inside]</td>
<td>- Egress w/Crewlock Bag, WIF adapter</td>
<td></td>
</tr>
<tr>
<td>01:00</td>
<td></td>
<td>CETA CART RELOCATION (01:00)</td>
<td>CETA CART RELOCATION (01:00)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- CETA Cart (01:00)</td>
<td>- CETA Cart (01:00)</td>
<td></td>
</tr>
<tr>
<td>02:00</td>
<td></td>
<td>SPDM COVERS (01:30)</td>
<td>S1 TASKS (02:10)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- OTCM Cover Reconfiguration (00:30)</td>
<td>- S1/S3 SSAS BBC PNL RECONFIG (00:30)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- EP1 Cover Removal (00:40)</td>
<td>- S3 FLUID QD JUMPER INSTALL (00:35)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- SPDM Cover Cleanup (00:20)</td>
<td>- S1 FHRC P CLAMP RELEASE (01:05)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Stinger (00:25)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Hose Box (00:30)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- FHRC Cleanup (00:10)</td>
<td></td>
</tr>
<tr>
<td>04:00</td>
<td></td>
<td>LEE B REPAIR (01:45)</td>
<td>S0 1A D RPCM R&amp;R (00:45)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- LEE B Snare Repair (01:15)</td>
<td>- LEE B Cleanup (00:30)</td>
<td></td>
</tr>
<tr>
<td>05:00</td>
<td></td>
<td>CLEANUP AND INGRESS (00:50)</td>
<td>P1 1A A RPCM R&amp;R (00:45)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06:00</td>
<td></td>
<td>EVA 3 PET = 06:00 hr</td>
<td>CLEANUP AND INGRESS (00:25)</td>
<td></td>
</tr>
<tr>
<td>06:30</td>
<td></td>
<td>PRE-REPRESS (00:05)</td>
<td>PRE-REPRESS (00:05)</td>
<td></td>
</tr>
</tbody>
</table>

**EVA 2 – Arnold (SSRMS) for CETA Cart Ops**

- CETA Cart (01:00)
- Egress w/Med ORU Bag [Crewlock Bags (3) inside]

**CETA CART RELOCATION (01:00)**

- CETA Cart (01:00)

**SPDM COVERS (01:30)**

- OTCM Cover Reconfiguration (00:30)
- EP1 Cover Removal (00:40)
- SPDM Cover Cleanup (00:20)

**LEE B REPAIR (01:45)**

- LEE B Snare Repair (01:15)
- LEE B Cleanup (00:30)

**CLEANUP AND INGRESS (00:50)**

- PRE-REPRESS (00:05)

**EVA 3 PET = 06:00 hr**

**POST DEPRESS, EGRESS & SETUP (00:50)**

- Post Depress/Egress (00:25)
- Setup (00:20)
- Egress w/Med ORU Bag [Crewlock Bags (3) inside]

**EVA 3 POST EGRESS & SETUP (00:50)**

- Post Depress/Egress (00:25)
- Setup (00:20)
- Egress w/Crewlock Bag, WIF adapter
EVA 3 SUMMARY TIMELINE

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

<table>
<thead>
<tr>
<th><strong>EV2</strong></th>
<th><strong>EV3</strong></th>
<th><strong>CREWLOCK</strong> (Cont)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- EMU D-rings</td>
<td>- EMU D-rings</td>
<td>- RET (Lg-sm)</td>
</tr>
<tr>
<td>- 2 – Tether Extender</td>
<td>- 2 – Tether Extender</td>
<td>- Med ORU Bag</td>
</tr>
<tr>
<td>- Waist Tether [on right]</td>
<td>- Waist Tether [on right]</td>
<td>- RET (sm-sm) (for EP MLI Cover on outside of bag)</td>
</tr>
<tr>
<td>- 55-ft Safety Tether (spare) [on right] [to MWS]</td>
<td>- 55-ft Safety Tether (spare) [on right] [to MWS]</td>
<td>- RET (sm-sm) (1 hook outside, 1 hook inside ORU bag)</td>
</tr>
<tr>
<td>- MWS</td>
<td>- MWS</td>
<td>- WIF Adapter</td>
</tr>
<tr>
<td>- Small trash bag</td>
<td>- Small Trash Bag</td>
<td>- 2 – EVA Wipes to bag straps (lid)</td>
</tr>
<tr>
<td>- RET (w/PIP pin) [right]</td>
<td>- RET (w/PIP pin) [right]</td>
<td>- RET (sm-sm) to outside CL bag TP</td>
</tr>
<tr>
<td>- RET (sm-sm)</td>
<td>- RET (sm-sm)</td>
<td>- RET (sm-sm)</td>
</tr>
<tr>
<td>- Adj tether [right]</td>
<td>- Adj tether (Lg-sm)</td>
<td>- MWS</td>
</tr>
<tr>
<td>- 2 – Wire ties</td>
<td>- Swing Arm [right side]</td>
<td>- PGT w/6-in wobble s/n _____</td>
</tr>
<tr>
<td>- Swing Arm [right side]</td>
<td>- PGT w/no socket s/n _____</td>
<td>- Adj tether (Lg-sm)</td>
</tr>
<tr>
<td>- Wire tie loop (holster) for Lube Gun</td>
<td>- 6-in wobble socket</td>
<td>- RPCM P1 1A_A Crewlock Bag (#2)</td>
</tr>
<tr>
<td>- BRT [left side]</td>
<td>- BRT [left side]</td>
<td>- RPCM for P1 1A_A s/n C326597 (Int RET #1)</td>
</tr>
<tr>
<td>- 2 – Wire ties, short</td>
<td>- 2 – Wire ties</td>
<td>- Rnd scoop (Int RET #2)</td>
</tr>
<tr>
<td>- RET (sm-sm)</td>
<td>- RET (sm-sm)</td>
<td>- Adj tether (Lg-sm)</td>
</tr>
<tr>
<td>- SAFER</td>
<td>- SAFER</td>
<td>- RPCM S0 1A_D Crewlock Bag (#4)</td>
</tr>
<tr>
<td>Use Blue RETS only</td>
<td></td>
<td>- RPCM for S0 1A_D s/n C235299 (Int RET #1)</td>
</tr>
<tr>
<td>RET Counts:</td>
<td></td>
<td>- Rnd scoop (Int RET #2)</td>
</tr>
<tr>
<td>used (ISS qty)</td>
<td></td>
<td>- Cnctr Insul. Sleeve, size 33/37 (Int RET #3)</td>
</tr>
<tr>
<td>RETs (sm-sm) = 9</td>
<td>- Adj tether (sm-sm) = 6 (10)</td>
<td>- Adj tether (sm-sm) (to Med ORU Bag Lid)</td>
</tr>
<tr>
<td>RETs (PIP pin) = 4</td>
<td>- Adj Eq Tethers (sm-sm) = 6 (10)</td>
<td>- S1 Tasks Crewlock Bag (#3)</td>
</tr>
<tr>
<td>RETs (lg-sm) = 5</td>
<td>- Adj Eq Tethers (lg-sm) = 2 (2)</td>
<td>- EVA Camera</td>
</tr>
<tr>
<td>Adj Eq Tethers (sm-sm) = 6</td>
<td>- D-ring Tether Extenders = 5 (6)</td>
<td>- RET w/PIP pin</td>
</tr>
<tr>
<td>NOTE: Prior to use, inspect the following hardware:</td>
<td></td>
<td>- 6-in ext – 7/16-in wobble socket</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- RET ret w/PIP pin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 18-in ext – 7/16-in</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Ratchet w/2-in rigid ext (Int RET #1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- EVA Camera</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- RET (sm-sm)</td>
</tr>
</tbody>
</table>

**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

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

---

**Attachment 4**

---

**FS 7-98**

---

**EVA119/FIN X**
### EVA 3 EGRESS (00:25) (Cont)

<table>
<thead>
<tr>
<th>IV</th>
<th>EV2 – Arnold (FF)</th>
<th>EV3 – Acaba (SSRMS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Attach LEE Lube Crewlock Bag #1 to BRT</td>
<td>7. Attach LEE Lube Crewlock Bag #1 to BRT</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>8. Verify EV2 SAFER Configuration:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- √ R Handle down (HCM door – Closed)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- √ L Handle down (MAN ISO Valve – Open)</td>
</tr>
<tr>
<td></td>
<td>9. Close hatch thermal cover</td>
<td>9. Translate to CETA Cart 2 location (outboard) (fairlead, as reqd)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10. Close hatch thermal cover</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>11. Translate to S0 HR 3528</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12. Translate to CETA Cart 2 location (outboard) (fairlead, as reqd)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**WARNING**

Maintain a 2-ft Keep-Out-Zone for floating cables between MT and MBS. Stay on UMA handrails during translation underneath MT.

---

- EV2: 1 – 85-ft Safety Tether (to Airlock)
- EV3: 1 – 85-ft Safety Tether (to Airlock)
- EV3: 1 – 55-ft Safety Tether (spare for SSRMS)

---

1. Post crew egress:
   - WVS Software: Select page – RF Camera
   - sel 'Advanced controls’
   - S-Band level (two) – max

---

<table>
<thead>
<tr>
<th>(L)</th>
<th>(R)</th>
<th>(L)</th>
<th>(R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EV2</td>
<td>EV2</td>
<td>EV3</td>
<td>EV3</td>
</tr>
<tr>
<td>UIA</td>
<td>D-ring w/ extender</td>
<td>UIA</td>
<td>D-ring w/ extender</td>
</tr>
<tr>
<td>EV2 safety tether (85)</td>
<td>EV3 safety tether (85)</td>
<td>EV2 safety tether (85)</td>
<td>EV3 safety tether (85)</td>
</tr>
<tr>
<td>aft</td>
<td>fwd</td>
<td>aft</td>
<td>fwd</td>
</tr>
</tbody>
</table>

---

FS 7-101
eva/119/fiNX
## EVA 3 SETUP (00:20)

<table>
<thead>
<tr>
<th>IV</th>
<th>EV2 – Arnold (FF)</th>
<th>EV3 – Acaba (SSRMS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MT</td>
<td>CETA Cart 1 (inboard)</td>
<td>CETA Cart 2 (outbd)</td>
</tr>
<tr>
<td>CETA Carts starting position – Port side of MT</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### SETUP (00:20)

1. Prep CETA Cart 2 for transfer
   - CETA Cart 2 coupler to UNLOCK
   - Translate CETA 2 to Bay 04. Align inboard TFR w/truss marker 8070
   - Engage parking brake (left handle)
   - CETA Cart 2 coupler to CAPTURE
   - Stow brake handles (4) (forward)
   - Swing arms (3) stowed

2. Temp stow LEE Lube Crewlock Bag #1 on CETA Carts starting position – Port side of MT

3. Transl. to CETA Cart’s location (MT at WS 4)

4. 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

5. Assist EV3 with GCA/clearances, as reqd

6. Temp stow med ORU Bag on S0 HR 3528/3517

   - Time permitting:
     1. Deploy S1 Tasks Crewlock Bag #3
     2. Temp stow Crewlock Bag
     3. Transfer Camera to MWS swingarm

    4. Translate to CETA Cart’s location (MT at WS 4)
    5. Stow brake handles (4) (forward)

6. Stow EV3 airlock Safety Tether stbd of CETA Cart pickup location at HR S0 3530 stand-off (nadir)

### CAUTION

Do not impart loads into CETA Cart with less than 3 of 4 wheel Bogies latches closed

---

Attachment 4

FS 7-102

EVA/119/FIN X
### EVA 3 CETA CART RELOCATION (01:00)

<table>
<thead>
<tr>
<th>IV/RMS</th>
<th>EV2 – Arnold (FF)</th>
<th>EV3 – Acaba (SSRMS)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MT</strong></td>
<td><strong>CETA Cart 1 (inboard)</strong></td>
<td><strong>CETA CART 2 REMOVAL FROM P1</strong></td>
</tr>
<tr>
<td><strong>CETA Cart 2 (outbd)</strong></td>
<td><strong>CETA Cart 1 (outbd)</strong></td>
<td>1. Assist EV3 with APFR ingress, as reqd</td>
</tr>
</tbody>
</table>
| | **MT** | 2. **WARNING**
| | **CETA Cart 2 relocated – Stbd side of MT** | Do not touch APFR Ingress Aid shaft for more than 2:30 min (after initial 1:30 hr of exposure) |
| | | 3. Inform M1/M2 APFR ingress is complete |
| | | 4. Verify good EV3 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:
<p>| | | - Lift CETA Cart 2 from rails (ISS forward), until wheel bogies are clear of structure. Use GCA, as reqd |
| | | 11. Inform M1/M2 CETA Cart 2 is separated from rail |
| | | 12. Give M1/M2 GO for CETA Cart Port Clearance position maneuver |
| | | <strong>INSTALL CETA CART 2 ON S1</strong> |
| 1. M1/M2: Receive report from EV3 when APFR ingress is complete |
| 2. IV: Ψ Verify good EV3 glove heaters, visor, and TCV configuration |
| 3. M1/M2: On EV3 GO, CETA Cart 2 ready for removal |
| 4. M1/M2: On EV3 GO, maneuver CETA Cart 2 to Port Clearance position |
| | | <strong>INSTALL CETA CART 2 ON S1</strong> |
| | | 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 |
| | | - S1 Tasks: SSAS BBC PNL RECONFIG, FLUID QD JUMPER, FHRC P-CLAMP RELEASE |</p>
<table>
<thead>
<tr>
<th>IV/RMS</th>
<th>EV2 – Arnold (FF)</th>
<th>EV3 – Acaba (SSRMS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. M1/M2: Receive EV3 report that APFR egress is complete</td>
<td>18. Rotate and lock wheel bogies (4) onto MT rail</td>
<td>18. Perform prep for Safety Tether swap: Attach Waist Tether to handrail Verify tether configuration:  - ( \checkmark ) Gate closed  - ( \checkmark ) Hook locked</td>
</tr>
<tr>
<td>7. IV receive glove inspection report from EV2</td>
<td>19. Engage CETA Cart 2 Parking Brake 20. Give EV3 GO to release CETA Cart 2 and remove RET</td>
<td>19. Swap to 55-ft SSRMS Safety Tether:  - ( \checkmark ) Gate closed  - ( \checkmark ) Hook locked  - ( \checkmark ) Safety Tether Reel Unlocked</td>
</tr>
<tr>
<td>9. M1/M2: On EV2 GO, maneuver SSRMS to the Starboard Clearance position</td>
<td>- ( \checkmark ) Gate closed  - ( \checkmark ) Hook locked</td>
<td></td>
</tr>
</tbody>
</table>
### EVA 3 CETA CART RELOCATION (01:00) (Cont)

<table>
<thead>
<tr>
<th>IV/RMS</th>
<th>EV2 – Arnold (FF)</th>
<th>EV3 – Acaba (SSRMS)</th>
</tr>
</thead>
</table>

**IV: The next step is for M1/M2 and EV2, and requires no IV action**

- **10. M1/M2:** On EV2 GO, begin maneuver to OTCM 2 Blanket Setup position

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>26. Give M1/M2 GO to begin maneuver to OTCM 2 Blanket Setup position for SPDM COVERS</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>COUPLE CETA CART 2 TO MT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>21. Verify configuration ready for CETA Cart 2 coupling to MT</td>
</tr>
<tr>
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<tr>
<td></td>
<td></td>
<td>22. Release brakes (tap pedal twice)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>23. Translate CETA Cart 2 to MT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24. Couple CETA Cart 2 to MT</td>
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<tr>
<td></td>
<td></td>
<td>25. Verify CETA Cart 2 brakes handles forward and locked</td>
</tr>
<tr>
<td></td>
<td></td>
<td>26. Retrieve EVA camera from temp stow location</td>
</tr>
</tbody>
</table>

**CLEANUP**

- 27. Inspect gloves. Report glove status to IV
- 28. Translate to S1 for S1 TASKS

**NOTE**

- IV: The next step is for M1/M2 and EV2, and requires no IV action

[Diagram of IV/RMS, EV2, EV3]
EVA 3 CETA CART RELOCATION – TASK DATA (Cont)

Tools: None

Foot Restraints:

<table>
<thead>
<tr>
<th>Task</th>
<th>WIF</th>
<th>APFR Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>CETA CART Install/Remove</td>
<td>SSRMS</td>
<td>12, PP, F, 6</td>
</tr>
</tbody>
</table>

