

US EVA 23 SUMMARY TIMELINE

| PET | IV/SSRMS | EV1 - Chris Cassidy | EV2 - Luca Parmitano | |
|-------|---|--|--|---------------------------------------|
| 00:00 | <ul style="list-style-type: none"> Z1 JUMPER INHIBITS | POST DEPRESS (00:05) PAGE 19 | POST DEPRESS (00:05) PAGE 19 | 00:00 |
| | | EGRESS / SETUP (00:30) PAGE 19 | EGRESS / SETUP (00:30) PAGE 19 <ul style="list-style-type: none"> EV2 Egresses first | |
| 01:00 | | Z1 Y-BYPASS JUMPER PART 2 (00:30) PAGE 21 <ul style="list-style-type: none"> Zenith/3B Jumper | 1553 CABLE CONNECTIONS (00:15) PAGE 21 | |
| | | V-GUIDE BOLT (P1) (01:30) PAGE 22 | MLM ETHERNET CABLE (01:00) PAGE 23 | 01:00 |
| 02:00 | <ul style="list-style-type: none"> WETA INHIBITS | | SPDA DOOR (0:40) PAGE 27 <ul style="list-style-type: none"> SSRMS BOOM B CLPA / LENS COVER | 02:00 |
| | | | WETA RELOCATE TO CP11 (01:30) PAGE 29 | WETA RELOCATE TO CP11 (01:25) PAGE 29 |
| 03:00 | | WETA/VSSA REMOVAL (00:45) WETA/VSSA Install (00:45) | WETA/VSSA REMOVAL (00:45) WETA/VSSA Install (00:45) | 03:00 |
| 04:00 | <ul style="list-style-type: none"> JEM EF VE INHIBITS | JEM EF VE (01:00) PAGE 33 | MBSU MLI REMOVAL (00:45) PAGE 34 <ul style="list-style-type: none"> MBSU MLI REMOVAL (00:45) AMS Photos | 04:00 |
| | | | GET AHEADS (00:20) | GET AHEADS (00:20) |
| 05:00 | <p><u>Get-aheads (In priority order)</u></p> <ul style="list-style-type: none"> MBSU MLI Skirt Tie Down SSRMS Boom B Lens Cover R&R Open Nadir RPCM MLI Cover Port CETA Brake Handle AMS Photos APFR / TS Relocate from P1 WIF 3 Release S1 FHRC P-Clamp | CLEAN UP & INGRESS (00:45) PAGE 36 | CLEAN UP /STOW FSE BAG / INGRESS (00:50) PAGE 36 <ul style="list-style-type: none"> Stow RGB FSE EV 2 Ingresses Second | 05:00 |
| 06:00 | | PRE REPRESS (00:05) PAGE 38 | PRE REPRESS (00:05) PAGE 38 | 06:00 |
| 06:30 | PET 6:15 | | | 06:30 |

US EVA 23 TOOL CONFIG

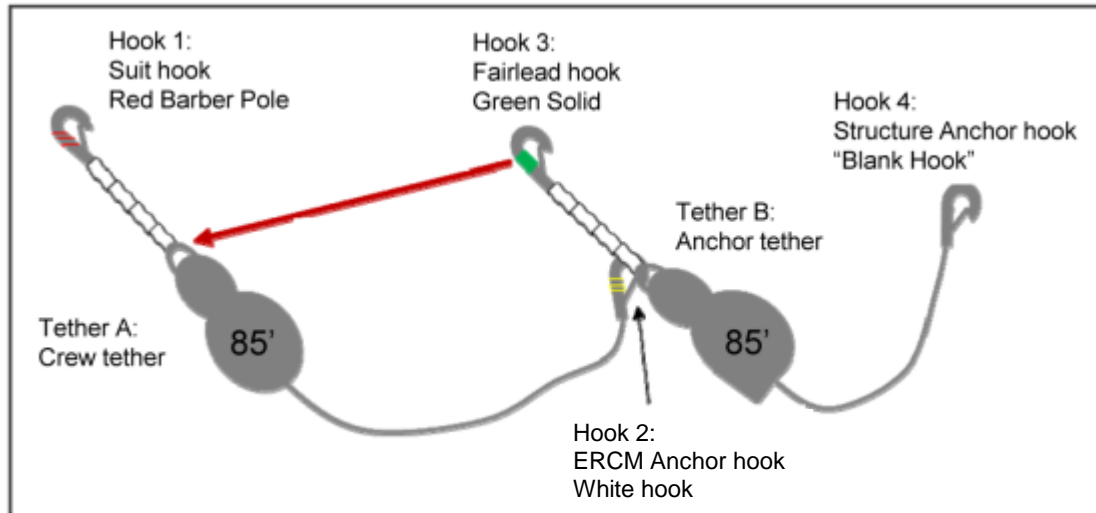
EV1

- MWS
 - BRT (L)
 - Adj Equip Tether
 - RET (sm-sm)
 - Wire Tie (2-Short, 2 Long) (Squish short TPs)
 - T-Bar
 - RET (sm-sm)
 - RET w/ PIP pin
 - RET (sm-sm)
 - 28mm EVA Camera w/ L-brckt
 - Swing Arm (R)
 - RET (sm-sm)
 - PGT [X Xft-lb, **CAL**, MTL 30.5] s/n _____
 - PGT Battery s/n _____
 - 5/8 (rigid) Socket-2" ext
 - 7/16 (wobble) Socket-6 ext
 - Adj Equip Tether (on PGT)
- D-ring Extender (2) (R & L D-ring)
 - Waist Tether (1) (R-D-Ring Extender)
 - 85-ft Safety Tether Pack (L D-ring Ext)

EV2

- MWS
 - BRT (L)
 - RET (sm-sm)
 - Wire Tie (2- short, 2 long) (Squish short TPs)
 - T-Bar
 - Wire Tie (2 short taped)
 - RET (sm-sm) (L)
 - RET w/ PIP pin (R)
 - Adj Equip Tether
 - RET (sm-sm)
 - 28mm EVA Camera w/ L-brckt
 - Swing Arm (R)
 - RET (sm-sm)
 - PGT [X Xft-lb, **CAL**, MTL 30.5] s/n _____
 - PGT Battery s/n _____
 - 7/16 (wobble) Socket-6 ext
 - Adj Equip Tether (on PGT)
- D-ring Extender (2) (R & L D-ring)
 - Waist Tether (2) (R & L D-ring Ext)
 - 85-ft Safety Tether Pack (L D-ring Ext)

| | |
|---|--------------------------------|
| Tether Counts: | |
| RETs (sm-sm) = 16/ 16 | RETs (PIP Pin) = 5/ 5 |
| RETs (Lg sm) = 8 / 8 | Adj Equip Tethers = 14 /15 |
| Fish Stringer = 6 / 6 | Adj Equip Tether (Lg sm) = 2/2 |
| NOTE: Prior to use, inspect the following hardware: | |
| <input type="checkbox"/> RET cords for fraying | |
| <input type="checkbox"/> Inspect Load Alleviating Straps and D-ring Extenders; ref 1.6.101 CREW TETHER INSPECTIONS (SODF: EVA TASK:TOOLS: TETHERS): | |
| 1. MMOD/general damage | |
| 2. Tack Stitching | |
| 3. Discoloration | |
| 4. Red Band | |
| <input type="checkbox"/> ISS Trash Bag: | |
| √ No Bristle Deformation/ Damage | |
| √ Empty | |
| √ Zipper Closed | |
| <input type="checkbox"/> Swing Arm Stiffness | |



US EVA 23 TOOL CONFIG

AIRLOCK CONFIG

- RET (Lg-sm) (stays in A/L)
- Node 3 Avionics Cable Bag** (label Node 3 Avionics Cable Bag)
 - RET (sm-sm) (Bottom of Bag)
 - Adj Equip Tether (RET to D-Ring)
 - Small ISS Trash Bag (bottom of bag)
 - Wire Tie Caddy (w/ 9 short; hook 2)
 - Fish Stringer (Lg hooks to bottom of bag)
 - US 1533 Cable Cap P1 (hook 1)
 - US 1553 Cable Cap P2 (hook 2)
 - 1553 Cable (bottom of bag; secure with non-hinge-side Velcro strap)
 - J2/W5634 cap (Ethernet pigtail) (hook 3)
 - Terminator cap J1 FGB (hook 4)
 - Terminator cap J2 FGB (hook 5)
 - Terminator cap MLI (hook 6)
 - Terminator cap MLI (hook 7)
 - MLM Ethernet Cable (top of bag, secure with Velcro strap, remove J2 cap)
- RET (Lg-sm)
 - Adj Equip Tether (1) (for PMA Cover Task)
 - PMA-2 Cover

- RET (Lg-sm)
- V-Guide Lrg ORU /Crewlock Bag Bundle**
 - Adj Equip Tether (2) (outside bag)
 - RET (sm-sm)
 - Adj Equip Tether (sm-sm) (d-ring)
 - V-Guides (2) (R/L) tether point
 - RET (sm-sm)
 - Adj Equip Tether (sm-sm) (d-ring)
 - V-Guides (2) (R/L) tether point
 - RET (Lg-sm) (taped, used for bundle)
 - Crewlock Bag (bundle w /lint and RET)**
 - Ratchet Wrench (Int # 1) (*No Palm Whl*)
 - 7/16 (rigid) Socket-9 ext
 - Small ISS Trash Bag (Bottom) (Int # 2)
 - Socket Caddy (Bottom Bag) (Int # 3)
 - 7/16 (wobble) Socket-6 ext
 - 5/8 (rigid) Socket-2" ext
 - 7/16 (wobble) Socket 12" ext
 - Round Scoop (Int #4) (If JEM VE, in JEM VE Bag at end of EVA)
 - LDTDT (*contingency*) (D-Ring)
 - LDTDT (*contingency*) (D-Ring)
 - RET w/ PIP pin (D-Ring)
 - EVA Scissors**

- RET (Lg-sm) (stays in A/L)
- MBSU MLI Medium ORU Bag** label "MBSU MLI Bag"
 - RET (Lg-sm) (tape large hook) (outside, front)
 - Adj Equip Tether (Lg sm) (outside, back)
 - Fish Stringer (route diag.)
 - Wire Tie Caddy (4 long 5 short) (hook 1)
 - Small ISS Trash Bag (hook 2)
 - Ratchet Wrench w/ 7/16 (rigid) 2"ext (hook 3)
 - EVA Scissors (hook 4)
 - CLPA Lens Cover MLI (hook 5)
 - CLPA Lens Cover (old)
 - CLPA Lens Cover (new)
 - Small Comp. Cutter (if located) (hook 6)
 - RET (sm-sm) (to outside front fwd loops)
 - MBSU MLI

- RET (Lg-sm) (stays in A/L) (For FSE Bag)

ISS CONFIG (EXTERNAL)

External Airlock Airlock HR 0564 and 0567

- FSE Lrg ORU Bag** (inside straps left inside attached to lid)
 - Adj Equip Tether (2) (outside bag)
 - Adj Equip Tether (Lg-sm) (outside bag; R-front)
 - RET (sm-sm) (R)
 - Grapple Bar FSE B
 - RET w/ PIP pin (R)
 - RET (sm-sm) (L)
 - Round Scoop
 - Grapple Bar FSE A
 - RET (sm-sm) (L)
 - Socket Caddy
 - 5/8 (wobble) Socket-12 ext
 - RET (sm-sm) (L)
 - Small STS Trash Bag
- RET (Lg-sm) (stays in A/L)
 - JEM EF VE Medium ORU Bag** - labeled HR "JEM EF VE Bag"
 - Adj Equip Tether (2) (outside of bag)
 - RET w/ PIP pin
 - Round Scoop
 - JEM EF VE (Spare)
 - RET w/ PIP pin (hook to outside of bag)
 - Round Scoop (from Crewlock Bag)
 - JEM EF VE (Failed)
 - Fish Stringer (Lg hooks to bottom of bag)
 - Short Wire Tie (hook 1)
 - Small ISS Trash Bag (hook 2)
 - VE Connector Cap (attached to VE)(hook 3)

US EVA 23 TOOL CONFIG

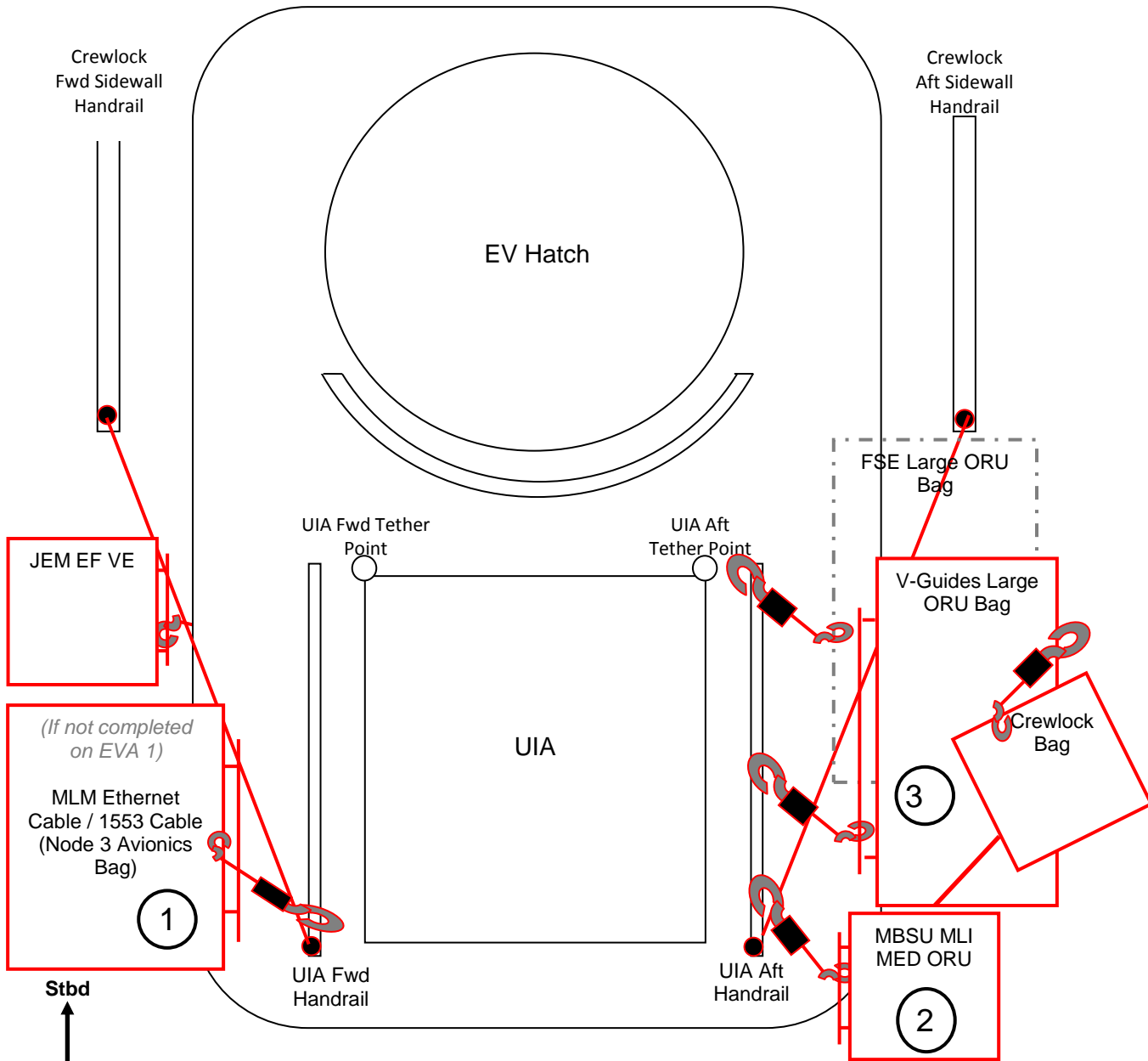
AIRLOCK CONFIG (CONT)

(Bold Items are different than EVA 1)

- Staging Bag
 - Fish Stringer Tether
 - Long Duration Tie-Down Tethers (4)
 - GTEC
 - Velcro/Tape Caddy
 - Probe
 - Pin Straightener Assy
 - MWS Key Strap Assy
 - Fish Stringer Tether
 - Spare 85-ft Safety Tether Pack
 - PGT (hook 1) s/n _____
 - PGT Battery s/n _____
 - 7/16 (wobble) Socket-6 ext**
 - Spare WIF Adapter (hook 2)
 - Pry Bar (hook 3)
 - Vise Grips (hook 4)
 - Connector Cleaner Tool Kit ((hook 5)
 - P2 Cap (US MLM Ethernet Cable Cap)
 - EVA Wipe
 - Fish Stringer Tether
 - Spare size 25L Dust Cap (hook 1)**
 - Zenith Patch Panel Cap (hook 2)**
 - Zenith Patch Panel Cap (hook 3)**

- IV Bag**
 - Towels (2)
 - Contamination Detection Kit
 - GP Caddy (2)
 - Adjustable Thermal Mittens (2)
 - Socket Caddy (hatch cont) w/RET (sm-sm) (Black)
 - 1/2 Socket-8 ext
 - DCM Plug (SAFER Hardmount) (2)
 - RET (sm-sm, Black) (2)

US EVA 23 CREWLOCK CONFIG



| | |
|--|--------------------------------|
| | Lg-Sm RET |
| | Sm-Sm RET |
| | Adj Equip Tether |
| | Fish Stringer |
| | Integrated Crewlock Bag Tether |
| | A/L Bungee |
| | 85-ft Safety Tether |
| | 55-ft Safety Tether |
| | Long Wire Tie |
| | Wire Tie Caddy |
| | Large Trash Bag |
| | PGT with Socket |
| | EVA Camera with Bracket |
| | Indicates Retrieval Order |

Tool Legend

Stbd
↑
Aft
7/12/2013

EVA 23

US EVA 23 BRIEFING CARD - CONDUCTED EVENING PRIOR TO EVA

1. People:

IV – Karen Nyberg
EV1 – Chris Cassidy
EV2 – Luca Parmitano
M1 – Karen Nyberg
Capcom / Ground IV – Shane Kimbrough
Flight Dir – David Korth
EVA Team – Karina Eversley, Sandy Moore, Scott Wray, David Simon

2. EVA Prep

- Get-up, Plan – clothing and EMU equipment bag – **EV1**
- Prebreathe protocol review (Notes and cue card) – **IV**
- Equipment lock activities/responsibilities – **IV**
 - Extra people and “help” management
- Suit donning plan – special requests – **EV’s, IV’s**
- SAFER, MWS, tools, C-Lk positions, bag stowage – **EV2**
- Airlock depress review (Depress/Repress Cue Card) – **IV**

3. EV Crew Procedure Review – **EV1**

- SAFETY, CONFIG, TASK
- Egress Plan, tethers, SAFER, MWS tabs
 - Memorize / visualize first 4-5 minutes
- Order of tasks (summary timeline)
- Translation plan, fairleads and tether swaps
- Hazards
- Ingress Plan

4. Robotics –

- N/A

5. Communication – **EV1**

- Overall setup: big picture, S/G2, Hardline, remind EV crew when voice going to ground
- EV/IV comm protocol review – Use EV1(2) for DCM sw throws (all time in A/L), use first names otherwise
- Handover to/from ground IV during Post-Depress/Pre-Repress

6. General Procedure Review – **EV1**

- Get ahead tasks
- Constraints – ground and flight
- Notes, Cautions, Warnings review

7. Emergencies Review – **EV1**

- Cuff checklist with no DCM warning: Loss of Cooling, Air Flow Contamination, BITE light (wagon-wheel), DCS, Comm Failure
- No comm signs: “OK,” “PRI to Alt,” “switch freq,” “Terminate,” “Abort,” “to AL”
- Lost tools
- Incapacitated crew rescue
- Terminate: safe worksite, one or both get to airlock, go on SCUs
- Abort: Abandon worksites, both enter AL, no SCUs. Put sick guy in, ingress, toss tethers or put on rail, close hatch
- IV rapid doffing steps: Equalize (EMER) and open IV hatch, O2 actuator OFF, purge valve up, pop glove. Remove helmet/LTA (going to be hot)
- SAFER deploy, use auto-attitude hold button

8. Post EVA – **IV**

- Suit doffing responsibilities
- Post EVA plan (clean your own body fluids)

9. Morning of EVA – **EV1 and EV2**

- “Chair Fly” the whole timeline (5-10 mins)

US EVA 23 NOTES/CAUTIONS/WARNINGS

NOTE

1. Bolt install: Report torque and turns.
2. Bolt release: Report torque and turns if different from published range.
3. CETA Cart brake handle wire ties must be replaced after crew loading.
4. EVA connectors: After disconnection and prior to connection, verify pin and EMI band integrity, verify connector free of FOD.
5. Inspect QDs for damage prior to mating.
6. For HTV N/C/W, refer to [3.14.102 HTV NOTES, CAUTIONS, & WARNINGS \(SODF: EVA TASK: CONTINGENCY TASKS\)](#)
7. 85-ft Safety Tether retraction force may affect body positioning.
8. Tool Box doors must be closed with one latch per door when EV crew not in immediate vicinity.

CAUTION

ISS Generic Constraints

- A. Electrical cables
 1. Avoid bend radii < 10 times cable diameter.
- B. Fiber optic cables
 1. Avoid bend radii < 10 times cable diameter.
 2. Avoid pulling on cable during mate/demate.
- C. Fluid line flex hoses and QDs
 1. Avoid bend radii < 14" for hoses with a diameter ≥ 1".
 2. Avoid bend radii less than 5" for hoses with diameter less than 1" on LAB, S0, S1, P1, and 10" for hoses with diameter less than 1" on all other elements.
 3. Additional care should be taken to not exceed bend radii when applying loads at the flexible hose to rigid tube stub interfaces.
 4. Ensure fluid QD booties are fully closed prior to leaving worksite; wire tie if required.
- D. Avoid inadvertent contact
 1. Grapple fixture shafts (drylube)
 2. MBS/SSRMS/SPDM taped radiative surfaces: VDU, ACU, JEU, LEU, MCU, CRPCMs, and Cameras
 3. OTSD
 4. PIP Pins
 5. Passive UMAs
 6. SPDM SJEU, EP, OTCM, LEU, and LEE

CAUTION

VDU radiator surfaces

ISS Generic Constraints (cont)

- E. For structural reasons
 1. The 2" socket may not disengage the anti-rotation device in a micro square fixture.
 2. Avoid performing shaking motions (sinusoidal functions) for more than four cycles.
 3. Avoid vigorous body motions, quick grabs, and kickoffs against tether restraints.
- F. Other
 1. ITT Cannon Connector: on demated connectors, do not rotate collar or manipulate cable or connector using collar or connector tool.
 2. MLI handholds are not rated for crewmember translation loads.

ISS Truss Constraints

- A. Avoid inadvertent contact
 1. CETA lights (Z-93 paint) (LAB, S1, S3, P3, Node 1)
 2. CMG cover/shells (Z1)
 3. Deployed MISSEs
 4. ETCS radiator flexhoses and panels (S1, P1)
 5. FPMU (P1)
 6. GPS Antennas (S13 paint) (S0, JLP)
 7. Ku-Band Antenna (SGANT) dish (Z1)
 8. OBSS composite sections, striker bars, grapple fixture shafts, and cable

Z

US EVA 23 NOTES/CAUTIONS/WARNINGS

| CAUTION |
|--|
| <p>harnesses</p> <ol style="list-style-type: none"> 9. OTP on HAB Tray (S0) 10. PCU cathode and HCA ports (Z1) 11. EETCS/PV radiator flexhoses, bellows, and panels (P6, P4, S4, S6) 12. RRM back radiator (Z-93 paint) (ELC-4) 13. S0 Aft face radiator 14. SASA high and low gain Antennas and radiator surfaces (S1, P1, Z1) 15. Deployed TUS cable (Zenith and Nadir CETA rails) 16. UHF Antennas (LAB, P1) 17. Heat pipe radiators (Z1) <p>B. For structural reasons</p> <ol style="list-style-type: none"> 1. Avoid kicking S1/P1 radiator beam. If this occurs, wait 2 to 5 minutes to allow structural response to dissipate. <p>C. Other</p> <ol style="list-style-type: none"> 1. Lubricant from Ku-Band SGANT gimbals (Z1), CMGs (Z1), and RTAS ground strap fasteners (P6, P4, S4, S6) can contaminate EMU. 2. Prevent inadvertent contact of the Tether Shuttle with ETRS when the S3/P3 Tether Shuttle Stop is raised away from the rail. 3. EWIS Antennas: do not use as handholds (Node 1, LAB, P6, Z1) |

| CAUTION |
|--|
| <p>ISS U.S. Pressurized Elements Constraints</p> <p>A. Avoid inadvertent contact</p> <ol style="list-style-type: none"> 1. APAS hardware (PMA 2, PMA 3) 2. Open CBM petal covers, LAB and Cupola window shutters 3. CETA Lights (Z-93 paint) (LAB, S1, S3, P3, Node 1) 4. EVA Crane (PMA 1) 5. S0/Node 2 fluid tray hardlines at Node 2 end, which are limited to 25 lbs 6. MDM Radiator (PMA 1) 7. TCS reflectors (PMA 2, PMA 3) 8. UHF Antennas (LAB, P1) <p>B. RF radiation exposure</p> <ol style="list-style-type: none"> 1. Stay 1.3 ft from Dragon UHF transmitters when powered. <p>C. Other</p> <ol style="list-style-type: none"> 1. CBM petal covers may not be used as handholds unless both launch restraint pins are engaged. 2. EWIS Antennas: do not use as handholds (Node 1, LAB, P6, Z1) <p>ISS I.P. Elements Constraints</p> <p>A. Avoid inadvertent contact</p> <ol style="list-style-type: none"> 1. COL ARISS and AIS Antennas (COL Nadir) 2. GPS Antennas (S13 paint) (S0, JLP) 3. ICS-EF Ka-Band Antenna dish 4. JEF ORUs and EFUs (paint and lubricant) 5. JEM A/L target and pins 6. Trunnions and UCMs (paint and |

| CAUTION |
|--|
| <p>lubricant) (JEF Payloads)</p> <ol style="list-style-type: none"> 7. JEMRMS taped radiative surfaces (JEU, EE, Cameras) 8. Open JPM window shutter 9. JTVE, WVE/EVE, JEF VE Cameras 10. MAXI front and top panel (paint) 11. MCE outboard and Nadir faces 12. RAIDS covers on end of HREP 13. SEDA-AP sensors (HIT, SDOM, and AOM) 14. Small Fine Arm (SFA) (paint, coating, and lubricant) <p>B. For structural reasons</p> <ol style="list-style-type: none"> 1. Avoid tool impact on ICS-EF sensor. 2. Avoid kicking MMOD shields between JLP and JPM |

