EVA 4 NOTES, CAUTIONS, & WARNINGS

NOTES

1. On MCC Go, other unstated actions may be applied to the SAW troubleshooting (e.g. shaking)
2. Maintain 3 ft clearance around SAW while retracting
3. Inspect kapton tape on tools as time permits

CAUTION

ISS Constraints

A. Avoid inadvertent contact with:
   1. Grapple fixture shafts
   2. PIP pins
   3. Passive UMAs
   4. MBS VDU, MCU, CRPCMs & Cameras (taped radiative surfaces, silver Teflon)
   5. Deployed TUS cable
   6. SVS Targets with planned future use [S1, P1]
   7. EETCS/PV Radiator bellows and panels [P6, P4, S4, S6]
   8. SSRMS cameras

B. Electrical cables:
   1. Avoid bend radii < 10 times cable diameter

C. For structural reasons:
   1. Avoid vigorous body motions, quick grabs and kickoffs against tether restraints

   Avoid performing shaking motions (sinusoidal functions) more than four cycles

EVA 4 NOTES, CAUTIONS, & WARNINGS (Cont)

WARNING

ISS Constraints

A. Avoid inadvertent contact with:
1. Grapple fixture targets and target pins
2. SSU, ECU, beta gimbal platform, mast canister, SAW blanket boxes unless the beta gimbal is locked and the motor is turned off
3. SABB
- Lower SABB exposed reels (guide wire reels (3) and tensioning mechanisms (2))
- Guide wires
- Tension mechanisms
- Blanket box skirts
- SABB swing bolts
- Solar array panels (possible exposed circuits)
- FCC and kapton part of solar array panels

B. Pinch:
1. Solar array mast during retraction
2. SABB
    - Exposed reels
    - Guide-wire mechanisms
    - Blanket tension mechanisms

C. Other
1. EVA crew will only contact energized surfaces with approved tools that have been insulated to prevent molten metal and shock
2. The solar array to be manipulated will be shunted prior to the EVA crew entering the worksite

WARNING (Cont)

ISS Constraints (Cont)

D. Sharp Edges:
1. Inner edges of WIF sockets
2. Mating surfaces of EVA connectors. Avoid side loads during connector mating
3. Nickel coated braided copper Ground Straps may contain frayed wires [P6, P4]
4. Solar Array [P6]
    - SABB (skirts, swing bolts)
    - Solar cells
    - Springs along tension bar
    - Hinge Pins
    - Guide cable burrs
    - Mast Canister Roller guides
    - Braided cables
    - Hinges on SAW blanket
    - Fastener exposed threads
5. Spring loaded captive EVA fasteners (e.g., 6B-boxes, BMRRM, RTAS ground strap bolt); the end of the spring may protrude

E. Thermal:
1. Turn off glove heaters when comfortable temp reached to prevent bladder damage. Do not pull fingers out of gloves when heaters are on
2. Uncovered trunnion pins may be hot
3. SSRMS/MBS operating cameras/lights may radiate large amounts of heat
4. Do not touch EMU protective visor if temp has been < -134 for > 15 min
5. Stay 1 ft away from PMAs and MMOD shields > 270 degF if EMU sun visor up

WARNING (Cont)

ISS Constraints (Cont)

6. Stay at least 1 ft away for no more than 15 min from PMAs and MMOD shields > 300 degF if EMU sun visor up
7. Stay 0.5 ft away from PMA and MMOD shields > 325 degF
8. No EMU boot contact with foot restraint when temp < -120 degF or > 200 degF
9. No EMU TMG contact of PMAs and MMOD shields when temp > 320 degF

F. RF radiation exposure:
1. Stay 3.6 ft from S-Band (SASA) high gain Antenna when powered [S1,P1,P6]
2. Stay 1.3 ft from S-Band (SASA) low gain Antenna when powered [S1,P1,P6]

EVA 4 BRIEFING CARD

1. EVA Prep
   - ❑ Get-up Plan – clothing and EMU equipment bag
   - ❑ Prebreathe protocol review
   - ❑ Equipment lock activities
   - ❑ Suit donning plan
     - o glove disconnect taping, with tape for quick removal – Reference taping procedures
   - ❑ Airlock depress review

2. Communications
   - ❑ Overall setup: big loop, A/G2, S/G2, ICOM, Hardline, remind EV crew when mode swapping
   - ❑ Use EV1(2) for DCM sw throws (all time in A/L)