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
<table>
<thead>
<tr>
<th>IV/SSRMS</th>
<th>EV2 – Arnold (SSRMS)</th>
</tr>
</thead>
</table>
| 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 | OTCM COVER RECONFIGURATION (00:30)  
   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) |
| 2. M1/M2: Expect EV2 GCA to position SSRMS for “Wrist Roll Flaps”, side 1 access | EP1 THERMAL BLANKET REMOVAL (00:40)  
   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 EP 1 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 EP 1 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)

<table>
<thead>
<tr>
<th>IV/SSRMS</th>
<th>EV2 – Arnold (FF)</th>
</tr>
</thead>
</table>
| 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 ¼ inch from bearing.
### EVA 3 LEE B REPAIR (01:45) (Cont)

<table>
<thead>
<tr>
<th>IV/SSRMS</th>
<th>LEE B SNARE REPAIR (00:40)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. M1/M2: Receive GO from EV2 for Snare Checkout</td>
<td>8. Inform M1/M2, tools and EV crew clear of LEE. Give SSRMS GO for Snare Checkout (Close and Open Snares)</td>
</tr>
<tr>
<td>2. IV/MCC-H: Receive EV2 report on snare condition</td>
<td>9. Report to IV/MCC-H: Snare condition (in or out of groove)</td>
</tr>
<tr>
<td>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</td>
<td>10. Push top right and bottom right snares (#1 &amp; #3) into groove with needle nose pliers, as reqd</td>
</tr>
<tr>
<td>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</td>
<td>11. Use gap gauge to get left snare (#2) out of groove, as reqd (form “C” curve)</td>
</tr>
<tr>
<td>12. Exercise lower left outer bearing (#2) in x-axis using needle nose pliers [15 sec]</td>
<td>13. Report to IV/MCC-H: Bearing mobility  (This report is used to calibrate the initial bearing stiffness)</td>
</tr>
<tr>
<td>14. Push left snare (#2) into groove with needle nose pliers</td>
<td>15. Prep grease gun</td>
</tr>
<tr>
<td>16. Apply grease to lower left bearings (#1 &amp; #2) (use box pattern, apply to inside first). Pack grease using gap gauge, as reqd</td>
<td>17. Give M1/M2 GO to maneuver a +120 deg (ccw) wrist roll</td>
</tr>
<tr>
<td>18. Apply grease to lower left bearings (#3 &amp; #4) (use box pattern, apply to inside first). Pack grease using gap gauge, as reqd</td>
<td>19. Give SSRMS GO to maneuver a +120 deg (ccw) wrist roll</td>
</tr>
<tr>
<td>20. Apply grease to lower left bearings (#5 &amp; #6) (use box pattern, apply to inside first). Pack grease using gap gauge, as reqd</td>
<td>21. Prep grease gun</td>
</tr>
<tr>
<td>22. GCA SSRMS wrist roll to access both sides of lower right snare (#1), as reqd</td>
<td>23. Pull lower right snare (#1) fully out into C-curve with gap gauge, apply force perpendicular to rod-end</td>
</tr>
<tr>
<td>24. Prep grease gun</td>
<td>25. Apply grease to rod-end/fork interface to lower left bearing (#5)</td>
</tr>
<tr>
<td>26. Apply grease to rod-end/fork interface to lower right (#4)</td>
<td>27. Prep grease gun</td>
</tr>
<tr>
<td>28. Pack grease using gap gauge, as reqd</td>
<td>29. Exercise lower left bearing (#5) in x-axis using needle nose pliers [1 min/40 cycles]</td>
</tr>
<tr>
<td>30. Report to IV/MCC-H: Noticeable change in bearing motion</td>
<td>31. Exercise lower right (#4) in x-axis using needle nose pliers [1 min/40 cycles]</td>
</tr>
<tr>
<td>32. Report to IV/MCC-H: Noticeable change in bearing motion</td>
<td>33. Push lower right snare (#1) into groove with needle nose pliers</td>
</tr>
</tbody>
</table>

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### Diagram

- **X-axis**
- **Handrail**
- **Camera**

---

**Attachment 4**

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**FS 7-114**

**EVA/119/FIN X**
### 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

<table>
<thead>
<tr>
<th>IV/SSRMS</th>
<th>EV2 – Arnold (FF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>34. Give SSRMS GO to maneuver a -120 deg (cw) wrist roll</td>
<td></td>
</tr>
<tr>
<td>35. On SSRMS GO: Pull lower right snare (#2) fully out into C-curve with gap gauge, apply force perpendicular to rod-end</td>
<td></td>
</tr>
<tr>
<td>36. Prep grease gun</td>
<td></td>
</tr>
<tr>
<td>37. Apply grease to rod-end/fork interface to lower left bearing (#3)</td>
<td></td>
</tr>
<tr>
<td>38. Apply grease to rod-end/fork interface to lower right bearing (#2)</td>
<td></td>
</tr>
<tr>
<td>39. Stow grease gun</td>
<td></td>
</tr>
<tr>
<td>40. Exercise lower left bearing (#3) in x-axis using needle nose pliers [1 min/40 cycles]</td>
<td></td>
</tr>
<tr>
<td>41. Report to IV/MCC-H: Noticeable change in bearing motion</td>
<td></td>
</tr>
<tr>
<td>42. Exercise lower right bearing (#2) in x-axis using needle nose pliers [1 min/40 cycles]</td>
<td></td>
</tr>
<tr>
<td>43. Report to IV/MCC-H: Noticeable change in bearing motion</td>
<td></td>
</tr>
<tr>
<td>44. Push lower right snare (#2) into groove with needle nose pliers</td>
<td></td>
</tr>
<tr>
<td>45. Give SSRMS GO to maneuver a -120 deg (cw) wrist roll</td>
<td></td>
</tr>
<tr>
<td>46. On SSRMS GO: Pull lower right snare (#3) fully out into C-curve with gap gauge, apply force perpendicular to rod-end</td>
<td></td>
</tr>
<tr>
<td>47. Prep grease gun</td>
<td></td>
</tr>
<tr>
<td>48. Apply grease to rod-end/fork interface to lower left bearing (#1)</td>
<td></td>
</tr>
<tr>
<td>49. Apply grease to rod-end/fork interface to lower right bearing (#6)</td>
<td></td>
</tr>
<tr>
<td>50. Stow grease gun</td>
<td></td>
</tr>
<tr>
<td>51. Exercise lower left bearing (#1) in x-axis using needle nose pliers [1 min/40 cycles]</td>
<td></td>
</tr>
<tr>
<td>52. Report to IV/MCC-H: Noticeable change in bearing motion</td>
<td></td>
</tr>
<tr>
<td>53. Exercise lower right bearing (#6) in x-axis using needle nose pliers [1 min/40 cycles]</td>
<td></td>
</tr>
<tr>
<td>54. Report to IV/MCC-H: Noticeable change in bearing motion</td>
<td></td>
</tr>
<tr>
<td>55. Push lower right snare (#3) into groove with needle nose pliers</td>
<td></td>
</tr>
<tr>
<td>56. Use gap gauge to pack any excess grease into bearings, as reqd</td>
<td></td>
</tr>
<tr>
<td>57. Clean tools as necessary with EVA wipe</td>
<td></td>
</tr>
</tbody>
</table>
EVA 3 LEE B REPAIR (01:45) (Cont)

<table>
<thead>
<tr>
<th>IV/SSRMS</th>
<th>EV2 – Arnold (FF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. M1/M2: Receive GO from EV2 for Snare Checkout</td>
<td>LEE B CLEANUP (00:30)</td>
</tr>
<tr>
<td>4. IV/MCC-H: Receive EV2 report on snare condition</td>
<td>58. Give SSRMS GO for Snare Checkout (Close and Open Snare)</td>
</tr>
<tr>
<td>6. M1/M2: On EV2 GO, maneuver SSRMS to LEE Lubrication Clearance position</td>
<td>60. [ ] Take pictures of LEE:</td>
</tr>
<tr>
<td></td>
<td>• Bearings #1 &amp; #2</td>
</tr>
<tr>
<td></td>
<td>• Bearings #3 &amp; #4</td>
</tr>
<tr>
<td></td>
<td>• Bearings #5 &amp; #6</td>
</tr>
<tr>
<td></td>
<td>• Overall view of LEE</td>
</tr>
<tr>
<td></td>
<td>61. Stow EVA Camera on MWS swingarm</td>
</tr>
<tr>
<td></td>
<td>62. Inform M1/M2, LEE photos and observation complete. Give SSRMS GO to maneuver SSRMS to LEE Lubrication Clearance position</td>
</tr>
<tr>
<td></td>
<td>63. Adjust MWS up, as reqd</td>
</tr>
<tr>
<td></td>
<td>64. Perform tool inventory</td>
</tr>
<tr>
<td></td>
<td>65. Place EVA wipe over end of grease gun and secure with wire tie</td>
</tr>
<tr>
<td></td>
<td>66. Stow grease gun on outside of Crewlock Bag using adj tether</td>
</tr>
<tr>
<td></td>
<td>67. Egress APFR</td>
</tr>
<tr>
<td></td>
<td>68. Collapse APFR ingress aid</td>
</tr>
<tr>
<td></td>
<td>69. Relocate APFR to S0 WIF 42 \Blk-Blk, pull/twist test</td>
</tr>
<tr>
<td></td>
<td>70. Adjust APFR to low-profile configuration and report settings to IV</td>
</tr>
<tr>
<td></td>
<td>71. Inspect gloves. Report glove check to IV</td>
</tr>
<tr>
<td></td>
<td>72. Translate to med ORU Bag (S0 HR 3528)</td>
</tr>
<tr>
<td></td>
<td>73. Stow LEE Lube Crewlock Bag #1 near med ORU Bag location</td>
</tr>
<tr>
<td></td>
<td>If EV2 performing P1 1A_A REMOVE/REPLACE:</td>
</tr>
<tr>
<td></td>
<td>74. Retrieve PGT. Stow PGT on swing arm</td>
</tr>
<tr>
<td></td>
<td>75. Go to P1 1A_A RPCM REMOVE/REPLACE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tool Inventory</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MWS</strong></td>
</tr>
<tr>
<td>[ ] Small trash bag</td>
</tr>
<tr>
<td>[ ] RET</td>
</tr>
<tr>
<td>[ ] RETs w/PIP pin</td>
</tr>
<tr>
<td>[ ] Adj tether</td>
</tr>
<tr>
<td>[ ] Wire ties (2)</td>
</tr>
<tr>
<td><strong>Crewlock Bag</strong></td>
</tr>
<tr>
<td>[ ] Adj tether</td>
</tr>
<tr>
<td>[ ] Adj tether</td>
</tr>
<tr>
<td>[ ] EVA Wipes (2)</td>
</tr>
<tr>
<td>[ ] EVA wipe w/ wire tie</td>
</tr>
<tr>
<td>[ ] Grease gun</td>
</tr>
<tr>
<td>[ ] Needle nose pliers</td>
</tr>
<tr>
<td>[ ] RCC Gap gauge</td>
</tr>
<tr>
<td><strong>BRT</strong></td>
</tr>
<tr>
<td>[ ] Wire ties (2)</td>
</tr>
<tr>
<td>[ ] RET</td>
</tr>
<tr>
<td><strong>Swingarm</strong></td>
</tr>
<tr>
<td>[ ] Wire tie loop (holster)</td>
</tr>
<tr>
<td>[ ] EVA Camera</td>
</tr>
<tr>
<td><strong>RET</strong></td>
</tr>
<tr>
<td>[ ] RET</td>
</tr>
</tbody>
</table>

7. IV: Record APFR settings: [ , , , ] (S0 WIF 42) |
8. Receive glove check report from EV2
Figure 3. LEE Lubing Pattern

1. Rod end to torsion spring interface

2. Spherical bearing bottom side

3. Rod end to fork interface

4. Spherical bearing top side

NOTE
Do not apply grease beyond this point
EVA 3 LEE B REPAIR – TASK DATA (Cont)

Estimated Task Duration:

<table>
<thead>
<tr>
<th></th>
<th>With SSRMS</th>
<th>Without SSRMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>One EV Crew</td>
<td>01:45</td>
<td>N/A</td>
</tr>
<tr>
<td>Two EV Crew</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Tools:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EV3</td>
<td></td>
</tr>
<tr>
<td>Crewlock Bag RETs (2)</td>
<td></td>
</tr>
<tr>
<td>Gap gauge w/Kapton Tape</td>
<td>Grease Gun w/Straight Nozzle</td>
</tr>
<tr>
<td>Needle nose pliers w/Kapton</td>
<td>EVA Wipes (5)</td>
</tr>
<tr>
<td>tape</td>
<td></td>
</tr>
<tr>
<td>EVA Camera</td>
<td></td>
</tr>
</tbody>
</table>

Foot Restraints:

<table>
<thead>
<tr>
<th>Task</th>
<th>WIF</th>
<th>Y/P Setting</th>
<th>APFR Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEE B SNARE REPAIR</td>
<td>S0 WIF 45</td>
<td>4, HH, F, 6</td>
<td></td>
</tr>
</tbody>
</table>

EVA Fasteners: N/A

EVA Connectors: N/A

LEE Mass = ~460 lb/209 kg

Notes:
1. Grease should not extend more than ¼ inch from bearing

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

Warnings:
1. Avoid touching LEE curvic coupling, grounding springs, snares, and internal mechanisms inside LEE with gloved hand

Timeline Considerations:
1. Photos shall be taken as best effort, noting that it is possible that the LEE may be in an eclipse
2. 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
3. Time permitting, MCC-H may request additional cycles for sticky bearings

Grease Gun Steps:
Prep grease gun
1. Engage teeth by rotating plunger 180 deg (black triangle up)
2. Remove MLI; stow on gun in way to prevent contact with LEE
3. Point tip away from LEE
4. Rotate shutoff knob such that FLOW points toward nozzle
Stow grease gun
1. Rotate shutoff knob such that FLOW points perpendicular to nozzle
2. Disengage teeth by rotating plunger 180 deg (black triangle down)
3. Install MLI tip cover
<table>
<thead>
<tr>
<th>IV</th>
<th>EV3 – Acaba (FF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Verify with <strong>MCC-H</strong> that inhibits are in place</td>
<td><strong>SSAS BBC CONNECTOR SWAPS</strong> (00:30)</td>
</tr>
<tr>
<td>2. Give EV GO to perform connector swaps</td>
<td>1. Temp stow EVA camera at FHRC worksite. Report location</td>
</tr>
</tbody>
</table>

### S1-S3 SSAS Panel BBC Inhibits (16)

**Panel A102** (zenith):

2. Remove cap from J195
3. Demate P116 from J116
4. Install cap on J116
5. Inspect and Mate P116 to J195
6. Check good bend radius

**Panel A103** (nadir):

7. Remove cap from J196
8. Demate P121 from J121
9. Install cap on J121
10. Inspect and Mate P121 to J196
    - 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

**NOTE**

- Connectors for straight pins, no FOD,
- EMI band intact, and good bend radius.

If BRT on oval HR is required, inspect contact area prior to attaching the BRT and again after the BRT is released.

---

If BRT used on oval HR:

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

---

**SSAS BBC CONNECTOR SWAPS** (00:30)

1. Temp stow EVA camera at FHRC worksite. Report location

---

**NOTE**

- Connectors for straight pins, no FOD,
- EMI band intact, and good bend radius.

If BRT on oval HR is required, inspect contact area prior to attaching the BRT and again after the BRT is released.