US EVA 23 NOTES/CAUTIONS/WARNINGS

| WARNING |
|---|
| ISS Generic Constraints |
| A. Fluid line flex hoses and QDs |
| 1. Bail may kick back suddenly when detent button is depressed if pressure has built up in spring cavity. |
| 2. If QD is in FID when valve is opened (bail Fwd), QD will leak and fluid line may whip. |
| 3. Do not rotate if in mated, valve open configuration. |
| B. Avoid inadvertent contact |
| 1. Grapple fixture targets and target pins |
| C. Pinch |
| 1. ITT Cannon Connector rotating housing |
| 2. NZGL connector linkage. Use caution when mating/locking. |
| 3. PDGF connector doors |
| D. Sharp edges |
| 1. APFR active WIF probes |
| 2. Mating surfaces of EVA connectors: avoid side loads during connector mating. |
| 3. Keep hands away from SSRMS LEE, POA, SPDM LEE opening, snares, and PDGF curvic coupling (teeth). |
| 4. Back side of MMOD shield fasteners |
| 5. MMOD strikes on ISS exterior |
| 6. Inner edges of WIF sockets |
| 7. SPDM OTCM gripper jawsMMOD strikes on ISS exterior |
| 1. Inner edges of WIF sockets |
| 2. SPDM OTCM gripper jaws |

| WARNING |
|--|
| 8. Spring-loaded captive EVA fasteners (i.e., 6B boxes, BMRRM, RTAS, SARJ Covers); the end of the spring may protrude For structural reasons |
| 9. Do not Safety Tether to a handrail with an EVA Handrail Clamp Assembly installed. |
| E. Thermal |
| 1. EVA connectors with booties may become hot if left uncovered. Handling may need to be limited. |
| 2. Do not touch EMU protective visor if temperature has been < -134 deg F for > 15 minutes. |
| 3. No EMU boot contact with foot restraint when temperature < -120 deg F or > 200 deg F. |
| 4. Turn off glove heaters when comfortable temperature reached to prevent bladder damage. Do not pull fingers out of gloves when heaters are on. |
| 5. PDGF surfaces may not meet touch temperature requirements for unlimited contact when $\beta \leq -70$ or $\beta \geq 70$. |
| 6. SSRMS/MBS/SPDM operating Cameras and lights may radiate large amounts of heat. |
| 7. Uncovered trunnion pins may be hot |
| ISS Truss Constraints |
| A. Electrical shock |
| 1. Stay ≥ 2 ft from ungrounded floating connectors if powered: S0 EVA power cables (inside S0 Bay 00 Face 4, Bay |

| WARNING |
|--|
| 01 Face 3); ESP-2 jumper (inside S0 Bay 03 Face 4) |
| B. Avoid inadvertent contact |
| 1. SSU, ECU, beta gimbal platform, mast canister, SAW blanket boxes unless the beta gimbal is locked and the motor is turned off |
| 2. Deployed MISSEs and ORMatE-III R/W (ELC-2) |
| 3. Moving Radiator: stay 2 ft from S1/P1 radiator beam rotational envelope when beam is free to rotate. |
| 4. HDEV windows |
| 5. Moving SGANT Antenna: stay 3.3 ft from Ku-Band Antenna when powered. |
| 6. Moving MT: stay 5 ft from moving MT on Face 1. |
| 7. Moving SARJ: stay inboard of SARJ when active. |
| 8. SCAN Testbed payload hardware above the FRAM interface |
| 9. STP-H3 Experiments: stay 1 ft from top of STP-H3 (ELC-3). |
| C. Pinch |
| 1. Avoid contact with RRM above FRAM. |
| 2. Avoid pinch hazards on SCAN Testbed payload hardware above the FRAM interface. |
| D. RF radiation exposure |
| 1. Stay 3.8 ft from S-Band (SASA) high gain Antenna when powered (S1, P1). |
| 2. Stay 1.3 ft from S-Band (SASA) low gain Antenna when powered (S1, P1). |
| 3. Stay out of KOZ for SCAN Testbed Ku- and S-Band Antennas when powered |

US EVA 23 NOTES/CAUTIONS/WARNINGS

| WARNING |
|---|
| (ELC-3, P3, P1). |
| 4. Stay 1.3 ft from UHF Antenna when powered (LAB, P1). |
| E. Sharp edges |
| 1. AMS Star Trackers Baffles (two) |
| 2. Nickel coated braided copper ground straps may contain frayed wires (P6, P4, S4, S6) |
| 3. LDRI Baffles (also an entrapment hazard) (OBSS) |
| 4. Outboard MT rail attachment lug near P6 handrail 5333 and gap spanner |
| 5. P2 connector on EWIS box TAA-06 (Zenith/Forward corner 1 of P5 - SARJ at 0 deg) |
| 6. Avoid contact with RRM above FRAM. |
| 7. SCAN payload (above FRAM) |
| 8. Solar array blanket box (P6, S6) |
| 9. Fastener threads on back of Z1 U-jumper male FQD panel, if nutplate cap missing |
| F. Thermal |
| 1. ELC may exceed touch temperatures when $\beta > 75$ deg. |
| 2. No EMU TMG contact with HRS radiator flex hoses at negative beta angles of 40 or higher magnitude. Temp can exceed 320 deg F, which may result in EMU suit bladder boiling. Avoid ESP-3 inboard face, S3 Nadir between ESP-3 and ELC-4, and ELC-4 outboard face. |
| 3. No EMU TMG contact with RRM Coolant Valve Panel (top of RRM and ISS port when on ELC-4) and attached hardware. Temp can exceed 350 deg F, which may result in EMU layers melting and potential |

| WARNING |
|---|
| thermal shorts. |
| ISS U.S. Pressurized Elements Constraints |
| A. Electrical shock |
| 1. Stay ≥ 2 ft from ungrounded floating connectors if powered: SSPTS connectors include Node 1 Stbd/Fwd HR 0130, LAB Stbd/Fwd HR 0273, PMA 2 Stbd. |
| B. Fluid line flex hoses and QDs |
| 1. Do not translate on gap spanners restraining Node 3 - LAB NH3 jumpers. |
| C. Handrails |
| 1. Handrails previously used for MISSE attachment may not be used as a Safety Tether point (A/L endcone 564 and 566, A/L Tank 2 Nadir/Fwd and Port/Fwd, P6 5389). |
| D. Avoid inadvertent contact |
| 1. APAS hardware (PMA 2, PMA 3) |
| 2. Dragon RCS Thrusters |
| E. Pinch |
| 1. EV side of IV Hatch during hatch operation (also snag hazard) (A/L) |
| 2. LAB and Cupola window shutters and CBM petal cover linkages during operation |
| F. RF radiation exposure |
| 1. Stay 0.5 m from Cygnus PLS and TT&C Antennas when powered. |
| 2. Stay 0.5 m from Cygnus LIDAR even when unpowered. |

| WARNING |
|---|
| 3. Stay 2 ft from Dragon S-Band transmitters when powered. |
| 4. Stay 1.3 ft from UHF Antenna when powered (LAB, P1) |
| G. Sharp edges |
| 1. Port/Aft portion of A/L circular HR (HR 0506) |
| 2. A/L HR 0537 (Eq Lock Zenith) |
| 3. ESP-2 HR 8012 |
| 4. Adjustable Fuse Tether (Fish Stringer) buckles stowed in Node Bag |
| 5. PMA umbilical launch restraints - exposed bolt threads |
| 6. PMM ROEU and ROFU panels (Zenith endcone) |
| H. Thermal |
| 1. PMA and Node 1 Handrails may be hot. Handling may need to be limited. |
| 2. Stay ≥ 1 ft away from PMAs and MMOD shields > 270 deg F if EMU sun visor up; limit time to 15 minutes or less if > 300 deg F. |
| 3. Stay at least 0.5 ft away from PMA and MMOD shields > 325 deg F. |
| 4. No EMU TMG contact with PMAs and MMOD shields > 320 deg F. |

US EVA 23 NOTES/CAUTIONS/WARNINGS

| WARNING |
|--|
| ISS I.P. Elements Constraints |
| A. Avoid inadvertent contact |
| 1. ICS-EF sensors |
| 2. JSSOD deployment ports |
| 3. MCE outboard and Nadir faces |
| 4. SOLAR (COL EPF) |
| B. Pinch |
| 1. HREP hinge sides and RAIDS pinch areas |
| 2. ICS-EF Antenna boom |
| 3. JEF SSE latch |
| 4. JEM Cameras (JTVEs, EVE, WVE, and JEF VEs) |
| 5. JEM EFU latching arms |
| 6. JEMRMS EE |
| 7. JEMRMS Small Fine Arm (SFA) joints and booms |
| 8. JPM window shutter linkages during operation |
| 9. MCE outboard face |
| 10. SEDA-AP mast |
| 11. SMILES Antenna rotating area |
| C. RF radiation exposure |
| 1. Stay 0.3 ft from Fwd/Aft JPM PROX Antennas. |
| D. Sharp edges |
| 1. HREP Baffles (four) (Star Tracker aperture Zenith and three instrument baffles Aft) |
| 2. ICS-EF AHM gears |
| 3. JEM A/L Hatch corners |
| 4. JEMRMS EE opening and snares |
| 5. Interior of JEMRMS HRMs |

| WARNING |
|---|
| ISS I.P. Elements Constraints (cont) |
| 7. MCE outboard face |
| 8. SFA's Electro-Mechanical GF (EMGF) |
| 9. SMILES Baffles (two), baffle base bare bolts, and Cold Sky Terminator (CST) |
| E. Thermal |
| 1. Columbus end cones may violate touch temperature constraints when $-75 \leq \beta \leq -60$ or $60 \leq \beta \leq 75$. |
| 2. JPM Port end cones and JLP Port Nadir may violate touch temperature constraints when $\beta > 60$ deg. |
| 3. JEMRMS/JTVE/JEFVE operating Cameras and lights may radiate large amounts of heat |

US EVA 23 INHIBIT PAD

ALL EVAs (PRIOR TO DEPRESS)

ISS Hardware

1. COL ANTENNAS

IV Crew

1. HAM Radio – Deactivate

2. CUCU

IV Crew: LAB104

1. √cb POWER A, B (two) – OPEN
2. √cb LINK 1,2 (two) – OPEN

3. GROUND RADAR

MCC-H: TOPO

1. √Ground radar restrictions in place for EVA

4. ICS-EF ANTENNA

SSIPC

1. ICS MOD – OFF
2. ICS UPC – OFF
3. ICS HPA – OFF
4. HPA ON and UPC ON commands are cleared (not present) in the ICS stored command queue

5. PCU

MCC-H: SPARTAN/SPOC (FR B9-908)

NOTE

PCUs may require up to a 1-hour warmup period before they are operational.

5.1 √PCUs (two) operational in discharge mode and one of the following:

1. CCS PCU EVA hazard control FDIR enabled , if required or
2. Only allowed arrays unshunted and oriented <105° from velocity vector

5.2 If one or both PCUs failed

1. Only allowed arrays unshunted and oriented <105° from velocity vector

6. EKTS COMMUNICATION SYSTEM

MCC-M/RIO

1. EKTS Communication System – Deactivate

7. RUSSIAN PAYLOADS

MCC-M/RIO

1. Control (КОТРОЛ) – Deactivate
2. Indicator ISS
 - 2.1. Unit of Input Converters (БВП)-Inhibit
 - 2.2 Control Unit (БУ) - Inhibit

8. SM ANTENNAS

IV Crew

1. ARISS (Ham Radio) – Deactivate

MCC-M/RIO

2. GTS – Deactivate
3. Napor (PCПИ) – Deactivate
4. Laser Comm System (БТЛС-Н) – Deactivate

US EVA 23 INHIBIT PAD

LOCATION DEPENDENT USOS

9. **FPMU – (Prior to Depress)**
(Required for V-Guide Bolt on RGB , WETA Relocate & APFR/TS Relocate on P1)
 - MCC-H: SPARTAN/SPOC**
If EV crew on port truss (P1-P6) or working within 5 feet of Floating Potential Measurement Unit
 1. RPCM P11A_B RPC 13 Open/Close Cmd Inhibit
10. **MOBILE TRANSPORTER (Prior to Depress)**
 - MCC-H: ROBO/MSS SYSTEMS**
If EV crew < 1.5 meters from MT
 1. √MT latched
11. **SARJ (Prior to Depress) (Required for ISS Loads Constraints, Array Feathering due Z1 Jumper Task, MBSU MLI)**
 - MCC-H: SPARTAN/SPOC**
 1. **PORT SARJ – LOCKED** at 75
 - 1.1 √DLA 1 (2) – LOCKED
 - 1.2 √DLA 2 (1) – ENGAGED
 - 1.3 All motor setpoint set to zero
 - 1.4 All motors deselected
 2. **STBD SARJ – LOCKED** at 294
 - 2.1 √DLA 1(2) – LOCKED
 - 2.2 √DLA 2(1) – ENGAGED
 - 2.3 All motor setpoint set to zero
 - 2.4 All motors deselected
12. **FRAM Inhibits (Prior to Depress)**
(Common Translation Path – New OCAD requirement)
 - MCC-H: SPARTAN/SPOC**
 1. **ESP-2: FRAM site 1**
 - RPC N1RS2-B RPC 6 -Open, Close Cmd Inh
 - S04B-F RPC 10-Open, Close Cmd Inh
 2. **ESP-2: FRAM site 4**
 - RPC N1RS2-B, RPC 10- Open, Close Cmd Inh
 - S04B-F RPC 12- Open, Close Cmd Inh
13. **SCAN TESTBED (Prior to Depress)**
(Required for WETA Relocate on P1)
 - POIC: POD (SCAN Testbed)**
 1. If using SSRMS, EMU, Orlan, or payload in respective SCAN Testbed KOZ (reference flight rule B19-31)
 1. ELC-3 ECM ExPA-1 120V MAIN SWITCH – OFF
 2. HARRIS SDR – OFF
 3. TWTA – OFF
14. **SSPTS (Prior to Depress)**
 - MCC-H: SPARTAN/SPOC**
If EV crew working within 2 feet of SSPTS cable connections
 1. RPCM LA2A3B D RPC 1 – Open, Close Cmd Inhibit
 2. RPCM Z14B A RPC 2 – Open, Close Cmd Inhibit
 3. RPCM Z13B A RPC 2 – Open, Close Cmd Inhibit
15. **CUPOLA WINDOW (Prior to Depress)**
(Protect for Thruster Firing per FR B2-55)
 - IV Crew**
If EV crew < 10 feet from window or in window FOV
Close window shutter
16. **Lab WINDOW (Prior to Depress)**
(Required for translation to JEM for JEM EF VE & Protect for Thruster Firing per FR B2-19)
 - IV Crew**
If EV crew < 10 feet from window or in window FOV
 1. Close window shutter

US EVA 23 INHIBIT PAD

17. Boom B Camera (Prior to Depress)

MCC-H: ROBO (MSS Task)

(Required for Elbow Boom B Camera Lens Cover R&R)

1. Boom B Camera Light - OFF

18. TRRJ (Prior to Depress)

MCC-H: SPARTAN/SPOC

(Required for S1 P-Clamp Get Ahead Task)

1. **STBD-TRRJ** – LOCKED at 0
 - 1.1 √DLA 1(2) – LOCKED
 - 1.2 √DLA 2(1) – ENGAGED
 - 1.3 All motor setpoint set to zero
 - 1.4 All motors deselected

(Required for V-Guide Bolt on RGB, WETA Relocate & APFR/TS Relocate on P1)

2. **PORT-TRRJ** – LOCKED at 0
 - 2.1 √DLA 1(2) – LOCKED
 - 2.2 √DLA 2(1) – ENGAGED
 - 2.3 All motor setpoint set to zero
 - 2.4 All motors deselected

US EVA 23 INHIBIT PAD

LOCATION DEPENDENT JEM

19. **BLUETOOTH STETHOSCOPE FOR DIAGNOSTIC KIT EXPERIMENT** *(Prior to Depress)*

(Required for translation to JEM EF VE R&R)

SSIPC

If EV crew working on JEM

1. Electronic Stethoscope – Off
2. Medical Laptop –Bluetooth Disable

20. **EFU** *(Prior to Depress)*

(Required for translation to JEM EF VE R&R)

SSIPC

If EV crew working within 2 feet of EFU

1. JEF PDB a RPC 03 – Open (for EDU a)
2. JEF PDB b RPC 20 – Open (for EDU b)
3. EFU[X] Sel Status – not selected [X=1 to 12]
4. EEU Mode – EFU stop

21. **ICS-EF** *(Prior to Depress)*

(Required for translation to JEM EF VE R&R)

SSIPC

If EV crew working within the ICS-EF antenna dynamic envelope

1. ICS DM/DLM Pwr Status – Off
2. ICS DM Ena/Dis – Disable
3. ICS DM Step Sig – Stopped
4. ICS APM Pwr Status – Off
5. ICS APM X Ena Valid – Inhibit
6. ICS APM Y Ena Valid – Inhibit
7. ICS APM X Step Sig – Stopped
8. ICS APM Y Step Sig – Stopped

22. **JPM PROX ANTENNAS** *(Prior to Depress)*

(Required for translation to JEM EF VE R&R)

SSIPC

1. TRX Power – OFF
2. RX Power – OFF

OR

JPM PROX Antennas – OFF

23. **JPM Windows** *(Prior to Depress)*

(If translating on JPM Port Endcone)

IV Crew

1. Close Window Shutters

24. **JEMRMS** *(Prior to Depress)*

(Required for translation to JEM EF VE R&R)

SSIPC

If crew within 5 ft of JEMRMS

1. The following inhibits:
 - a. JEU all Joints Brake Status – ON
 - b. MDP Main Mode – Stby Mode

OR

1. JEMRMS Rack – OFF

25. **SEDA-AP Mast and PLAM-S** *(Prior to Depress)*

(Required for translation to JEM EF VE R&R)

SSIPC

If EV crew working within the SEDA-AP mast extension envelope

1. Mast Actuator – Off
2. PLAM-S – Off

26. **SSE SLM** *(Prior to Depress)*

(Required for translation to JEM EF VE R&R)

SSIPC

If SFA is not on SSE and EV crew working in the area of the SSE SLM

1. SSE SLM Ops Ena/Inh Status 1 – Inhibit
2. SSE SLM Ops Ena/Inh Status 2 – Inhibit

US EVA 23 INHIBIT PAD

LOCATION DEPENDENT RSOS

27. **FGB ANTENNAS** *(Prior to Depress)*
(Required for 1553 Cable, FBG PDGF FOD Removal, MLM Ethernet Cable)
- MCC-M/RIO**
EVA on RSOS
 1. √TORU (ТОРУ) – Deactivated
 2. √TV System (ТВС) – Deactivated
 3. Radiotelemetry (БР-9ЦУ-8) – Deactivate
 4. √TV System (КЛ-108А) – Deactivated
 5. √CNPMS (СИТНП) – Deactivated
 6. √KOMPARUS (КИС) – Deactivated
28. **RSOS AND RSOS VISITING VEHICLE ANTENNAS**
Includes FGB, SM, DC-1, MRM-1, MRM-2, Soyuz, Progress, and ATV
(Required for 1553 Cable, FBG PDGF FOD Removal, MLM Ethernet Cable)
- MCC-M/RIO**
EVA on PMA 1 or RSOS
 1. √KURS P (КУРС Р) – Deactivated
 2. √KURS A (КУРС А) – Deactivated
29. **SM Antennas**
EVA on RSOS
(Required for 1553 Cable, FBG PDGF FOD Removal, MLM Ethernet Cable)
- MCC-M/RIO**
EVA on RSOS
 1. √LIRA (ОА) – Deactivated
30. **SOYUZ THRUSTERS** *(Prior to Depress)*
(Required for 1553 Cable, FBG PDGF FOD Removal, MLM Ethernet Cable)
- MCC-M/RIO**
EVA on PMA 1 or RSOS
 1. 35S Thruster on MRM 1 - Inhibited

Visiting Vehicles – (If ATV berthed)

31. **ATV ANTENNAS** *(Prior to Depress)*
(Required for 1553 Cable, FBG PDGF FOD Removal, MLM Ethernet Cable)
- ATV-CC/RIO**
EVA on RSOS
 1. √Proximity Link – Deactivated
 2. √KURS P: KMTA 1&2 – Deactivated
32. **ATV OTHER EQUIPMENT (LASERS)** *(Prior to Depress)*
(Required for 1553 Cable, FBG PDGF FOD Removal, MLM Ethernet Cable)
- ATV-CC/RIO**
EVA on RSOS
 1. √Telegoniometer – Deactivated
 2. √Videometer – Deactivated
33. **ATV THRUSTERS** *(Prior to Depress)*
(Required for 1553 Cable, FBG PDGF FOD Removal, MLM Ethernet Cable)
- ATV-CC/RIO**
EVA on RSOS
 1. √ATV Attitude Control Thruster Valves (56) – Closed

US EVA 23 INHIBIT PAD

Flight Specific

34. **CP11 NODE 2** (*Prior to Depress*)
(*Required for WETA Relocate*)

- MCC-H/CRONUS/CATO:
 - RPCM N21A4A-A RPC 16 (OPS)-Open, Close, Cmd Inh
 - RPCM N21A4A-A RPC 1(Not used)- Open, Close Cmd Inh
 - RPCM N22A3B-A RPC 5 (HTR) – Open, Close, Cmd Inh
 - RPCM N22A3B-A RPC 12 (HTR) – Open, Close, Cmd Inh

35. **FGB PDGF POWER** (*Prior to Depress*)
(*Required for 1553 Cable Russian Connectors Per OCAD 122407, FBG PDGF FOD Removal*)

- MCC-M/RIO:
 - √RACU-5 – OFF
 - √RACU-6-OFF

SYSTEM POWER (ППС) fgb 313

- IV (RS) Crew:
 - √BKC Cable 77KM-7228-110-01 – Demated
 - √BKC Cable 77KM-7228-110 – Demated

36. **NODE 3 J1 FGB & J2 FGB 1553** (*Prior to Depress*)
(*Required for 1553 Cable – Node 3 Connections*)

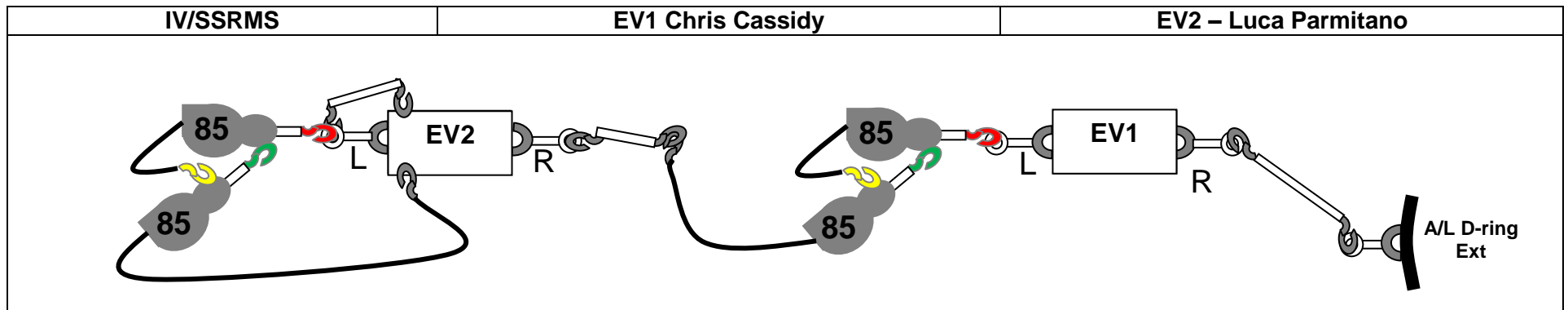
- MCC-H/ROBO:
 - If any RWS active, cmd 'Active Assert Backup'

US EVA 23 INHIBIT PAD

Prior To Task – Planned Tasks

37. **SPDA Z1-3B RPCM PANEL** *(Prior to or during Depress)*
(Required for Z1 Channel 2/3 Jumpers)
1. MCC-H/ ADCO:
- CMG 3 Spin Motor Relay Disconnected and Wheelspeed decreasing
2. MCC-H/SPARTAN:
- DDCU S03B – CONVERTER OFF
 - √N1 isolation jumper installed
38. **CP8 P1 UPPER OUTBOARD** *(Prior to Task)*
(Required for WETA Relocate)
- MCC-H/CRONUS/CATO
- RPCM P11A-A-RPC 2 (HTR) – Open Close, Cmd Inh
 - RPCM P11A-A-RPC 16 (HTR) – Open Close, Cmd Inh
 - RPCM P12B-A RPC 15 (OPS)-Open, Close, Cmd Inh
 - RPCM P12B-A RPC 1(Not used)- Open, Close Cmd Inh
39. **JEF FWD VE** *(Prior to Task)*
(Required for JEM EF VE R&R)
- SSIPC**
1. JEF PDB b RPC 22 - Open (DCU/TVC/PTU Fwd)
 2. JEF PDB b RPC 23 - Open (VLU Fwd)
 3. JEF HCE a SW 11 - Open (TVC/PTU Htr Fwd)
 4. JEF HCE b SW 65 - Open (TVC/PTU Htr Fwd)

US EVA 23 EGRESS/SETUP (00:30)



| | | |
|--|--|--|
| <p>1. Record PET Start Time __ : __ (Pwr to Batt)</p> | <p><u>POST-DEPRESS</u> (00:05)</p> <ol style="list-style-type: none"> <input checked="" type="checkbox"/> All gates closed & hooks locked <ul style="list-style-type: none"> <input type="checkbox"/> R Waist Tether to A/L D-ring Ext <input type="checkbox"/> Red hook on L D-ring Ext <input type="checkbox"/> White hook on Anchor Reel <input type="checkbox"/> Green Hook on Crew Tether Reel <input type="checkbox"/> Blank hook to EV2 R Waist Tether <input type="checkbox"/> Verify Reels Unlocked <input type="checkbox"/> WVS Green Light BRT RET to MBSU MLI Bag | <p><u>POST-DEPRESS</u> (00:05)</p> <ol style="list-style-type: none"> <input checked="" type="checkbox"/> All gates closed & hooks locked <ul style="list-style-type: none"> <input type="checkbox"/> R Waist Tether to EV1 Blank Hook <input type="checkbox"/> Red hook on L D-ring Ext <input type="checkbox"/> White hook on Anchor Reel <input type="checkbox"/> Green Hook on Crew Tether Reel <input type="checkbox"/> Blank hook on MWS <input type="checkbox"/> L Waist Tether to MWS <input type="checkbox"/> Verify Reels unlocked <input type="checkbox"/> WVS Green Light |
| | <div style="background-color: red; color: black; padding: 2px; border: 1px solid black;">WARNING</div> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;">Sharp Edge: Port/Aft portion of A/L circular HR (HR 0506)</div> | <div style="background-color: red; color: black; padding: 2px; border: 1px solid black;">WARNING</div> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;">Sharp Edge: Port/Aft portion of A/L circular HR (HR 0506)</div> |
| <p>2. Start A/L Thermal Cover Clock _____ (00:30)</p> <p>3. Verify Z1 Jumper Inhibits complete</p> | <p><u>EGRESS</u> (00:30)</p> <p>←MCC Coord Only Verify Inhibits</p> | <p><u>EGRESS</u> (00:30)</p> <ol style="list-style-type: none"> ←Open A/L thermal cover Egress A/L Attach EV2 Safety Tether (blank hook) to aft A/L tether point <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Gate closed, hook locked, reels unlocked Attach EV1 Safety Tether (blank hook) from R Waist Tether to fwd A/L tether point <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Gate closed, hook locked, reels unlocked |