3. EVA Procedure Review
   - ❑ Order of tasks (summary timeline)
   - ❑ Egress Plan
   - ❑ Detailed Task Review
   - ❑ Notes, Cautions, and Warnings
   - ❑ Ingress Plan

4. Robotics
   - ❑ SSRMS initial position, maneuvers, clearances
   - ❑ Coordinate Frames
   - ❑ SSRMS/SRMS/IV comm protocol review

5. Post EVA
   - ❑ Cold soak
   - ❑ Airlock Repress review
   - ❑ Suit doffing responsibilities
   - ❑ Post EVA plan

6. Emergencies
   - ❑ Emergency suit doff and power down during EVA prep and post EVA
   - ❑ CUFF checklist
   - ❑ Abort and Terminate review – scenarios/protocols
   - ❑ Hand signals

<u>IV CHECKLIST VERIFICATION ITEMS</u>

- ❑ Day/Night Cycles and extended two-handed ops
  - o √Lights, heaters, visors, tools, tethers, gloves
- ❑ √Load Alleviating Strap on Safety Tethers not damaged
- ❑ √Safety Tether in good config
  - o Crew Report: "**Hook closed, slide locked, reel unlocked**"
- ❑ √Both SAFER valves down at egress
  - o Crew Report: "**Both handles down**"
- ❑ √APFR locking collar Black-on-Black and pull test
  - o Clocking, pitch, roll, yaw
- ❑ √PGT Green light on for bolt engage
  - o program, (C)CW, MTL setting
  - o PGT and sockets – pull test
  - o May get Lo Torque msg at bolt release
  - o Crew Report: "**Torqued out, XX turns (or green light)**"
- ❑ Coordination between IV/EV/Robotics/Ground

EVA 4 INHIBIT PAD

Orbiter

All EVAs

TCS

L12 — 1. √TCS POWER – OFF

Ku-Band Antenna

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

RCS

If EV crew < 27 ft from FRCS:

IV — 1. √DAP: VERN, FREE, LO Z (flt specific √ with GNC)
O14,15,16 — 2. √RJDF F1, F2, F3, F4 MANF DRIVER (four) – OFF
LOGIC (four) – OFF
MCC-H — 3. √Above RCS config
IV — 4. √RCS F – ITEM 1 EXEC (*)
√JET DES F1U – ITEM 17 (*)
√F3U – ITEM 19 (*)
√F2U – ITEM 21 (*)

S-Band Antennas

NOTE
Possible loss of comm when forced LL FWD antenna

IV — If EV crew < 1.6 ft from S-Band antenna:
A1R — 1. S-BAND FM ANT – XMIT LOWER/RCVR UPPER
2. √MCC, lower antenna selected
If no comm, or on MCC call:
C3 — 3. S-BAND PM ANT – LL FWD
When EVA crewmember at least 1.6 ft away from all S-Band upper antennas:
C3 — 4. S-BAND PM ANT – GPC

USOS

All EVAs

PCU

MCC-H
1. √PCUs (two) operational in discharge mode and one of the following:
   A. CCS PCU EVA Hazard Control enabled
   B. No more than two arrays unshunted and pointed < 90 degrees from velocity vector

OR

2. One or no PCUs operational in discharge mode and one of the following:
   A. No more than two arrays unshunted
   B. No more than two arrays pointed < 90 degrees from velocity vector

Ground Radar

MCC-H — 1. √TOPO and FDO consoles, ground radar restrictions in place for EVA

Location Dependent Inhibits

SARJ

MCC-H — If 4B deployment beyond 17.5 bays, √port SARJ parked outside of 4B interaction zone

BGA

1. 4B BGA angle = 135, 2B = 140
2. 4B, 2B motor state – OFF
3. 4B, 2B Latch 1 pin status - Latched

KU-Band

If SSRMS goes toward aft 4B array (right BB) outbd BB, √MCC to safe ISS KU (locked and parked)