---

**Attachment 4**
### EVA 3 S1/S3 FLUID QD JUMPER INSTALL (00:35)

<table>
<thead>
<tr>
<th>IV</th>
<th>EV3 – Acaba (FF)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Verify with <strong>MCC-H</strong> that TRRJ inhibits are in place for translation to S1/S3 worksite</strong></td>
<td><strong>S1/S3 FLUID JUMPER INSTALL</strong> (00:35)</td>
</tr>
<tr>
<td>2. Give GO to EV3 to translate to S1/S3</td>
<td><strong>CAUTION</strong></td>
</tr>
<tr>
<td></td>
<td>QDs exposed to direct sunlight can overtemp in 20 min. Shading by EMU or thermal shroud can lengthen acceptable time with bootie removed</td>
</tr>
<tr>
<td><strong>DEMATE QD</strong></td>
<td></td>
</tr>
<tr>
<td>1. Forward white band visible, button up</td>
<td></td>
</tr>
<tr>
<td>2. Demate QD (pull back on release ring)</td>
<td></td>
</tr>
<tr>
<td><strong>MATE QD</strong></td>
<td></td>
</tr>
<tr>
<td>1. Inspect QDs for FOD or damage</td>
<td></td>
</tr>
<tr>
<td>2. Detent button is up</td>
<td></td>
</tr>
<tr>
<td>3. Forward white band is NOT visible</td>
<td></td>
</tr>
<tr>
<td>4. Assess side loads</td>
<td></td>
</tr>
<tr>
<td>5. Mate QD. Forward white band is visible</td>
<td></td>
</tr>
<tr>
<td>6. Perform snap back test</td>
<td></td>
</tr>
<tr>
<td>7. Perform pull test</td>
<td></td>
</tr>
<tr>
<td>8. Perform gap check (visual)</td>
<td></td>
</tr>
<tr>
<td><strong>OPEN VALVE</strong></td>
<td></td>
</tr>
<tr>
<td>1. Press button, move bail forward (open valve)</td>
<td></td>
</tr>
<tr>
<td>2. Aft white band visible, button up</td>
<td></td>
</tr>
<tr>
<td>3. Verify detent button can be depressed</td>
<td></td>
</tr>
<tr>
<td>3. Receive glove check from EV3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>On IV GO:</td>
<td></td>
</tr>
<tr>
<td>1. Translate to S1/S3 Face 6 (nadir) interface</td>
<td></td>
</tr>
<tr>
<td>2. Open shroud on S1 nadir umbilical tray</td>
<td></td>
</tr>
<tr>
<td>3. Release TA clamps, as reqd</td>
<td></td>
</tr>
<tr>
<td>4. For QDs F56, perform <strong>DEMATE QD</strong> steps in the IV column</td>
<td></td>
</tr>
<tr>
<td>5. Open thermal bootie and remove QD cap from M3 on S1 Panel A503</td>
<td></td>
</tr>
<tr>
<td>6. Open thermal bootie and remove QD cap from M1 on S3 panel A501</td>
<td></td>
</tr>
<tr>
<td>7. Attach RET to jumper</td>
<td></td>
</tr>
<tr>
<td>8. For QDs F57, perform <strong>DEMATE QD</strong> steps in the IV column</td>
<td></td>
</tr>
<tr>
<td>9. BRT to HR 3010</td>
<td></td>
</tr>
<tr>
<td>10. Perform <strong>MATE QD</strong> steps in IV column to mate QD F57 to M3 on S1 panel A503</td>
<td></td>
</tr>
<tr>
<td>11. For QD F57, perform <strong>OPEN VALVE</strong> steps in IV column</td>
<td></td>
</tr>
<tr>
<td>12. Perform <strong>MATE QD</strong> steps in IV column to mate QD F56 to M1 on S3 panel A501</td>
<td></td>
</tr>
<tr>
<td>13. For QD F56, perform <strong>OPEN VALVE</strong> steps in IV column</td>
<td></td>
</tr>
<tr>
<td>14. Reinstall thermal booties (2)</td>
<td></td>
</tr>
<tr>
<td>15. Close TA clamps, as reqd</td>
<td></td>
</tr>
<tr>
<td>16. Perform WVS survey of jumper connections</td>
<td></td>
</tr>
<tr>
<td>17. Replace S1 nadir umbilical tray shroud</td>
<td></td>
</tr>
<tr>
<td>18. Inspect EMU gloves. Report glove status to IV</td>
<td></td>
</tr>
<tr>
<td>19. Translate to S1 for FHRC P-Clamp Release</td>
<td></td>
</tr>
</tbody>
</table>
### EVA 3 S1 FHRC P-CLAMP RELEASE (01:05)

<table>
<thead>
<tr>
<th>IV</th>
<th>EV3 – Acaba (FF)</th>
</tr>
</thead>
</table>
| S1 FHRC P-Clamps:  
  Bay 11 Stinger (6) – diagram on next page  
  Bay 13 Hose Box (6) – diagram on next page | RELEASE FHRC P-CLAMPS  
  **Stinger (Inboard)** (00:30)  
  1. Retrieve 18-in ext from Crewlock Bag #3 and install on PGT  
  2. **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  
  3. Stow 7/16-18-in ext in Crewlock Bag #3  
  4. Install 6-in extension on PGT  
  5. Retrieve ratchet w/2-in from Crewlock Bag #3 to MWS  

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| **Hose Box (Outboard)** (00:25)  
  6. **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  
  7. Perform tool inventory  
  8. Stow EVA Camera in Crewlock Bag #3  
  9. Inspect gloves. Report glove status to IV  
  10. Retrieve S1 Tasks Crewlock Bag #3 and attach to BRT |  |
|  |  |
| **FHRC P-CLAMP CLEANUP** (00:10)  
  11. Translate to med ORU Bag (S0 Face 2)  
  12. Verify MED ORU bag deployed  
  13. Stow S1 Tasks Crewlock Bag #3 at med ORU Bag location  
  14. Retrieve S0 1A_D RPCM Crewlock Bag #4  
   Attach S0 RPCM Crewlock Bag #4 to BRT  
  15. On **MCC-H GO**, translate to S0 outboard for  
   S0 1A_D RPCM REMOVE/REPLACE |  |
|  |  |

#### Tool Inventory

**MWS**  
- Sm Trash bag  
- 2 – QD caps  
- RET w/PIP pin  
- RET  
- Wire ties (2)

**Crewlock Bag**  
- RET w/PIP pin  
- 2-in socket ext  
- RET w/PIP pin  
- 18-in socket ext  
- RET w/PIP pin  
- EVA Camera  
- RET

**Swing Arm**  
- PGT  
- 6-in wobble ext  
- RET

**Ratchet wrench**
### EVA 3 S0 1A_D RPCM REMOVE/REPLACE (00:45) (Cont)

<table>
<thead>
<tr>
<th>IV</th>
<th>EV3 – ACABA (FF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCC-H:</td>
<td>On IV GO, perform the following RPCM R&amp;R steps:</td>
</tr>
<tr>
<td>1. Verify S0 RPCM Inhibits in place (√DDCU S01A Converter – Off), give EV GO for removal</td>
<td>5. Verify failed RPCM 1A_D is s/n C024088</td>
</tr>
<tr>
<td>2. Record Failed RPCM s/n __________ (expect s/n C024088)</td>
<td>6. Tether to RPCM with gate pointing away from RPCM</td>
</tr>
<tr>
<td>3. Record Spare RPCM s/n __________ (expect s/n C235299)</td>
<td>7. PGT [A6 8.3 ft-lb, CCW2 30 RPM, MTL 30.5]-6ext 7/16</td>
</tr>
<tr>
<td>4. IV record S0 1A_D RPCM Drive Screw Installation Data</td>
<td>□ Release Drive Screw, push while turning, ~8 turns</td>
</tr>
<tr>
<td>Turns: _____ Torque: ______</td>
<td>8. √Status Indicator – UNLOCK</td>
</tr>
<tr>
<td>5. Receive glove check report from EV2</td>
<td>9. Install scoop, as reqd</td>
</tr>
<tr>
<td>Tool Inventory</td>
<td>10. Remove failed RPCM (slide off rail)</td>
</tr>
<tr>
<td>□ RPCM S0 1A_D Crewlock Bag (#4)</td>
<td>11. Stow failed RPCM</td>
</tr>
<tr>
<td>□ RPCM for S0 1A_D s/n C235299 (Int RET #1)</td>
<td>12. Retrieve spare RPCM</td>
</tr>
<tr>
<td>□ Rnd scoop (Int RET #2)</td>
<td>13. Inspect RPCM connectors and guide rail for debris/damage</td>
</tr>
<tr>
<td>□ Cnctr Insul. Sleeve, size 33/37 (Int RET #3)</td>
<td>14. Verify spare RPCM s/n (expect C235299)</td>
</tr>
<tr>
<td>15. Verify proper hook orientation on new RPCM (gate away from RPCM)</td>
<td>16. Install RPCM on guide rail and slide into soft dock</td>
</tr>
<tr>
<td>17. √Status Indicator not below UNLOCK</td>
<td>18. PGT [A2 3.8 ft-lb, CW2 30 RPM, MTL 30.5]-6ext 7/16</td>
</tr>
<tr>
<td>Fasten Drive Screw, push while turning, 6-7 turns to hard stop</td>
<td>□ Fasten Drive Screw, push while turning, 6-7 turns to hard stop</td>
</tr>
<tr>
<td>21. Slide door closed, verify door does not slide freely and √alignment mark</td>
<td>22. Perform Tool Inventory</td>
</tr>
<tr>
<td>23. Close S0 1A_D RPCM Crewlock Bag #4. Attach S0 1A_D Crewlock Bag #4 to BRT</td>
<td>24. Inspect gloves</td>
</tr>
<tr>
<td>25. Translate to med ORU Bag (S0 HR 3528)</td>
<td>Report glove status to IV</td>
</tr>
<tr>
<td>26. Stow S0 1A_D RPCM Crewlock Bag #4 in med ORU Bag</td>
<td>27. Go to P1 1A_A RPCM R&amp;R</td>
</tr>
</tbody>
</table>

**NOTE**

- Equipment Hook shown in correct orientation for R&R.
- Gate away from RPCM

---

**Attachment 4**

[Image of the correct orientation of the equipment hook for the RPCM removal/replace process.]
### EVA 3 P1 1A_A RPCM REMOVE/REPLACE (00:45)

<table>
<thead>
<tr>
<th>IV</th>
<th>EV2/EV3 (FF)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>WARNING</strong></td>
</tr>
</tbody>
</table>
|     | Edges of RPCM housing may be sharp, use caution while handling  
|     | Maintain minimum 1 ft clearance from P1 antenna (radomes) during translation  
|     | **CAUTION**  |
|     | Failure to align and fully seat socket until lock springs have released can result in damage to RPCM Drive Screw Assembly  
|     | Combined linear and rotational motion on the socket while inserting, can result in damage to RPCM Drive Screw Assembly  
|     | 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  
|     | Do not operate drive screw with scoop attached to microconical. The wobble socket feature will not extend thru the round scoop  
| NOTE | CETA lights will be turned off due to DDCU power-down  
| NOTE | Equipment Hook shown in correct orientation for R&R. Gate away from RPCM  

1. Verify with **MCC-H**: P1 RPCM Inhibits in place (\DDCU S01A Converter – Off)  
   or  
   RPCM S01A_A RPC 01 Open, Close Inhibited), then:  
   IV give EV2 GO for RPCM R&R  

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:  
   - \Gate closed  
   - \Hook locked  
   - \Safety Tether Reel unlocked  
   - 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
<table>
<thead>
<tr>
<th>IV</th>
<th>EV2/EV3 (FF)</th>
</tr>
</thead>
</table>
| 2. IV record Failed RPCM s/n __________ (expect s/n C235300) | REMOVE FAILED RPCM  
On IV GO (inhibits complete), perform the following RPCM removal steps:  
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, CCW 2 30 RPM, MTL 30.5]-Ext 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 |
| 3. IV record Spare RPCM s/n __________ (expect C326597) | INSTALL RPCM  
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, CW 2 30 RPM, MTL 30.5]-Ext 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 |
| 4. IV record RPCM Drive Screw installation data:  
Turns= _____ Torque= ______  
NOTE  
CETA lights may turn on after power-up | NOTE  
Equipment Hook shown in correct orientation for R&R.  
Gate away from RPCM |
| 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 |  |
### EVA 3 P1 1A_A RPCM REMOVE/REPLACE (00:45) (Cont)

<table>
<thead>
<tr>
<th>IV</th>
<th>EV2/EV3 (FF)</th>
</tr>
</thead>
</table>
| 6. Receive glove check report from EV2 | 28. Inspect gloves  
Report glove status to IV |

#### Tool Inventory
- RPCM P1 1A_A Crewlock Bag (#2)
- RPCM for P1 1A_A s/n C326597 (Int RET #1)
- Rnd scoop (Int RET #2)

| | 29. Perform tool inventory |
| | 30. Translate to airlock Safety Tether  
temp stow location (S0 HR 3545) |
| | 31. Perform Safety Tether swap to airlock 85-ft  
Safety Tether:  
- √ Gate closed  
- √ Hook locked  
- √ Safety Tether Reel unlocked  
- Remove 55-ft Safety Tether and stow on MWS |
| | 32. Perform CLEANUP |

FS 7-133
Table 1. Tools

<table>
<thead>
<tr>
<th>EV2/EV3</th>
</tr>
</thead>
<tbody>
<tr>
<td>PGT</td>
</tr>
<tr>
<td>7/16 (wobble) Socket-6 ext</td>
</tr>
<tr>
<td>Round scoop</td>
</tr>
</tbody>
</table>

Table 2. EVA Fasteners

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

* 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

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Serial Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spare RPCM</td>
<td>R077419-61</td>
</tr>
<tr>
<td>Failed RPCM</td>
<td>R077419-61</td>
</tr>
</tbody>
</table>

RPCM Tether Orientation

---

Attachment 4
### EVA 3 CLEANUP (00:50)

<table>
<thead>
<tr>
<th>IV</th>
<th>EV2 – Arnold (FF)</th>
<th>EV3 – Acaba (FF)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CLEANUP (00:50)</td>
<td>CLEANUP (00:25)</td>
</tr>
<tr>
<td></td>
<td>1. Retrieve LEE Lube Crewlock Bag #1 and attach to BRT</td>
<td>1. Open med ORU Bag and stow the following items:</td>
</tr>
<tr>
<td></td>
<td>(LEE Lube Crewlock Bag #1 near med ORU Bag)</td>
<td>- P1 1A_A RPCM Crewlock Bag #2</td>
</tr>
<tr>
<td></td>
<td>2. Adjust TCV to begin cold soak, as reqd</td>
<td>- S0 1A_D RPCM Crewlock Bag #4</td>
</tr>
<tr>
<td></td>
<td>3. Translate to Airlock</td>
<td>- S1 Tasks Crewlock Bag #3 in the med ORU Bag</td>
</tr>
</tbody>
</table>

**Tool Inventory**

- 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 C325299 (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)
### 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  
|       | 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} | When EV crew working within vicinity of JEMRMS |
| SSIPC | 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} | When EV crew working within 0.3 ft JPM PROX Antenna |
| SSIPC | 1. √TRX Power – OFF  
|       | 2. √TX Power – OFF  
|       | or  
|       | 1. JPM PROX Antennas – OFF |

| JPM Windows | {JLP GPS Ant} | 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 |

---

*Attachment 4*
### EVA 4 INHIBIT PAD (Cont)

#### RSOS (1)

**ALL EVAs**

<table>
<thead>
<tr>
<th>SM Antennas</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>IV</td>
<td></td>
</tr>
<tr>
<td>1. GTS – Deactivate</td>
<td></td>
</tr>
<tr>
<td>2. ARISS (Ham Radio) – Deactivate or VHF (144-146 MHz) TX only</td>
<td></td>
</tr>
</tbody>
</table>

**EVAs ON PMA1 OR RSOS (LOCATION DEPENDENT)**

<table>
<thead>
<tr>
<th>FGB Thrusters</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MCC-M</td>
<td></td>
</tr>
<tr>
<td>1. √FGB MCS unpowered</td>
<td></td>
</tr>
<tr>
<td>2. √All FGB Attitude Control Thruster Valves (eighty) – closed</td>
<td></td>
</tr>
<tr>
<td>3. √FGB Attitude Control Manifold Valves – closed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>КШК1, КШК2, КШК4, КШК5, КШК9, ОКО3, ОКГ3, ОКО6, ОКГ6, ОКО7, ОКГ 7, ОКО8, ОКГ8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Soyuz Thrusters</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MCC-M</td>
<td></td>
</tr>
<tr>
<td>1. √Soyuz manifolds (four) – closed</td>
<td></td>
</tr>
<tr>
<td>2. √Soyuz MCS unpowered</td>
<td></td>
</tr>
<tr>
<td>3. √Soyuz Attitude Control Thruster Valves (fifty-two) – closed</td>
<td></td>
</tr>
<tr>
<td>4. √Soyuz Main Engine Valves (K1, K2, K3, K4, K5, K6) – closed</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FGB Antennas</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MCC-M</td>
<td></td>
</tr>
<tr>
<td>1. √FGB KURS P [КУРС P] – Deactivated</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Soyuz Antennas</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MCC-M</td>
<td></td>
</tr>
</tbody>
</table>
# CONNECTOR INSULATING SLEEVE – CHANNEL 1/4 (S0)