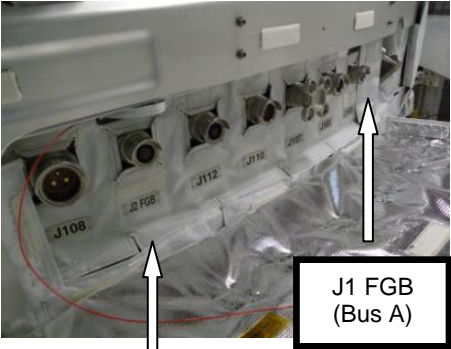
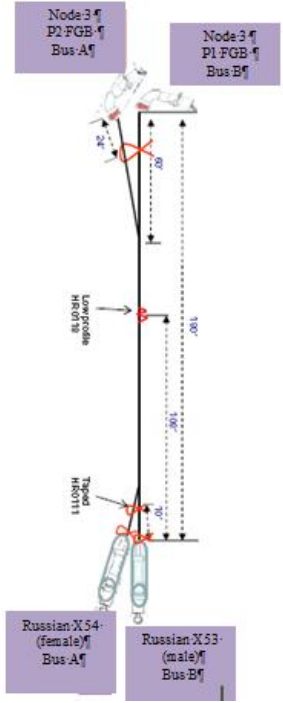
US EVA 23 EGRESS/SETUP (00:30)

| IV/SSRMS | EV1 Chris Cassidy | EV2 – Luca Parmitano |
|--------------------------------------|---|--|
| | 3. On EV2 GO, release R Waist Tether from A/L D-ring Ext 4. On EV2 GO, Egress with MBSU MLI Bag on BRT RET 5. √SAFER handles down 6. √Tethers and Tools | 6. Give EV1 GO to release Waist Tether from A/L D-Ring Extender 7. Translate aft on A/L circular HR 8. Give EV1 GO to Egress 9. √SAFER handles down 10. √Tethers and Tools |
| 3. Stop A/L Thermal Cover Clock_____ | 7. Temp stow MBSU MLI Bag on A/L circular HR 8. Retrieve V-Guides Large ORU/Crewlock Bag Bundle (stow A/L RET (Lg-sm) on A/L D-ring ext) 9. ←Close A/L Thermal Cover 10. √SAFER handles down | |

US EVA 23 Z1 Y-BYPASS JUMPER INSTALL (CHANNEL 3B) (00:30) / 1553 CABLE CONNECTIONS (00:15)

| IV/SSRMS | EV1 – Chris Cassidy | EV2 – Luca Parmitano |
|--|--|--|
| <p>Initial Config for EVA 23 (after EVA 22)</p> | <p>INSTALL Z1 JUMPER PART 2 (00:30)</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center; background-color: red; color: white; margin: 0;">WARNING</p> <p style="margin: 0;">Sharp edge on A/L 0537 (zenith, fwd of aft HPGT)</p> <p style="margin: 0;">Do not demate Nadir Y-Jumper Z1-005 (HOT)</p> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center; background-color: yellow; color: black; margin: 0;">CAUTION</p> <p style="margin: 0;">Avoid contact with PCU cathode and HCA ports (Z1- PORT)</p> </div> <ol style="list-style-type: none"> 1. Translate to Z1 Port Side <ul style="list-style-type: none"> <input type="checkbox"/> Fairlead on A/L HR 0500 <input type="checkbox"/> Fairlead up CETA Spur (weave tether) <input type="checkbox"/> Translate port along CETA HR (face 1) <input type="checkbox"/> Stow V-Guides Large ORU/Crewlock Bag Bundle at MM 8010 <input type="checkbox"/> Translate nadir under truss <input type="checkbox"/> Drop green hook in S0 HR 3520 (high fairlead) Translate to Z1 Port Side <ul style="list-style-type: none"> <input type="checkbox"/> Optional: APFR Z1 WIF 16 [10, PP, F, 11] <ul style="list-style-type: none"> <input type="checkbox"/> Blk on Blk <input type="checkbox"/> Pull / Twist Test | <p>1553 CABLE CONNECTIONS(00:15)</p> <ol style="list-style-type: none"> 1. Translate to Avionics Bag (Node 1 HR 0103) (Nadir pathway) 2. Retrieve Fish Stringer 3. Translate to Node 1 HR 118; Retrieve 1553 Cable <ul style="list-style-type: none"> <input type="checkbox"/> Verify 1553 Cable restrained to Node 1 HR 118 4. Translate to Node 3 Avionics Panel (Nadir /aft Node 3) 5. Temp stow Fish Stringer on Node 3 HRs (0618/0619 or 0618/0671) (for ease in cap stow, Fish Stringer hooks reach caps/MLI directly) 6. Remove Node 3 terminator MLI (2); stow on Fish Stringer <ul style="list-style-type: none"> <input type="checkbox"/> J1 FGB <input type="checkbox"/> J2 FGB 7. On MCC GO: Remove Node 3 Terminator Caps (2) from aft avionics panel; stow on Fish Stringer <ul style="list-style-type: none"> <input type="checkbox"/> Terminator Cap ← → Node 3 J1 FGB (Bus A) <input type="checkbox"/> Terminator Cap ← → Node 3 J2 FGB (Bus B) 8. Release Caps (2) from US 1553 cable P1 & P2; stow caps on Fish Stringer 9. <u>Mate 1553 cable P1 to Node 3 J1 FGB</u> <ul style="list-style-type: none"> <input type="checkbox"/> √Good pins & EMI band; no FOD <input type="checkbox"/> 1553 cable P1 → ← J1 FGB (Node 3) (Bus A) 10. <u>Mate 1553 cable P2 to Node 3 J2 FGB</u> <ul style="list-style-type: none"> <input type="checkbox"/> √Good pins & EMI band; no FOD <input type="checkbox"/> 1553 cable P2 → ← J2 FGB (Node 3) (Bus B) 11. Give MCC GO: For ROBO/1553 Bus Checkout 12. Retrieve Fish Stringer |
| <p>Final Config for EVA 23</p> | <ol style="list-style-type: none"> 2. Retrieve Jumper P1 Connector from GTEC 3. Translate aft, to Zenith RPCM connectors 4. <u>Aft Zenith Connectors:</u> <ul style="list-style-type: none"> <input type="checkbox"/> Z1-3B P1 (Jumper) ← → Dust Cap <input type="checkbox"/> W05 P2 ← → J1 (zenith RPCM Panel) <input type="checkbox"/> Z1-3B P1(Jumper) → ← J1 (zenith RPCM Panel) <input type="checkbox"/> W05 P2 → ← Dust Cap <input type="checkbox"/> Place W-05 P2 in GTEC, cinch bag (release TA clamp if needed) | |

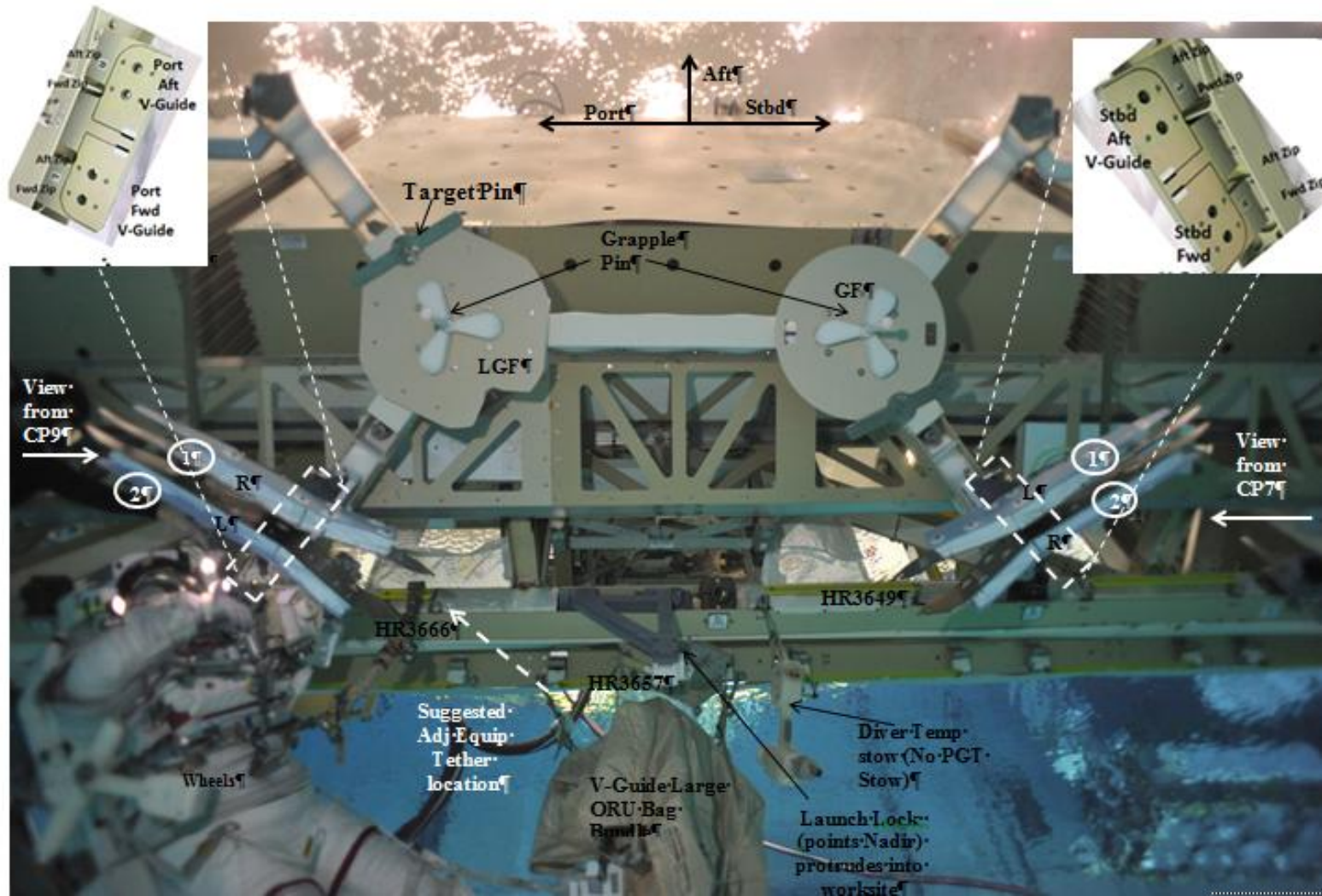
US EVA 23 V-GUIDE BOLT ON RGB (1:30) / MLM ETHERNET CABLE ROUTING (01:00)

| IV/SSRMS | EV1 – Chris Cassidy | EV2 – Luca Parmitano |
|---|---|---|
| <p>4. On IV GO: SPARTAN Re-power DDCU</p>  <p>J2 FGB (Bus B)</p> <p>J1 FGB (Bus A)</p> <p>Node 3 Aft Avionics Panel</p> | <p>5. Fwd / Zenith Patch Panel Connectors</p> <ul style="list-style-type: none"> <input type="checkbox"/> Optional: APFR Z1 WIF 16 [10, PP, D, 12] <ul style="list-style-type: none"> <input type="checkbox"/> Blk on Blk <input type="checkbox"/> Pull / Twist Test <input type="checkbox"/> Z1-006 P3/J3 (Jumper) ← → J3 (Patch Panel) (NOTE: J3 Label missing) <input type="checkbox"/> W05 P1 ← → J1 (Patch Panel) <input type="checkbox"/> Z1-006 P3/J3 (Jumper) → ← J1 (Patch Panel) <input type="checkbox"/> W05 P1 → ← J3 (Patch Panel) <p>← Give MCC Go for DDCU re-power</p> <p>6. <input type="checkbox"/> WVS close-out imagery of worksite</p> <p>7. If needed, return APFR to Z1 WIF 13 [3, QQ, D, 1]</p> <ul style="list-style-type: none"> <input type="checkbox"/> Blk on Blk <input type="checkbox"/> Pull / Twist Test <p>8. Re-Configure Nadir RPCM MLI</p> <ul style="list-style-type: none"> <input type="checkbox"/> Open Velcro flap <input type="checkbox"/> Restrain MLI with Velcro flap <p>8. Perform glove inspection</p> <p>9. If needed, standby for DDCU check</p> <p>V-GUIDE INSTALL ON RGB (01:30)</p> <div style="border: 2px solid black; background-color: red; color: white; text-align: center; padding: 2px;">WARNING</div> <div style="border: 1px solid black; padding: 2px;">Due to entrapment hazard, do not insert glove into the exposed latch mechanisms of the T-Handle (removed prior to flight)</div> <div style="border: 1px solid black; padding: 2px;">Avoid Curvic coupling on LGF (sharp edge)</div> <div style="border: 2px solid black; background-color: yellow; text-align: center; padding: 2px;">CAUTION</div> <div style="border: 1px solid black; padding: 2px;">Avoid kicking P1 radiator beam. If this occurs, wait 2 minutes to allow structural response to dissipate</div> <div style="border: 1px solid black; padding: 2px;">Minimize side loads on bolts due to sensitivities of Zip Nuts</div> <div style="border: 1px solid black; padding: 2px;">Avoid Grapple Pins, Target Pins, Connector Ports, on the RGB Grapple Fixtures</div> | <p>US PDGF 1553 CLEAN UP</p> <p>13. Translate to Node 3 Avionics Cable Bag</p> <p>14. Stow Fish Stringer in Node 3 Avionics Cable Bag</p>  |


US EVA 23 V-GUIDE BOLT ON RGB (1:30) / ETHERNET CABLE ROUTING (01:00)

| IV/SSRMS | EV1 - Chris Cassidy | EV2 – Luca Parmitano | | | | | | | | | | | | | | | |
|--|--|---|------------------------|-------------------------------|--|--|-------------------------------|--|--|-------------------------------|--|--|-------------------------------|--|--|--|--|
| <p>1. Verify MLM Ethernet Inhibits in place</p> <p>Record Port Grapple Bar Bolt Data:</p> <table border="1" data-bbox="107 516 615 833"> <thead> <tr> <th>Bolt</th> <th>Turns</th> <th>Torque 18.4 (ft-lb)</th> </tr> </thead> <tbody> <tr> <td>Port aft V-Guide Aft Bolt (R)</td> <td></td> <td></td> </tr> <tr> <td>Port aft V-Guide Fwd Bolt (R)</td> <td></td> <td></td> </tr> <tr> <td>Port fwd V-Guide Aft Bolt (L)</td> <td></td> <td></td> </tr> <tr> <td>Port fwd V-Guide Fwd Bolt (L)</td> <td></td> <td></td> </tr> </tbody> </table> | Bolt | Turns | Torque 18.4 (ft-lb) | Port aft V-Guide Aft Bolt (R) | | | Port aft V-Guide Fwd Bolt (R) | | | Port fwd V-Guide Aft Bolt (L) | | | Port fwd V-Guide Fwd Bolt (L) | | | <p>V-GUIDE INSTALL ON RGB Cont</p> <ol style="list-style-type: none"> Retrieve Green Hook from S0 HR3520; Translate to MM 8010 Drop Green Hook on CETA HR near Port-most Lab Strut (MM 8010) BRT to V-Guides Large ORU/Crewlock Bag Bundle Translation to P1 RGB <ul style="list-style-type: none"> <input type="checkbox"/> Translate port to MM 9180 (nadir of P1 FHRC) <input type="checkbox"/> Translate on Nadir HR path to P1 RGB <p>PORT AFT V-GUIDE INSTALL (00:15)</p> <ol style="list-style-type: none"> Stow V-Guides Large ORU/Crewlock Bag Bundle hooks on P1 HR 3657 & P1 3666 (Bag fwd/port launch lock) Temp stow Crewlock Bag nearby (if desired) Open V-Guides Large ORU Bag, restrain lid as needed Retrieve V-Guide (R) (use MWS RET if desired) Translate & BRT to P1 HR 3666 Align and zip V-Guide (R) bolts (2) Release tether from V-Guide | <p>MLM ETHERNET CABLE ROUTE (1:00)</p> <p>←MCC Coord Only Verify Inhibits</p> <div style="border: 2px solid black; background-color: red; text-align: center; padding: 2px;">WARNING</div> <p>Avoid contact with grapple fixture target, target pin, and PDGF curvic coupling (teeth)</p> <p>Avoid contact with FGB sun sensors (possible sharp edges)</p> <div style="border: 2px solid black; background-color: yellow; text-align: center; padding: 2px;">CAUTION</div> <p>Avoid contact with zenith PMA1 MDM and above 22" of EVA crane stanchion</p> <p style="text-align: center;"><u>NOTE</u></p> <p>Do not release MLM Ethernet Cable Wire Tie labeled "PIGTAIL". This Wire Tie secures 4 pigtails to main cable and is not used to secure cable to structure</p> <p>NODE 1 CONNECTION</p> <ol style="list-style-type: none"> Retrieve MLM Ethernet Cable from Node 3 Avionics Cable Bag (RET to Russian End) |
| Bolt | Turns | Torque 18.4 (ft-lb) | | | | | | | | | | | | | | | |
| Port aft V-Guide Aft Bolt (R) | | | | | | | | | | | | | | | | | |
| Port aft V-Guide Fwd Bolt (R) | | | | | | | | | | | | | | | | | |
| Port fwd V-Guide Aft Bolt (L) | | | | | | | | | | | | | | | | | |
| Port fwd V-Guide Fwd Bolt (L) | | | | | | | | | | | | | | | | | |
| | <p>PORT FWD V-GUIDE INSTALL (00:15)</p> <ol style="list-style-type: none"> Retrieve V-Guide (L) (use MWS RET if desired) Translate & BRT to P1 HR 3666 Align and zip V-Guide (L) bolts (2) Release tether from V-Guide Configure PGT: [B3 (18.4), CW1, 30.5] 2-ext 5/8 ←Fully Zip and drive V-Guide Bolts (4) with PGT (minimize side loads); expect ~1 turn if fully zipped. Report torque & turns. Stow PGT Perform jiggle test on Port V-Guides and all bolts | <ol style="list-style-type: none"> Translate to Node 1 Fwd endcone HR 0141 (existing Ethernet pigtail), staying zenith of CETA Light Release Wire Ties labeled HR 0141/START & HR 0140/ FIRST TY RET & Remove to J2 cap on existing Ethernet pigtail (release Wire Tie if req'd) Pigtail J2 → ← P2 (MLM Ethernet) √ good pins & EMI band, no FOD <input type="checkbox"/> Briefly describe Node 3 IFHX worksite access (HX is under Nod3 MMOD Shield C1-01) | | | | | | | | | | | | | | | |

US EVA 23 V-GUIDE BOLT ON RGB (1:30) / ETHERNET CABLE ROUTING (01:00)



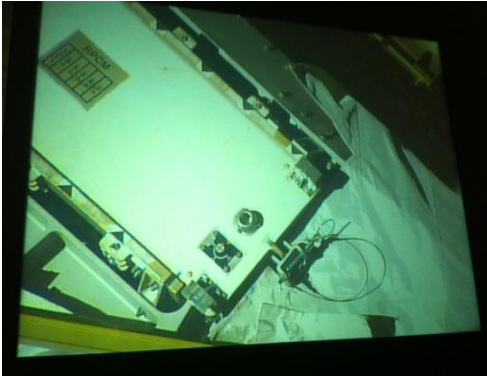
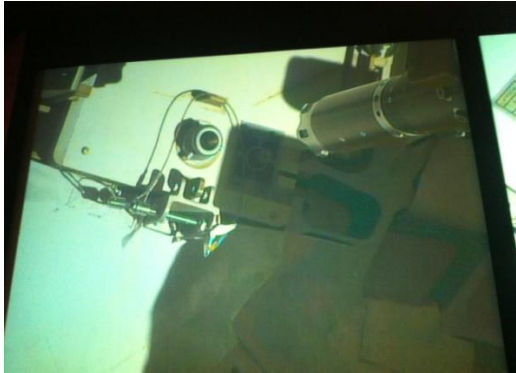
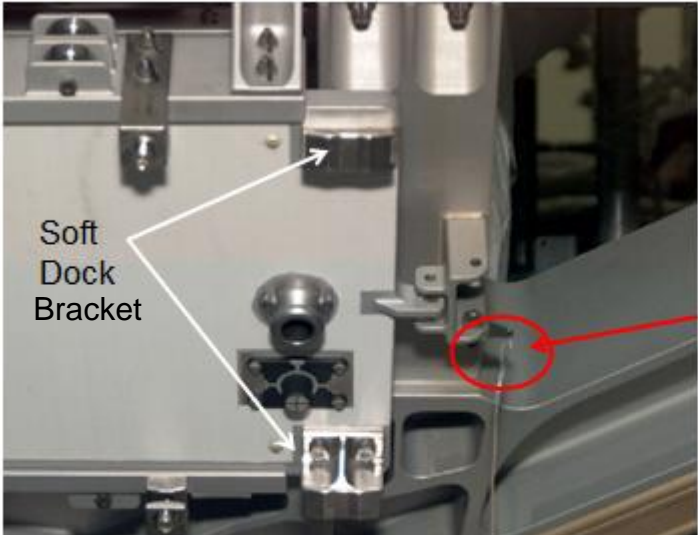
US EVA 23 V-GUIDE BOLT ON RGB (1:30) / ETHERNET CABLE ROUTING CONT (01:00)

| IV/SSRMS | EV1 - Chris Cassidy | EV2 – Luca Parmitano | | | | | | | | | | | | | | | |
|--|---------------------|------------------------|------------------------|-------------------------------|--|--|-------------------------------|--|--|-------------------------------|--|--|-------------------------------|--|--|---|--|
| <p>2. Verify WETA Inhibits in work</p> <p>Record Stbd Grapple Bar Bolt Data:</p> <table border="1" data-bbox="100 623 611 943"> <thead> <tr> <th>Bolt</th> <th>Turns</th> <th>Torque 18.4 (ft-lb)</th> </tr> </thead> <tbody> <tr> <td>Stbd aft V-Guide Aft Bolt (L)</td> <td></td> <td></td> </tr> <tr> <td>Stbd aft V-Guide Fwd Bolt (L)</td> <td></td> <td></td> </tr> <tr> <td>Stbd fwd V-Guide Aft Bolt (R)</td> <td></td> <td></td> </tr> <tr> <td>Stbd fwd V-Guide Fwd Bolt (R)</td> <td></td> <td></td> </tr> </tbody> </table> <p><input type="checkbox"/> V-Guide Lrg ORU Bag</p> <ul style="list-style-type: none"> <input type="checkbox"/> Adj Equip Tether (2) (outside bag) <ul style="list-style-type: none"> <input type="checkbox"/> RET (sm-sm) <ul style="list-style-type: none"> <input type="checkbox"/> Adj Equip Tether (sm-sm) <input type="checkbox"/> RET (sm-sm) <ul style="list-style-type: none"> <input type="checkbox"/> Adj Equip Tether (sm-sm) | Bolt | Turns | Torque 18.4 (ft-lb) | Stbd aft V-Guide Aft Bolt (L) | | | Stbd aft V-Guide Fwd Bolt (L) | | | Stbd fwd V-Guide Aft Bolt (R) | | | Stbd fwd V-Guide Fwd Bolt (R) | | | <p><u>STBD AFT V-GUIDE INSTALL (00:15)</u></p> <p>20. Retrieve V-Guide (L) (use MWS RET if desired)</p> <p>21. Translate & BRT to P1 HR 3649</p> <p>22. Align and zip V-Guide (L) bolts (2)</p> <p>23. Release tether from V-Guide</p> <p>←MCC Coord Only Verify WETA Inhibits in work</p> <p><u>STBD FWD V-GUIDE INSTALL (00:15)</u></p> <p>24. Retrieve V-Guide (R) (use MWS RET if desired)</p> <p>25. Translate & BRT to P1 HR 3649</p> <p>26. Align and zip V-Guide (R) bolts (2)</p> <p>27. Release tether from V-Guide</p> <p>28. Configure PGT: [B3 (18.4), CW1, 30.5] 2-ext 5/8</p> <p>29. ←Fully Zip and drive V-Guide Bolts (4) with PGT (minimize side loads); expect ~1 turn if fully zipped. Report torque & turns.</p> <p>30. Stow PGT</p> <p>31. Perform jiggle test on stbd V-Guides and all bolts</p> <p>32. Inventory & close V-Guides Large ORU bag</p> <p>33. Translate to Crewlock Bag (if separated)</p> <p>34. Perform Socket Swap to 7/16 (wobble) Socket-6 ext</p> <p>35. Stow 5/8 (rigid) socket- 2 ext on socket caddy</p> <p>36. Bundle Crewlock Bag to V-Guides Large ORU Bag</p> <p>37. BRT to V-Guides Large ORU/Crewlock Bag Bundle</p> <p>38. Perform glove inspection</p> | <p><u>NODE 1 ROUTING TO FGB (0:30)</u></p> <p>6. Secure cable to HRs with 1 pre-integrated Short Wire Tie each, 3 twists. Verify safety tether is clear before securing each Wire Tie</p> <ul style="list-style-type: none"> <input type="checkbox"/> Node 1 HR 0141 (optional) (If not used, make low profile) <input type="checkbox"/> Node1 HR 0140/ FIRST TY Nadir stanchion (Circumferential HR) <input type="checkbox"/> Node 1 HR 0129 fwd stanchion (Horiz HR) <input type="checkbox"/> Node 1 HR 0121 aft stanchion (Horiz HR) <input type="checkbox"/> Node 1 HR 0105 zenith stanchion (Circumferential HR) <p><u>NODE 1 ROUTING TO FGB CONT</u></p> <p>7. (Verify Safety Tether is clear before securing each Wire Tie)</p> <ul style="list-style-type: none"> <input type="checkbox"/> PMA1 STOVEPIPE (Wire Tie label “HR STOVEPIPE”) <input type="checkbox"/> PMA1 TA C-7 (Wire Tie label “TA-C7”) <input type="checkbox"/> PMA1 HR 0010 (Nadir of Crane) <input type="checkbox"/> FGB HR 1050 (Circumferential HR) – coil & restrain extra cable in this Wire Tie zenith on HR away from FGB PDGF <input type="checkbox"/> Verify bootie secure on Russian connector <p>8.  WVS close-out imagery of stowed cable end</p> <p>9. Perform Glove Inspection</p> |
| Bolt | Turns | Torque 18.4 (ft-lb) | | | | | | | | | | | | | | | |
| Stbd aft V-Guide Aft Bolt (L) | | | | | | | | | | | | | | | | | |
| Stbd aft V-Guide Fwd Bolt (L) | | | | | | | | | | | | | | | | | |
| Stbd fwd V-Guide Aft Bolt (R) | | | | | | | | | | | | | | | | | |
| Stbd fwd V-Guide Fwd Bolt (R) | | | | | | | | | | | | | | | | | |



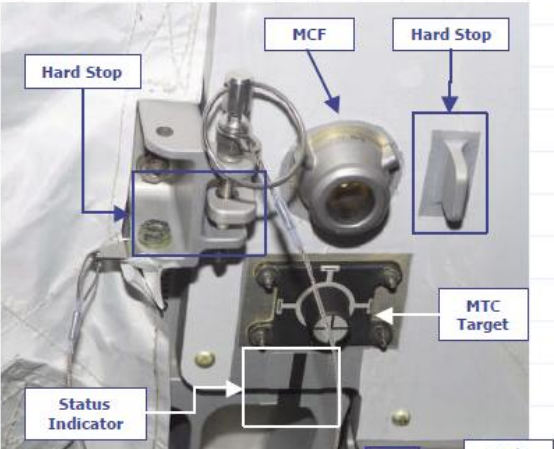

US EVA 23 V-GUIDE BOLT ON RGB (1:30) / ETHERNET CABLE ROUTING CONT (01:00)

| IV/SSRMS | EV1 - Chris Cassidy | EV2 – Luca Parmitano |
|--|---------------------|--|
| <ul style="list-style-type: none"> <input type="checkbox"/> Node 3 Avionics Cable Bag <ul style="list-style-type: none"> <input type="checkbox"/> RET (sm-sm) (Bottom of Bag) <ul style="list-style-type: none"> <input type="checkbox"/> Adj Equip Tether <ul style="list-style-type: none"> <input type="checkbox"/> Small ISS Trash Bag <input type="checkbox"/> Wire Tie Caddy <input type="checkbox"/> Fish Stringer (Lg hooks to bottom of bag) <ul style="list-style-type: none"> <input type="checkbox"/> US 1533 Cable Cap P1 (hook 1) <input type="checkbox"/> US 1553 Cable Cap P2 (hook 2) <input type="checkbox"/> J2/W5634 cap (Ethernet) (hook 3) <input type="checkbox"/> Terminator cap J1 FGB (hook 4) <input type="checkbox"/> Terminator cap J2 FGB (hook 5) <input type="checkbox"/> Terminator cap MLI (hook 6) <input type="checkbox"/> Terminator cap MLI (hook 7) <input type="checkbox"/> RET (Lg-sm) <ul style="list-style-type: none"> <input type="checkbox"/> Adj Equip Tether (1) (for PMA Cover Task) | | <p><u>US PDGF 1553 CLEAN UP</u></p> <ol style="list-style-type: none"> 10. Translate to Node 3 Avionics Cable Bag 11. Stow P2 Ethernet Cap on Fish Stringer 12. Inventory Node 3 Avionics Cable Bag 13. Retrieve Node 3 Avionics Cable Bag; stow on BRT 14. Perform glove inspection 15. Standby for ROBO Bus Checkout complete 16. ON MCC GO, Translate to A/L (follow tether nadir path) 17. Stow Node 3 Avionics Cable Bag on A/L Circumferential HR |