RSOS

All EVAs

SM Antennas

MCC-M — 1. Global Timing Sys 1(400.1 MHz) [GTS] – Deactivate

EVA 4 SUMMARY TIMELINE

TIME	SSRMS	EV1 (SSRMS)	EV2 (FF)
0:00		POST DEPRESS (00:05)	POST DEPRESS (00:05)
0:05		EGRESS/SETUP (00:25)	EGRESS/SETUP (00:25)
0:30	SSRMS MNVR to SABB	P6 SAW 4B RETRACTION (03:00) • SSRMS setup and ingress • SSRMS GCA to worksite • SABB Survey • SAW Retraction Troubleshooting o SAW panel problem correction o SAW Retraction • SABB Closure • SSRMS GCA to egress • Tip LEE FMS MLI troubleshooting • SSRMS cleanup	P6 SAW 4B RETRACTION (03:00) o Assist EV1 as reqd o On MCC GO, push on 4B MDA latch box to induce oscillations similar to EVA 3 o On MCC GO, photograph 2B array (stbd) SABBs
3:30		CLEANUP (00:30)	CLEANUP (00:30)
4:00		INGRESS (00:25)	INGRESS (00:25)
4:25		PRE REPRESS (00:05)	PRE REPRESS (00:05)
4:30			

EVA 4 TOOL CONFIG

AIRLOCK

EMU 1 (keep MWS very low-profile)
- ☐ MWS, right swing arm
- ☐ Cheater bar with 1.5" bail drive lever (sm-sm RET)
- ☐ BRT (left)
- ☐ w/3 wire ties & sm-sm RET
- ☐ T-Bar
- ☐ D-ring ext – left
- ☐ Waist tether – right
- ☐ Spare 55' safety tether (right D-ring)
- ☐ SAFER

EMU 2
- ☐ MWS, right swing arm
- ☐ Digital Camera (inner right swing arm), with integral RET attached to swing arm
- ☐ Tether camera thermal blanket to swingarm (RET)
- ☐ PGT w/7/16 x 2-in ext w/RET (for SABB latching contingency)
- ☐ BRT (left)
- ☐ w/3 wire ties & sm-sm RET
- ☐ T-Bar
- ☐ ISS trash bag (outer right)
- ☐ Wire ties (2) around T-Bar
- ☐ Sm-sm RET (left D-ring)
- ☐ Adj tether (left D-ring)
- ☐ Sm-sm RET w/PIP pin (right D-ring)
- ☐ Adj tether (right D-ring)
- ☐ D-ring ext (2)
- ☐ Spare 55' safety tether (left D-ring ext)
- ☐ Waist tethers (2) (attach 1 to right D-ring extender)
- ☐ SAFER

Total sm-sm RETs used (w/o PIP pin): 8
Total sm-sm RETs (w/PIP Pin) used: 1
Total lg-sm RETs used: 1
Total adj tethers used: 3

AIRLOCK ENDCONE

Staging Bag
- ☐☐ Fish Stringer #3
- ☐☐ Connector cleaner tool caddy
- ☐☐ Wire tie caddy (2)
- ☐☐ Pin straightener
- ☐☐ MWS Key strap
- ☐☐ Velcro/Tape caddy
- ☐☐ Spare PGT (s/n:_____); battery (s/n:____)
- ☐☐ Pry Bar
- ☐☐ EVA Ratchet
- ☐☐ Probe

- ☐☐ IV Bag
- ☐☐ Contamination Detection Kit
- ☐☐ Hydrazine Detector (Gold Salt Coupon) (6)
- ☐☐ Color Chart (2)
- ☐☐ ISS Contamination Detection Sampler (2)
- ☐☐ Shuttle Contamination Detection Sampler (2)
- ☐☐ Nitrogen Dioxide Detector (Oxidizer Draeger Tube) (6)
- ☐☐ Ammonia Detector (NH3 Draeger Tube) (6)
- ☐☐ 2 towels with wire ties
- ☐☐ DCM plug (2) (SAFER hardmount)
- ☐☐ GP caddy (2)
- ☐☐ Thermal mittens (2 pr)
- ☐☐ Socket Caddy (hatch contingencies) w/sm-sm RET
- ☐☐ 1/2 X 8-in socket (IV hatch)
- ☐☐ 7/16 X 6-in socket (spare)

AIRLOCK INTERNAL D-RING

- ☐ D-ring extender

UIA HANDRAILS

- ☐ Crewlock bag w/adj tether
  - o Loop pin puller (cont)
  - o BRS pin tool (cont)
  - o Needle nose pliers (cont)
  - o WIF Adapter (2) with RETs (2)
  - o Broom Clip Caddy
    - TPS scraper (w/integral RET)

Crewlock bag with lg-sm RET
Spare PGT battery: s/n: _____
Socket caddy with 6-in
Digital Camera (spare)