## IV

1. **IV/MCC-H:** Verify Inhibits are in place:
   - DDCU S0 1A

## EV (FF)

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
   - Install P333 (W4145)/J333A (W4148)

### CAUTION
Avoid contact with SPDA Radiator (Face 3) and S0 Radiator (Aft Face) to prevent hardware damage
## CONNECTOR INSULATING SLEEVE – MBS

<table>
<thead>
<tr>
<th>IV</th>
<th>EV (FF)</th>
</tr>
</thead>
</table>
| 1. **IV/MCC-H**: Verify Inhibits are in place:  
  Worksite Dependent  
  WS1: RPCM S3-4B_F  
  RPCM S3-3A_F  
  WS4: RPC S0-4B_A1  
  RPC S0-3A_A1 | 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  
  - J2 (W9181)/P2 (A1W8031)  
  - J2 (W9182)/P2 (A2W8031) |

![Diagram of MT/MBS with connector insulating sleeves](attachment:4)

- Install sleeves here

![Diagram of MT/MBS with connector insulating sleeves](attachment:4)
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**

<table>
<thead>
<tr>
<th>JEMRMS SSIPC</th>
<th>RIP MA Brake – On</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDP Main Mode – Stby Mode</td>
<td></td>
</tr>
<tr>
<td>PDB RMS Ext4 Vout: 0.0V</td>
<td></td>
</tr>
<tr>
<td>VCU_B TVC WVE Sig Stat – No Signal</td>
<td></td>
</tr>
<tr>
<td>VLU EE Pwr – Open</td>
<td></td>
</tr>
<tr>
<td>JEU Interlock – Inhibit</td>
<td></td>
</tr>
<tr>
<td>JEU RT – Inhibit</td>
<td></td>
</tr>
<tr>
<td>MDP Ang/Mtr Cross Ck – Inhibit</td>
<td></td>
</tr>
</tbody>
</table>

Attachment 4
JEM RMS GROUNDING TABS – TASK DATA

Estimated Task Duration:

<table>
<thead>
<tr>
<th></th>
<th>With RMS</th>
<th>Without RMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>One EVA Crew</td>
<td>N/A</td>
<td>00:30</td>
</tr>
<tr>
<td>Two EVA Crew</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

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 1. Grounding Tab Obstructing Camera View
Figure 2. Grounding Tabs
Figure 3. JEM RMS KOZ
**EVA 1 ATTACH S6 TO S5 (01:05) (Cont)**

<table>
<thead>
<tr>
<th>IV</th>
<th>EV1 – Swanson (FF)</th>
<th>EV2 – Arnold (FF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque wrench out of bag GMT: _____ : _____</td>
<td>6. Retrieve torque wrench from Crewlock Bag</td>
<td>5. On IV call: EV2 has GO for translation on S6 truss</td>
</tr>
<tr>
<td>8. Give EV1 and EV2 GO for translation on S6 truss</td>
<td>7. Transfer 5/8-7.8-in ext from PGT to torque wrench</td>
<td>RTAS BOLT 2 AND 1 FINAL TORQUE</td>
</tr>
<tr>
<td></td>
<td>8. On IV call: EV1 has GO for translation on S6 truss</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RTAS BOLT 3 AND 4 FINAL TORQUE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9. Torque RTAS Bolts 3 and 4 (any order)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Torque Wrench, 5/8-7.8-in ext: 57 ft-lb cw, to torque</td>
<td></td>
</tr>
<tr>
<td></td>
<td>\√Gap with small equip hook</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Bolt Order</strong></td>
<td><strong>BRT</strong></td>
</tr>
<tr>
<td></td>
<td>Bolt 3 – zenith/aft</td>
<td>2138</td>
</tr>
<tr>
<td></td>
<td>Bolt 4 – zenith/fwd</td>
<td>2129</td>
</tr>
<tr>
<td><strong>NOTE</strong>: Once 3 of 4 RTAS bolts at final torque, inform M1/M2 on RTAS bolt status</td>
<td>10. Transfer torque wrench to EV2</td>
<td></td>
</tr>
<tr>
<td>11. Retrieve tools from Crewlock Bag and stow on MWS:</td>
<td>12. EV1 perform glove/gauntlet inspection, report status to IV</td>
<td>6. Receive torque wrench from EV1</td>
</tr>
<tr>
<td></td>
<td>7/16-6-in ext from socket caddy (for PVR)</td>
<td>Attach torque wrench to left MWS RET</td>
</tr>
<tr>
<td></td>
<td>□ 7/16-6-in ext from socket caddy (for PVR)</td>
<td>7. Torque RTAS Bolts 2 and 1 (any order):</td>
</tr>
<tr>
<td></td>
<td>Install wobble socket on PGT</td>
<td>Torque Wrench, 5/8-7.8-in ext: 57 ft-lb cw, to torque \√Gap with small equip hook</td>
</tr>
<tr>
<td></td>
<td>□ Canon Connector Tools (2)</td>
<td><strong>NOTE</strong>: Once 3 of 4 RTAS bolts at final torque, inform M1/M2 on RTAS bolt status</td>
</tr>
<tr>
<td></td>
<td>(Use MWS RETs on connector tools. Leave crewlock RETs on connector tool)</td>
<td><strong>Bolt Order</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2128</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2126</td>
</tr>
<tr>
<td>Once all RTAS bolts (4) at final torque and verified tools and tethers clear, give SSRMS GO for S6 ungrapple</td>
<td>9. Obtain glove inspection report from EV1</td>
<td>8. Translate to crewlock bag</td>
</tr>
<tr>
<td>Torque wrench re-stowed GMT: _____ : _____</td>
<td>10. Stow torque wrench in torque wrench bag on Crewlock Bag with RET</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>EV1 – Swanson (FF)</td>
<td>EV2 – Arnold (FF)</td>
</tr>
<tr>
<td>----</td>
<td>--------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>10. Obtain glove inspection report from EV2</td>
<td>RELEASE S5 CAPTURE LATCH PRE-LOAD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. 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</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. EV2 perform glove/gauntlet inspection, report status to IV</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Translate to S5/S6 umbilical worksite (radiator side)</td>
<td></td>
</tr>
</tbody>
</table>
### EVA 1 CONNECT S5 TO S6 UMBILICALS (00:55)

<table>
<thead>
<tr>
<th>IV</th>
<th>EV1 – Swanson (FF)</th>
<th>EV2 – Arnold (FF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S6 TO S5 INHIBITS (see Task Data for reqd inhibits)</td>
<td><strong>CONNECT S6 UMBILICALS</strong></td>
<td><strong>CONNECT S6 UMBILICALS</strong></td>
</tr>
<tr>
<td>1. □ IV verify with MCC-H S5-S6 inhibits in place</td>
<td>1. Assist EV1, as reqd</td>
<td></td>
</tr>
<tr>
<td>2. Give EV GO for P253 demate</td>
<td>2. Open TA clamps (10): P253 (2) □ □ □, P254 (2) □ □ □, P259 (3) □ □ □, P260 (3) □ □ □</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE**
- Connectors for straight pins, no FOD, EMI band intact, and good bend radius.
- RET to caps when both connector tools are in use, as reqd

3. On IV GO, perform the following 1553 Bus A demate/mates and swap connector cap from S5 to S6 dummy connector:

<table>
<thead>
<tr>
<th>EV2 – Demate cap from S6</th>
<th>EV1 – Demate cable from S5</th>
<th>EV2 – Insp/Mate cable to S6</th>
<th>EV1 – Insp/Mate cap on S5</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ S6 cap ←→ S6 J153</td>
<td>□ S5 P253 ←→ S5 J153</td>
<td>□ S5 P253 ←→ S6 J153</td>
<td>□ S6 cap ←→ S5 J153</td>
</tr>
</tbody>
</table>

4. Give IV/MCC-H GO for 1553 bus reconfiguration. Continue with power cap/connector demates:

<table>
<thead>
<tr>
<th>EV2 – Demate cap from S6</th>
<th>EV1 – Demate cable from S5</th>
<th>EV1 – Insp and mate cable to S6</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ S6 cap ←→ S6 J160</td>
<td>□ S5 P260 ←→ S5 J160</td>
<td>□ S5 P260 ←→ S6 J160</td>
</tr>
</tbody>
</table>

EV2: Keep cap on tool


6. Stow cannon connector tools on HR 2140 and HR 2142

7. On EV GO, perform the following 1553 Bus B cap/connector swap:

<table>
<thead>
<tr>
<th>EV2 – Demate cap from S6</th>
<th>EV1 – Demate cable from S5</th>
<th>EV2 – Insp/Mate cable to S6</th>
<th>EV1 – Insp/Mate cap on S5</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ S6 cap ←→ S6 J154</td>
<td>□ S5 P254 ←→ S5 J154</td>
<td>□ S5 P254 ←→ S6 J154</td>
<td>□ S6 cap ←→ S5 J154</td>
</tr>
</tbody>
</table>

EV2: Keep cap on RET/tool

8. Give EV1 GO to demate P254

9. Notify MCC-H P254 mated (Give GO for S6 activation)

FS 7-26  
EVA/119/FIN X
1. IV/MCC+H: Verify Inhibits are in place: DDCU S0 1A

   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
      - Install P333 (W4145)/J333A (W4148)
   6. WVS Survey

CAUTION
Avoid contact with SPDA Radiator (Face 3) and S0 Radiator (Aft Face) to prevent hardware damage

Face 3 Shroud Door – Ingress Here

S0 Zenith – Looking Nadir

RPCM Worksite

SPDA Radiator

Aft Face Radiator

Install sleeve on this connector

FWD

TA clamp

HR 3500

W4145 P333 mated to W4148 S0 jumper J333A

W4148 S0 jumper P333A mated to A163 J333

ZEN

NAD

PANEL A163 (EVA 3) POST 12A.1

CAUTION
Avoid contact with SPDA Radiator (Face 3) and S0 Radiator (Aft Face) to prevent hardware damage
1. **IV/MCC-H**: Verify Inhibits are in place:

   Worksite Dependent
   - WS1: RPCM S3-4B_F
   - RPCM S3-3A_F
   - WS4: RPC S0-4B_A1
   - RPC S0-3A_A1

2. On IV GO (Inhibits completed)
3. Translate to nadir side of MT/MBS
4. Install Connector Sleeves (2) over affected connectors
   - J2 (W9181)/P2 (A1W8031)
   - J2 (W9182)/P2 (A2W8031)
5. WVS Survey

---

**Connectors:**

- J2 (W9181)/P2 (A1W8031)
- J2 (W9182)/P2 (A2W8031)

**Location:**

- Nadir side of MT

**Diagram:**

- Illustration of connector installation areas
- Marked connectors and sleeves installation locations
- Arrows indicating installation direction

---

**Notes:**

- WVS Survey
- Install sleeves here

---

**Attachment:**

- Attachment 5

---

**References:**

- FS 7-184
- EVA/119/FIN X
CONNECTOR INSULATING SLEEVE – SSPTS (NODE 1 FWD)

<table>
<thead>
<tr>
<th>IV</th>
<th>EV (FF)</th>
</tr>
</thead>
</table>
| 1. **IV/MCC-H:** Verify Inhibits are in place:  
  RPCM Z1 3B_A2  
  RPCM Z1 4B_A2 | 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 |

---

Attachment 5
### CONNECTOR INSULATING SLEEVE – SSPTS (LAB FWD)

<table>
<thead>
<tr>
<th>IV</th>
<th>EV (FF)</th>
</tr>
</thead>
</table>
| 1. **IV/MCC-H**: Verify Inhibits are in place:  
RPCM Z1 3B_A2  
RPCM Z1 4B_A2 | 1. Retrieve 2 connector sleeves (sz 21/25)  
2. On IV GO (Inhibits completed)  
3. Translate to Lab Fwd (stdb) – HR Lab 0273  
4. Install Connector Sleeves (2) over affected connectors  
   - P113/J113A  
   - P114/J114A  
5. WVS Survey |

![Diagram of connectors and locations](image)
## CONNECTOR INSULATING SLEEVE – SSPTS (PMA2 PORT)

<table>
<thead>
<tr>
<th>IV</th>
<th>EV (FF)</th>
</tr>
</thead>
</table>
| 1. IV/MCC-H: Verify Inhibits are in place: RPCM LA 1A4A_D3 RPCM Z1 4B_A2 | 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 P3/J3A |

![Diagram of connector sleeve placement](image)
### CONNECTOR INSULATING SLEEVE – SSPTS (PMA2 STBD)

<table>
<thead>
<tr>
<th>IV</th>
<th>EV (FF)</th>
</tr>
</thead>
</table>
| 1. **IV/MCC-H**: Verify Inhibits are in place:  
  RPCM LA 2A3B_D1  
  RPCM Z1 3B_A2 | 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  
  - P16/J16A  
  5. WVS Survey |

---

[Diagram with labels: 0407, J16A,P16, W9303]

---

FS 7-188  
EVA/119/FIN X
**EVA 4 INHIBIT PAD (Cont)**

<table>
<thead>
<tr>
<th>Z1 Patch Panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCC-H</td>
</tr>
<tr>
<td>1. RPCM Z13B_B RPC 18 – Open, Close Cmd Inhibit</td>
</tr>
<tr>
<td>2. RPCM S02B_D RPC 17 – Open, Close Cmd Inhibit</td>
</tr>
</tbody>
</table>

**WETA Inhibits, to be performed prior to WETA installation:**

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

**Orbiter**

<table>
<thead>
<tr>
<th>ALL EVAs</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCS</td>
</tr>
<tr>
<td>L12</td>
</tr>
<tr>
<td>1. √TCS POWER – OFF</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>KU-BAND ANTENNA</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCC-H</td>
</tr>
<tr>
<td>1. √KU-BAND Mask – active</td>
</tr>
<tr>
<td>2. √KU-BAND EVA Protect Box – active</td>
</tr>
</tbody>
</table>

**Ground**

<table>
<thead>
<tr>
<th>ALL EVAs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground Radar</td>
</tr>
<tr>
<td>MCC-H</td>
</tr>
<tr>
<td>1. √TOPO console, ground radar restrictions in place for EVA</td>
</tr>
</tbody>
</table>

**Ground Radar**

<table>
<thead>
<tr>
<th>JEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>JEMRMS</td>
</tr>
<tr>
<td>{JLP GPS Ant}</td>
</tr>
<tr>
<td>SSIPC</td>
</tr>
<tr>
<td>1. RIP MA Brake – On</td>
</tr>
<tr>
<td>2. MDP Main Mode – Stby Mode</td>
</tr>
<tr>
<td>3. PDB RMS Ext4 Vout: 0.0V</td>
</tr>
<tr>
<td>4. VCU_B TVC WVE Sig Stat – No Signal</td>
</tr>
<tr>
<td>5. VLU EE Pwr – Open</td>
</tr>
<tr>
<td>6. JEU Interlock – Inhibit</td>
</tr>
<tr>
<td>7. JEU RT – Inhibit</td>
</tr>
<tr>
<td>8. MDP Ang/Mtr Cross Ck – Inhibit</td>
</tr>
<tr>
<td>or</td>
</tr>
<tr>
<td>1. JEMRMS Rack – OFF</td>
</tr>
</tbody>
</table>

| 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 Install, to be performed prior to opening MLI |
| SSIPC | 1. PDB A2 RPC4 – OPEN |
| 2. PDB B1 RPC5 – OPEN |

| EFBI 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

<table>
<thead>
<tr>
<th>SM Antennas</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>IV</td>
<td>1. GTS – Deactivate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. ARISS (Ham Radio) – Deactivate or VHF (144-146 MHz) TX only</td>
<td></td>
</tr>
</tbody>
</table>