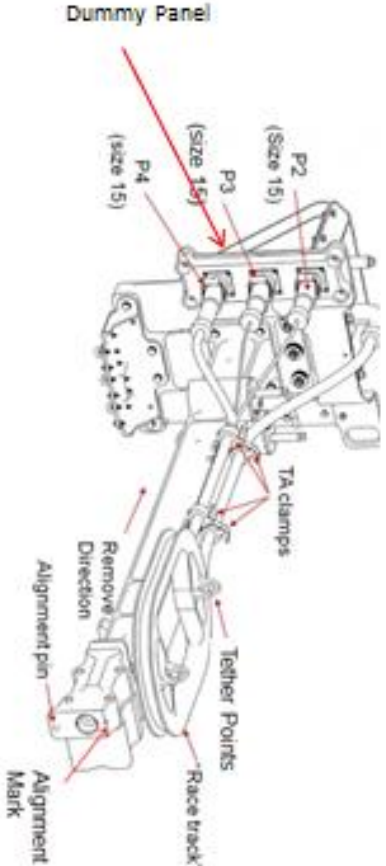
US EVA 23 SPDA DOOR (00:40)

| IV/SSRMS | EV1 - Chris Cassidy | EV2 – Luca Parmitano |
|--|---|---|
|  <p>SPDA Port Door (Actual)</p> |  <p>SPDA Stbd Door (Actual)</p>  <p>Soft Dock Bracket</p> <p>Lanyard Tether Loop</p> | <p>SPDA PORT DOOR (00:20)</p> <ol style="list-style-type: none"> 1. Retrieve MBSU MLI Bag 2. Translate to S0 SPDA Port Door (Bay 0, Face 2) 3. Stow MBSU MLI Bag, as required 4. Assess cutting or wire tie options for PIP Pin lanyard <p><u>If cutting wire tie:</u></p> <div style="border: 2px solid black; padding: 5px; text-align: center;"> <p>WARNING</p> <p>Do not touch lanyard attachment loop after cutting due to possible sharp edges</p> </div> <ol style="list-style-type: none"> 5. Retrieve Small Trash Bag; stow on MWS 6. Retrieve EVA Scissors 7. Position for lanyard removal 8. RET to PIP pin tether point 9. Cut lanyard through attachment loop on stowage bracket (use crotch of scissors or cutters, may take several cuts) 10. Release PIP pin from stowage bracket 11. Stow in Trash Bag (Avoid touching lanyard) |

US EVA 23 SPDA DOOR (00:40)

| IV/SSRMS | EV1 - Chris Cassidy | EV2 – Luca Parmitano |
|---|---|---|
|  <p data-bbox="233 727 541 756">SPDA Port Door (NBL)</p> |  <p data-bbox="722 727 1266 756">Wire tie lanyard to PIP Pin Housing (NBL)</p>  | <p data-bbox="1318 240 1713 269"><u>If restraining PIP pin with wire tie:</u></p> <ol style="list-style-type: none"> <li data-bbox="1371 302 1990 354">12. Retrieve wire tie with squished tether points from BRT <li data-bbox="1371 363 1934 393">13. Restrain lanyard to PIP pin stowage bracket <li data-bbox="1318 425 1969 574">14. Open port SPDA door ~ 12" If no joy, <ol style="list-style-type: none"> <li data-bbox="1371 487 1969 574">a. Inspect for FOD in the tracks, signs of warping, denting, misalignment, or other damage <li data-bbox="1371 578 1955 636">b. Inspect spring plunger (only ball tip of plunger should protrude from bracket) <li data-bbox="1318 639 1902 669">15. Fully Close door (status indicator blk on blk) <li data-bbox="1318 672 1835 701">16.  WVS close-out imagery of worksite <p data-bbox="1318 734 1661 763"><u>SPDA STBD DOOR (00:20)</u></p> <ol style="list-style-type: none"> <li data-bbox="1318 766 1780 795">17. Translate to S0 SPDA STBD Door <li data-bbox="1318 799 1755 828">18. Clear Lanyard from door handle <li data-bbox="1318 831 1598 860">19. Repeat steps 4-16 <li data-bbox="1318 863 1667 893">20. Retrieve MBSU MLI Bag <li data-bbox="1318 896 1877 948">21. Translate to Lab HR 0247 (fwd of stbd Lab stanchion); temp stow MBSU MLI Bag. |


US EVA 23 WETA RELOCATE (1:30)

| IV/SSRMS | EV1 - Chris Cassidy | EV2 – Luca Parmitano |
|--|--|--|
| <p>1. <input type="checkbox"/> MCC-H WETA inhibits complete</p> <p>2. Start WETA Thermal Clock (4 hours)_____</p>  | <p>WETA REMOVE (00:45)</p> <p>←MCC Coord Only, Verify WETA Inhibits complete</p> <div style="border: 1px solid black; background-color: yellow; padding: 5px; text-align: center;">CAUTION</div> <p>Avoid contact with P1 radiator beam. If kicked, wait 2 minutes to allow structural response to dissipate</p> <div style="border: 1px solid black; padding: 5px;"> <p>WETA Cable J2 is Fiber Optic. Maintain >90 degree bend at connector backshell during removal and install.</p> </div> <ol style="list-style-type: none"> 1. <u>Translate to P1 Zenith CP8 (EV1 Leads)</u> <ul style="list-style-type: none"> <input type="checkbox"/> Translate port along CETA HR (face 1) <input type="checkbox"/> Fairlead on CETA HR at P1 Bay 16 before going zenith <input type="checkbox"/> Translate zenith at P1 Bay 16 2. Stow V-Guides Large ORU/Crewlock Bag Bundle on P1 HR 3685 (outboard/slightly aft of WETA) 3. Retrieve Rd Scoop from Crewlock Bag 4. Install Rd Scoop on WETA (Handhold nadir); Verify Locked 5. If needed, BRT to P1 HR 3684 6. Demate VSSA Connectors (3) from P1 panel A101 7. Demate caps (3) from VSSA/Stanchion dummy panel & install on P1 panel A101 8. Route cable around VSSA race track, restrain with TA clamps (at least 1) 9. Install connectors (3) on dummy panel 10. Attach BRT RET to WETA tether point 11. Receive Ratchet Wrench with 7/16 (rigid) Socket-9 ext 12. Break Torque on Stanchion Bolt (NOTE: Failure Torque: 62 ft-lbs) 13. Stow Ratchet in Crewlock Bag or hand to EV2 14. Configure PGT: [B7 (25.5), CCW2, 30.5] 6-Ext 7/16 | <p>WETA REMOVE (00:45)</p> <div style="border: 1px solid black; background-color: yellow; padding: 5px; text-align: center;">CAUTION</div> <p>Avoid contact with P1 radiator beam. If kicked, wait 2 minutes to allow structural response to dissipate</p> <ol style="list-style-type: none"> 1. <u>Translate to P1 Zenith CP8 (EV1 leads)</u> <ul style="list-style-type: none"> <input type="checkbox"/> Translate port along CETA HR (face 1) <input type="checkbox"/> Drop Green Hook on CETA Rail (nadir FHRC-Mile marker 9180) <input type="checkbox"/> Translate Zenith at P1 Bay 14 (deconflicts tethers) <input type="checkbox"/> If needed, fairlead P1 HR 3656 2. If needed, Assist EV1 with WETA cap removal as needed <ul style="list-style-type: none"> <input type="checkbox"/> Tether to caps using EV2 RET <input type="checkbox"/> EV2 install caps on P1 panel A101 3. Retrieve EVA Ratchet Wrench with 7/16 (wobble) Socket-6 ext from Crewlock Bag, hand to EV 1 4. Receive Ratchet Wrench with 7/16 (wobble) Socket-9 ext; Stow in Crewlock Bag 5. Assist EV1 with WETA/VSSA remove and install on BRT 6. If needed, BRT to P1 HR 3676 (or 3674) (head aft, feet fwd) |

US EVA 23 WETA RELOCATE (1:30)

| IV/SSRMS | EV1 - Chris Cassidy | EV2 – Luca Parmitano | | | | | | |
|--|--|---|-------------------|---------------------|--|--|--|--|
| <p>3. Verify JEF VE inhibits are in work</p> | <p>15. Remove socket from PGT, install on stanchion bolt 16. Tilt socket to install PGT 17. Release stanchion bolt ~16.5 turns</p> <p>18. Stow PGT; Remove WETA/VSSA from CP8, position horizontally 19. BRT to Scoop on WETA</p> | <p>7. Retrieve V-Guides Large ORU/Crewlock Bag Bundle, Stow on BRT</p> <p>←MCC Coord Start JEM EF VE inhibits</p> | | | | | | |
| <div data-bbox="107 586 625 1203" data-label="Image"> </div> <p data-bbox="170 1208 562 1235">Node 2 – CP11 Connector Panel</p> <table border="1" data-bbox="107 1268 583 1422"> <thead> <tr> <th></th> <th>Torque (18.4 ft-lbs)</th> <th>Turns (16 -18)</th> </tr> </thead> <tbody> <tr> <td>WETA Stanchion Bolt</td> <td></td> <td></td> </tr> </tbody> </table> | | Torque (18.4 ft-lbs) | Turns (16 -18) | WETA Stanchion Bolt | | | <div data-bbox="695 483 1268 591" data-label="Text" style="background-color: yellow; border: 2px solid black; padding: 5px;"> <p align="center">CAUTION</p> <p>Avoid EWC Antennas on Lab endcone HRs and do not use as handholds</p> </div> <p data-bbox="632 626 905 654"><u>WETA INSTALL (00:45)</u></p> <p>20. <u>Translate to Node 2 Aft/Zenith</u> (EV2 Must Lead)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Allow EV2 to translate to CETA HR & get in position to GCA <input type="checkbox"/> Translate nadir to CETA HR at P1 Bay 16 <input type="checkbox"/> Translate along Face 1 to port Lab Strut (leave Green Hook on CETA rail; acts as fairlead) (NOTE: Watch Safety Tether, & accept GCA for orientation change) <input type="checkbox"/> Translate along Lab port zenith HR path to CP11 (Node 2 zenith/aft endcone) <p>21. Install WETA stanchion onto CP11 (Bolt forward, racetrack port, may not be able to feel soft-dock)</p> <p>22. Verify stanchion base flush with mounting plate</p> <p>23. Open TA Clamps to release VSSA cable, demate connectors (3)</p> | <div data-bbox="1381 483 1955 591" data-label="Text" style="background-color: yellow; border: 2px solid black; padding: 5px;"> <p align="center">CAUTION</p> <p>Avoid EWC Antennas on Lab endcone HRs and do not use as handholds</p> </div> <p data-bbox="1318 626 1591 654"><u>WETA INSTALL (00:45)</u></p> <p>8. <u>Translate to Node 2 Aft/Zenith</u> (EV2 Must Lead)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Follow safety tether to CETA HR at P1 Bay 14 (near WIF 1), watch for EV1's tether on CETA HR <input type="checkbox"/> Retrieve Green Hook from CETA HR (near MM 9810) <input type="checkbox"/> Give GO to EV1 to begin translation <input type="checkbox"/> Translate down Lab port Strut <input type="checkbox"/> Translate via Gap spanner to Lab stbd/zenith HR path <input type="checkbox"/> Translate to CP11 (Node 2 zenith/aft endcone) <p>9. Provide GCA for EV1 along translation</p> <p>10. Temp stow V-Guides Large ORU/ Crewlock Bag Bundle on Lab HR 0264 (stbd, fwd-most HR)</p> <p>11. Inspect CP11 receptacle threads ✓ no FOD, no damage</p> <p>12. Assist EV1 with WETA Install</p> <p>13. If needed, BRT to Node 2 HR 0370</p> <p>14. Configure PGT: [B3 (18.4), CW2, 30.5] 6-Ext 7/16</p> <p>15. ←Push in (6 lbf) and drive stanchion bolt ~ 16-18 turns (Report Torque & Turns)</p> |
| | Torque (18.4 ft-lbs) | Turns (16 -18) | | | | | | |
| WETA Stanchion Bolt | | | | | | | | |

US EVA 23 WETA RELOCATE (1:30)

| IV/SSRMS | EV1 - Chris Cassidy | EV2 – Luca Parmitano |
|---|--|---|
|  <p>Fitcheck of VSSA at CP11 Electrical Panel</p> <p>3. Give MCC-H GO to power up WETA 4. Stop WETA Thermal Clock _____</p> | <p>24. Demate connector (3) from Dummy panel 25. Locate Node 2 CP11 connector panel (NOD2/01-07). Pull back MLI cover, restrain to Node 2 HR 0370 if necessary 26. Demate caps (3) from Node 2 CP11 panel and install on VSSA dummy panel</p> <p>27. Mate VSSA connectors (3) to Node 2 CP11 panel (Assess cable bend radius during connection, maintain >90 deg bend on P2)</p> <p><input type="checkbox"/> P2→ ←J2 <input type="checkbox"/> √Good pins & EMI Band; no FOD <input type="checkbox"/> P3→ ←J3 <input type="checkbox"/> √Good pins & EMI Band; no FOD <input type="checkbox"/> P4→ ←J4 <input type="checkbox"/> √Good pins & EMI Band; no FOD</p> <p>28. ←Give MCC Go to power WETA 29. Reconfigure MLI around Node 2 connectors 30. <input type="checkbox"/> WVS close-out imagery of WETA connectors (verify P2 Bend radius) 31. Remove Rd Scoop; stow on MWS (for JEF Camera) 32. Inventory Crewlock Bag 33. Retrieve V-Guides Large ORU / Crewlock Bag Bundle, stow on BRT</p> | <p>16. Assist EV1 with caps using EV2 RET as needed</p> <p>17. Perform glove inspection</p> |
| <p><input type="checkbox"/> Crewlock Bag</p> <ul style="list-style-type: none"> <input type="checkbox"/> Ratchet Wrench (Int # 1) <input type="checkbox"/> 7/16 (rigid) Socket-9 ext <ul style="list-style-type: none"> <input type="checkbox"/> Small ISS Trash Bag <input type="checkbox"/> Socket Caddy <ul style="list-style-type: none"> <input type="checkbox"/> 5/8 (rigid) Socket-2" ext <input type="checkbox"/> 7/16 (wobble) Socket 12" ext <input type="checkbox"/> 5/8 (rigid) Socket-2" ext <input type="checkbox"/> Round Scoop (Int #4) <input type="checkbox"/> LDTDT (contingency) (D-Ring) <input type="checkbox"/> LDTDT (contingency) (D-Ring) <input type="checkbox"/> RET w/ PIP pin (D-Ring) <input type="checkbox"/> EVA-Scissors | <p>34. Perform glove inspection 35. Retrieve Green Hook on CETA HR 36. Translate to A/L</p> | <p>18. Translate to Lab HR 0247; Retrieve MBSU MLI Bag</p> |

US EVA 23 JEM EF VE (1:00)

| IV/SSRMS | EV1 – Chris Cassidy |
|---|---|
| <p>1. Verify JEM EF VE Inhibits are in place</p> <p>2. Start A/L Thermal Cover Clock _____</p> <p>3. Start JEM EF VE Thermal Clock _____ (2.5 hours at worst Beta Angle)</p> <p>4. Stop A/L Thermal Cover Clock _____</p> | <p><u>JEM EF VE CAMERA SETUP (00:20)</u> ←MCC COORD only: Verify JEM EF VE Inhibits</p> <ol style="list-style-type: none"> 1. Translate to A/L 2. Open thermal Cover 3. Stow V-Guides Large ORU / Crewlock Bag Bundle at A/L (V-Guides Large ORU can be stowed in A/L, Crewlock should remain on A/L Circumferential HR) 4. If needed, retrieve Round Scoop from Crewlock Bag 5. Retrieve JEM EF VE Bag 6. Stow Rd. Scoop on outside of JEM EF VE Bag on Microconical <input type="checkbox"/> Verify Locked 7. Stow on JEM EF VE Bag on BRT 8. Close A/L Thermal Cover 9. Check SAFER handles, Tools & Tethers <div style="border: 1px solid black; background-color: yellow; text-align: center; padding: 2px;">CAUTION</div> <div style="border: 1px solid black; padding: 2px;">Avoid EWC Antennas on Lab endcone HRs and do not use as handholds</div> <ol style="list-style-type: none"> 10. Translate to JEF via <ul style="list-style-type: none"> <input type="checkbox"/> Node 2 fwd <input type="checkbox"/> Attach Safety Tether Green Hook to port JEM HR 1134 (zenith endcone HR) <input type="checkbox"/> JPM nadir → port <input type="checkbox"/> JEF → fwd → port (along fwd edge to camera) <input type="checkbox"/> If needed, fairlead on JEM EF HR 7019 (most stbd HR on fwd edge) <p><u>REMOVE FAILED JEM EF VE CAMERA (00:20)</u></p> <div style="border: 1px solid black; background-color: yellow; text-align: center; padding: 2px;">CAUTION</div> <div style="border: 1px solid black; padding: 2px;">Avoid touching white/black paint, silver teflon and solid lubricant on VE and R-ORU (required for Stow of JEM EF VE Bag)</div> <div style="border: 1px solid black; padding: 2px;">Avoid Pan and Tilt mechanisms. Motion at these joints is likely (Possible Pinch Points)</div> <ol style="list-style-type: none"> 11. Temp stow JEM EF VE Bag on JEF HR 7059 (HR on top of fwd/port most ORU) 12. Retrieve Scoop (use MWS RET) attach to failed JEM EF VE (handle nadir) 13. Attach other hook from MWS RET to JEF HR 7065 (stbd) 14. BRT to JEF HR 7060 |

US EVA 23 JEM EF VE (1:00)

IV/SSRMS

| VE Install Bolts | Torque (B2- 16.0 ft-lbs) | Turns (min 12 – 15 expected) |
|------------------|--------------------------------|---------------------------------------|
| Bolt 1 (FWD) | | |
| Bolt 2 (AFT) | | |

5. End JEM EF VE Thermal Clock _____

- JEM EF VE Medium ORU Bag**
 - Adj Equip Tether (2) (outside of bag)
 - RET w/ PIP pin
 - Round Scoop
 - RET w/ PIP pin
 - Round Scoop (from Crewlock Bag)
 - JEM EF VE (Failed)
 - Fish Stringer (Lg hooks to bottom of bag)
 - Short Wire Tie
 - Small ISS Trash Bag
 - VE Connector Cap (attached to VE)

EV1 – Chris Cassidy

15. On IV GO
 - slide bootie with Wire Tie down cable
 - P009 ←|→ JEM EF VE J004
 16. Configure PGT [**B7 (25.5), CCW2, 30.5**] 6-ext 7/16;
 17. Release EVA bolts (2) 15 turns
 - fwd bolt (Bolt 1)
 - aft bolt (Bolt 2)
 18. Guide failed JEM EF VE to JEF HR 7065
- INSTALL SPARE JEM EF VE (00:20)
19. Retrieve spare JEM EF VE
 20. Dust Cap ←|→ J1, on spare VE; stow in JEM EF VE Bag (on Fish Stringer)
 - Verify Good Pins, No FOD, Good EMI Band
 21. Install spare JEM EF VE on JEF softdock stanchion (Position indicator; black marks not visible)
 22. BRT to 7060 as required
 23. Configure PGT [**B2 (16.0), CW2, 30.5**] 6 ext 7/16;
 24. ←Install EVA bolts (2) (12.5-15 turns)
 - fwd bolt
 - aft bolt
 25. Retrieve Round Scoop, stow in bag
 26. On IV GO
 - P009 →|← J1 on spare VE
 - slide bootie with Wire Tie over connector
 27. Give IV GO for VE heater activation
 28. Retrieve Bag RET hook (from outside tether loop), attach to scoop on Failed VE
 29. Retrieve MWS RET
 30. Stow failed JEM EF VE in bag
 31. Dust Cap →|← P009
 32. Retrieve JEM EF VE Bag on BRT
 33. Perform glove inspection
 34. Translate to A/L (follow tether, retrieve fairleads if needed)

US EVA 23 MBSU MLI REMOVAL (00:45)

IV/SSRMS



MBSU MLI



Tie down of flaps near Primary Bolt

EV2 – Luca Parmitano

MBSU MLI REMOVAL (00:45)

1. Retrieve MBSU MLI Bag from Lab HR 0247
2. Translate to S1 HR 3217 (angled HR under DDCU)
 - Drop Safety Tether Green Hook (MM 5760)
 - At ELC2 Fairlead tether around trunnion pin scuff plate (if needed)

CAUTION

MBSU MLI bolt captive feature may not function. Bolt and 2 washers could be released if captive feature fails

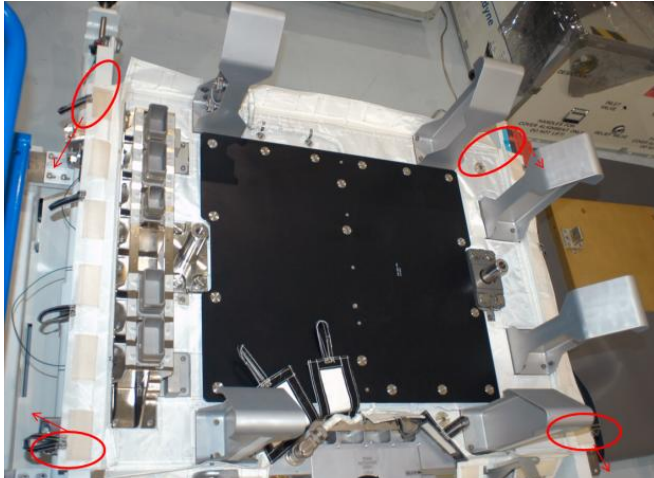
3. Stow MBSU MLI Bag on ELC2 HR 3039 & angled HR on strut
4. Open MBSU MLI Bag & Retrieve Wire Tie Caddy (stow inside bayonet)
5. Install Small ISS Trash Bag on MWS
6. If needed, temp stow Camera
7. RET to MLI corner tether point with bag RET
8. BRT as needed to aft FRAM HR
9. Configure PGT:
 - [A2 (3.8), CCW2, 30.5] 6-Ext 7/16**
10. Release 2 EVA MBSU MLI Bolts (16-19 turns)
11. Release Velcro and lift/release aft MLI flap.
12. Release Velcro on front & sides of MBSU base
13. Stow cover in MBSU MLI Bag

IF TIME PERMITS PERFORM GET AHEAD: MBSU MLI SKIRT TIE DOWN (00:45)

14. Secure MLI flaps near primary FRAM bolt to FRAM HRs (any order)
 - Route Long Wire Tie through 4 port MLI Skirt Tether points, secure to port FRAM HR (3 Twists)
 - Repeat, stbd MLI flaps to stbd FRAM HR (3 Twists)
 - Verify ~8" radius clear around the ctr of FRAM Bolt (use Lrg Crew hook as reference)

US EVA 23 MBSU MLI REMOVAL (00:45)

IV/SSRMS



Tie-down flap locations on MBSU

- MBSU MLI Medium ORU Bag**
 - RET (Lg-sm) (tape large hook)
 - Adj Equip Tether (Lg sm)
 - Fish Stringer
 - Wire Tie Caddy
 - Small ISS Trash Bag
 - Ratchet Wrench w/ 7/16 (rigid) 2"ext
 - EVA Scissors
 - CLPA Lens Cover MLI
 - CLPA Lens Cover (old)
 - Small Comp. Cutter (if located) (hook 6)
 - RET (sm-sm) (to outside front fwd loops)
 - MBSU MLI

2. Start A/L Thermal Cover Clock _____ (00:30)

3. Stop A/L Thermal Cover Clock _____

EV2 – Luca Parmitano

15. Secure zenith MLI Flaps at Corners along blind mate connectors (2 Short Wire Ties, 3 twists)
16. Secure nadir MLI Flaps at corners of MBSU (2 short Wire Ties, 3 twists)
17. WVS close-out imagery
18. If time/lighting permit, take photos of skirt tiedown config & AMS
 - Fwd edge MBSU (near primary bolt)
 - Zenith edge MBSU (Near dog house)
 - Nadir edge MBSU
 - Photos of AMS forward/stbd sides
19. Stow Small ISS Trash Bag / Wire Tie Caddy in MBSU MLI Bag on Fish Stringer (If needed, position CLPA Lens Cover for easy access)
20. Inventory & stow MBSU MLI Bag on BRT
21. Retrieve Camera from temp stow location (if stowed)
22. Perform glove inspection
23. Translate to the A/L
 - Retrieve green hook S1 HR 3217 (near MM 5850)
24. Open thermal Cover
25. Stow MBSU MLI MED ORU Bag
26. If Time permits: Go To EVA GET AHEAD Procedure, else CLEAN UP

US EVA 23 CLEANUP/INGRESS (00:45)

| IV/SSRMS | EV1 - Chris Cassidy | EV2 – Luca Parmitano |
|---|--|--|
| <ol style="list-style-type: none"> Start A/L Thermal Cover Clock | <p><u>CLEANUP</u> (00:15)</p> <ol style="list-style-type: none"> Perform tool inventory | <p><u>CLEANUP / STOW FSE BAG</u> (00:15)</p> <ol style="list-style-type: none"> Perform tool inventory Translate to A/L ←Open A/L Thermal Cover As required stow bag/hardware on A/L RET Translate to stbd endcone of A/L Crewlock (aft pathway to deconflict tethers) Retrieve FSE Bag on BRT, stow in A/L (aft) Stow Node 3 Avionics Bag in A/L If needed, retrieve V-Guides Large ORU/ Crewlock Bag Bundle from A/L Tool Box, stow in A/L |
| | | |
| <ol style="list-style-type: none"> Stop A/L Thermal Cover Clock Prior to hatch closure, perform WVS PWRDN (PHOTO/TV, <u>WVS</u> Cue Card) | <p><u>INGRESS</u> (00:30)</p> <ol style="list-style-type: none"> Ingress A/L Attach R Waist Tether to A/L internal D-ring Ext <ul style="list-style-type: none"> ☑ √Gate closed, hook locked, reel unlocked Give EV2 GO to release Safety Tether Remove SCU from stowage pouch Remove DCM cover; Velcro to DCM Connect SCU to DCM <ul style="list-style-type: none"> √SCU locked | <p><u>INGRESS</u> (00:30)</p> <ol style="list-style-type: none"> On EV1 GO, release EV1 Safety Tether, attach to own right waist tether <ul style="list-style-type: none"> ☑ √Gates closed, hooks locked, reel unlocked Release EV2 Safety Tether from A/L, attach to MWS Ingress A/L ←Close A/L thermal cover, attach Velcro strap Remove SCU from stowage pouch Remove DCM cover; Velcro to DCM Connect SCU to DCM <ul style="list-style-type: none"> √SCU locked |