PRE-EVA 4 TOOL CONFIG

1. Configure/verify MWSs
2. Verify IV and Staging Bag contents per list
3. Prior to EVA, inspect the following:
   - ❑ RET cords for damage
   - ❑ BRT and MWS toggles: loose fittings/screws
   - ❑ Safety and waist tether load alleviating straps (no red band or damage)
4. Configure the following SAW troubleshooting tools per Overview pitch and stow in crewlock bag:
   - Loop pin puller
   - BRS pin tool
   - Needle Nose Pliers
   - TPS Scraper
5. Add remaining tools to crewlock bag as listed under UIA HRs

POST EVA 4 TOOL STOW

1. Remove PGT batteries (2) from PGTs and stow in M-02 bag (EVA Prep and Ops, s/n 1038)
2. Retrieve Loop pin Puller (& Caddy) and Needle Nose pliers (& caddy); return items to Shuttle
   Stow in XXXX

EGRESS (00:25)

IV	EV1 (FF)	EV2 (FF)
NOTE For safety tether swaps, expect to hear: 1. Hook closed 2. Slide locked 3. Reel unlocked	√Right waist tether to airlock internal D-ring extender, verify ST config	√Right waist tether to UIA panel fwd D-ring, verify ST config
	1. Thermal cover – open 2. Egress airlock 3. Inspect load alleviating straps on 85' safety tethers (2) 4. Retrieve airlock safety tether from fwd external D-ring, attach to left D-ring extender, verify ST config 5. Release waist tether from internal D-ring extender 6. Receive crewlock bag (w/adj tether) from EV2, temp stow on port A/L toolbox HR 7. Transfer aft airlock safety tether to EV2	1. Transfer crewlock bag (w/adj tether) to EV1 2. Receive airlock safety tether from EV1, attach to left D-ring extender, verify ST config 3. Release right waist tether from UIA panel D-ring 4. Egress airlock ◄□
1. WVS Software: Select page – RF camera Sel 'Advanced Controls' S-Band Level (two) – Max (required after EV1 and EV2 egress airlock)	8. √EV2's SAFER MAN ISOL vlv – OP (dn) and HCM (dn)	5. Close thermal cover 6. √EV1's SAFER MAN ISOL vlv – OP (dn) and HCM (dn) 7. Retrieve crewlock bag (w/adj tether) from port A/L toolbox HR,attach to BRT

P6 4B SOLAR ARRAY WING RETRACT TROUBLESHOOTING (3:00)

IV	EV1 (SSRMS)	EV2 (FF)
2A. 4B BGA angle = 135 deg (+/-0.5) Motor State – OFF Latch 1 Pin Status – Latched 2B. √MCC free drift or CMG control prior to mast retraction or deployment NOTE Inspect glove gauntlets and tool condition/kapton tape as time permits during day/night cycles ASSUMPTIONS/INFO 1. Both crew on 85' airlock safety tethers 2. Both crew have spare 55' safety tethers (85' tethers get you close, but perform safety tether swap as reqd) (Verify Safety Tether Config) 3. 4B is port array, and is locked at 135 deg (optimal posn for SSRMS mnvr 4. MT at WS 5 5. EV2 may be asked to take pictures of 2B blanket boxes (stbd array) from mast canister HRs (on MCC GO) 6. EV2 may induce oscillations on 4B blanket box similar to EVA 3 (on MCC GO) 7. EV1 will troubleshoot loose tip LEE FMS MLI during SSRMS cleanup	**WARNING** Sharp edge/pinch point/entrapment/shock hazard: Avoid EMU contact with the following: 1. Lower SABB exposed reels (guide wire reels (3) and tensioning mechanisms (2)) 2. Guide wires 3. Tension mechanisms 4. Blanket box skirts 5. Solar array panels (possible exposed circuits) 6. The P6 S-Band Antenna KOZ is 3.6 feet (antenna is fwd of 2A BGA) 7. FCC and kapton part of solar array panels 1. Retrieve APFR from A/L Toolbox 1 WIF (stbd), attach to BRT 2. Translate to SSRMS APFR setup posn (P6 stbd/fwd edge) via the following translation path: o Translate aft of ISS airlock to Z1 stbd pool handle o Translate zenith to stbd Z1 toolbox and onto P6 o Translate forward on P6 nadir of stbd radiator o Translate zenith on P6 on fwd/stbd edge up to nadir most point on IEA o Translate port on P6 under fwd radiator to IEA fwd/port corner HRs 5340/5343 3. GCA SSRMS for APFR install 4. Receive WIF adapter from EV2 5. Install WIF adapter on SSRMS EE, tether point on WIF adapter points toward EE 6. Install APFR in WIF adapter, config to: [12,PP,F,6] 7. Perform safety tether swap onto SSRMS with spare safety tether, verify ST config	1. Translate to SSRMS APFR setup posn (P6 stbd/fwd edge) via the following translation path: o Translate aft of ISS airlock to Z1 stbd pool handle o Translate zenith to stbd Z1 toolbox and onto P6 o Translate forward on P6 nadir of stbd radiator o Translate zenith on P6 on fwd/stbd edge up to nadir most point on IEA o Translate port on P6 under fwd radiator to IEA fwd/port corner HRs 5340/5343 2. Temp stow crewlock bag on IEA HR 3. Retrieve WIF adapter from crewlock bag, transfer to EV1 4. Assist EV1 as reqd