### EVAs ON PMA1 OR RSOS (LOCATION DEPENDENT)

<table>
<thead>
<tr>
<th>FGB Thrusters</th>
<th>MCC-M</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. √FGB MCS unpowered</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. √All FGB Attitude Control Thruster Valves (eighty) – closed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. √FGB Attitude Control Manifold Valves – closed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ΚШК1, ΚШК2, ΚШК4, ΚШК5, ΚШК9,ΟΚΟ3, ΟΚГ3, ΟΚΟ6, ΟΚГ6, ΟΚΟ7, ΟΚГ7, ΟΚΟ8, ΟΚГ8</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Soyuz Thrusters</th>
<th>MCC-M</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. √Soyuz manifolds (four) – closed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ЭКО1, ЭКО2, ЭКГ1, ЭКГ2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. √Soyuz MCS unpowered</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. √Soyuz Attitude Control Thruster Valves (fifty-two) – closed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. √Soyuz Main Engine Valves (K1, K2, K3, K4, K5, K6) – closed</td>
<td></td>
</tr>
</tbody>
</table>

### FGB Antennas

<table>
<thead>
<tr>
<th>MCC-M</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. √FGB KURS P [ΚΥΡΣ P] – Deactivated</td>
<td></td>
</tr>
</tbody>
</table>

### Soyuz Antennas

<table>
<thead>
<tr>
<th>MCC-M</th>
<th></th>
</tr>
</thead>
</table>
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**

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

Attachment 6
JEM RMS GROUNDING TABS – TASK DATA

Estimated Task Duration:

<table>
<thead>
<tr>
<th></th>
<th>With RMS</th>
<th>Without RMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>One EVA Crew</td>
<td>N/A</td>
<td>00:30</td>
</tr>
<tr>
<td>Two EVA Crew</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

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 1. Grounding Tab Obstructing Camera View
Figure 2. Grounding Tabs
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 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

Use Blue RETs only

<table>
<thead>
<tr>
<th>RET Counts</th>
<th>(total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RETs (sm-sm)</td>
<td>10 (16)</td>
</tr>
<tr>
<td>RETs (PIP pin)</td>
<td>2 (5)</td>
</tr>
<tr>
<td>RETs (lg-sm)</td>
<td>1 (6)</td>
</tr>
<tr>
<td>Adj Eq Tethers</td>
<td>4 (10)</td>
</tr>
<tr>
<td>8 Adj (sm-sm) on ISS, from STS</td>
<td>2 (12)</td>
</tr>
</tbody>
</table>

D-ring Tether Extenders = 5 (6)

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

FS 7-13

EVA/119/FIN X
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 TP) 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, blck)
- 1/2-in Socket-8 ext
- 7/16-in (wobble) Socket-6 ext (spare)
- 2 – DCM Plug (SAFER Hardmount)
- 2 – RET (sm-sm, black)

**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 (hook #1)
- 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
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

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
- 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
- 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

Use Blue RETs Only

<table>
<thead>
<tr>
<th>Tether Count</th>
<th>(used)</th>
<th>(total)</th>
<th>ISS qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>RET (sm-sm)</td>
<td>9</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>RET (w/PIP pin)</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>RET (Lg-sm)</td>
<td>3</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Adj Tethers (sm-sm)</td>
<td>4</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Adj Tethers (Lg-sm)</td>
<td>0</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>D-ring Extenders</td>
<td>5</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

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 (buckles in the middle)
  - RET (Lg-sm) (Attach to A/L D-ring ext)
  - APFR

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

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EVA/119/FIN X
**EVA 2 TOOL CONFIG (Cont)**

**CREWLOCK (Cont)**

**Staging Bag**
- Fish Stringer #1
- Wire Tie Caddy (hook #1)
- 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

**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**

**Mesh Bag #1 (119 EVA Tools)**
- WIF Adapter
- 2 – EVA Wipes
- Grease Gun
- PGT Battery & Wire Tie
- 2 – Wire Ties (short)
- 2 – Wire Ties (long)
- BRS Pin Tool w/Sheath
- Ziplock w/Grease Gun Caps
- Fish Stringer
- Rnd Scoop
- 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 #2 (Done Tools)**
- 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 Insulating Sleeve Size 33/37 (Int RET #3)

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

**FS 7-63**

**EVA/119/FIN X**
**IV**

1. **Post crew egress:**
   - WVS Software: Select page – RF Camera
   - sel 'Advanced controls'
   - S-Band level (two) – max
   - (Required after A/L egress)

   **NOTE**
   - Sunrise/Sunset checks
   - \(\checkmark\) Helmet lts, visor, as reqd
   - \(\checkmark\) Gloves & Gauntlets
   - \(\checkmark\) Tool, MWS tethers
   - \(\checkmark\) MWS, BRT latches

**EV1 – Swanson (FF)**

- **INITIAL CONFIG**
  - Verify:
    - \(\checkmark\) EV1 right waist tether connected to EV3's 85-ft safety tether
    - \(\checkmark\) Gate closed (both hooks)
    - \(\checkmark\) Hook locked (both hooks)
    - \(\checkmark\) Reel unlocked

- **EGRESS (00:20)**
  1. Open hatch thermal cover
  2. Egress crewlock
  3. Receive C/L bag #3 from EV3 and attach to BRT
  4. Verify EV3 SAFER Configuration:
     - \(\checkmark\) R Handle down (HCM door – Closed)
     - \(\checkmark\) L Handle down (MAN ISO Valve – Open)
  5. Translate to P1/P3 tether swap location
     (P1 nadir-outboard, near CP9)
  6. Attach EV1 85-ft safety tether hook to P1 HR 3652
     out of EV3s translation path (nadir of P1 FHRC)
     - \(\checkmark\) Gate closed
     - \(\checkmark\) Hook locked
     - \(\checkmark\) Reel unlocked
  7. Attach EV3 85-ft safety tether hook to P1 HR 3651
     - \(\checkmark\) Gate closed
     - \(\checkmark\) Hook locked
  8. Release EV1 waist tether from EV3 safety tether
  9. Give EV3 GO to release EV3 waist tether from Airlock D-ring
  10. Translate to LAB WIF 7

**EV3 – Acaba (FF)**

- **INITIAL CONFIG**
  - Verify:
    - \(\checkmark\) EV3 right waist tether connected to Airlock D-ring extender
    - \(\checkmark\) Gate closed
    - \(\checkmark\) Hook locked

- **EGRESS (00:20)**
  1. Transfer C/L bag #3 to EV1; RET(Lg-sm) to A/L D-ring ext
  2. Egress crewlock
  3. Verify EV1 SAFER Configuration:
     - \(\checkmark\) R Handle down (HCM door – Closed)
     - \(\checkmark\) L Handle down (MAN ISO Valve – Open)
  4. Perform translation adaptation as reqd
  5. \(\checkmark\) Reel unlocked
  6. On EV1 GO, release right waist tether from Airlock D-ring
  7. Close hatch thermal cover
### EVA 3 SUMMARY TIMELINE

<table>
<thead>
<tr>
<th>PET HR : MIN</th>
<th>IV/SSRMS</th>
<th>EV2 – Arnold</th>
<th>EV3 – Acaba</th>
<th>PET HR : MIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>00:00</td>
<td>EVA 3 POST DEPRESS, EGRESS &amp; SETUP (00:50)</td>
<td>EVA 3 POST EGRESS &amp; SETUP (00:50)</td>
<td></td>
<td>00:00</td>
</tr>
<tr>
<td></td>
<td>• Post Depress/Egress (00:25)</td>
<td>• Post Depress/Egress (00:25)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Setup (00:20)</td>
<td>• Setup (00:20)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Egress w/Med ORU Bag [Crewlock Bags (3) inside]</td>
<td>Egress w/Crewlock Bag, WIF adapter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>01:00</td>
<td>CETA CART RELOCATION (01:00)</td>
<td>CETA CART RELOCATION (01:00)</td>
<td></td>
<td>01:00</td>
</tr>
<tr>
<td></td>
<td>• CETA Cart (01:00)</td>
<td>• CETA Cart (01:00)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>02:00</td>
<td>SPDM COVERS (01:30)</td>
<td>S1 TASKS (02:10)</td>
<td></td>
<td>02:00</td>
</tr>
<tr>
<td></td>
<td>• OTCM Cover Reconfiguration (00:30)</td>
<td>• S1/S3 SSAS BBC PNL RECONFIG (00:30)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• EP1 Cover Removal (00:40)</td>
<td>• S3 FLUID QD JUMPER INSTALL (00:35)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• SPDM Cover Cleanup (00:20)</td>
<td>• S1 FHRC P CLAMP RELEASE (01:05)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Stinger (01:05)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>o Hose Box (00:30)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>o FHRC Cleanup (00:10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>03:00</td>
<td>LEE B REPAIR (01:45)</td>
<td>S0 1A_D RPCM R&amp;R (00:45)</td>
<td></td>
<td>03:00</td>
</tr>
<tr>
<td></td>
<td>• LEE B Snare Repair (01:15)</td>
<td>• LEE B Cleanup (00:30)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>04:00</td>
<td>CLEANUP AND INGRESS (00:50)</td>
<td>GET AHEADS (00:45)</td>
<td></td>
<td>04:00</td>
</tr>
<tr>
<td>05:00</td>
<td>CLEANUP AND INGRESS (00:25)</td>
<td></td>
<td></td>
<td>05:00</td>
</tr>
<tr>
<td>06:00</td>
<td>EVA 3 PET = 06:00 hr</td>
<td>PRE-REPRESS (00:05)</td>
<td></td>
<td>06:00</td>
</tr>
<tr>
<td>06:30</td>
<td></td>
<td>PRE-REPRESS (00:05)</td>
<td></td>
<td>06:30</td>
</tr>
</tbody>
</table>

**Notes:**
- EV3 – Acaba (SSRMS) for CETA Cart Ops
- EV2 – Arnold (SSRMS) for SPDM & LEE B Lube (EV2 egresses SSRMS prior to LEE REPAIR)
- EV2 bingo time to start LEE REPAIR: PET = 03:45
- Begin S0 RPCM powerdown commanding when EV3 completes S1 TASKS
- EV3 must complete or break out of S1 TASKS to start S0 RPCM R&R by a PET = 04:00

**Additional Tasks:**
- CETA CART RELOCATION (01:00)
- S1 TASKS (02:10)
- LEE B REPAIR (01:45)
- CLEANUP AND INGRESS (00:50)
- GET AHEADS (00:45)

**Timeline Breakdown:**
- **00:00**
  - EVA 3 POST DEPRESS, EGRESS & SETUP (00:50)
- **01:00**
  - CETA CART RELOCATION (01:00)
- **02:00**
  - SPDM COVERS (01:30)
- **03:00**
  - LEE B REPAIR (01:45)
- **04:00**
  - CLEANUP AND INGRESS (00:50)
- **05:00**
  - GET AHEADS (00:45)
- **06:00**
  - PRE-REPRESS (00:05)

**Attachment:**
- Attachment 7
EVA 3 SUMMARY TIMELINE (Cont)

<table>
<thead>
<tr>
<th>EVA 3 Constraints and Bingo Times Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Powerdown required to put inhibits in place for S0-1A_D and R&amp;R will take approximately 15-20 min of ground commanding to execute; thus, <strong>MCC-H</strong> will begin powerdown operations when EV3/Acaba completes the S1 tasks and starts translation to the RPCM R&amp;R location.</td>
</tr>
<tr>
<td>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.</td>
</tr>
<tr>
<td>3. Some of the ISS cameras that will be powered down in support of the RPCM R&amp;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.</td>
</tr>
<tr>
<td>4. <strong>MCC-H</strong> 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.</td>
</tr>
<tr>
<td>5. Per their procedure, crewmembers will confirm w/ <strong>MCC-H</strong> that inhibits are in place prior to beginning the RPCM R&amp;R.</td>
</tr>
<tr>
<td>6. Per their procedure, crewmembers will notify <strong>MCC-H</strong> that the RPCM R&amp;R is complete.</td>
</tr>
<tr>
<td>7. <strong>MCC-H</strong> will make a call to the crewmembers confirming that DDCU powerup is beginning, once the RPCM R&amp;R is complete.</td>
</tr>
<tr>
<td>8. To manage the timeline and ensure LEE B Lube and RPCM R&amp;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&amp;R at an EVA PET of NLT 4:45 hr.</td>
</tr>
<tr>
<td>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.</td>
</tr>
</tbody>
</table>
## EVA 3 INHIBIT PAD

### Orbiter (1)

<table>
<thead>
<tr>
<th>ALL EVAs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TCS</td>
<td>1. √TCS POWER – OFF</td>
</tr>
<tr>
<td>KU-BAND ANTENNA</td>
<td></td>
</tr>
<tr>
<td>{Performed during egress}</td>
<td></td>
</tr>
<tr>
<td>MCC-H</td>
<td>1. √KU-BAND Mask – active</td>
</tr>
<tr>
<td></td>
<td>2. √KU-BAND EVA Protect Box – active</td>
</tr>
</tbody>
</table>

### Ground

<table>
<thead>
<tr>
<th>ALL EVAs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground Radar</td>
<td></td>
</tr>
<tr>
<td>MCC-H</td>
<td>1. √TOPO console, ground radar restrictions in place for EVA</td>
</tr>
</tbody>
</table>

### USOS (1)

<table>
<thead>
<tr>
<th>ALL EVAs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PCU</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NOTE</td>
</tr>
<tr>
<td></td>
<td>PCUs may require up to a 1-hr warmup period before they are operational</td>
</tr>
<tr>
<td>MCC-H</td>
<td>1. √PCUs (two) operational in discharge mode and one of the following:</td>
</tr>
<tr>
<td></td>
<td>a. CCS PCU EVA hazard control FDIR enabled</td>
</tr>
<tr>
<td></td>
<td>b. No more than two arrays unshunted and oriented &lt; 105° from velocity vector</td>
</tr>
<tr>
<td></td>
<td>If one or both PCUs failed</td>
</tr>
<tr>
<td></td>
<td>2. No more than two arrays unshunted and oriented &lt; 105° from velocity vector</td>
</tr>
<tr>
<td>EuTEF</td>
<td>Verify PLEGPay Power Status (ETF_PLEGPAY_Pwr_Stat) – OFF</td>
</tr>
<tr>
<td>COL-CC</td>
<td></td>
</tr>
</tbody>
</table>

### 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)

<table>
<thead>
<tr>
<th>Inhibit Description</th>
<th>MCC-H Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVA 3 SPECIFIC INHIBITS</td>
<td></td>
</tr>
<tr>
<td>RPCM R&amp;R</td>
<td>{Prior to performing S0 1A_D R&amp;R}</td>
</tr>
<tr>
<td>NOTE</td>
<td>Phalcon plan is to take DDCU S01A Converter – Off, prior to the first RPCM R&amp;R task, and leave in off until both RPCM R&amp;Rs are complete</td>
</tr>
<tr>
<td>RPCM S01A_D</td>
<td>1. Verify DDCU S01A Converter – Off</td>
</tr>
</tbody>
</table>

### RSOS (1)

<table>
<thead>
<tr>
<th>Inhibit Description</th>
<th>MCC-H Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALL EVAs</td>
<td></td>
</tr>
<tr>
<td>IMPULSE (ИПИ-100) – Deactivate</td>
<td></td>
</tr>
<tr>
<td>SM Antennas</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>1. GTS – Deactivate</td>
</tr>
<tr>
<td>2. ARISS (Ham Radio) – Deactivate or VHF (144-146 MHz) TX only</td>
<td></td>
</tr>
</tbody>
</table>