US EVA 23 CLEANUP/INGRESS (00:45)

| IV/SSRMS | EV1 - Chris Cassidy | EV2 – Luca Parmitano |
|----------|---|---|
| | <div data-bbox="772 269 1171 367" style="border: 1px solid black; padding: 5px; text-align: center;"> <p><u>NOTE</u> A TCV setting 8 – Max C minimizes time for SCU cooling</p> </div> <p data-bbox="634 376 1304 409">8. WATER – OFF (fwd), expect H2O IS OFF msg</p> <div data-bbox="676 441 1915 516" style="border: 2px solid black; background-color: yellow; padding: 5px; text-align: center;"> <p>CAUTION Do not close hatch until EMU Water OFF for 2 min. Verify outer hatch clear of hardware</p> </div> <p data-bbox="634 708 1304 766"><u>PRE REPRESS</u> (00:05) Go to PRE-REPRESS (<u>DEPRESS/REPRESS</u> Cue Card)</p> | <div data-bbox="1459 269 1858 367" style="border: 1px solid black; padding: 5px; text-align: center;"> <p><u>NOTE</u> A TCV setting 8 – Max C minimizes time for SCU cooling</p> </div> <p data-bbox="1320 376 1948 409">16. WATER – OFF (fwd), expect H2O IS OFF msg</p> <p data-bbox="1320 574 1822 669">17. Verify outer hatch clear of hardware 18. Verify handle position per hatch decal 19. Close and lock hatch</p> <p data-bbox="1320 708 1990 766"><u>PRE REPRESS</u> (00:05) Go to PRE-REPRESS (<u>DEPRESS/REPRESS</u> Cue Card)</p> |

US EVA 23 GETAHEADS- JEM EF VE

| EVA Get-ahead Tasks (Order indicates priority) | Duration 1EV / 2EV | Inhibits |
|---|-------------------------------|-----------------|
| MBSU MLI SKIRT TIE DOWN | 0:45 | Yes |
| SSRMS CAMERA LENS COVER | 0:20 | Yes |
| CETA BRAKE HANDLE TIEDOWN | 0:15 | No |
| APFR/TS Relocate from P1 WIF 3 | 00:30 | Yes |
| Release S1 FHRC P-Clamps (need ratchet w/ 7/16" (wobble) 6" ext) | 1:00 / 00:30 | Yes |
| | | |
| | | |

US EVA 23 GETAHEADS- MBSU MLI REMOVAL / SKIRT TIE DOWN WITH 2 EV(00:45)

| IV/SSRMS | EV1 - Chris Cassidy | EV2 – Luca Parmitano |
|----------|---|---|
| | <p><u>MBSU MLI REMOVAL (00:45)</u></p> <ol style="list-style-type: none"> 1. Retrieve MBSU MLI Bag from A/L Circumferential HR 2. Translate to S1 HR 3217 (angled HR under DDCU) <ul style="list-style-type: none"> <input type="checkbox"/> Drop Safety Tether Green Hook (MM 5760) <input type="checkbox"/> At ELC2 Fairlead tether around trunnion pin scuff plate (if needed) <div style="border: 1px solid black; background-color: yellow; padding: 5px; margin: 10px 0;"> <p style="text-align: center;">CAUTION</p> <p>MBSU MLI bolts captive feature may not function. Bolt and 2 washers could be released if captive feature fails</p> </div> <ol style="list-style-type: none"> 3. Stow MBSU MLI Bag on ELC2 HR 3047 4. Open Bag & Stow Wire Tie Caddy (inside bayonet) 5. Install Small ISS Trash Bag on MWS 6. If needed, stow Camera 7. RET to MLI corner tether point with bag RET 8. BRT as needed to aft FRAM HR 9. Configure PGT: [A2 (3.8), CCW2, 30.5] 6-Ext 7/16 10. Release 2 EVA MBSU MLI Bolts (16-19 turns) 11. Release Velcro and lift/release aft MLI flap. 12. Release Velcro on front & sides of MBSU base 13. Hand cover to EV2 to stow | <p><u>MBSU MLI ASSIST GET AHEAD (0:40)</u></p> <ol style="list-style-type: none"> 1. Translate to S1 Bay 15 MM 5910 (EV 1 leads) (Note stay port of EV1 at worksite) <ul style="list-style-type: none"> <input type="checkbox"/> Drop Safety Tether Green Hook <input type="checkbox"/> Translate to MBSU MLI Bag (ELC2 HR 3047) <input type="checkbox"/> If needed, temp stow Camera 2. Assist EV 1 with MBSU MLI Removal 3. Stow MBSU MLI in MBSU MLI Bag |

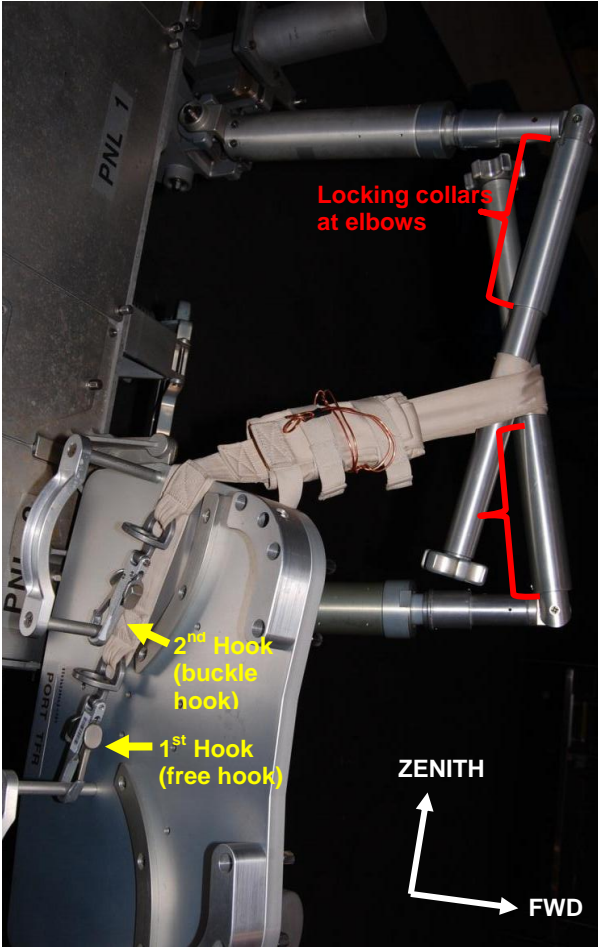
US EVA 23 GETAHEADS- CLPA LENS COVER R&R (00:20)

| IV/SSRMS | EV1 - Chris Cassidy | EV2 – Luca Parmitano |
|---|--|---|
| <p>-----</p> <ul style="list-style-type: none"> <input type="checkbox"/> MBSU MLI Medium ORU Bag <ul style="list-style-type: none"> <input type="checkbox"/> RET (Lg-sm) <input type="checkbox"/> Adj Equip Tether (Lg sm) (outside, back) <input type="checkbox"/> Fish Stringer (route diag.) <ul style="list-style-type: none"> <input type="checkbox"/> Wire Tie Caddy <input type="checkbox"/> Small ISS Trash Bag <input type="checkbox"/> Ratchet Wrench w/ 7/16 x 2"ext <input type="checkbox"/> EVA Scissors or Cmpd Cutters <input type="checkbox"/> CLPA Lens Cover MLI <ul style="list-style-type: none"> <input type="checkbox"/> CLPA Lens Cover (old) <input type="checkbox"/> RET (sm-sm) (to outside front fwd loops) <ul style="list-style-type: none"> <input type="checkbox"/> MBSU MLI <p>2. Start A/L Thermal Cover Clock _____ (00:30)</p> <p>3. Stop A/L Thermal Cover Clock _____</p> <p>-----</p> | <p><u>MBSU MLI SKIRT TIE DOWN (00:45)</u></p> <ol style="list-style-type: none"> 14. Secure MLI flaps near primary FRAM bolt to FRAM HRs (any order) <ul style="list-style-type: none"> <input type="checkbox"/> Route Long Wire Tie through 4 port MLI Skirt Tether points, secure to port FRAM HR (3 Twists) <input type="checkbox"/> Repeat, stbd MLI flaps to stbd FRAM HR (3 Twists) <input type="checkbox"/> Verify ~8" radius clear around the ctr of FRAM Bolt (use Lrg Crew hook as reference) 15. Secure zenith MLI Flaps at Corners along blind-mate connectors (2 Short Wire Ties, 3 Twists) 16. Secure nadir MLI Flaps at corners of MBSU (2 short Wire Ties, 3 twists) 17. <input type="checkbox"/> WVS close-out imagery 18. If time/lighting permit, take photos of skirt tiedown config & AMS <ul style="list-style-type: none"> <input type="checkbox"/> Fwd edge MBSU (near primary bolt) <input type="checkbox"/> Zenith edge MBSU (Near dog house) <input type="checkbox"/> Nadir edge MBSU <input type="checkbox"/> Photos of AMS forward side 19. Stow Small ISS Trash Bag / Wire Tie Caddy in MBSU MLI Bag 20. Inventory & Stow MBSU MLI Bag on BRT 21. Retrieve camera if temp stowed 22. Perform glove inspection 23. Translate to the A/L <ul style="list-style-type: none"> <input type="checkbox"/> Retrieve green hook S1 HR 3217 (near MM 5850) 24. Open thermal Cover 25. Stow MBSU MLI MED ORU Bag 26. IF Time permits: Go To EVA GET AHEAD Procedure, else CLEAN UP | <p style="text-align: center;">EV2 – Luca Parmitano</p> <div data-bbox="1444 277 1892 516" data-label="Image"> </div> <p style="text-align: center;">Tie down of flaps near Primary Bolt</p> <div data-bbox="1478 583 1875 889" data-label="Image"> </div> <p style="text-align: center;">Tie-down flap locations on MBSU</p> <ol style="list-style-type: none"> 4. Retrieve Camera from temp stow location 5. Perform Glove Inspection 6. Translate to A/L <ul style="list-style-type: none"> <input type="checkbox"/> Retrieve Safety Tether Green Hook S1 Bay 15 MM 5910 |

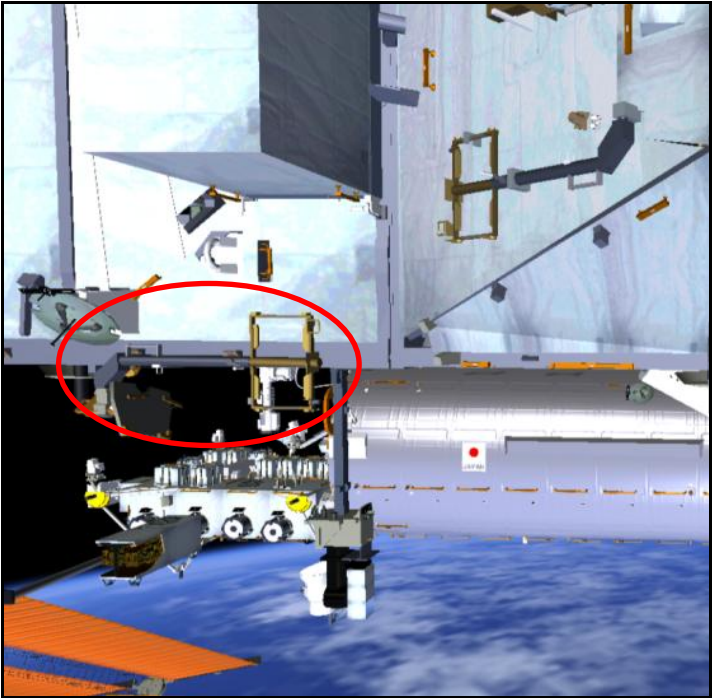
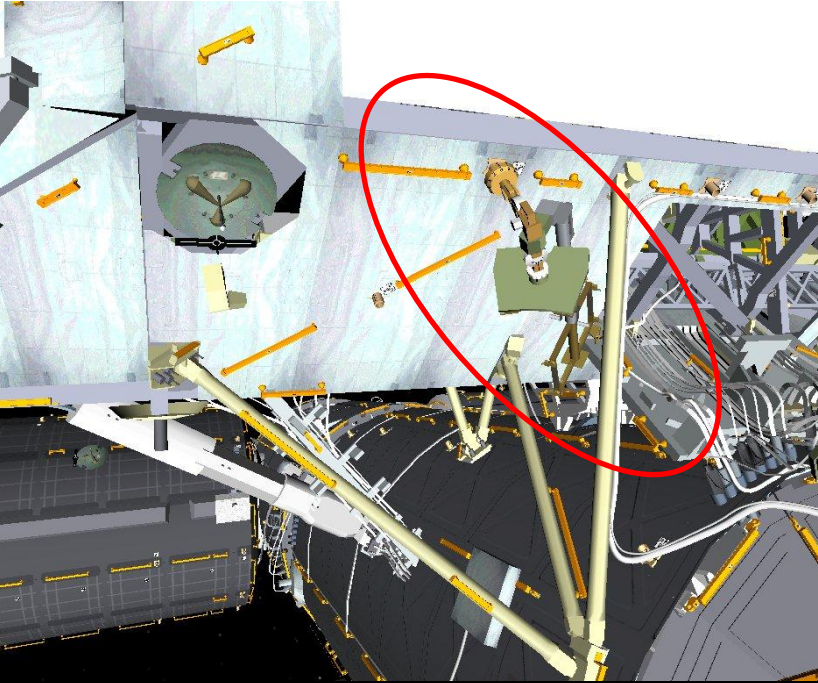
US EVA 23 GETAHEADS- CLPA LENS COVER R&R (00:20)

| IV/SSRMS | EV |
|---|--|
| <p>1. Verify Boom B Camera Inhibits in place.</p>   <p style="text-align: center;">Cover on CLPA</p>  | <p>CLPA LENS COVER R&R SSRMS BOOM B (00:20)</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>CAUTION Avoid contact with CLPA cover lens</p> </div> <p>←MCC Coord Only Verify Inhibits</p> <ol style="list-style-type: none"> 1. If needed, retrieve MBSU MLI Bag 2. Translate to S0 Face 2 SPDA door worksite (Zenith of Port CETA Cart) 3. Local Tether to S0 HR 3490 4. Use MBSU Corner guide or Microsquare for stability during CLPA Lens Cover R&R 5. RET to Lens Cover on SSRMS Boom B Camera 6. Rotate locking lever to the OPEN position 7. Slide Cover towards locking lever (Station Aft) depressing the spring and pull lens handle away from lens plane (Station Nadir) 8. Move out of camera field of view for 1 minute (for ground quality test) 9. RET to spare CLPA Lens Cover Handle from MBSU MLI Bag; CLPA MLI case remains in bag 10. Rotate locking lever to the open/unlocked position (lever perpendicular to plane of lens) 11. Install CLPA cover on SSRMS CLPA by inserting spring loaded flange to depress spring 12. Rotate cover to seat against camera bracket for full installation 13. Rotate locking lever to the closed/locked position (lever parallel to plane of lens) 14. Perform pull test 15. Remove RET 16. Stow old Lens Cover in CLPA MLI case; secure with Velcro strap 17. Remove RET from Lens handle 18.  Perform WVS survey 19. Perform Glove Inspection |

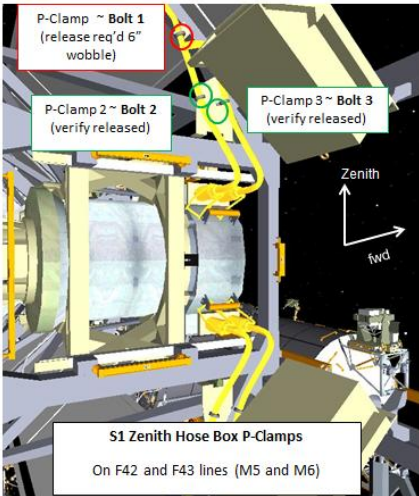
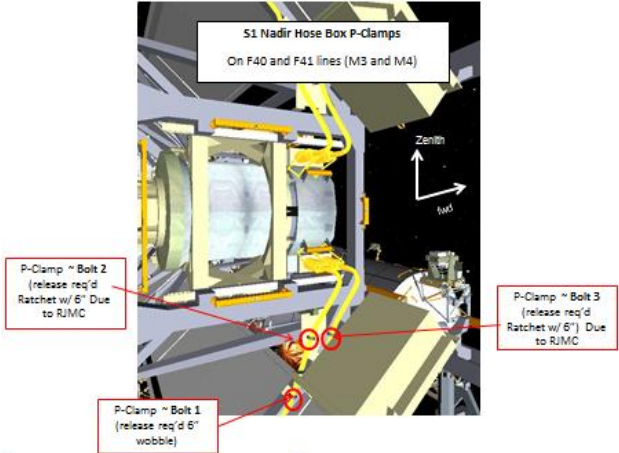
US EVA 23 Getaheads- CETA CART BRAKE HANDLES TIE DOWN (00:15)

| IV | EV |
|---|--|
|  <p>Locking collars at elbows</p> <p>2nd Hook (buckle hook)</p> <p>1st Hook (free hook)</p> <p>ZENITH</p> <p>FWD</p> | <p>CETA CART BRAKE HANDLES TIE DOWN</p> <div style="border: 2px solid black; background-color: yellow; padding: 5px; text-align: center; font-weight: bold;">CAUTION</div> <p>Inadvertent contact/kick loads applied to the LDTDT can result in large tension loads with relatively small inputs, which can exceed hardware capability. Care should be taken to avoid inadvertent contact with the LDTDT after installation.</p> <ol style="list-style-type: none"> 1. Translate to the Port side of the Port CETA Cart. 2. If needed, remove any old wire ties as required (expecting one holding brake handles together). <ol style="list-style-type: none"> a. Note: remove wire tie if it interferes with tiedown 3. Verify TFR Swing Arm is rotated 180 degrees from stowed, at position 30 (swing arm at nadir-most position). 4. Verify Brake Handles are folded over at elbow to hard stop, locking collars are resting against elbows, and brake handles are pushed towards CETA cart as far as possible. 5. Install free hook (the long end farthest from the buckle) <ul style="list-style-type: none"> <input type="checkbox"/> Hook to left boot toe loop, zenith stanchion, as close to the Boot Plate as possible <input type="checkbox"/> Tether point away from boot plate 6. Route LDTDT under the brake handles (i.e. ISS outboard). Ensure tether is taut during first wrap. 7. Continue wrapping LDTDT around both brake handles, completing 1.5 wraps. 8. Attach buckle hook <ul style="list-style-type: none"> <input type="checkbox"/> Hook to right boot toe loop, nadir stanchion, as close to the Boot Plate as possible <input type="checkbox"/> Tether point away from boot plate <input type="checkbox"/> Verify buckle is accessible (may have 1 twist in tether) 9. Remove slack from LDTDT and close buckle. Do not over tighten. 10. Close MLI flap around buckle 11. Fold extra tether slack on top of buckle, secure with 2 smaller Velcro straps 12. Install long wire tie around buckle only, ensuring other strap is free from wire tie <ol style="list-style-type: none"> b. Wrap once, 3 twists c. Wrap again, 3 twists d. Fold down wire tie ends 13. <input type="checkbox"/> Perform WVS survey 14. Glove Inspection |

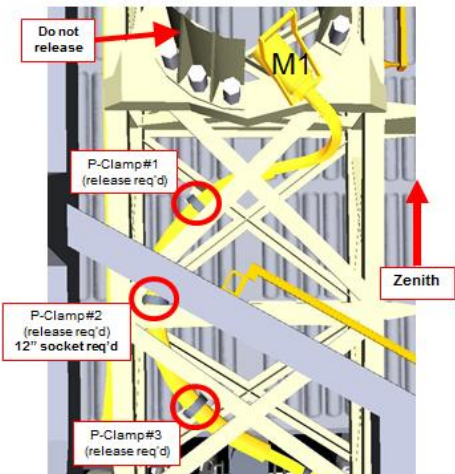
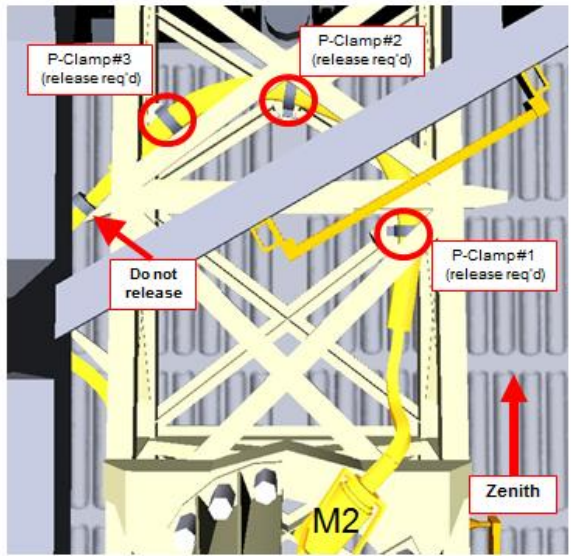
US EVA 23 GETAHEADS – APFR / TS RELOCATION

| IV/SSRMS | EV |
|---|--|
| <p data-bbox="107 240 430 267">1. Verify Port TRRJ locked</p>  <p>A 3D CAD rendering of the International Space Station (ISS) exterior. The focus is on the Port Transfer Releasable Retention Joint (TRRJ) located on the side of a module. A red circle highlights the TRRJ assembly, which includes a large cylindrical structure and various support beams and cables. The background shows the blue of Earth's atmosphere and the white of the station's structure.</p> | <p data-bbox="934 240 1312 267"><u>RELOCATE APFR/ TS (00:30)</u></p> <p data-bbox="934 300 1522 328">←MCC COORD Only Verify Port TRRJ Locked</p> <ol data-bbox="934 332 1701 641" style="list-style-type: none">1. Translate to P1 WIF 32. RET to APFR/ TS3. Release APFR/ TS, stow on BRT4. Translate to S0 WIF 335. If desired, soft dock APFR in a clocking of [12], rotate to 11.6. Complete Install APFR in S0 WIF 33 [11,PP,F,11]<ul data-bbox="997 511 1218 576" style="list-style-type: none"><input type="checkbox"/> Black on Black<input type="checkbox"/> Pull and Twist Test7. Re-orient TS head as required8. Perform glove inspection  <p>A 3D CAD rendering of the interior of the ISS, showing the APFR/TS assembly. The assembly is a complex structure with various beams, cables, and components. A red circle highlights the APFR/TS assembly, which is mounted on a structure. The background shows the white and grey interior of the station, with various equipment and structural elements visible.</p> |

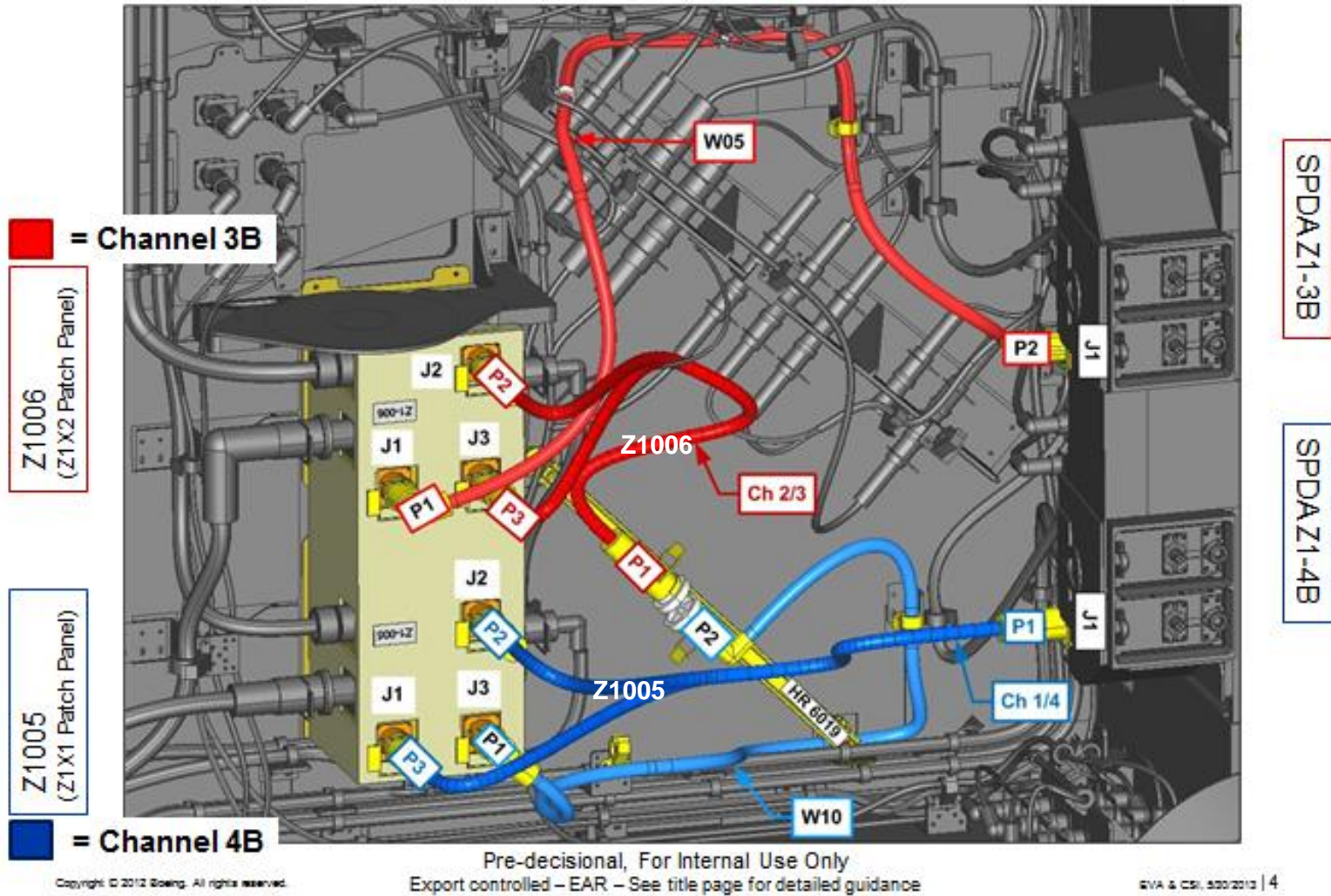
US EVA 23 GETAHEADS – S1 P-CLAMP RELEASE