IV	EV1 (SSRMS)	EV2 (FF)
	8. GCA SSRMS for ingress 9. Install local waist tether onto APFR as reqd 10. Ingress APFR 11. Receive Broom Clip Caddy from EV2, stow on MWS bayonet 12. Give SSRMS operator GO to Ingress clearance position	5. Retrieve Broom Clip Caddy with TPS scraper from crewlock bag, transfer to EV1
3. √MCC GO to mnvr to P6 4B	←□	
	13. GCA SSRMS for SABB survey, fwd/zenith (left) end SABB to nadir/aft (right) SABB 14. Perform WVS scan of SABB/SAW including: o Y-guides (4 per SABB) (should not be visible; if visible, workaround will occur at 1 bay) o Middle and outboard guide wire pulleys (check that the guide wire is not rubbing against cable) (don't check inbd because it is covered) o Panels, grommets, and guide wires 15. Determine SABB problem and corresponding <u>SAW WORKAROUND CASE</u> in EV2 column 16. Report condition to MCC 17. Verify glove gauntlets cover glove wrist disconnects	6. Provide clearance calls as necessary 7. Translate to 4B array (port) mast canister HRs (MCC call - which blanket box to go to) 8. If necessary: on MCC GO, using gloved hand, apply enough pressure to Latch Override MDA box to induce small in/out and up/down oscillations <u>SAW WORKAROUND CASES</u> <u>Grommet Reset</u> Use TPS scraper to flip guide wire grommet(s) up so that they are pointing perpendicular to blanket box or up toward upper blanket box cover - OR - Pull guide wire above grommet to allow it to flip up. Avoid contact with Kapton part of panel. If required, and on MCC GO, GCA SSRMS to STE (standard test equip loop) and shake panel to reset grommet <u>Over Center Hinge Reset</u> Use bail drive lever part of cheater bar stack up to press on metal panel hinge into normal hinge configuration. Avoid contact with Kapton part of panel and guide wire
4. √MCC GO to mnvr to SABB problem	←□	
	18. GCA SSRMS to SABB problem 19. Clear problem using the <u>SAW WORKAROUND CASES</u> in EV2 column 20. When problem cleared, give SSRMS operator a GO to mnvr to Array clearance posn	
5. Verify MCC GO for retract of one mast bay	←□	
	21. Verify condition of SAW panels 22. Perform SAW assessments and troubleshooting	

IV	EV1 (SSRMS)	EV2 (FF)
6. Give MCC GO to unlatch the SABBs (low-tension)	as reqd until 1 mast bay remains deployed 23. GCA SSRMS out to 3 feet ◄□ 24. At 1 mast bay deployed and on MCC GO, GCA SSRMS for SABB survey 25. Perform WVS scan of SABB/SAW including: o Verify blanket fully contained within box o Verify hinge lines are parallel to one another in the blanket stack o Verify outboard FCC STE loops neatly stacked within SABB goal posts o Verify SABB cover guide pins aligned with base goal posts o Verify guide wires (three per SABB) retracted (no excess slack) 26. If Y-guide problem noted earlier, reference Y-Guide Reset in EV2 column 27. Assess final condition of SABB 28. GCA out 3 ft, give GO for final SABB retract 29. At full retraction and on MCC GO, GCA SSRMS for SABB survey 30. Repeat step 25 and then verify latches are aligned with latch pins on SABB cover, and latches are within reach of pins 31. GCA out 3 feet, give MCC GO for SABB latching 32. Verify successful SABB containment	9. On MCC GO, translate to 2B stbd array mast canister HRs and take digital stills of left (fwd) and right (aft) blanket boxes: o Y-brackets o Guide wire mechanisms o Foam pads in SABB base o Inactive panels and lower blanket panels o Tension mechanism o FCC Transition area Y-Guide Reset 1. GCA SSRMS back to P6 IEA 2. MCC – Verify SABBs are unlatched (low tension) 3. EV2 hand off BRS pin tool to EV1 4. GCA SSRMS into worksite 5. Use TPS scraper and BRS pin tool to lift tension bar. a. Put BRS pin tool on short stiffner section of skirt (stronger), pry up 6. Lower tension bar and monitor Y-guide(Y-guide should seat under tension bar as it is lowered)