### USOS (3)

<table>
<thead>
<tr>
<th>Inhibit Description</th>
<th>MCC-H Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION DEPENDENT INHIBITS</td>
<td></td>
</tr>
<tr>
<td>S-Band (SASA) Antennas</td>
<td></td>
</tr>
<tr>
<td>{On call, EV crew not expected to be in this area}</td>
<td></td>
</tr>
<tr>
<td>MCC-H</td>
<td>If EV crew &lt; 3.6 ft from S1 SASA [P1 SASA]</td>
</tr>
<tr>
<td>1. P1 SASA (S1 SASA) – Active</td>
<td></td>
</tr>
<tr>
<td>2. S1 SASA [P1 SASA] – Powered down</td>
<td></td>
</tr>
<tr>
<td>SARJ</td>
<td></td>
</tr>
<tr>
<td>{On call, EV crew not expected to be in this area}</td>
<td></td>
</tr>
<tr>
<td>MCC-H</td>
<td>If EV crew working within 2 ft or outboard of SARJ</td>
</tr>
<tr>
<td>1. DLA (1) – LOCKED</td>
<td></td>
</tr>
<tr>
<td>2. All motor setpoints set to zero</td>
<td></td>
</tr>
<tr>
<td>3. All motors deselected</td>
<td></td>
</tr>
<tr>
<td>TRRJ</td>
<td>For S1/S3 Fluid QD Jumper &amp; FHRC P-Clamps:</td>
</tr>
<tr>
<td>MCC-H</td>
<td>While EV crew working within 2 ft of S1 TRRJ rotation envelope</td>
</tr>
<tr>
<td>1. DLA (1) – LOCKED (locked at 0 deg for FHRC P-Clamps)</td>
<td></td>
</tr>
<tr>
<td>FPMU</td>
<td>{On call, EV crew not expected to be in this area}</td>
</tr>
<tr>
<td>MCC-H</td>
<td>If EV crew working within 5 ft of Floating Potential Measurement Unit</td>
</tr>
<tr>
<td>1. FPMU power – Off</td>
<td></td>
</tr>
<tr>
<td>SSPTS</td>
<td>{On call, EV crew not expected to be in this area}</td>
</tr>
<tr>
<td>MCC-H</td>
<td>If EV crew working within 2 ft of SSPTS cables</td>
</tr>
<tr>
<td>1. RPCM LA1A4A D RPC 3 – Open, Close Cmd Inhibit</td>
<td></td>
</tr>
<tr>
<td>2. RPCM LA2A3B D RPC 1 – Open, Close Cmd Inhibit</td>
<td></td>
</tr>
<tr>
<td>3. RPCM Z14B A RPC 2 – Open, Close Cmd Inhibit</td>
<td></td>
</tr>
<tr>
<td>4. RPCM Z13B A RPC 2 – Open, Close Cmd Inhibit</td>
<td></td>
</tr>
</tbody>
</table>
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)

**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
  - RET (Lg-sm)
- MWS
  - Small Trash Bag
  - RET (w/PIP pin) [right]
  - RET (sm-sm)
  - WIF Adapter
  - RET (Lg-sm)
- 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)

**CREWLOCK**

**CREWLOCK**
- RET (sm-sm) = 13 (16)
- RET (lg-sm) = 4 (8)
- Adj Eq Tethers (sm-sm) = 9 (10)
- Adj Eq Tethers (lg-sm) = 1 (2)
- D-ring Tether Extenders = 5 (6)

**CREWLOCK**
- 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)

**SAFER**

**SAFER**
- Use Blue RETS only
- RET Counts: used (ISS qty)
  - RETs (sm-sm) = 13 (16)
  - RETs (PIP pin) = 4 (5)
  - RETs (lg-sm) = 4 (8)

**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

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

FS 7-98

EVA/119/FIN Y
### 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

---

### 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"

**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

---

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

---

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

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

Check Trash Bag zipper is closed
**EVA 3 EGRESS (00:25)**

<table>
<thead>
<tr>
<th>IV</th>
<th>EV2 – Arnold (FF)</th>
<th>EV3 – Acaba (SSRMS)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>INITIAL CONFIG</td>
<td>INITIAL CONFIG</td>
</tr>
<tr>
<td></td>
<td>Verify Safety Tether configuration:</td>
<td>Verify Safety Tether configuration:</td>
</tr>
<tr>
<td></td>
<td>□ EV2 right Waist Tether connected to</td>
<td>□ EV3 right Waist Tether connected to</td>
</tr>
<tr>
<td></td>
<td>EV3 Safety Tether</td>
<td>airlock hatch D-ring extender</td>
</tr>
<tr>
<td></td>
<td>□ □ Gate closed (both hooks)</td>
<td>□ □ Gate closed</td>
</tr>
<tr>
<td></td>
<td>□ □ Hook locked (both hooks)</td>
<td>□ □ Hook locked</td>
</tr>
<tr>
<td></td>
<td>EGRESS (00:25)</td>
<td>EGRESS (00:25)</td>
</tr>
<tr>
<td></td>
<td>1. Open hatch thermal cover</td>
<td>1. □ EV3 Safety Tether Reel unlocked</td>
</tr>
<tr>
<td></td>
<td>2. Egress crewlock</td>
<td>2. On EV2 GO, release waist tether</td>
</tr>
<tr>
<td></td>
<td>3. Attach EV2 85-ft Safety Tether hook to aft D-ring anchor point. Verify Safety Tether configuration:</td>
<td>3. EV3 retrieve APFR and transfer to EV2</td>
</tr>
<tr>
<td></td>
<td>□ □ Gate closed</td>
<td>□ □ Gate closed</td>
</tr>
<tr>
<td></td>
<td>□ □ Hook locked</td>
<td>□ □ Hook locked</td>
</tr>
<tr>
<td></td>
<td>□ Safety Tether Reel unlocked</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Attach EV3 85-ft Safety Tether to forward D-ring anchor point</td>
<td>4. EV3 retrieve Med ORU Bag (leave RET on AL D-ring extender)</td>
</tr>
<tr>
<td></td>
<td>□ □ Gate closed</td>
<td>Transfer Med ORU Bag to EV2</td>
</tr>
<tr>
<td></td>
<td>□ □ Hook locked</td>
<td></td>
</tr>
<tr>
<td></td>
<td>□ Release EV2 waist tether</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Give EV3 GO to release waist tether</td>
<td>5. EV3 retrieve LEE Lube Crewlock Bag #1</td>
</tr>
<tr>
<td></td>
<td>6. EV2 receive APFR from EV3</td>
<td>Transfer LEE Lube Crewlock Bag #1 to EV2</td>
</tr>
<tr>
<td></td>
<td>Stow APFR in airlock toolbox starboard WIF (Low-profile, record APFR settings: [<strong>,</strong>,__])</td>
<td>[Keep RET (lg-sm) on bag]</td>
</tr>
<tr>
<td></td>
<td>□ □ Bk-Bk, pull/twist test</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. EV2 receive med ORU Bag</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Attach med ORU to BRT</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. EV2 receive LEE Lube Crewlock Bag #1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hold LEE Lube Crewlock Bag #1 for EV3</td>
<td></td>
</tr>
</tbody>
</table>

NOTE
Sunrise/Sunset checks:
- □ Helmet lts, visor, as reqd
- □ Glove heaters
- □ Tool, MWS tethers
- □ MWS, BRT latches

**Attachment 7**
**EVA 3 SPDM COVERS (01:30) (Cont)**

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

Post 1JA SPDM Configuration

2.6 Flaps (SJEU) – Detail

Wrap Blanket – Detail 1

Currently part of this side of the blanket is rolled under, all of the tab on the opposite side is rolled under.

- EP 1 blanket
- 2.6 flaps
- Wrist MLI flaps
- Wrap blanket interface
- SJEU cover (removed on 1JA)
- SJEU flaps (cover exposed velcro)
## EVA 3 LEE B REPAIR (01:45) (Cont)

<table>
<thead>
<tr>
<th>IV/SSRMS</th>
<th>EV2 – Arnold (FF)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prep grease gun:</strong></td>
<td>34. Give <strong>SSRMS</strong> GO to maneuver a -120 deg (cw) wrist roll</td>
</tr>
<tr>
<td>• Engage teeth by rotating plunger 180 deg (black triangle up)</td>
<td>35. On <strong>SSRMS</strong> GO: Pull lower right snare (#2) fully out into C-curve with gap gauge, apply force perpendicular to rod-end</td>
</tr>
<tr>
<td>• Remove MLI. Stow on gun in way to prevent contact w/LEE</td>
<td>36. <strong>Prep grease gun</strong></td>
</tr>
<tr>
<td>• Point tip away from LEE</td>
<td>37. Apply grease to rod-end/fork interface to lower left bearing (#3)</td>
</tr>
<tr>
<td>• Rotate shutoff knob such that FLOW points toward nozzle</td>
<td>38. Apply grease to rod-end/fork interface to lower right bearing (#2)</td>
</tr>
<tr>
<td><strong>Stow grease gun:</strong></td>
<td>39. <strong>Stow grease gun</strong></td>
</tr>
<tr>
<td>• Disengage teeth by rot plunger 180 deg (black triangle down)</td>
<td>40. Exercise lower left bearing (#3) in x-axis using needle nose pliers [1 min/40 cycles]</td>
</tr>
<tr>
<td>• Rotate shutoff knob such that FLOW points ⊥ to nozzle</td>
<td>41. Report to IV/MCC-H: Noticeable change in bearing motion</td>
</tr>
<tr>
<td>• Install MLI tip cover</td>
<td>42. Exercise lower right bearing (#2) in x-axis using needle nose pliers [1 min/40 cycles]</td>
</tr>
</tbody>
</table>

![Diagram](attachment:7)

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

47. **Prep grease gun**

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

49. Apply grease to rod-end/fork interface to lower right bearing (#6)

50. **Stow grease gun**

51. Exercise lower left bearing (#1) 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)

<table>
<thead>
<tr>
<th>IV/SSRMS</th>
<th>EV2 – Arnold (FF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. M1/M2: Receive GO from EV2 for Snare Checkout</td>
<td>LEE B CLEANUP (00:30)</td>
</tr>
<tr>
<td>4. IV/MCC-H: Receive EV2 report on snare condition</td>
<td>58. Give SSRMS GO for Snare Checkout (Close and Open Snare)</td>
</tr>
<tr>
<td>6. M1/M2: On EV2 GO, maneuver SSRMS to LEE</td>
<td>60. ![ ] Take pictures of LEE:</td>
</tr>
<tr>
<td>Lubrication Clearance position</td>
<td>• Bearings #1 &amp; #2</td>
</tr>
<tr>
<td></td>
<td>• Bearings #3 &amp; #4</td>
</tr>
<tr>
<td></td>
<td>• Bearings #5 &amp; #6</td>
</tr>
<tr>
<td></td>
<td>• Overall view of LEE</td>
</tr>
<tr>
<td></td>
<td>61. Stow EVA Camera on MWS swingarm</td>
</tr>
<tr>
<td></td>
<td>62. Inform M1/M2, LEE photos and observation complete.</td>
</tr>
<tr>
<td></td>
<td>Give SSRMS GO to maneuver SSRMS to LEE Lubrication Clearance position</td>
</tr>
<tr>
<td></td>
<td>63. Adjust MWS up, as reqd</td>
</tr>
<tr>
<td></td>
<td>64. Perform tool inventory</td>
</tr>
<tr>
<td></td>
<td>65. Place EVA wipe over end of grease gun and secure with wire tie</td>
</tr>
<tr>
<td>Tool Inventory</td>
<td>66. Stow grease gun on outside of Crewlock Bag using adj tether</td>
</tr>
<tr>
<td>MWS</td>
<td>67. Egress APFR</td>
</tr>
<tr>
<td>![ ] Small trash bag</td>
<td>68. Collapse APFR ingress aid</td>
</tr>
<tr>
<td>![ ] RET</td>
<td>69. Relocate APFR to S0 WIF 42 ![ ] Blk-Blk, pull/twist test</td>
</tr>
<tr>
<td>![ ] RET w/PIP pin</td>
<td>70. Adjust APFR to low-profile configuration and report settings to IV</td>
</tr>
<tr>
<td>![ ] Adj tether</td>
<td>71. Inspect gloves. Report glove check to IV</td>
</tr>
<tr>
<td>![ ] Wire ties (2)</td>
<td>72. Translate to Airlock</td>
</tr>
<tr>
<td>Crewlock Bag</td>
<td>73. Stow LEE Lube Crewlock Bag #1 at Airlock</td>
</tr>
</tbody>
</table>

| ![ ] Adj tether | 75. Give SSRMS GO for Snare Checkout (Close and Open Snare) |
| ![ ] Adj tether | 76. Report to IV/MCC-H: Snare condition (in or out of groove) |
| ![ ] EVA Wipes (2) | 77. Take pictures of LEE: |
| ![ ] EVA wipe w/ wire tie | • Bearings #1 & #2 |
| ![ ] Grease gun | • Bearings #3 & #4 |
| ![ ] Needle nose pliers | • Bearings #5 & #6 |
| ![ ] RCC Gap gauge | • Overall view of LEE |
| ![ ] Wire ties (2) | 78. Stow EVA Camera on MWS swingarm |
| ![ ] RET | 79. Inform M1/M2, LEE photos and observation complete. |
| ![ ] RET w/PIP pin | Give SSRMS GO to maneuver SSRMS to LEE Lubrication Clearance position |
| ![ ] EVA Wipes (2) | 80. Adjust MWS up, as reqd |
| ![ ] Adj tether | 81. Perform tool inventory |

7. IV: Record APFR settings: [__,__,__,__] (S0 WIF 42)
8. Receive glove check report from EV2
### EVA 3 S0 1A_D RPCM REMOVE/REPLACE (00:45) (Cont)

<table>
<thead>
<tr>
<th>MCC-H:</th>
<th>EV3 – ACABA (FF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Verify S0 RPCM Inhibits in place (√DDCU S01A Converter – Off), give EV GO for removal</td>
<td>On IV GO, perform the following RPCM R&amp;R steps:</td>
</tr>
<tr>
<td>2. Record Failed RPCM s/n __________ (expect s/n C024088)</td>
<td>5. Verify failed RPCM 1A_D is s/n C024088</td>
</tr>
<tr>
<td>3. Record Spare RPCM s/n __________ (expect s/n C235299)</td>
<td>6. Tether to RPCM with gate pointing away from RPCM</td>
</tr>
<tr>
<td>4. IV record S0 1A_D RPCM Drive Screw Installation Data Turns: _____ Torque: ______</td>
<td>7. PGT [A6 8.3 ft-lb, CCW2 30 RPM, MTL 30.5]-6ext 7/16</td>
</tr>
<tr>
<td></td>
<td>☐ Release Drive Screw, push while turning, ~8 turns</td>
</tr>
<tr>
<td></td>
<td>8. √Status Indicator – UNLOCK</td>
</tr>
<tr>
<td></td>
<td>9. Install scoop, as reqd</td>
</tr>
<tr>
<td></td>
<td>10. Remove failed RPCM (slide off rail)</td>
</tr>
<tr>
<td></td>
<td>11. Slow failed RPCM</td>
</tr>
<tr>
<td></td>
<td>12. Retrieve spare RPCM</td>
</tr>
<tr>
<td></td>
<td>13. Inspect RPCM connectors and guide rail for debris/damage</td>
</tr>
<tr>
<td></td>
<td>14. Verify spare RPCM s/n (expect C235299)</td>
</tr>
<tr>
<td></td>
<td>15. Verify proper hook orientation on new RPCM (gate away from RPCM)</td>
</tr>
<tr>
<td></td>
<td>16. Install RPCM on guide rail and slide into soft dock</td>
</tr>
<tr>
<td></td>
<td>17. √Status Indicator not below UNLOCK</td>
</tr>
<tr>
<td></td>
<td>18. PGT [A2 3.8 ft-lb, CW2 30 RPM, MTL 30.5]-6ext 7/16</td>
</tr>
<tr>
<td></td>
<td>☐ Fasten Drive Screw, push while turning, 6-7 turns to hard stop</td>
</tr>
<tr>
<td></td>
<td>19. √Status Indicator – LOCK</td>
</tr>
<tr>
<td></td>
<td>20. EV3 report torque and turns</td>
</tr>
<tr>
<td></td>
<td>21. Slide door closed, verify door does not slide freely and √alignment mark</td>
</tr>
<tr>
<td></td>
<td>22. Perform Tool Inventory</td>
</tr>
<tr>
<td></td>
<td>23. Close S0 1A_D RPCM Crewlock Bag #4. Attach S0 1A_D Crewlock Bag #4 to BRT</td>
</tr>
<tr>
<td></td>
<td>24. Inspect gloves Report glove status to IV</td>
</tr>
<tr>
<td></td>
<td>25. Translate to med ORU Bag (S0 HR 3528)</td>
</tr>
<tr>
<td></td>
<td>26. Stow S0 1A_D RPCM Crewlock Bag #4 in med ORU Bag</td>
</tr>
<tr>
<td></td>
<td>If time permits:</td>
</tr>
<tr>
<td></td>
<td>27. Perform CONNECTOR INSULATING SLEEVE – CHANNEL 1/4 (S0)</td>
</tr>
<tr>
<td></td>
<td>28. Perform CLEANUP</td>
</tr>
</tbody>
</table>

#### NOTE

Equipment Hook shown in correct orientation for R&R.