| IV/SSRMS | EV | | | | | | | | | | | | | | | | | | | | | | | | |
|--|------------------------------------|----------|--|-----------|--------------|----------|--------------|--------------------|--|--------------|------------------------------------|--|--------------|------------------------------------|--|---------------|--------------------|--|---------------|--------------------|----------|---------------|------------------------------------|----------|--|
| <p>1. Verify STBD TRRJ locked at 0</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th colspan="3" style="text-align: center;">S1 Hose Box P-Clamps</th> </tr> <tr> <th style="width: 15%;">P-Clamp #</th> <th style="width: 55%;">Tools Needed</th> <th style="width: 30%;">Released</th> </tr> </thead> <tbody> <tr> <td>Bolt 1 Nadir</td> <td>PGT with 6" wobble</td> <td></td> </tr> <tr> <td>Bolt 2 Nadir</td> <td>Needs Ratchet w/ 6" (Prox to RJMC)</td> <td></td> </tr> <tr> <td>Bolt 3 Nadir</td> <td>Needs Ratchet w/ 6" (Prox to RJMC)</td> <td></td> </tr> <tr> <td>Bolt 1 Zenith</td> <td>PGT with 6" wobble</td> <td></td> </tr> <tr> <td>Bolt 2 Zenith</td> <td>PGT with 6" wobble</td> <td style="text-align: center;">X</td> </tr> <tr> <td>Bolt 3 Zenith</td> <td>Needs Ratchet w/ 6" (Prox to RJMC)</td> <td style="text-align: center;">X</td> </tr> </tbody> </table>  | S1 Hose Box P-Clamps | | | P-Clamp # | Tools Needed | Released | Bolt 1 Nadir | PGT with 6" wobble | | Bolt 2 Nadir | Needs Ratchet w/ 6" (Prox to RJMC) | | Bolt 3 Nadir | Needs Ratchet w/ 6" (Prox to RJMC) | | Bolt 1 Zenith | PGT with 6" wobble | | Bolt 2 Zenith | PGT with 6" wobble | X | Bolt 3 Zenith | Needs Ratchet w/ 6" (Prox to RJMC) | X | <div style="background-color: red; color: white; text-align: center; padding: 5px; border: 2px solid black; margin-bottom: 10px;"> WARNING </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> Watch for and report any indication of leak </div> <p>S1 FHRC HOSE BOX P-CLAMP RELEASE – BAY 13 (00:35) ←MCC-H Coord only, Verify STBD TRRJ Locked at 0</p> <ol style="list-style-type: none"> 1. Translate to the A/L; open thermal cover 2. Stow bag/hardware on A/L RET 3. Retrieve Crewlock Bag on BRT 4. Egress A/L 5. Close A/L thermal cover 6. √SAFER handles down (NOTE: Periodically check SAFER handles while in Truss) 7. Translate to S1 FHRC Bay 13 8. Attach Safety Tether green hook to S1 HR 3239 <div style="background-color: yellow; text-align: center; padding: 5px; border: 2px solid black; margin-bottom: 10px;"> CAUTION </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> Do not impart loads greater than 15 lb into FHRC Hose Box fluid lines </div> <ol style="list-style-type: none"> 9. If needed, temp stow Crewlock Bag 10. Retrieve EVA Ratchet Wrench w/ 7/16 (wobble) Socket-6 ext 11. Translate to Nadir P-Clamps 12. Release Hose Box P-clamps 6-12.5 turns with Ratchet Wrench <ul style="list-style-type: none"> <input type="checkbox"/> Bolt 2 Nadir <input type="checkbox"/> Bolt 3 Nadir 13. Stow EVA Ratchet Wrench on MWS 14. Configure PGT: [A7 (9.2), CCW2, 30.5] 7/16 (wobble) Socket-6 ext 15. Release Hose Box P-clamps ~6-12.5 turns <ul style="list-style-type: none"> <input type="checkbox"/> Bolt 1 Nadir 16. Stow PGT 17. Translate to Zenith P-Clamps 18. Configure PGT: [A7 (9.2), CCW2, 30.5] 7/16 (wobble) Socket-6 ext 19. Release Hose Box P-clamps ~6-12.5 turns <ul style="list-style-type: none"> <input type="checkbox"/> Bolt 1 Zenith 20. Egress Bay 13 21. √SAFER handles down 22. Stow Ratchet Wrench in Crewlock Bag; Stow Crewlock Bag on BRT  |
| S1 Hose Box P-Clamps | | | | | | | | | | | | | | | | | | | | | | | | | |
| P-Clamp # | Tools Needed | Released | | | | | | | | | | | | | | | | | | | | | | | |
| Bolt 1 Nadir | PGT with 6" wobble | | | | | | | | | | | | | | | | | | | | | | | | |
| Bolt 2 Nadir | Needs Ratchet w/ 6" (Prox to RJMC) | | | | | | | | | | | | | | | | | | | | | | | | |
| Bolt 3 Nadir | Needs Ratchet w/ 6" (Prox to RJMC) | | | | | | | | | | | | | | | | | | | | | | | | |
| Bolt 1 Zenith | PGT with 6" wobble | | | | | | | | | | | | | | | | | | | | | | | | |
| Bolt 2 Zenith | PGT with 6" wobble | X | | | | | | | | | | | | | | | | | | | | | | | |
| Bolt 3 Zenith | Needs Ratchet w/ 6" (Prox to RJMC) | X | | | | | | | | | | | | | | | | | | | | | | | |

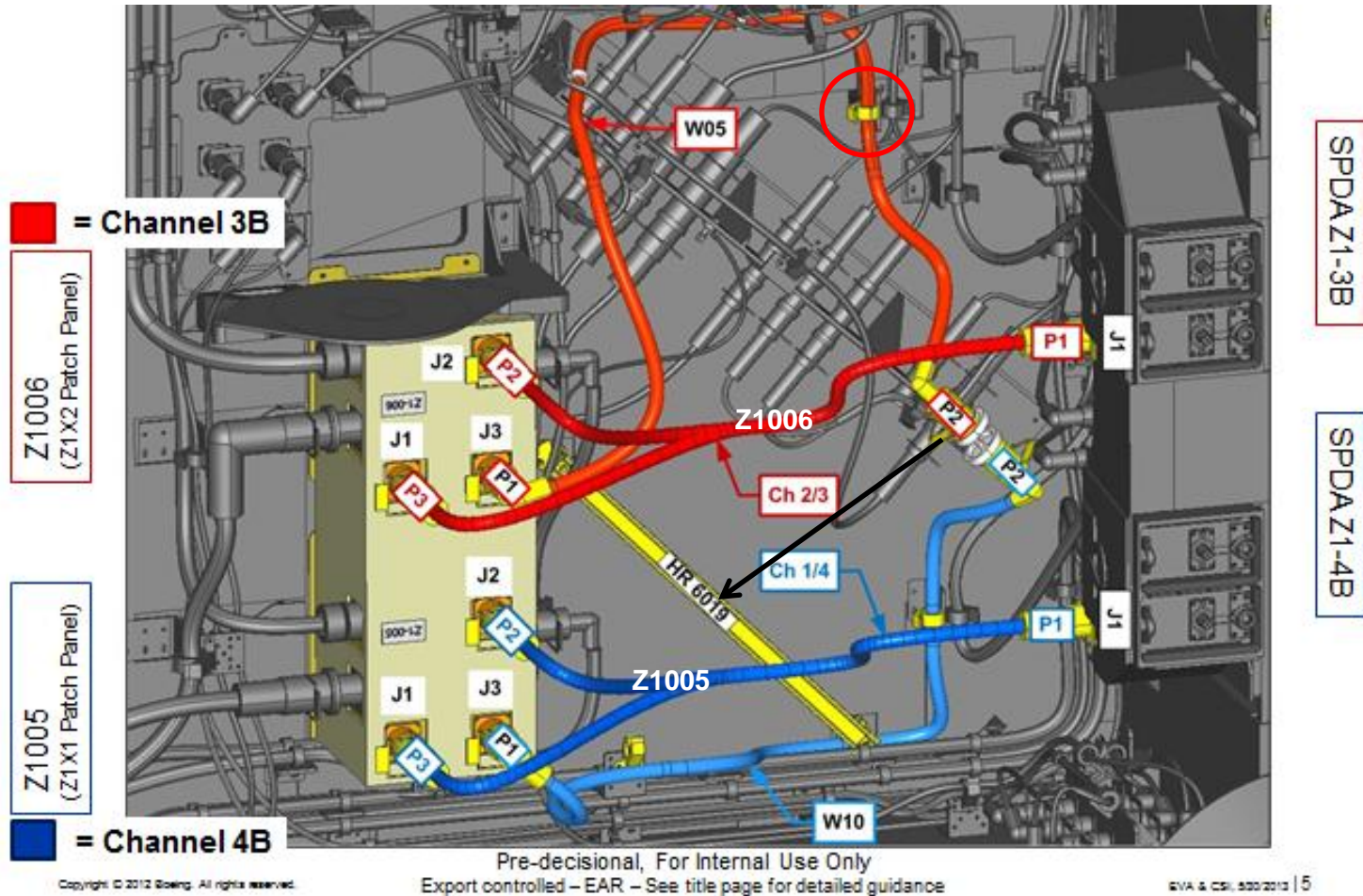
US EVA 23 GETAHEADS – S1 P-CLAMP RELEASE

| IV / SSRMS | EV | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---------------------------|----------|--|--------------------------|--------------|----------|------|--------------------|--|------|--------------------|--|------|--------------------|--|------|--------------------|--|------|---------------------------|--|------|--------------------|--|--|
| <p>2. √Stbd TRRJ locked at 0 deg</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th colspan="3" style="text-align: center;">S1 Stinger P-Clamps</th> </tr> <tr> <th style="text-align: center;">P-Clamp (not labeled)</th> <th style="text-align: center;">Tools Needed</th> <th style="text-align: center;">Released</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1 M1</td> <td>PGT with 6" wobble</td> <td></td> </tr> <tr> <td style="text-align: center;">2 M1</td> <td>PGT with 6" wobble</td> <td></td> </tr> <tr> <td style="text-align: center;">3 M1</td> <td>PGT with 6" wobble</td> <td></td> </tr> <tr> <td style="text-align: center;">1 M2</td> <td>PGT with 6" wobble</td> <td></td> </tr> <tr> <td style="text-align: center;">2 M2</td> <td>Needs a 12" or 18" Wobble</td> <td></td> </tr> <tr> <td style="text-align: center;">3 M2</td> <td>PGT with 6" wobble</td> <td></td> </tr> </tbody> </table>  <p style="text-align: center; border: 1px solid black; padding: 5px;">S1 Nadir (M1) Stinger P-Clamps</p> | S1 Stinger P-Clamps | | | P-Clamp (not labeled) | Tools Needed | Released | 1 M1 | PGT with 6" wobble | | 2 M1 | PGT with 6" wobble | | 3 M1 | PGT with 6" wobble | | 1 M2 | PGT with 6" wobble | | 2 M2 | Needs a 12" or 18" Wobble | | 3 M2 | PGT with 6" wobble | | <div style="background-color: red; color: white; text-align: center; padding: 5px; font-weight: bold;">WARNING</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">Watch for and report any indication of leak</div> <p>S1 FHRC STINGER P-CLAMPS – BAY 11 (00:25)</p> <ol style="list-style-type: none"> Translate S1 FHRC Bay 11 Nadir P-Clamps (M1) Configure PGT [A7 (9.2), CCW2, 30.5] 7/16 (wobble) Socket-6 ext <div style="background-color: yellow; text-align: center; padding: 5px; font-weight: bold;">CAUTION</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">Do not release P-clamp on hardline</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">Stinger P-clamps are not numbered</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">Release 3 P-clamps closest to QD ONLY</div> <ol style="list-style-type: none"> Release Stinger P-clamps (5) ~7-12.5 turns (NOTE: Bolts are NOT <i>LABELLED</i>) <ul style="list-style-type: none"> <input type="checkbox"/> 1st Bolt from M1 - Nadir <input type="checkbox"/> 2nd Bolt from M1 - Nadir <input type="checkbox"/> 3rd Bolt from M1 - Nadir <input type="checkbox"/> 1st Bolt from M2 - Zenith <input type="checkbox"/> 3rd Bolt from M2 - Zenith Access reach access to 2nd Bolt from M2 Zenith If needed, Perform socket swap to 7/16 (wobble) Socket 12" ext Release Stinger P-clamp ~7-12.5 turns <ul style="list-style-type: none"> <input type="checkbox"/> 2nd Bolt from M2 - Zenith Perform socket swap to 7/16" 6" Wobble Egress Bay 11 √SAFER handles down <p><u>S1-P-Clamp Clean up</u></p> <ol style="list-style-type: none"> If needed, retrieve Crewlock Bag Perform glove inspection Inventory Crewlock Bag Translate to A/L Retrieve Safety Tether green hook from S1 HR 3239  <p style="text-align: center; border: 1px solid black; padding: 5px;">S1 Zenith (M2) Stinger P-Clamps</p> |
| S1 Stinger P-Clamps | | | | | | | | | | | | | | | | | | | | | | | | | |
| P-Clamp (not labeled) | Tools Needed | Released | | | | | | | | | | | | | | | | | | | | | | | |
| 1 M1 | PGT with 6" wobble | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 M1 | PGT with 6" wobble | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 M1 | PGT with 6" wobble | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 M2 | PGT with 6" wobble | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 M2 | Needs a 12" or 18" Wobble | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 M2 | PGT with 6" wobble | | | | | | | | | | | | | | | | | | | | | | | | |

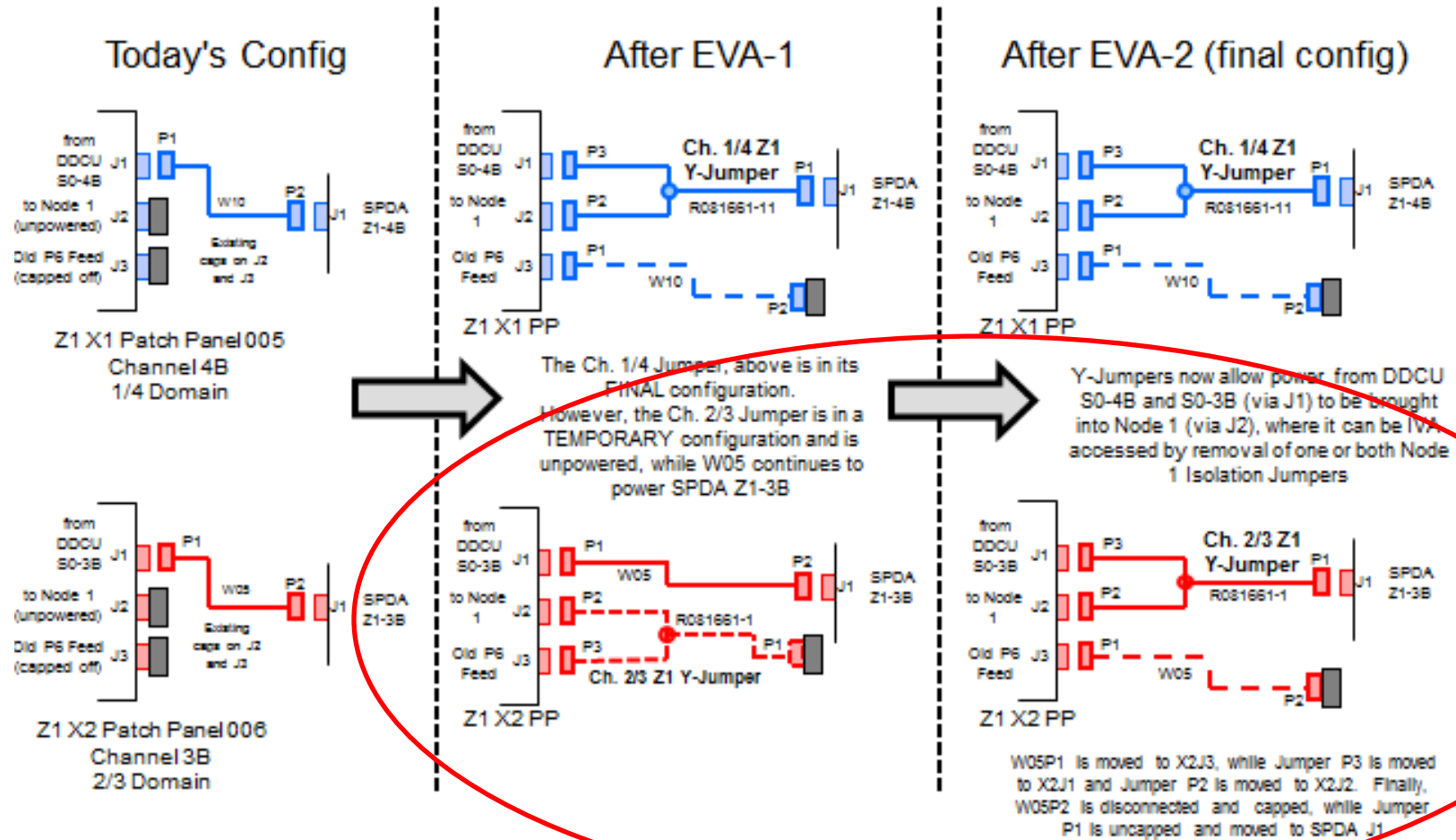
US EVA 23 TASK DATA – Z1 JUMPER PART 2 (CHANNEL 3B) – INITIAL CONFIG



US EVA 23 TASK DATA – Z1 JUMPER PART 2 (CHANNEL 3B) – FINAL CONFIG



US EVA 23 TASK DATA – Z1 JUMPER PART 2 CHANNEL 3B



US EVA 23 TASK DATA – Z1 JUMPER PART 2 (CHANNEL 3B)

Estimated Task Duration:

| | With RMS | Without RMS |
|--------|----------|-------------|
| One EV | N/A | 00:30 |

Tools:

| EV1 |
|--|
| Small trash bag close (loose cable ties) |

Restrains:

| HR | WIF | APFR Setting |
|-------|-----|--------------|
| IAPFR | N/A | N/A |

EVA Connectors:

| Harness | From | To | Clamps (#) | Conn Size | Function |
|------------------------------|------------------|---------------|--------------------------|-----------|--|
| W05 (Start) | Z1-006 / J1 | SPDA Z1 3B J1 | 2 P-Clamps 1 TA Clamp | 25 | Power from DDCU S0-3B to SPDA Z1-3B |
| W05 (End) | Z1-006 / J3 | Capped | 2 P-Clamps 1 TA Clamp | 25L | Temp stowed |
| Jumper 005 (Start-temp stow) | Z1-006 / J3 & J2 | Capped | | 25L | |
| Jumper 005 (End) | Z1-006 / J1 & J2 | SPDA Z1 3B J1 | | 25L | Power from DDCU S0-3B & NODE 1 to SPDA Z1-3B |

Inhibits:

| ORU/Task | Location | Inhibits |
|---------------------------|---|---|
| Z1-006 Patch Panel | Z1 Nadir / Port (Zenith Pair of Patch Panels) | <ol style="list-style-type: none"> DDCU S0-3B power -OFF <ul style="list-style-type: none"> Takes down CMG 3 pwr, CMG 1 & 4 survival heater, PCU 1, <u>SGTRC 1 ops</u> power, SGTRC 2 heater |

Warning:

1.

Caution:

- Avoid contact with PCU cathode and HCA ports (Z1)

Note:

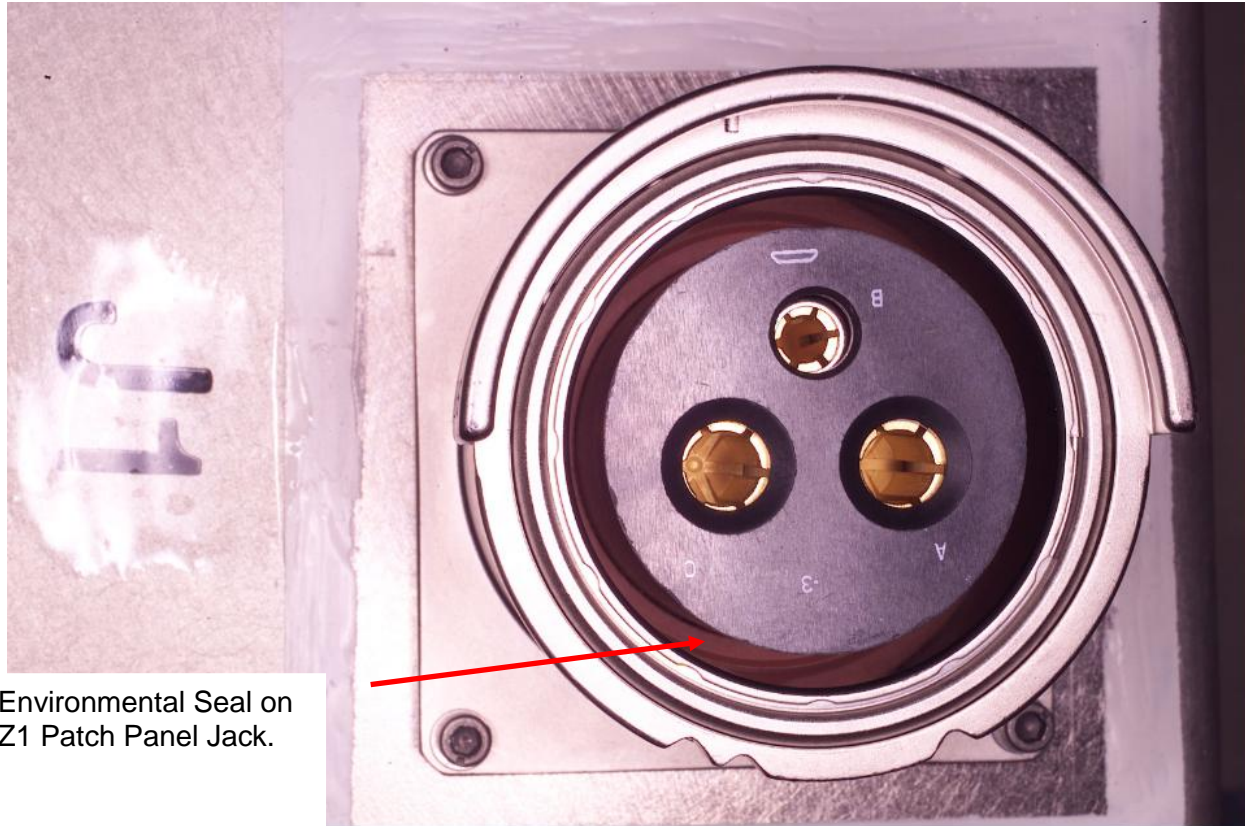
- Prior to Z1 Y-Bypass Jumper (R081661-1) installation, the N1 Isolation Cable (W5210-1) must be installed to prevent power back-flow to Z1 (OCAD)—completed. Task inhibits take down several other pieces of ISS hardware: CMG 3 pwr, CMG 1 & 4 survival heater, PCU 1, SGTRC 1 ops power, SGTRC 2 heater
- FPP booties (or GTEC) are (is) required to cover unmated connectors due to touch temperature constraints – per EV&CS
- Sockets are always on the powered side here. The patch panels have sockets and the P3 and P2 connectors on the Y side of the Jumper have pins, while the P1 side of the Jumper has sockets with the J1 connector on the SPDA having pins. - EPS
- The Y side connectors of the jumper are interchangeable with each other. It does not matter if J3 or J2 gets connected to P1 or P2. - EPS
- All the caps that fit on one plug (P side on the cables) will fit on all the Ps. Same with the jacks (J sides). – EPS
- Z1 Patch Panel Z1-006 caused label J3 is missing– EV&CS
- Due to potential for high temperatures on the Z1 unmated connectors, the connectors must be insulated by at least 3 layers of the bootie material, requiring 2 booties
- Z1 Aux Bag, flap opens zenith
- J3 on the patch panels are un-powered receptacles – EV&CS
- Due to an orbiter loads issue red plastic cable ties (similar to those used to secure cables on electronic equipment in cars) were added to several Z1 harnesses. The cable ties are not required for on orbit operations and they can be removed if they are still present (very susceptible to AO). The will likely break if the cable is moved much. – EV&CS
- W10 has a p-clamp near the diagonal handrail. W05 has a p-clamp after the TA-clamp coming from the P2 end. – EV&CS
- Missing label on zenith X2 J3 Patch Panel jack
- Wire Tie and bootie config has been approved – MER Tools
- No IFIs on this hardware – EV&CS

Timeline Considerations:

- Alternative APFR Settings:

- Z1 WIF 12: [11, VV, E, 12]:** aft panel (and GTEC on 0619) – for this one, might need to ingress at D and roll to E (if APFR)
- N3 WIF 1:[8, PP, E, 9]:** fwd panel (and GTEC on 0619)
- N1 WIF 5: [11, NN, J, 11]:** fwd panel (limited access and would impact MLM cables if Luca working there simo)

US EVA 23 TASK DATA – Z1 JUMPER PART 2 (CHANNEL 3B)



Environmental Seal on
Z1 Patch Panel Jack.

Z1 Patch Panel Jack

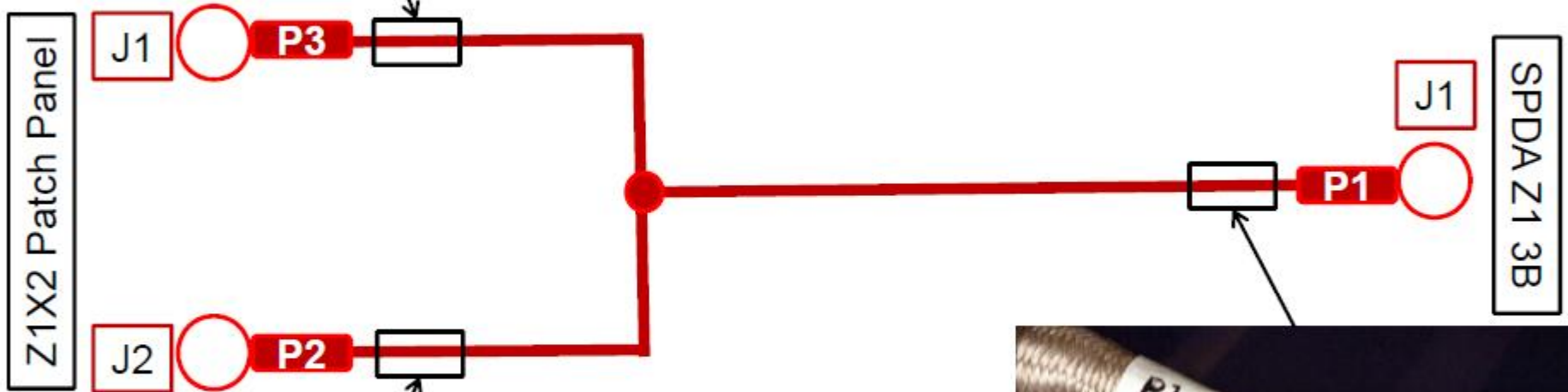
US EVA 23 TASK DATA – Z1 JUMPER PART 2 (CHANNEL 3B)

P3/J3-Z1 PATCH PANEL, Z1-006, Y-BYPASS



R081661-1

3B Y-Bypass shown in final installed configuration



P2/J2-Z1 PATCH PANEL, Z1-006, Y-BYPASS



P1/J1-SPDA-Z1-3B, Y-BYPASS

US EVA 23 TASK DATA – 1553 CABLE CONNECTIONS

Estimated Task Duration:

| | With RMS | Without RMS |
|-------------|----------|-------------|
| One EV Crew | N/A | 0:45 |
| Two EV Crew | N/A | N/A |

Tools:

| | EV1 | EV2 |
|-----------|-----|-----|
| RET | | |
| Wire Ties | | |
| | | |

EVA Connectors:

| Connector | To | Size | Function |
|---------------------|----------|--------|----------------|
| 1553 Cables | | | |
| P1 | J1 FGB | 15 | Bus A (W4495) |
| P2 | J2 FGB | 15 | Bus B (W4497) |
| J53 | 1800-X53 | male | Bus B (W4497) |
| J54 | 1800-X54 | female | Bus A (W7795) |
| PDGF Harness | | | |
| 1800-X53 | 1553 J53 | female | FGB Alt Data |
| 1800-X54 | 1553 J54 | male | FGB Prime Data |

Inhibits:

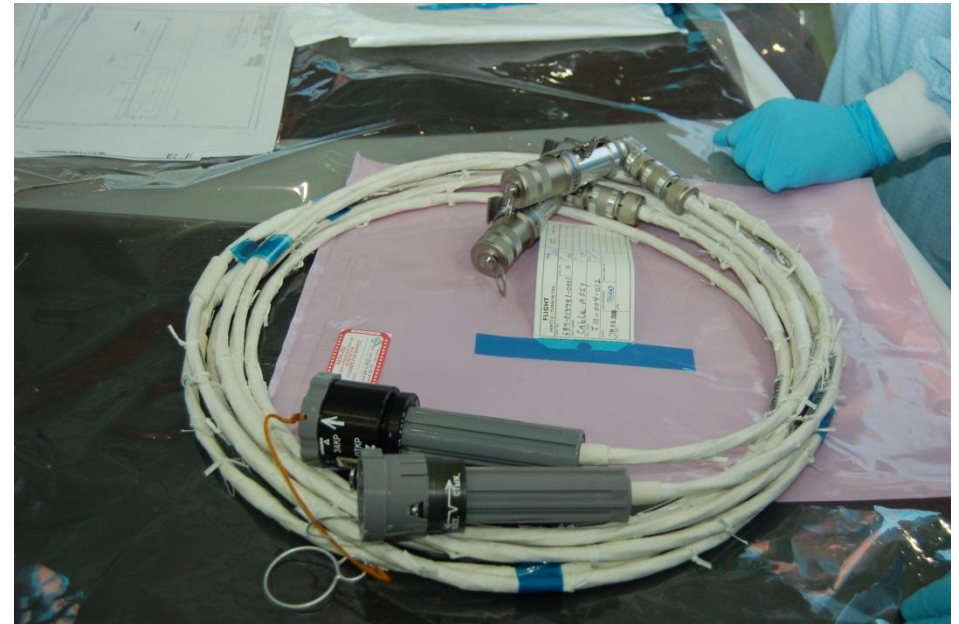
| ORU/Task | Location | Inhibit |
|------------|-----------------------------------|---|
| 1553 Cable | FGB to NOD 3 Avionics Panel | <ul style="list-style-type: none"> • PDGF 1553 Cable • RWS- NOT ACTIVE • PDGF Power Inhibit #34 – Per OCAD 122407 • Loc. RSOS Inhibits Inhibit pad page 17 |
| | | • |

Notes:

1. 1553 cables were taped together into a single bundle along middle of cable length. First tape location on Russian connector side is located approximately 2 ft from connector; first tape location on NZGL connector side is located approximately 5 ft from connector.