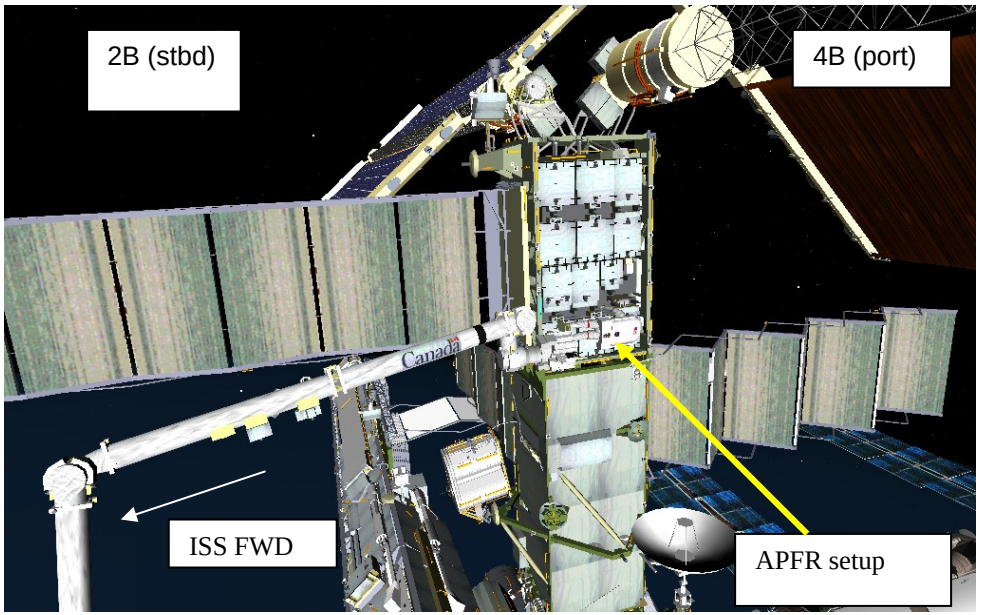
IV	EV1 (SSRMS)	EV2 (FF)
7. √SSRMS Operator, brakes ON	CLEANUP 1. GCA SSRMS to Egress clearance posn 2. GCA SSRMS to APFR egress posn 3. Egress APFR, remove waist tether as reqd 4. GCA SSRMS to FMS MLI manipulation position 5. Climb onto tip LEE, install waist tether to LEE HR as reqd 6. Locate the edge of the MLI that is billowed (see pic) NOTE When pulling on the billowing edge of the SSRMS MLI, it is important to hold the opposite edge such that the blanket does not slide up and past the "joint scale" 7. Pull up on the billowing edge of the MLI to remove the fold and smooth against underlying structure 8. Perform visual inspection of entire MLI and ensure there is no additional billowing or wrinkling, correct as reqd 9. Translate onto IEA HR 10. GCA SSRMS to APFR removal posn 11. Remove APFR, stow on BRT 12. Remove WIF adapter, stow on MWS 13. Perform safety tether swap onto airlock safety tether, verify ST config, retrieve spare 14. Give SSRMS GO to mnvr to EVA 4 Park posn 15. Translate to airlock, stow APFR in A/L Toolbox1 (stbd); config to: [9,MM,F,12] 16. Perform tool inventory	CLEANUP 1. Retrieve crewlock bag (w/adj), attach to BRT 2. Translate to airlock  TIP LEE SSRMS FMS MLI 3. Perform tool inventory