Gate away from RPCM
Table 1. Tools

<table>
<thead>
<tr>
<th>Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>EV2/EV3</td>
</tr>
<tr>
<td>PGT</td>
</tr>
<tr>
<td>7/16 (wobble) Socket-6 ext</td>
</tr>
<tr>
<td>Round scoop</td>
</tr>
</tbody>
</table>

Table 2. EVA Fasteners

<table>
<thead>
<tr>
<th>Fastener Name</th>
<th>Label</th>
<th>Head Size</th>
<th>Qty</th>
<th>Install Torque (ft-lb)</th>
<th>Release Torque (ft-lb)</th>
<th>Failure Torque (ft-lb)</th>
<th>Turns</th>
<th>RPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPCM Drive Screw</td>
<td>7/16</td>
<td>1</td>
<td>5.5 (grnd)</td>
<td>4.5</td>
<td>18.6 (remove)</td>
<td>8.5 (install)</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3.8 (orbit)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* 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

<table>
<thead>
<tr>
<th>ORU Type</th>
<th>Part Number</th>
<th>Serial Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spare RPCM</td>
<td>R077419-61</td>
<td>C326597</td>
</tr>
<tr>
<td>Failed RPCM</td>
<td>R077419-61</td>
<td>C235300</td>
</tr>
</tbody>
</table>

RPCM Tether Orientation

![RPCM Tether Orientation Image]
## EVA 3 CLEANUP (00:50)

<table>
<thead>
<tr>
<th>IV</th>
<th>EV2 – Arnold (FF)</th>
<th>EV3 – Acaba (FF)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CLEANUP (00:50)</td>
<td>CLEANUP (00:25)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Inform EV2/EV3 to begin cold soak, as reqd</td>
<td>1. Translate to med ORU Bag</td>
</tr>
<tr>
<td></td>
<td>Tool Inventory</td>
<td>2. Open med ORU Bag and stow the following items:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- S0 1A_D RPCM Crewlock Bag #4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- S1 Tasks Crewlock Bag #3 in the med ORU Bag</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Perform Tool Inventory</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Close med ORU Bag and attach to BRT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Adjust TCV to begin cold soak, as reqd</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. Translate to Airlock</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. Stow med ORU Bag at Airlock</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If time permits:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Perform GET AHEADS, per MCC-H</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Adjust TCV to begin cold soak, as reqd</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Translate to Airlock</td>
</tr>
<tr>
<td>2.</td>
<td>Adjust TCV to begin cold soak, as reqd</td>
<td>8. Perform GET AHEADS, per MCC-H</td>
</tr>
<tr>
<td></td>
<td>Translate to Airlock</td>
<td>9. Adjust TCV to begin cold soak, as reqd</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10. Translate to Airlock</td>
</tr>
</tbody>
</table>

### Tool Inventory

- 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
- 55 ft Safety Tether
- 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)
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

**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]
  - 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

**EV2**
- **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
  - EVA Camera w/bracket & 50mm lens
  - RET (sm-sm)
  - Swing Arm (right side)
  - PGT w/6-in ext s/n _________
  - RET (sm-sm)
  - BRT (left side)
  - RET (sm-sm)
  - 2 – Wire ties
  - SAFER

**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
  - IR Camera w/ISIP Bat
  - Round Scoop

- RET (sm-sm) (On UIA D-ring)
  - PGT w/6-in ext
  - EVA Camera w/bracket & 50mm lens

- RET (sm-sm) (On UIA D-ring)
  - BRS Pin Tool w/Sheath

Use Blue RETs Only
- Tether Count: (used) (total)
  - RET (sm-sm) 13 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

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

Bag Color Key: 119 EVA Tools, Staging, Crewlock, MWS, JLP, JPM
### EVA 4 TOOL CONFIG (Cont)

**CREWLOCK (Cont)**

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

<table>
<thead>
<tr>
<th>IV Bag</th>
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<tbody>
<tr>
<td>2 – Towel</td>
</tr>
<tr>
<td>Contamination Detection Kit</td>
</tr>
<tr>
<td>2 – GP Caddy</td>
</tr>
<tr>
<td>Thermal Mittens (1 pair)</td>
</tr>
<tr>
<td>RET (sm-sm) (Black)</td>
</tr>
<tr>
<td>Socket Caddy</td>
</tr>
<tr>
<td>1/2-in (wobble) Socket – 8 ext</td>
</tr>
<tr>
<td>7/16-in (wobble) Socket – 6 ext</td>
</tr>
<tr>
<td>2 – DCM Plug (SAFER Hardmount)</td>
</tr>
<tr>
<td>2 – RET (sm-sm, black)</td>
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**EQUIPMENT LOCK**

<table>
<thead>
<tr>
<th>Crewlock Bag #1</th>
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<tr>
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<table>
<thead>
<tr>
<th>Crewlock Bag #4</th>
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<tbody>
<tr>
<td>Failed RPCM (Int RET #1)</td>
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</table>

<table>
<thead>
<tr>
<th>Mesh Bag #1 (119 EVA Tools)</th>
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</thead>
<tbody>
<tr>
<td>Empty</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mesh Bag #2 (Done Tools)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/8-7.8-in extension</td>
</tr>
<tr>
<td>5/8-7.8-in extension</td>
</tr>
<tr>
<td>Round TM w/5/8-in Prd Socket</td>
</tr>
<tr>
<td>Socket Caddy</td>
</tr>
<tr>
<td>Torque Wrench bag</td>
</tr>
<tr>
<td>Cannon Connector Tool</td>
</tr>
<tr>
<td>Cannon Connector Tool</td>
</tr>
<tr>
<td>Ratchet Wrench</td>
</tr>
<tr>
<td>7/16-2-in rigid ext</td>
</tr>
<tr>
<td>Cnctr Insulating Sleeve Size 33/37</td>
</tr>
<tr>
<td>SPDM EP1 Cover</td>
</tr>
<tr>
<td>RCC Gap Gauge</td>
</tr>
<tr>
<td>WIF Adapter</td>
</tr>
<tr>
<td>7/16-18-in ext</td>
</tr>
<tr>
<td>Clean wipes ______</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Mesh Bag #3 (Transfer to Shuttle)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locking Strut Aid</td>
</tr>
<tr>
<td>Locking Strut Aid</td>
</tr>
<tr>
<td>Locking Strut Aid</td>
</tr>
<tr>
<td>Locking Strut Aid</td>
</tr>
<tr>
<td>Torque Wrench (s/n 1007)</td>
</tr>
<tr>
<td>Used Wipes ______ (in Ziplock)</td>
</tr>
<tr>
<td>Grease Gun Cartridge (pending manifest)</td>
</tr>
</tbody>
</table>

Bag Color Key: 119 EVA Tools, Staging, Crewlock, MWS
### EVA 4 A/L EGRESS (00:20)

<table>
<thead>
<tr>
<th>IV</th>
<th>EV1 – Swanson (FF)</th>
<th>EV2 – Arnold (FF)</th>
</tr>
</thead>
</table>
| **INITIAL CONFIG** | Verify:  
- EV1 right waist tether connected to  
- EV2’s 85-ft safety tether  
- Gate closed (both hooks)  
- Hook locked (both hooks)  
- Tool, MWS tethers  
- MWS, BRT latches | Verify:  
- EV2 right waist tether connected to  
- Airlock D-ring extender  
- Gate closed  
- Hook locked  
- Reel unlocked |
| **EGRESS** | 1. Open hatch thermal cover  
2. Egress crewlock  
3. Attach EV1 safety tether to fwd A/L D-ring  
   - Gate closed  
   - Hook locked  
   - Reel unlocked  
4. Fairlead safety tether as reqd  
5. Attach EV2s safety tether anchor end to aft A/L D-ring  
   - Gate closed  
   - Hook locked  
   - Release EV1 waist tether | 1. On EV1 GO, release waist tether from A/L D-ring  
2. Hand Med ORU bag to EV1, Leave RET on A/L D-ring ext  
3. sw MASTER – ON, LED – OFF  
4. Press and release ENABLE switch to initiate camera warmup (IV start 5-min timer), LED – ON  
5. Place IR camera on BRT  
6. Egress crewlock |
| NOTE | Sunrise/Sunset checks  
- Helmet lts, visor, as reqd  
- Gloves  
- Tool, MWS tethers  
- MWS, BRT latches | IR Camera requires 5-min warm up after power up and prior to use |
| IR Camera Warmup start: ________ | | |
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 (NOD1O4_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
<table>
<thead>
<tr>
<th>ITEM #</th>
<th>A9</th>
<th>A10</th>
<th>A11</th>
<th>A12</th>
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<td>PURPOSE</td>
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<td></td>
<td>FLYAROUND</td>
<td></td>
<td>STACK</td>
<td>(MNRS)</td>
</tr>
</tbody>
</table>

**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.
3. Refer to DOCKED DAP REFERENCE (REBOOST/DAP) for appropriate values.
4. Use 1 for OBSS scan and 2 for Orbiter attitude maneuvers.
# STS-119 DAP B CONFIGURATIONS

## STS-119 DAP B1 – DAP B8 CONFIGURATIONS

<table>
<thead>
<tr>
<th>ITEM #</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
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<th>B7</th>
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<tr>
<td>PRI</td>
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## FS 3-6

| ALT   | RATE DB| 38 (58) | 0.200 | 0.070 | 0.070 | 0.100 | 0.200 | 0.200 | 0.100 |
| JET OPT | 39 (59) | ALL    | TAIL  | ALL   | ALL   | ALL   | ALL   | ALL   |
| # JETS| 40 (60) | 2      | 1     | 1     | 2     | 2     | 2     | 2     |
| ON TIME| 41 (61) | 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  |

## 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) | 0.020  | 0.020  | 0.020  | 0.010  | 0.020  | 0.020  | 0.020  | 0.020  |
| ROT PLS| 46 (66) | 0.002  | 0.002  | 0.002  | 0.002  | 0.002  | 0.002  | 0.002  | 0.020  |
| COMP  | 47 (67) | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  |
| CNTL ACC| 48 (68) | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |

## ORB OPS 118/19/20 FIN

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<th>LOSS OF VERN (ALL)</th>
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*BOLD/ITALIC indicates change from I-Load.*
## STS-119 DAP B9 – DAP B13 CONFIGURATIONS

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### 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
DOCKED DAP REFERENCE

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

DOCKED DAPs

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<td>STACK (MNRS)</td>
<td>STACK (ATT HOLD)</td>
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</table>

**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

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<th>WHEN AVAILABLE</th>
<th>PURPOSE</th>
<th>DAP MODE</th>
<th>CA (^a,b)</th>
<th>RATE DB (^a)</th>
<th>ROT RATE (^a)</th>
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<td>Post Dock (before S6 ops)</td>
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\(^a\) 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

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<th>DAP: LVLH(INRTL)</th>
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<td>If RATE DAMPING takes &gt; 2 min</td>
<td>DAP: FREE, then return to RATE DAMPING</td>
</tr>
<tr>
<td>(continuous jet activity)</td>
<td>(select FREE on the DAP every two minutes until rates are damped)</td>
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<tr>
<td>When rates damped (jet activity</td>
<td>When rates are below rate deadband (jet activity stopped), DAP: FREE &gt; 2 sec, then AUTO</td>
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<td>stopped)</td>
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FS 4-6 ORB OPS/119/FIN X
## STS-119 DAP A9 – DAP A14 Configurations

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### Purpose
- Docking
- Approach
- Attitude
- Docking
- Autonomous
- Docking

**Bold Italic** indicates change from 1. Load.

1. Loaded below keyboard limit, do not change
2. DAP.CA, ROT RATE and RATE DB will require updating during mating ops.
3. Refer to DODGED DAP REFERENCE (DOCKED DAP) for appropriate values
4. Use CA 2 Post Dock and before 90 Ops OR use CA 2 Post 90 Install
5. Use 1 for 0899 scan and 2 for 0899 attitude maneuvers
### TOP

**BACK OF** 'STS-119 DAP B1 - DAP B8 CONFIGURATIONS'

HINGED AT BOTTOM OF **'STS-119 DAP A9 - DAP A14 CONFIGURATIONS'**

---

#### STS-119 DAP B9 – DAP B13 CONFIGURATIONS

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<tr>
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<td># JETS</td>
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<td>2</td>
<td>1</td>
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<tr>
<td>ROT RATE</td>
<td>43 (63)</td>
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<tr>
<td>ATT DB</td>
<td>44 (64)</td>
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<td>0.500</td>
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<td>RATE DB</td>
<td>45 (65)</td>
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<tr>
<td>ROT PLS</td>
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<tr>
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</table>

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

1. F-loaded below keyboard limit, do not change
2. DAP CA, ROT RATE and RATE DB will require updating during transit ops.

Refer to DOCKED DAP REFERENCES for appropriate values.
PTG

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

FS 2-1 ORB OPS/119/FIN
### STAR PAIRS PAD

<table>
<thead>
<tr>
<th>STAR PAIR</th>
<th>SEP ANGLE</th>
<th>ATTITUDE SET 1</th>
<th>ATTITUDE SET 2</th>
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<td>DUAL S TRK</td>
<td>SINGLE S TRK</td>
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<tr>
<td></td>
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<td>-Z</td>
<td>-Y</td>
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<tr>
<td>A</td>
<td>84.3</td>
<td>-Y:43 R+ 1</td>
<td>R+ 272</td>
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<td>-Z:47 P+ 74</td>
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<td>Y+ 335</td>
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<td>Y+ 343</td>
<td>Y+ 347</td>
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<td>B</td>
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<td>-Y:51 R+ 205</td>
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<td>Y+ 345</td>
<td>Y+ 327</td>
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<td>C</td>
<td>85.3</td>
<td>-Y:95 R+ 74</td>
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<td>Y+ 5</td>
<td>Y+ 355</td>
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<td>D</td>
<td>81.9</td>
<td>-Z:21 P+ 242</td>
<td>R+ 29</td>
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<td></td>
<td></td>
<td>Y+ 346</td>
<td>Y+ 350</td>
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<th>COAS ALIGN</th>
<th>ATTITUDE 1</th>
<th>AND</th>
<th>COAS ALIGN</th>
<th>ATTITUDE 2</th>
<th>SINGLE S TRK MIN, NAV OPT</th>
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<tr>
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<td>-X HED</td>
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<td>R+ 296</td>
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<td>R+ 296</td>
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<td>D</td>
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<td>P+ 194</td>
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<td>Y+ 310</td>
<td>42 P+ 221</td>
<td>Y+ 310</td>
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<td>Y+ 23</td>
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<tr>
<td>-2 COAS</td>
<td></td>
<td>R+ 121</td>
<td>TAIL UP</td>
<td>R+ 249</td>
<td>TAIL UP</td>
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<td>P+ 230</td>
<td>42 P+ 9</td>
<td>Y+ 320</td>
<td>42 P+ 9</td>
<td>Y+ 320</td>
</tr>
</tbody>
</table>

MET Applicable 00/00:40:00 to 16/00:00:00
Liftoff Date: 03/13/09
Liftoff GMT: 072/00:54:27.000
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) powrdn 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. \(\checkmark\)(G2FD) GPC MODE – HALT
    \(\checkmark\)OUTPUT – NORM
    \(\checkmark\)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

Cont next page

3-8

OPCL/ALL/GEN M
**AFT FLIGHT DECK RECONFIGURATION**

### AFT STATION CONFIG

<table>
<thead>
<tr>
<th>POST SEAT EGRESS</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>O14:D</td>
<td>cb MNA CAB VENT — op</td>
</tr>
<tr>
<td></td>
<td>ISOL — op</td>
</tr>
<tr>
<td>A14</td>
<td>RCS/OMS HTR FWD RCS — A AUTO</td>
</tr>
<tr>
<td></td>
<td>L POD (two) — A AUTO, B OFF</td>
</tr>
<tr>
<td></td>
<td>R POD (two) — A AUTO, B OFF</td>
</tr>
<tr>
<td></td>
<td>OMS CRSFD LINES (two) — A AUTO, B OFF</td>
</tr>
<tr>
<td></td>
<td>FWD/AFT RCS JET (ten) — AUTO</td>
</tr>
<tr>
<td>PDIP 1</td>
<td>KU BAND RATE — LO</td>
</tr>
<tr>
<td>A12</td>
<td>APU HTR LUBE OIL LN (three) — A AUTO</td>
</tr>
</tbody>
</table>