Timeline Considerations:

1. Routing of the Russian 1553 Pigtail will be carried as a get ahead on EVA 22.
- 2.
- 3.
- 4.
- 5.



US EVA 23 TASK DATA – MLM ETHERNET CABLE

Estimated Task Duration:

| | With RMS | Without RMS |
|-------------|----------|-------------|
| One EV Crew | n/a | 0:45 |
| Two EV Crew | n/a | n/a |

Tools:

| EV1 | EV2 |
|----------------|-----|
| Ethernet cable | |
| Wire ties | |
| Fishstringer | |
| Tethers | |

EVA Connectors:

| Connector | To | Size | Function |
|-----------|-----|-------------|----------|
| P2 | J2 | 21 | Ethernet |
| J578 | TBD | RSOS TBD | Ethernet |



Ground photo of cable post RS connector integration.

Notes:

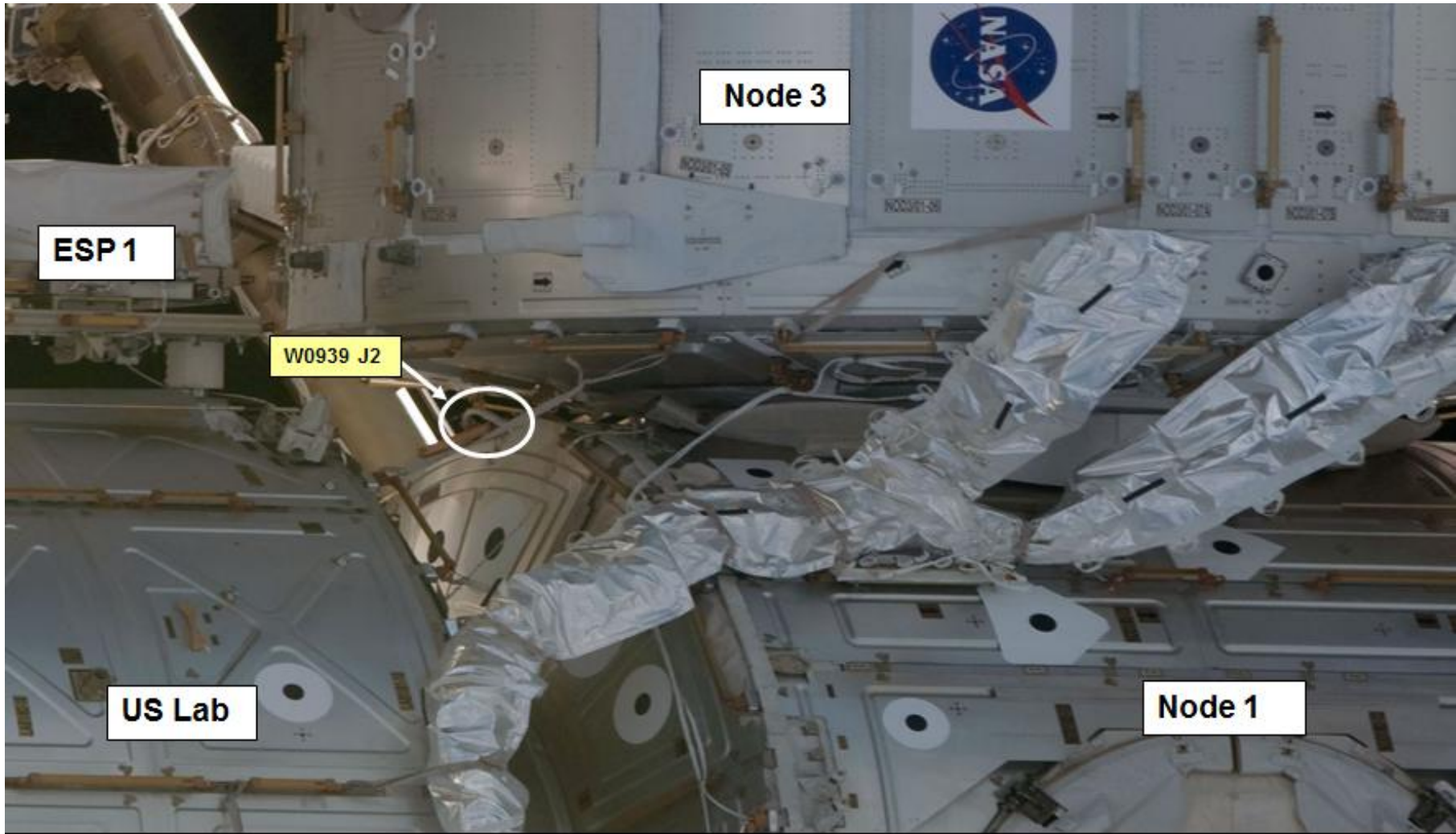
1. The cable length is not per drawing due to the preintegration of the wire ties. Once the final length is known post RS connector integration it will be updated in the task data.
2. US caps were added prior to shipment to Russia. VITT cannot confirm that the caps were sharp edge inspected at this time (Nov 2012).
3. Do not release wire tie Labeled 'PigTail'
4. NZGL Cap on P2 can be removed IVA

Timeline Considerations:

1. EVA Inspection of Node 1 HR 141 is required to verify J2 connector location (nadir or zenith stanchion)



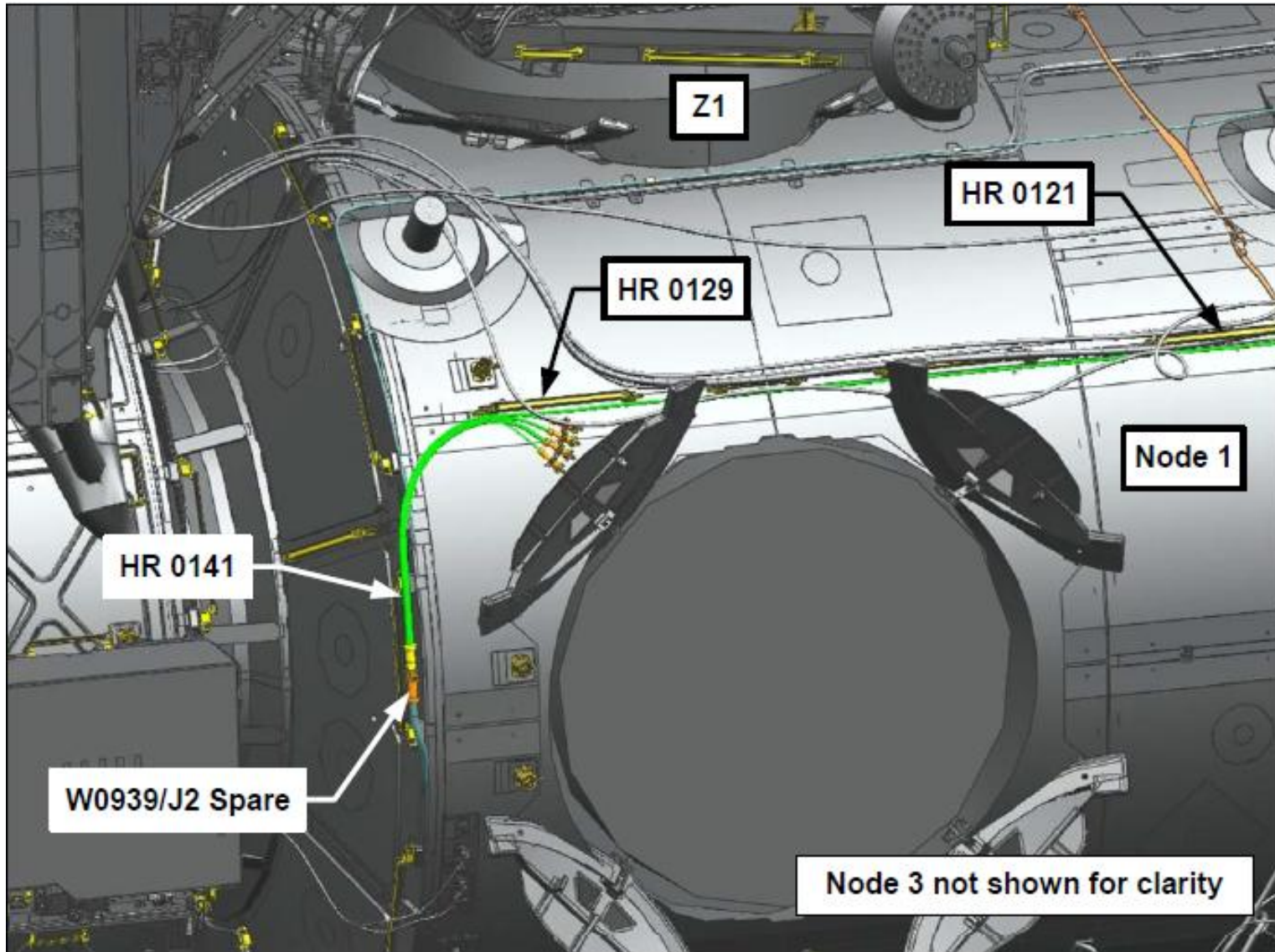
US EVA 23 TASK DATA – MLM ETHERNET CABLE CONT



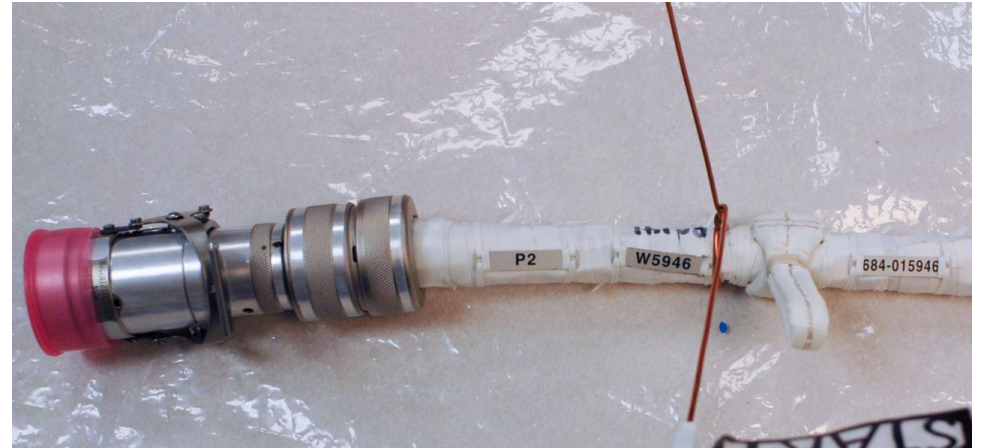
s130e013205

Nadir Looking Zenith

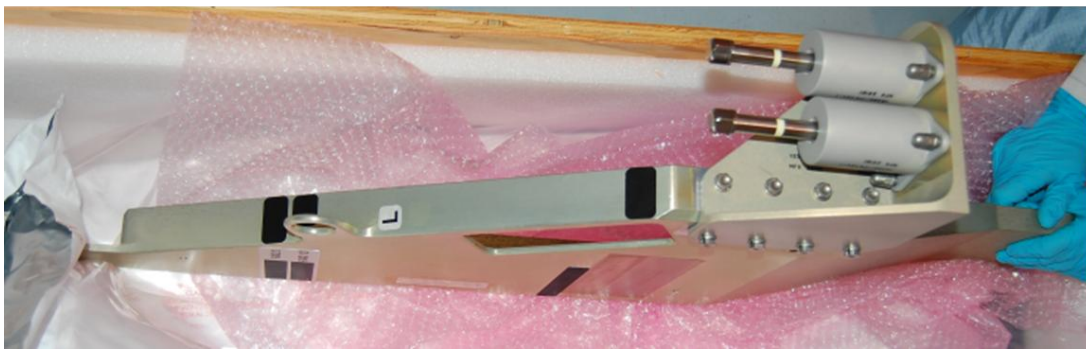
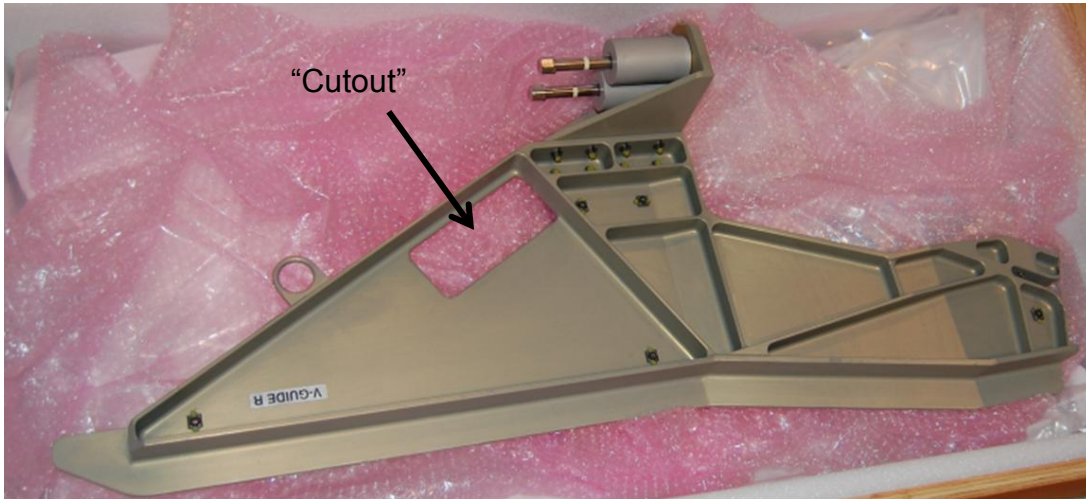
US EVA 23 TASK DATA – MLM ETHERNET CABLE CONT



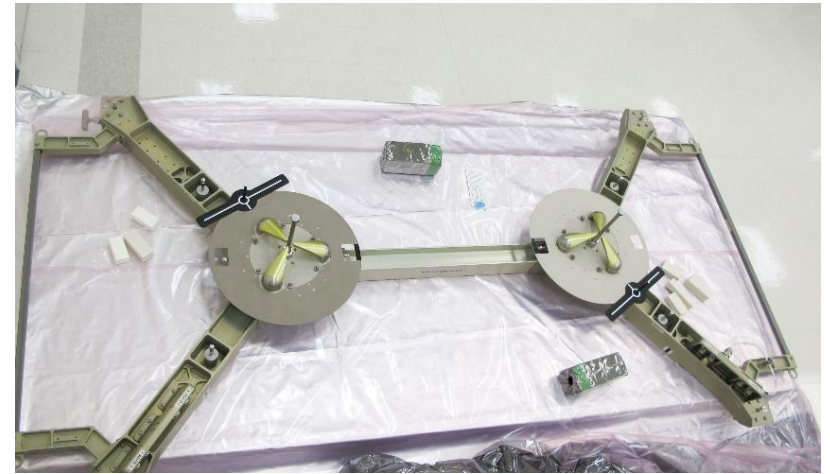
US EVA 23 TASK DATA – MLM ETHERNET CABLE CONT



US EVA 23 TASK DATA – V-GUIDE BOLT ON RGB (P1)



Flight Hardware Photos of V-Guides



Flight Hardware Photos of RGB



Sharpie Alignment Marks on RGB

US EVA 23 TASK DATA – V-GUIDE BOLT ON RGB (P1)

Estimated Task Duration:

| | With RMS | Without RMS |
|-------------|----------|-------------|
| One EV Crew | N/A | 1:50 |
| Two EV Crew | N/A | 1:00 |

Tools:

| EV1 | EV3 |
|--------------------|------------------------------|
| RET (2) to AET (2) | PGT with 5/8" (rigid) 2" ext |
| Large ORU Bag | BRT |
| | |

EVA Fasteners:

| Fastener Name | Head Size | Qty | Install Torque (ft-lb) | Release Torque (ft-lb) | Failure Torque (ft-lb) | Turns | RPM |
|---------------------------|-----------|------------------|---|------------------------|----------------------------------|------------------------|--|
| V-Guide Bolt 1F81219-1 | 5/8" | 2 per V-Guide | Initial 4.8 Final 18.4 | 22 | 43.8 (install) 77.0 (release) | 21-23 Before zip | 10 final torque 30 initial torque, or release |

Inhibits:

| ORU/Task | Location | Inhibit |
|----------|-----------|---------------------|
| P1 TRRJ | P1 | Locked at 0 |
| FPMU | P1 Zenith | 1. FPMU - inhibited |

Warning:

1. Due to entrapment hazard, do not insert glove into the exposed latch mechanisms
2. Avoid Curvic coupling on LGF – Sharp edge

Caution:

1. Avoid kicking S1/P1 radiator beam. If this occurs, wait 2 minutes to allow structural response to dissipate. Do not translate more than 130 inches from center of TRRJ (ref FR B18-351)
2. Stay between the following landmarks on the P1 radiator beam, to avoid exceeding the TRRJ torque limit: outboard edge of the outboard trunnion scuff plate to inboard end of handrail 3632 (ref FR B18-351)
3. Zip nuts are very sensitive to side-loading.

Notes:

1. V-Guide Bolts are Zip Nuts. Bolts should be zipped with palm or PGT before driving to torque.
2. Two stage installation recommended if zip bolts do not install properly (Documented in cribsheet) Ref. Chit 11405. (low Torque, then final torque)

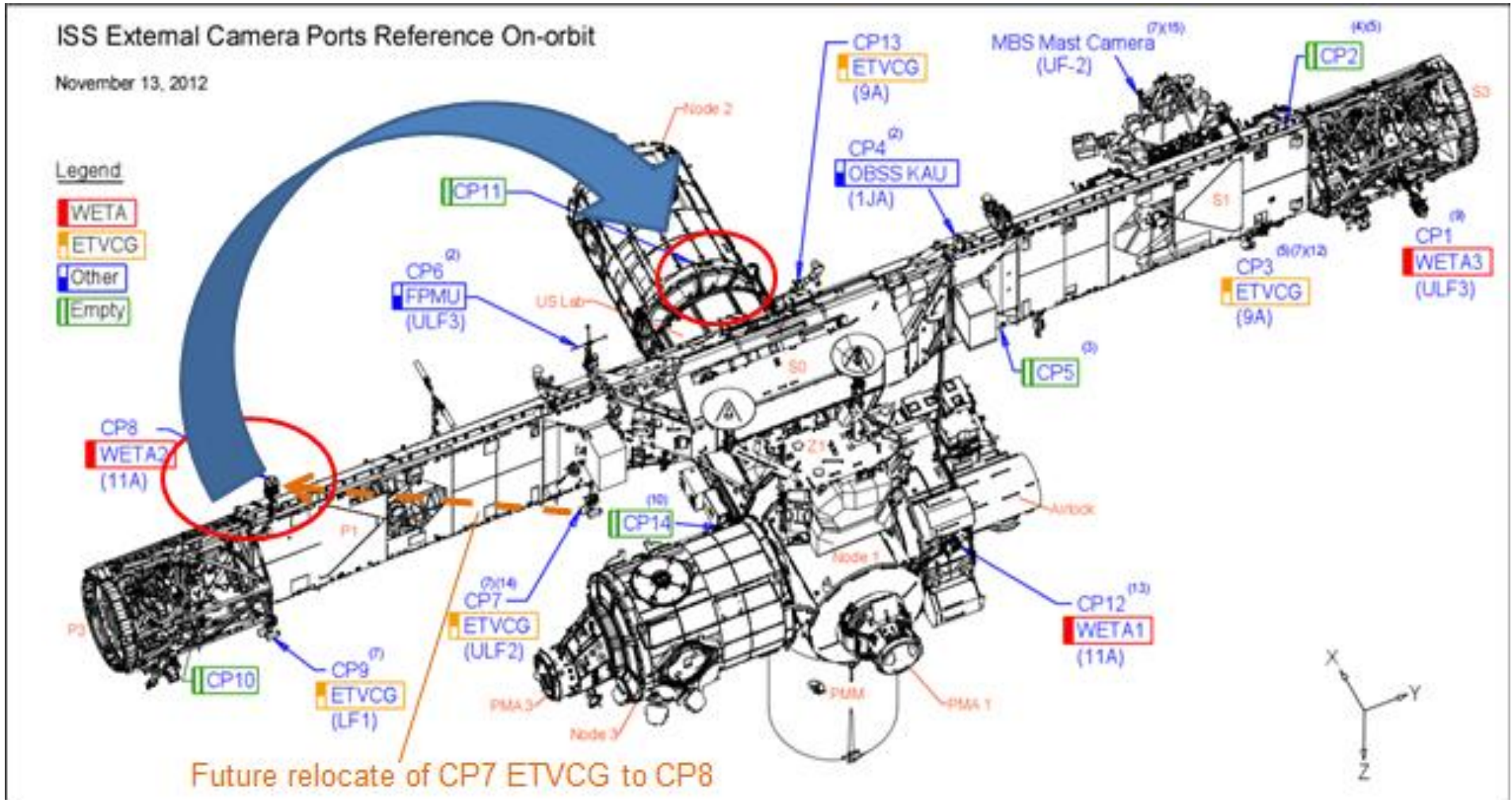
Timeline Considerations:

1. Crew may fully zip bolts on both V-Guides prior to final torque application with PGT (i.e. skip 1st stage). Force required to zip bolts ranges from 11lbf (start) to 22 lbf (end)

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US EVA 23 TASK DATA – WETA RELOCATE



US EVA 23 TASK DATA – WETA RELOCATE

Estimated Task Duration:

| | With RMS | Without RMS |
|-------------|----------|-------------|
| One EV Crew | N/A | N/A |
| Two EV Crew | N/A | 01:30 |

Tools:

| EV1 | EV3 |
|--|----------------------------------|
| RET | PGT w/7/16 (wobble) Socket-6 ext |
| Rd Scoop | BRT |
| Ratchet Wrench 6in wobble (break torque) | |

EVA Fasteners:

| Fastener Name | Head Size | Qty | Install Torque (ft-lb) | Release Torque (ft-lb) | Failure Torque (ft-lb) | Turns | RPM |
|----------------|-----------|-----|------------------------|------------------------|------------------------|-------|-----|
| Stanchion Bolt | 7/16" | 1 | 18.4 | 25.5 | 62 | 16.5 | 30 |

EVA Connectors:

| Connector | From | To | Conn Size | Function |
|-----------|------|------------------|-----------|--------------------|
| P2 | VSSA | Node 2 ISS Panel | 15 | Power/Fiber optics |
| P3 | VSSA | Node 2 ISS Panel | 15 | Heater Power |
| P4 | VSSA | Node 2 ISS Panel | 15 | Not used for WETA |

Inhibits:

| ORU/Task | Location | Inhibit |
|--------------|----------------------|--|
| VSSA Removal | CP 8 (P1 Zenith) | <ol style="list-style-type: none"> Port TRRJ locked FPMU –Inhibited (needed for crew Translation) <ol style="list-style-type: none"> ELC-3 ECM ExPA-1 120V Main Switch – OFF Harris SDR – OFF TWTA - OFF SCAN (crew close to KOZ on P1) <ol style="list-style-type: none"> RPCM P11A_B RPC 13 Open/Close Cmd Inhibit CP_8 (P1 Upper Outboard) <ol style="list-style-type: none"> RPCM P11AA-RPC 2 (HTR)- Open Close Cmd Inhibit RPCM P11AA-RPC 16 (HTR)-Open Close Cmd Inhibit RPCM P12BA-RPC 15 (OPS)- Open Close Cmd Inhibit RPCM P12BA-RPC 1 (Not used) –Open, Close cmd ihb |
| VSSA Install | CP11 (Node 2 Zenith) | <ol style="list-style-type: none"> CP_11 (Node 2 Zenith) <ol style="list-style-type: none"> RPCM N21A4A-A-RPC 5 (HTR)- Close Cmd Inhibit RPCM N22A3BA RPC 12 (HTR)-Close Cmd Inhibit RPCM N21A4A-A (OPS)- Close Cmd Inhibit RPCM N21A4A-A RPC1 (N/A) –Open, Close cmd ihb |

Warning:

1.

Caution:

- Avoid contact with P1 radiator beam. If kicked, wait 2 minutes to allow structural response to dissipate (Ref. Flight Rule B18-351)
- WETA Cable J2 is Fiber Optic. Maintain >90 degree bend at connector backshell during removal and install.
- Be aware of parked SSRMS above translation path and WETA installation at Node 2 (CP11)
- Avoid EWC Antennas on Lab endcone HRs and do not use as handholds

Notes:

- Install Only:** PGT interference with VSSA Stanchion Bolt upon release. Socket must be removed from PGT, placed on bolt, socket angled and PGT installed to bolt
- EVA Thermal Clock – 4 hours
- Antenna is NO TOUCH accept for tether point
- Spring force on bolt (6-8 lbf) per Boeing EV&CS
- VSSA Stanchion bolt turn count 16.5 turns is based on fit check of CETA light boom and stanchion attachment similarity to CETA light boom.