IV	EV1 (SSRMS)	EV2 (FF)
	POST EVA TOOL CONFIG o Sm-sm RETs (2): _____ o Wire Ties (3): _____ o BRT ____ o Waist tether: _____ o Spare 55' safety tether o 85' safety tether o Cheater bar with 1.5" bail drive lever o Broom Clip Caddy with TPS scraper tool GET-AHEAD 1. On MCC GO, Relocate APFR from A/L WIF 1 (or BRT) to CETA 2 WIF 1 (on port TFR), configure to: [1,NN,E,1]	POST EVA TOOL CONFIG o Sm-sm RETs (5): _____ o Adj tethers (2): _____ o Wire Ties (3): _____ o Trash bag: _____ o Camera: _____ o BRT o Waist tethers (2): _____ o Spare 55' safety tether o 85' safety tether o Crewlock bag o Loop pin puller o BRS pin tool o Needle nose pliers o WIF Adapter (2) with RETs (2) GET-AHEAD 1. On MCC GO, relocate APFR from ESP2 WIF 8 to CETA 2 WIF 2 (on stbd TFR), configure to: [3,TT,F,12]

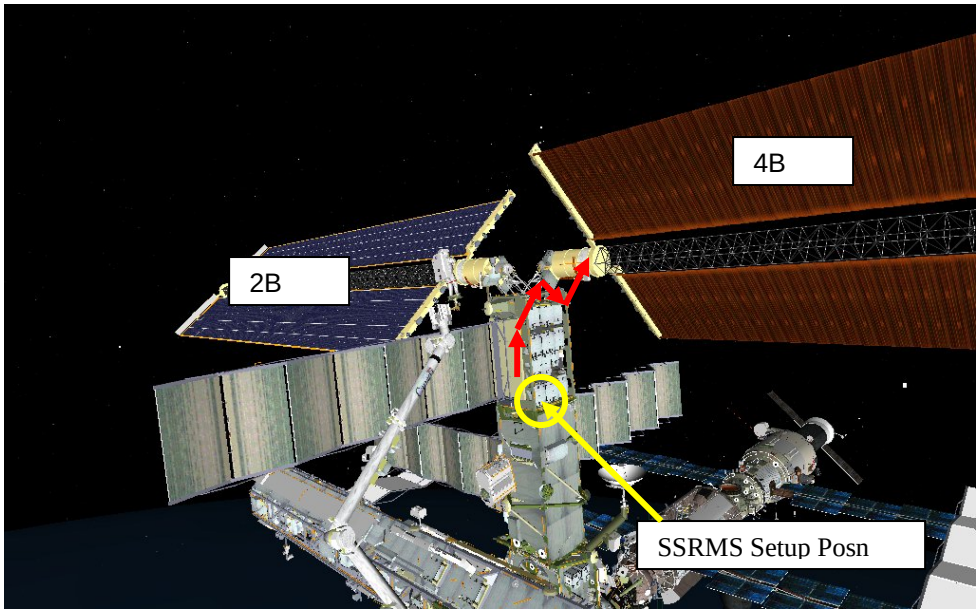
INGRESS (00:25)

IV	EV1 (FF)	EV2 (FF)
1. Perform WVS PWRDN (PHOTO/TV, WVS CUE CARD)		← □
		1. Ingress airlock 2. Connect right waist tether UIA panel fwd D-ring, verify ST config
	1. Disconnect EV2's 85' safety tether from airlock external aft D-ring, transfer to EV2 2. Connect right waist tether to D-ring extender on airlock internal D-ring, verify ST config 3. Disconnect 85' safety tether from airlock external fwd D-ring, stow on MWS 4. Ingress airlock	3. Receive 85' safety tether from EV1, stow in airlock
	5. Retrieve SCU, remove DCM cover 6. Connect SCU to DCM, √locked 7. DCM: water – OFF 8. Hatch thermal cover – close; attach Velcro strap	4. Retrieve SCU, remove DCM cover 5. Connect SCU to DCM, √locked 6. DCM: water – OFF
	CAUTION Do not close hatch until EMU water – OFF for 2 min	
	9. Verify hardware clear of hatch 10. Outer hatch – close and lock 11. Go to PRE REPRESS	7. Go to PRE REPRESS

EV1 APFR SETUP AND INGRESS POSITION



4B Array Clearance Position and EV2 Translation Path to 4B Mast Canister HRs



RECOMMENDED TRANSLATION PATH to 2B (STBD) ARRAY (on MCC GO for EV2)