### ON-ORBIT CONFIG

- Don headset (if req'd)
- If WCCS flown, perform STD WCCS CONFIG (ORB OPS, COMM/INST)
- 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
  - XMIT/ICOM MODE sel — PTT/PTT

### R10
- MS COMM CCU PWR — OFF
- Connect HMIC to MHA
- MS COMM CCU PWR — ON

### R6, L5
- CCU PWR — OFF
- A13
  - OS AUD SPKR PWR sel — SPKR
  - MSTR SPKR VOL sel — as reqd
- R6, L5
  - HIU VOL (two) — minimum, full ccw

### A1L
- S-BD PM MODE — TDRS 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

### :D
- Close left to right all cbs

### :E
- 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 (th-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
- PL BUS ACTIVATION complete

### L12
- Unstow, deploy reqd FDF

### 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

### R12 (OPP)
- cb OBSS SW PWR — cl
- OBSS SW PWR — ON

### (OBSS)
- RSC PWR — ON

### 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 CW 15 |
AFT FLIGHT DECK RECONFIGURATION

CONFIG FOR PLBD OPERATIONS

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: *
* (Aff) PL BAY FLOOD – OFF *

SET UP P/TV
Perform ACTIVATION, OPERATION (Cue Card, TV), AUTO
OPS only for camera A(0)
Prepare minicam and V10 for recording PLBD opening

CLOTHING CONFIG

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)

RESET C/W

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 | 4.85V/4.65 LBM/HR

R13U
PARAMETER NAME | C/W CH | ENA/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 | 58 | INH
HYD P 1 | 99 | INH
2 | 109 | INH
3 | 119 | INH

1-14
PI/119/FIN X
AFT FLIGHT DECK RECONFIGURATION

**AFTR STAION CONFIG 3**

- POST SEAT EGRESS
- cb MNA CAB VENT - op
- ISOL - op

- RCS/OMS HTR PWD RCS
  - L POD (two) - A AUTO
  - R POD (two) - A AUTO, B OFF
- OMS CRSF/D LINES (two) - A AUTO, B OFF
- FWD/JET RCS (ten) - AUTO

- PDIP 1
  - 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)
    - If flight deck handheld mic/speaker operation:
      - MS AUD PWR - AUDI/TONE
        - AVG1 - TR, tw - 2
        - AVG2 - RCV, tw - 2
        - AVG - RCV, tw - 2
        - ICOM A - TR, tw - 2
        - B - RCV, tw - 2
        - XMIT/COM MODE sel - PT/TPTT

- A11
  - MS COMM CCU PWR - OFF
  - Connect HHMC to MHA
  - MS COMM CCU PWR - ON
  - CCU PWR - OFF

- A13
  - OS AUD SPKR PWR sel - SPKR
  - MSTR SPKR VOL sel - as reqd

- R6, L5
  - HIU VOL (two) - minimum, full ccw

- A1L
  - S-BD PM MODE - TDRS 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:
  - cb MNB KT ANT HTR - cl
    - UHF EVA (two) - cl
  - : D Close left to right all chs
  - : E Close left to right all chs

- 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 MAINT BUS A,B (two) - ON (bl-ON)
    - OPCU 1.2 V-ADJ (two) - CMD

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

- PL BUS ACTIVATION complete

- L12
  - SSP1
    - cb PDIP 1 PWR 2/KU BAND RLY - cl
    - PDIP 1 PWR 1 - cl
    - S W PWR 2 - cl
    - SSP2
    - cb PDIP 2 PWR 2 - cl
    - PDIP 2 PWR 1 - cl
    - R12 (OPP)
      - cb OBSS SW PWR - cl
      - OBSS SW PWR - ON
      - OBSS
      - RSC PWR - ON

- Unsnow, 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 CW 16

---

CC 3-3

PI-1a/119/O/B

PI/119/FIN

(reduced copy)
AFT FLIGHT DECK RECONFIGURATION

CONFIG FOR PLBD OPERATIONS

- **A8U**
  - 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. *
  * (AF) PL BAY FLOOD -- OFF

SET UP PTV
- Perform ACTIVATION, OPERATION (Cue Card, TV, AUTOOPS only for camera A(D)
- Prepare minicam and V10 for recording PLBD opening

CLOTHING CONFIG

- 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)

(RECAP)
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
PWR/DATA/VIDEO: ENTRY CONFIG – MIDDECK

REV B
2/18/09

FS 4-9
REF/119/FIN X
NOTE:
1. SS and ST cooling units remain connected on-orbit at MDSP DC (J3)
2. DC Vacuum to timeshare power at MUP (J22) DC with the SSC computer transferred from SS to Middeck.

FS 4-11
REF/119/FIN X
NOTE:
1) ALL ICUTELC PWR CABLES ARE PREROUTED
2) ICUS FOR 55-11 ENTRY POWERED ONLY

FS 4-12
REF/119/FIN X
MAJOR MODE CHANGE

CRT 1. GNC, OPS 105 PRO

ET UMBILICAL DOOR CLOSURE

* If Feedline fail, √MCC before closure *

WARNING
ET CTRLLINE 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
CTRLLINE LAT – STO
√After 6 sec, CTRLLINE LAT tb – STO
* If CTRLLINE LAT does not stow within 12 sec: *
* CTRLLINE LAT – GND *
* √MCC *

CTRLLINE 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
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. \(\sqrt{MS}^2\): MS OVHD, AFT, & MIDDECK PNL PWRDN complete

3. \(\sqrt{VCS}^2\): CH (four) - AUTO

MS/O15:A, 4. \(\sqrt{NGA}^2\) 2,3 - ON

O16:A

MS/O15:F, 5. \(\sqrt{ASA}^2\) 2,3 - ON

O16:F

CRT 6. GNC, OPS 301 PRO

\(\sqrt{DAP}^2\): 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

<table>
<thead>
<tr>
<th>SITE</th>
<th>RWY</th>
<th>TACANS</th>
<th>ITEM 5</th>
<th>MLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>KSC 15</td>
<td>TTS 59Y</td>
<td>COF 97</td>
<td>8 6</td>
</tr>
<tr>
<td>42</td>
<td>NOR 17</td>
<td>SNG 121Y</td>
<td>HMN 92</td>
<td>6 6</td>
</tr>
</tbody>
</table>

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

L1 10. \(\sqrt{RWY}^2\) selection

11. CAB FAN A - ON

12. IMU FAN (three) - OFF

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

3. MPS FILL/DRAIN LO2, LH2 OUTBD (two) - GND

R2 4. PNEU He ISOL - CL
* RCS COMPLETION: *

if DIRECT INSERTION:

THC +X to ΔVTOT = 0 or TOT AFT QTY 1  ____ ___ %

THC +X to FLIP ΔV or

At AFT QTY 1  TOT AFT QTY 2 5 3 % then

if CUR ΔVTOT:  FRCS COMPLETION

FLIP
ΔV 4 8 FRCS COMPLETION

AFT
ΔV 2 9

THC +X to TGT ΔV

TGT
ΔV 0 0

If w/OMS 1:

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

THC +X to FLIP HP or

At AFT QTY 1  TOT AFT QTY 2 5 3 % then

if CUR HP:  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

Mnvr to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT)

THC -X to ΔVTOT = 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)
POST BURN ACTIONS

1. VCDR 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 [V/E PFD]

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)

<table>
<thead>
<tr>
<th>ΔHP</th>
<th>0</th>
<th>3</th>
<th>6</th>
<th>9</th>
<th>12</th>
<th>15</th>
<th>19</th>
<th>23</th>
<th>27</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREBANK</td>
<td>0</td>
<td>45</td>
<td>75</td>
<td>90</td>
<td>100</td>
<td>105</td>
<td>115</td>
<td>135</td>
<td>180</td>
</tr>
</tbody>
</table>

(ATO/AOA shallow entries)

<table>
<thead>
<tr>
<th>ΔHP</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREBANK</td>
<td>90</td>
<td>105</td>
<td>110</td>
<td>115</td>
<td>125</td>
<td>135</td>
<td>145</td>
<td>155</td>
<td>175</td>
</tr>
</tbody>
</table>

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)
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]
   \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

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

**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 (lb-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 (lb-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 |
DEORBIT FDF CONFIG

CDR

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
   OUTPUT 5 – B/U
5. BFS: GNC, OPS 301 PRO
6. VENT DOOR CNTL CLOSE – ITEM 44 EXEC (*)
   Wait 1 min, then:
   GNC, OPS 302 PRO
   [GNC 50 HORIZ SIT]
   ALL INCLINATIONS
   AOA RWY OPTIONS

<table>
<thead>
<tr>
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<td>COF 97</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>KSC 33</td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>42</td>
<td>NOR 17</td>
<td>SNG 121Y</td>
<td>HMN 92</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>NOR 23</td>
<td></td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

   If other runways reqd, use AOA RWY OPTIONS (ASC, AOA)
7. \RWY selection
8. CAB FAN A – ON
   AV BAY 2 FAN A – ON

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
    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

Attachment 15

8-4
DEORBAN BURN PREP

1. 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 (REF - 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

5. cb MNA DDU L - cl
O14:E

5a. cb MNB DDU L - cl
O15:E

At TIG-3

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

BFS, GNC SYS SUMM 2
O1 PCMMU PWR - 2

GO TO DEORBAN BURN

8-5

DEORBAN BURN

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

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

SYS AOA/ALL/GEN K
# DEORBIT BURN MONITOR
(LOSS OF 2 H2O LOOPS AOA)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>OMS TEMP*</td>
<td>FU IN P ≥ 225</td>
</tr>
<tr>
<td></td>
<td>≤ 205</td>
</tr>
<tr>
<td></td>
<td>or No FU IN P</td>
</tr>
<tr>
<td>OMS PC* &amp; OMS</td>
<td>ENG VLV 1 or 2 &lt; 70</td>
</tr>
<tr>
<td>↓ (BFS: (v_{\text{accel}}))</td>
<td>or OX IN P &gt; 227</td>
</tr>
<tr>
<td></td>
<td>OX IN P ≤ 227</td>
</tr>
<tr>
<td></td>
<td>or No OX IN P</td>
</tr>
<tr>
<td>OMS OX/FU TK P ((v_{\text{ENG IN P}}))</td>
<td>OX/FU LOW</td>
</tr>
<tr>
<td></td>
<td>He PRESS/VAP ISOL (two) – CL</td>
</tr>
<tr>
<td></td>
<td>OMS PRPLT FAIL</td>
</tr>
<tr>
<td></td>
<td>OX &amp; FU HIGH</td>
</tr>
<tr>
<td></td>
<td>Cycle He A(B) to maintain TK P 234-284</td>
</tr>
<tr>
<td>OMS GMBL</td>
<td>PRI fail</td>
</tr>
<tr>
<td></td>
<td>SEC fail</td>
</tr>
<tr>
<td>GPC 1</td>
<td>BFS Engage</td>
</tr>
<tr>
<td>I/O ERROR FA 1</td>
<td>L OMS GMBL – SEC</td>
</tr>
<tr>
<td></td>
<td>I/O RESET (if recov: BFS I/O RESET)</td>
</tr>
<tr>
<td></td>
<td>If high RCS usage: OMS ENG FAIL</td>
</tr>
<tr>
<td></td>
<td>2 FAs lost</td>
</tr>
<tr>
<td>BCE STRG D</td>
<td>I/O RESET (if recov: (&gt;&gt;))</td>
</tr>
<tr>
<td>1</td>
<td>If high RCS usage: L OMS GMBL – SEC</td>
</tr>
<tr>
<td>3</td>
<td>If high RCS usage: R OMS ENG FAIL</td>
</tr>
<tr>
<td>RM DLMA IMU</td>
<td>After C/O: (\sqrt{G21})</td>
</tr>
<tr>
<td></td>
<td>If any IMU ACC &gt; 0.03: aff IMU – desel</td>
</tr>
<tr>
<td></td>
<td>l'cnt OMS to RCS ((\sqrt{RCS\ Burn\ Time}))</td>
</tr>
<tr>
<td></td>
<td>THC + X (3.5 X timer at C/O)</td>
</tr>
<tr>
<td>I/O ERROR PCM</td>
<td>OI PCMMU PWR – 1</td>
</tr>
</tbody>
</table>

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

  At AFT QTY 2 [ 5 3 ] % then

  FLIP ΔV
  4 8
  FRCS COMPLETION

  AFT ΔV
  2 9
  THC +X to TGT ΔV

  TGT ΔV
  0 0

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: FRCS COMPLETION

  AFT HP
  FLIP HP
  FRCS COMPLETION

  AFT HP
  THC +X to TGT HP

  TGT HP

**FRCS COMPLETION:**

* Perform FRCS REACTIVATION, 9-3, steps 1 thru 7
* Mvr to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT)
* THC -X to ΔVTOT = 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)
POST BURN ACTIONS

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

\textbf{NOTE}
Prebank is applicable \textbf{ONLY} if OMS 1 reqd

9. Determine PREBANK
   Determine $\Delta$HP (CUR HP – TGT HP)
   Use RECOVERY PREBANK TABLES

\textbf{RECOVERY PREBANK TABLES (KSC)}
\textbf{NOTE: APPLICABLE ONLY IF OMS 1 REQD}

\begin{tabular}{|c|c|c|c|c|c|c|c|}
\hline
\textbf{\Delta HP} & 0 & 3 & 6 & 9 & 12 & 15 & 19 \textbf{23} \textbf{27} \\
\hline
\textbf{PREBANK} & 0 & 45 & 75 & 90 & 100 & 105 & 115 & 135 & 180 \\
\hline
\end{tabular}

\begin{tabular}{|c|c|c|c|c|c|c|c|}
\hline
\textbf{\Delta HP} & 0 & 1 & 2 & 3 & 4 & 5 & 6 \textbf{7} \textbf{9} \\
\hline
\textbf{PREBANK} & 90 & 105 & 110 & 115 & 125 & 135 & 145 & 155 & 175 \\
\hline
\end{tabular}

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

\textbf{OMS/RCS POST BURN RECONFIG}

O7 1. $\sqrt{AFT}$ L,R RCS He PRESS (four) – OP (tb-OP)
   $\sqrt{TK}$ ISOL (six) – GPC (tb-OP)
   $\sqrt{XFEED}$ (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)
C DPS POST BURN CONFIG

GNC, OPS 303 PRO

IMU POST BURN CONFIG

If IMMEDIATE AOA DEORB BIT BURN STEPS, 7-1, performed:

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

If IMMEDIATE AOA DEORB BIT 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**
RCS COMPLETION:

If DIRECT INSERTION:

THC +X to ΔVTOT = 0 or TOT AFT QTY 1 \[0.94\] %

At AFT QTY 1

if CUR ΔVTOT:

THC +X to FLIP ΔV or

FRCS COMPLETION

FIP ΔV

5 7

FRCS COMPLETION

AFT ΔV

3 1

THC +X to TGT ΔV

TGT ΔV

0 0

if w/OMS 1:

THC +X to TGT HP or TOT AFT QTY 1 \[0.94\] %

At AFT QTY 1

if CUR HP:

THC +X to FLIP HP or

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

Mnvr to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT)

THC -X to ΔVTOT = 0 or FRCS depletion (JET FAIL OFF)

CUTOFF

+ :02 OMS ENG(s) – OFF (if < 3 IMU, at \[\square:\square\] )

* AFT RCS RECONFIG if INTERCONNECT *

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

If DIRECT INSERTION:
- THC +X to ΔVTOT = 0 or TOT AFT QTY 1 [0 9 4] %
- At AFT QTY 1 THC +X to FLIP ΔV or
  if CUR ΔVTOT: TOT AFT QTY 2 [5 6] % then
  FRCS COMPLETION

FLIP ΔV

AFT ΔV

TGT ΔV

if w/OMS 1:
- THC +X to TGT HP or TOT AFT QTY 1 [0 9 4] %
- At AFT QTY 1 THC +X to FLIP HP or
  if CUR HP: TOT AFT QTY 2 [5 6] % then
  FRCS COMPLETION

FLIP HP

AFT HP

TGT HP

FRCS COMPLETION:
- Perform FRCS REACTIVATION, 9-3, steps 1 thru 7
- Mnr to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT)
- THC -X to ΔVTOT = 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)