Timeline Considerations:

- EVA evaluations show 2EV crewmembers are needed for this task (GCA, Removal, and Install)

WETA Bolts –Not Touching for-Relocate



Tether Point Micro-conical for Scoop

US EVA 23 TASK DATA – MBSU MLI REMOVE & MLI SKIRT TIEDOWN

Estimated Task Duration:

| | With RMS | Without RMS |
|-------------|----------|-------------|
| One EV Crew | N/A | 01:30 |
| Two EV Crew | N/A | N/A |

Tools:

| EV1 | EV3 |
|------------------------|--|
| RET | PGT w/7/16 (wobble) Socket-6 ext |
| Short & Long Wire Ties | MED ORU Bag |
| Wire Tie Caddy | EVA Scissors (for scale & Contingency) |

EVA Fasteners:

| Fastener Name | Head Size | Qty | Install Torque (ft-lb) | Release Torque (ft-lb) | Failure Torque (ft-lb) | Turns | RPM |
|---------------|-----------|-----|------------------------|------------------------|------------------------|---------|-----|
| MBSU MLI Bolt | 7/16" | 2 | N/A | 3.8 | 4.9 | 16-18.5 | 30 |

Inhibits:

| ORU/Task | Location | Inhibit |
|----------|----------|---------------------|
| MBSU MLI | ELC2 | S-SARJ locked |
| MBSU MLI | ELC2 | MISSE Task Complete |

Warnings:

-

Cautions:

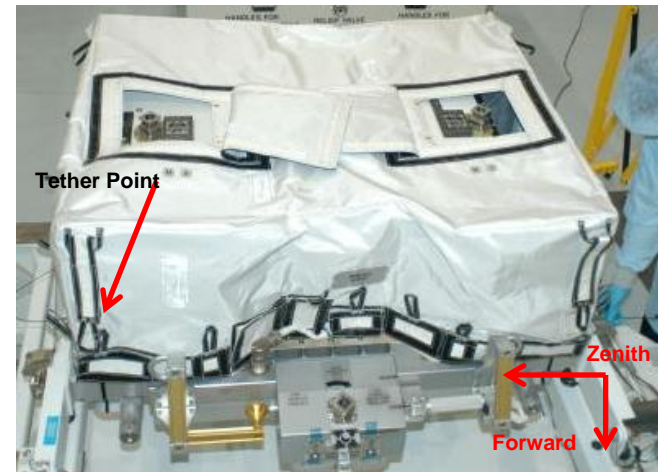
- The captive feature on the MLI Bolts is suspect. The "captive" washer can be easily sided loaded, prying it off.

Notes:

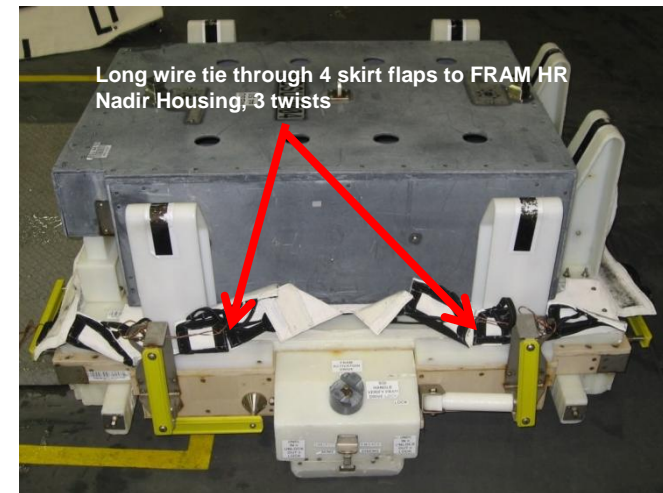
- The SPDM / OTCM Approach Envelope 16" in Diameter. MBSU MLI Skirt shall be Wire tied to provide 8" circular radius clearance centered at the primary bolt. EVA Scissors are 8'1" in length (when closed). EVA Scissors can be used as a scale if needed.

Timeline Considerations:

- Forward MBSU MLI Skirt Tiedown (near Primary Bolt) - Required
- Zenith MBSU MLI Skirt Tiedown at Corners (near Blind Mate Connectors) Required
- Nadir MBSU MLI Skirt Tiedown at Corners - Time Permitting

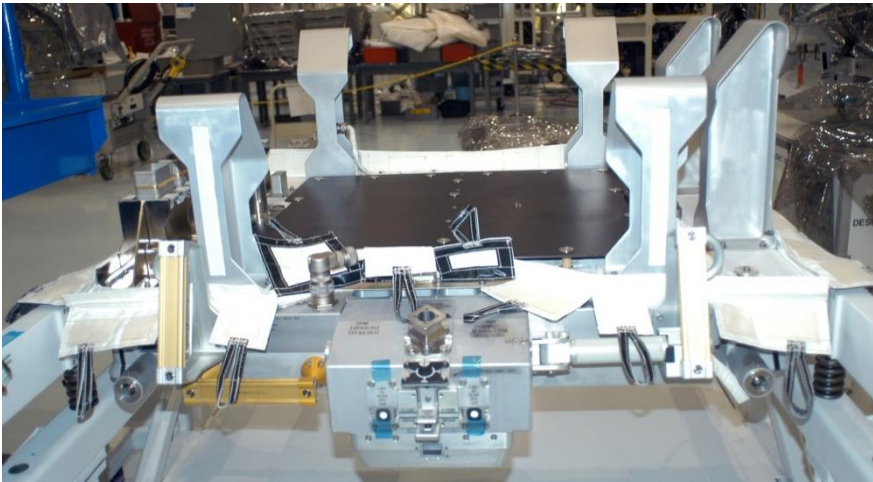


MBSU MLI to be removed (2 bolts, Velcro flaps on 4 sides)



MBSU MLI Fwd face Tie Down

US EVA 23 TASK DATA – MBSU MLI REMOVE & MLI SKIRT TIEDOWN CONT.



US EVA 23 TASK DATA – JEM EF FWD VE

Estimated Task Duration:

| | With RMS | Without RMS |
|-------------|----------|-------------|
| One EV Crew | N/A | 01:00 |
| Two EV Crew | N/A | 00:45 |

ORU Identification:

| ORU | Part number | Serial Number |
|-----------|----------------|---------------|
| Fwd VE | NFTCA170300G11 | 002 |
| VE(Spare) | 80AS51520-101 | 001 |

ORU Specks

| ORU | Dimensions |
|------------------|-----------------------------------|
| Vision Equipment | 26.4x14.2x22.2 22.7 kg (50lbs) |

Tools:

| EV1 | |
|-----------------------------------|-----------------------|
| RET | Wire Tie (for bootie) |
| Rd Scoop (2) | |
| PGT w/ 7/16 (wobble) Socket-6 ext | |

EVA Fasteners:

| Fastener Name | Head Size | Qty | Install Torque (ft-lb) | Release Torque (ft-lb) | Failure Torque (ft-lb) | Turns | RP M |
|--------------------|-----------|-----|------------------------|------------------------|------------------------|-------------|------|
| VE Structure Bolts | 7/16" | 2 | 14.2 B2/CW2 | 21.3 B7/CCW2 | 33.7 | 12.5 -15 | 30 |

EVA Connectors:

| Connector | From | To | Type | Conn Size | Function |
|---------------------------------|-------------|----|------|-----------|----------------------------|
| Cable Assy, EF F (Fwd location) | JEM EF P009 | J1 | NZGL | 25 | Pwr/cmd/vid eo lines to VE |

Inhibits:

| ORU/Task | Location | Inhibit |
|----------|----------|---|
| Fwd VE | JEM EF | see the inhibit pad for JEF FWD VE inhibits |

Notes:

1. VE has MCF (Micro-Conical Fixture) for scoop attachment handling
2. Thermal Clock for spare VE without heater is 2.5 hours, worst case Beta = -60
3. During 2J/A Flt, VE stanchion bolts were tightened by B4 setting (Nom 19.4ft-lb).

Cautions:

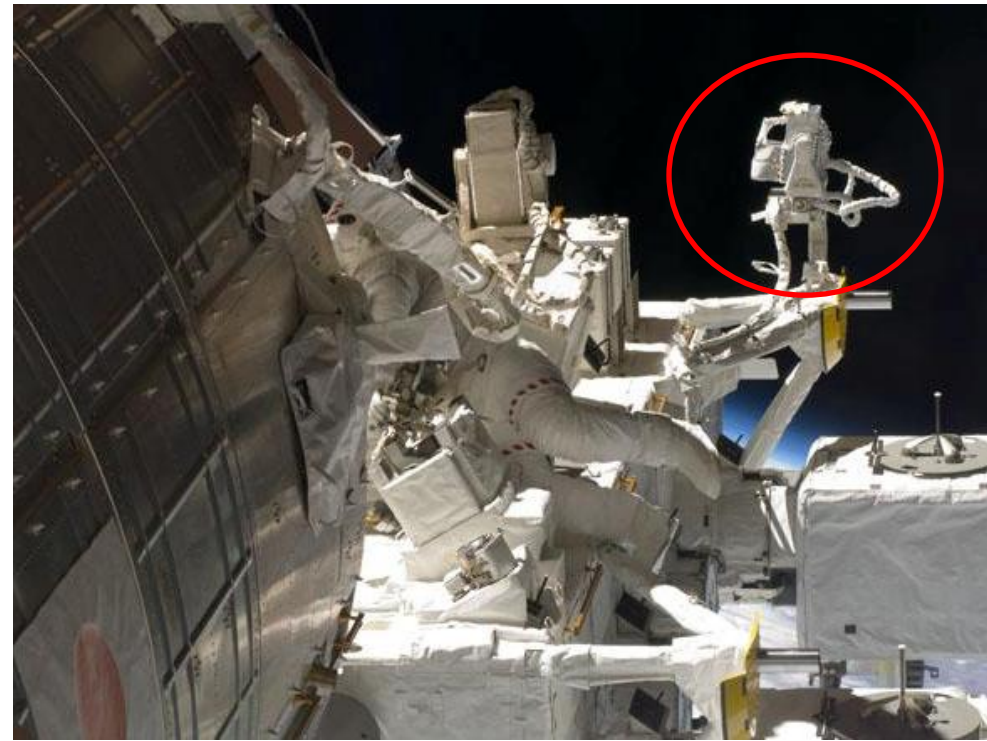
1. Avoid touching white paint, silver Teflon, and solid lubricant
2. Do not push TV Camera pan/tilt motors

Warnings:

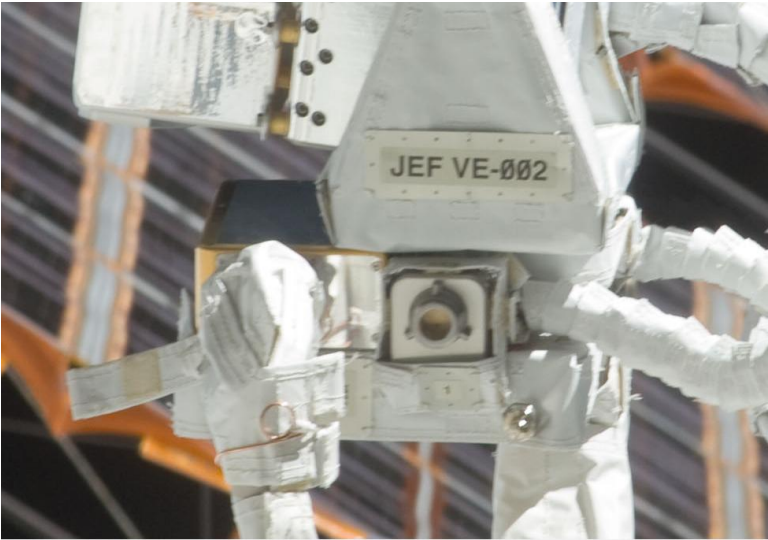
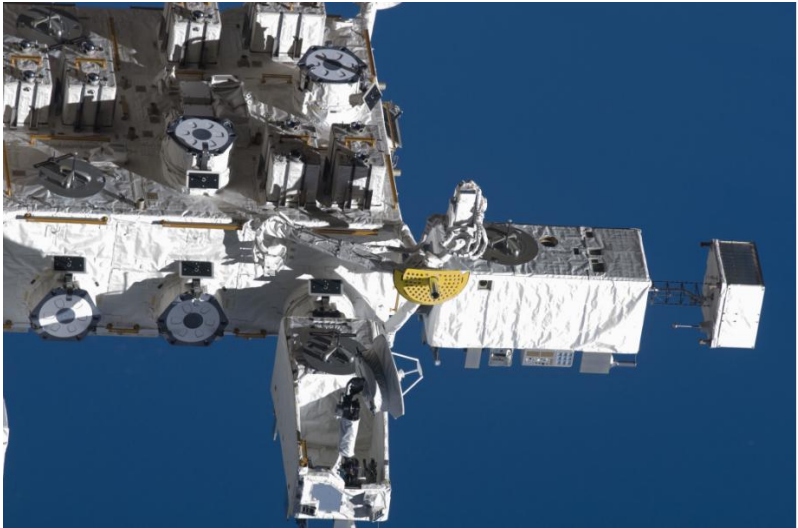
1. Avoid pinch points on VE
2. Avoid touching VE light if operated

Timeline Considerations:

1. Not much is gain performing task with 2 EV due to worksite restrictions



US EVA 23 TASK DATA – JEM EF FWD VE

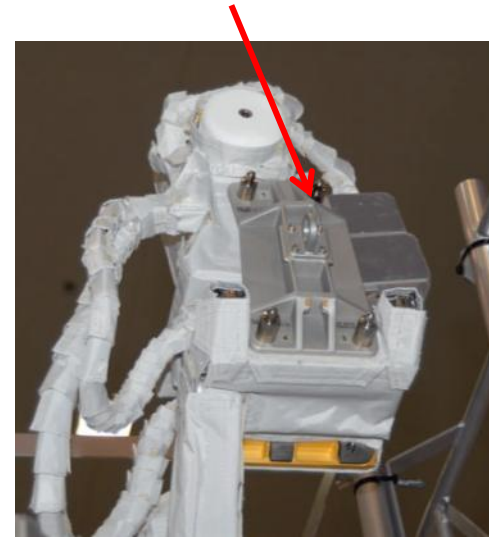
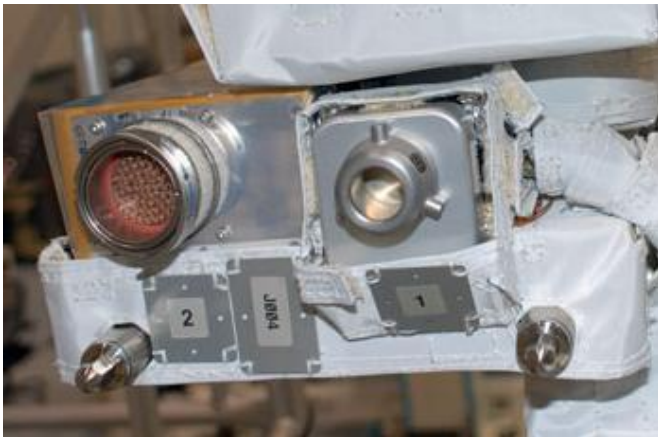


US EVA 23 TASK DATA – JEM EF FWD VE



Forward VE ORU:
1 electrical connector
2 EVA bolts
1 Microconical

Launch lock (already removed by Suni prior to EVA 18): 1 tether point
(Not req'd for R&R)



US EVA 23 TASK DATA – S1 P-CLAMP RELEASE

Estimated Task Duration:

| | With RMS | Without RMS |
|-------------|----------|-------------|
| One EV Crew | N/A | 1:00 / 0:30 |
| Two EV Crew | N/A | N/A |

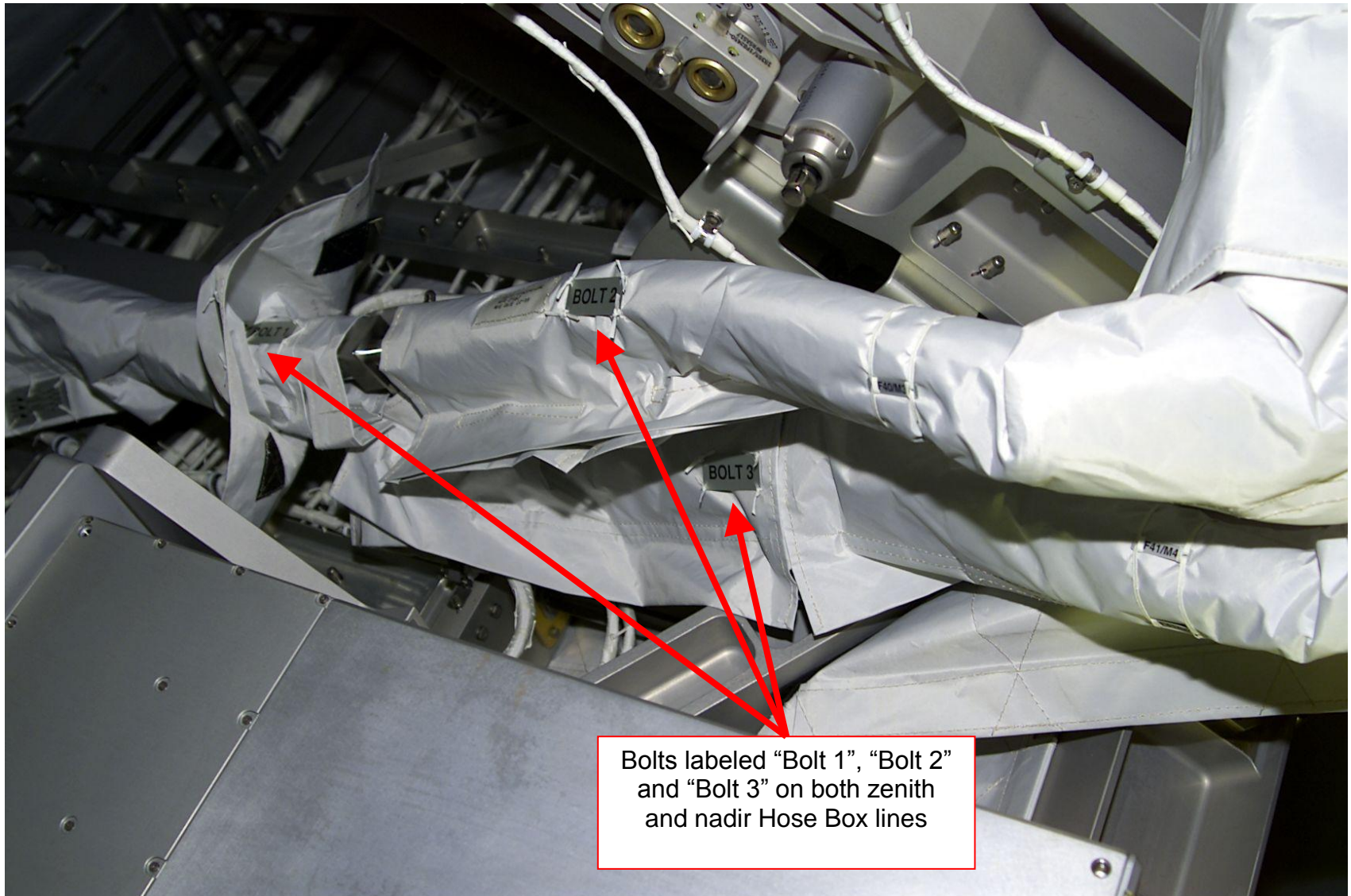
Tools:

| EV1 | |
|-----------------------------------|--|
| EVA Ratchet Wrench | |
| PGT w/ 7/16 (wobble) Socket-6 ext | |
| 7/16 (wobble) Socket – 12 ext | |

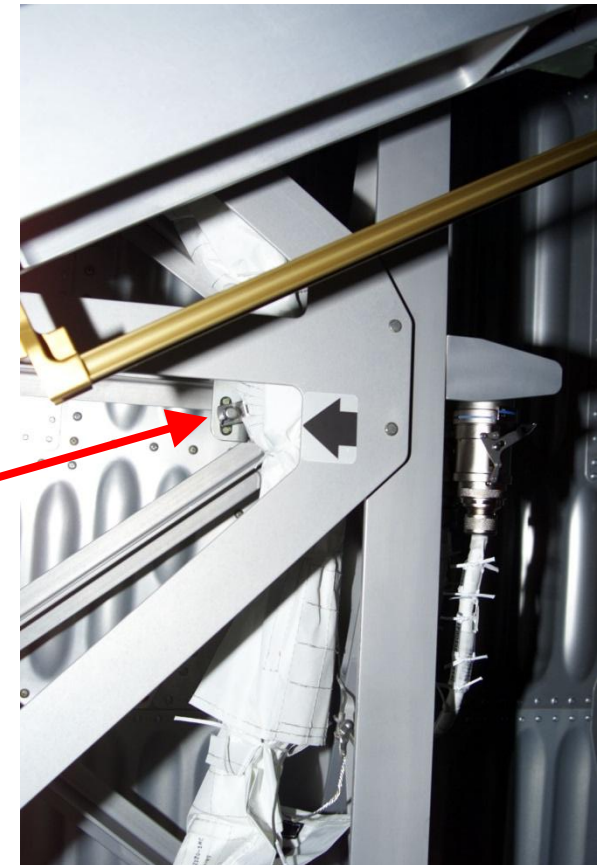
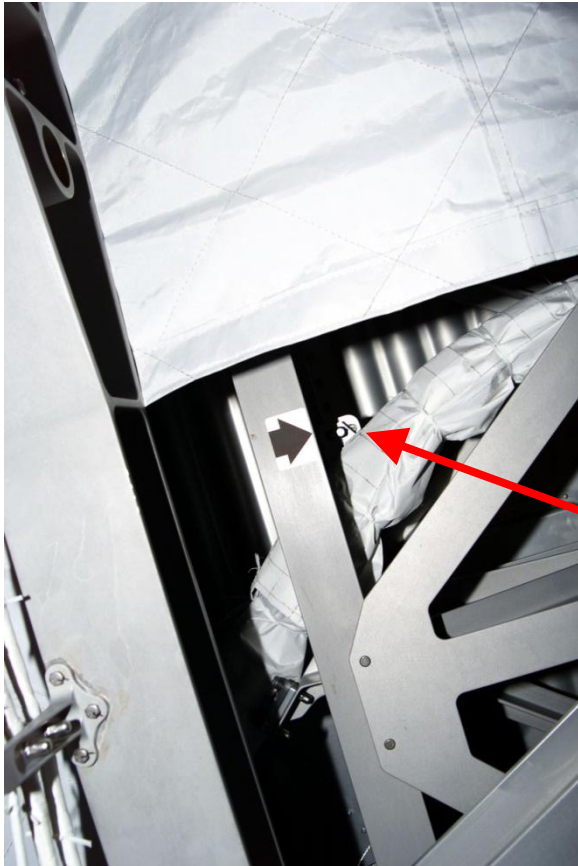
EVA Fasteners:

| Fastener Name | PGT | Socket | Qty | Turns | Install Torque (ft-lb) | Release Torque (ft-lb) | Failure Torque (ft-lb) |
|-------------------|----------------|---------------------------------|-----|------------|------------------------|------------------------|------------------------|
| Hose Box P-Clamps | B1, CCW2, 30.5 | Ratchet wrench w/ 2" ext or PGT | 6 | 6-12.5 CCW | 5.4 (Ground Install) | 9.2 | 12.6 |
| Stinger P-Clamps | B1, CCW2, 30.5 | 6" 7/16 wobble | 5 | 7-12.5 CCW | 5.4 (Ground Install) | 9.2 | 12.6 |
| | B1, CCW2, 30.5 | 12" 7/16 wobble | 1 | 7-12.5 CCW | 5.4 (Ground Install) | 9.2 | 12.6 |
| | | | | | | | |

US EVA 23 TASK DATA –HOSEBOX P CLAMPS

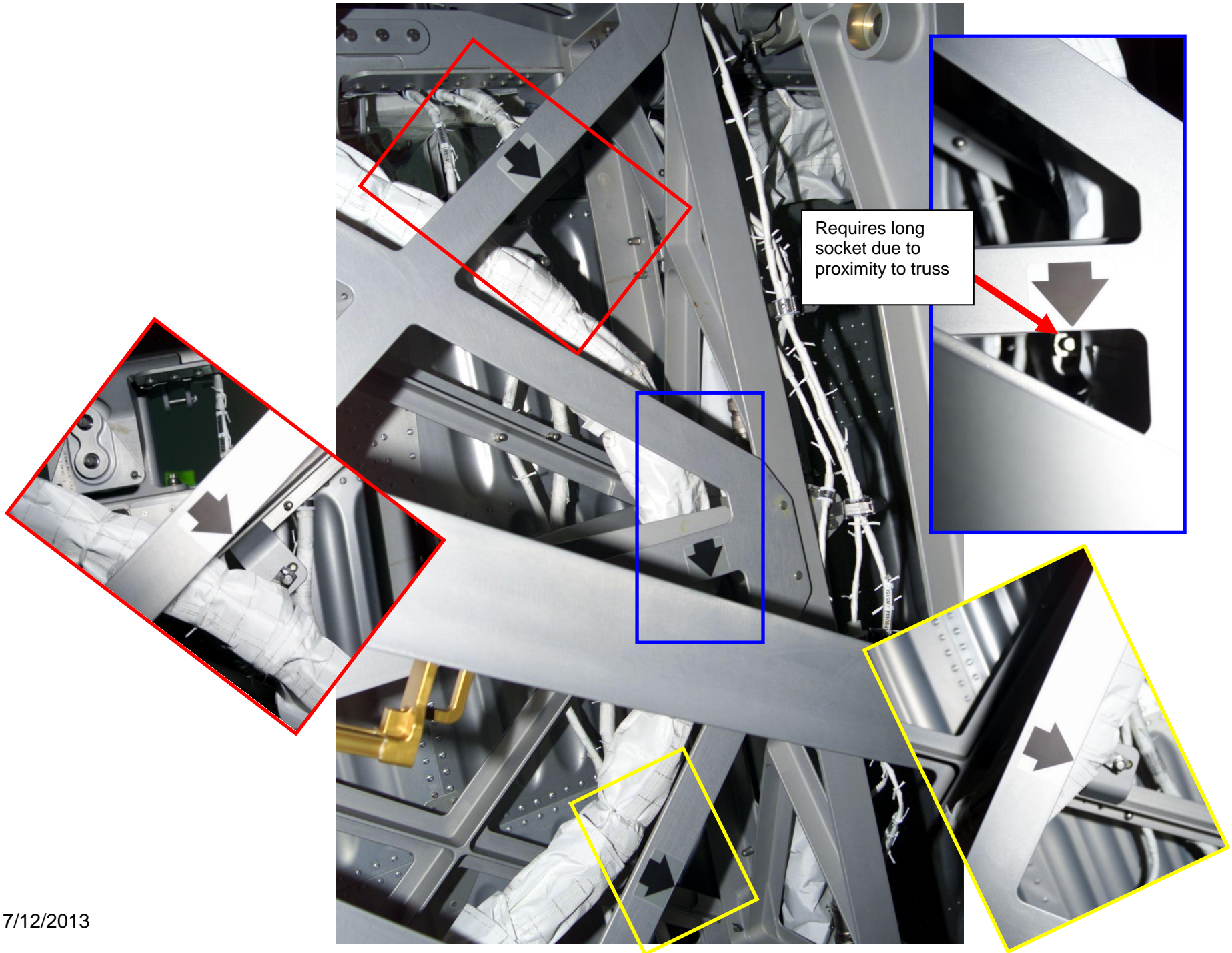


US EVA 23 RELEASE P-CLAMPS ON STINGER FQD M2 (00:30)



Release three P-Clamps closest to FHRC QD M2 (or verify released). Bolts are not labeled. Do not release P-Clamps further than three P-Clamps away from M2

US EVA 23 RELEASE P-CLAMPS ON STINGER FQD M2 (00:30)



US EVA 23 TASK DATA – AMS IMAGERY

