

# EVA Checklist

## STS-113 Flight Supplement

Mission Operations Directorate  
EVA, Robotics, and Crew Systems  
Operations Division

Final  
September 30, 2002

**NOTE**

This supplement is to be integrated into the generic edition to provide a complete document for the specific flight. Some pages in the generic edition may be replaced with supplemental pages identified as 'TEMP'. These generic pages, if any, must be retained for use on future flights.

National Aeronautics and  
Space Administration

Lyndon B. Johnson Space Center  
Houston, Texas



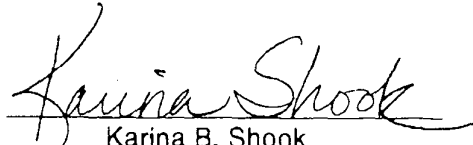


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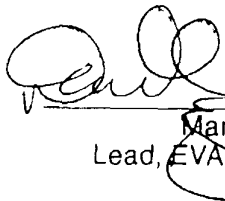
**EVA CHECKLIST  
STS-113 FLIGHT SUPPLEMENT**

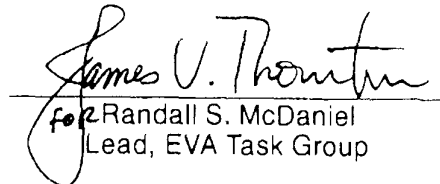
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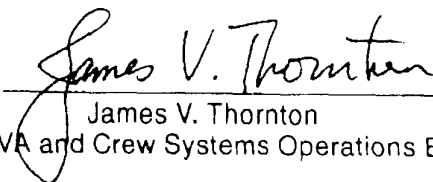
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	EVA-1459	EVA-1476	EVA-1484
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EVA CHECKLIST  
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AIRLOCK  
CONFIG

## AIRLOCK PREP (50 min)

Retrieve or unstow following equipment:

MF28G	3/8-in breaker bar, 4-in ext w/3/8-in drive
IFM Tool Kit	1/2-in socket w/3/8-in drive
Vol H	EMU Equipment Bag – attach to middeck lockers/wall
	Cooling Loop Jumper – stow in EMU Equipment Bag
	EMU Servicing Kit – temp stow
	Helmet Lights – remove covers
	EVA Bag
FDF Locker	Cuff Checklists (2) – stow in EMU Equipment Bag
	<u>DEPRESS/REPRESS</u> Cue Card

- AW18A
1. ✓ Inner hatch Equal vlv (two) – OFF
  2. LTG FLOOD (four) – ON
  3. Remove from airlock, as reqd:
    - Airlock Stowage Bag
    - Airlock Floor Pallet using 3/8-in breaker bar, 4-in ext w/3/8-in drive, and 1/2-in socket w/3/8-in drive

### CAUTION

Do not stow EMU lights in locker with batteries installed

4. Stow Vol H Bags in Vol H
5. Transfer to airlock:
  - EVA Bag – install on airlock wall
  - DEPRESS/REPRESS Cue Card
  - Helmet Lights
6. Install IVA foot restraint, as reqd
7. Unbuckle SCU straps, Velcro SCU to wall
8. Install EMU lights on helmets (EMU 1, EMU 2)
9. Disconnect all helmets, temp stow
10. Remove comm caps from LTA restraint bags and connect to electrical harnesses
11. Remove LTA restraint bags
12. Disconnect waist rings; remove and stow any equipment stowed in HUT/LTA
13. Remove Drink Bag restraint bags – stow in EV1, EV2 mesh bags
14. Stow LTA restraint bags on AAPs
15. ✓ Thermal cover clear of waist ring
16. Waist ring – engage posn
17. Connect LTA to HUT, lock
18. ✓ Tether hook operation
19. Remove 20-g Crash Bag from middeck EMU, as reqd

# EMU PREP FOR TRANSFER TO ISS

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BOTH EMUs

1. Configure/verify items per table below
2. ✓PWR – SCU
3. ✓PURGE vlv – op (up)
4. ✓O2 ACT – OFF
5. ✓WATER – OFF, switch guard installed
6. ✓Helmet sun visors down, cover installed
7. ✓Waist Tethers, Wrist Tethers, Wrist Mirrors installed

<b>EMU TBD (XL)</b>	<b>EMU 3006 (L)</b>
<input type="checkbox"/> DIDB Restraint Bag installed in HUT <input type="checkbox"/> Comm Cap installed <input type="checkbox"/> LCVG (w/biomed) stowed in HUT <input type="checkbox"/> Mesh Bag (EV Crew Options Kit) (LA) in HUT <ul style="list-style-type: none"> <li><input type="checkbox"/> LA-1 Ziplock Bag               <ul style="list-style-type: none"> <li><input type="checkbox"/> MAG</li> <li><input type="checkbox"/> TCU (top)</li> <li><input type="checkbox"/> TCU (bottom)</li> <li><input type="checkbox"/> Comfort Gloves</li> <li><input type="checkbox"/> Moleskin</li> <li><input type="checkbox"/> Wristlets</li> <li><input type="checkbox"/> Socks</li> </ul> </li> <li><input type="checkbox"/> LA-2 Ziplock Bag (same as above)</li> <li><input type="checkbox"/> LA-3 Ziplock Bag (same as above)</li> </ul> <input type="checkbox"/> EMU Battery S/N TBD <input type="checkbox"/> LiOH Cartridge S/N TBD <input type="checkbox"/> Helmet S/N TBD <input type="checkbox"/> Helmet Cover <input type="checkbox"/> EV1 (LA) Gloves <input type="checkbox"/> Wrist Mirrors (2) <input type="checkbox"/> Remove tethers from EMU ( <u>NOTE</u> : only tethers listed below should be transferred to ISS)	<input type="checkbox"/> DIDB Restraint Bag installed in HUT <input type="checkbox"/> Comm Cap installed <input type="checkbox"/> LCVG (w/biomed) stowed in HUT <input type="checkbox"/> Mesh Bag (EV Crew Options Kit) (He) in HUT <ul style="list-style-type: none"> <li><input type="checkbox"/> He-1 Ziplock Bag               <ul style="list-style-type: none"> <li><input type="checkbox"/> MAG</li> <li><input type="checkbox"/> TCU (top)</li> <li><input type="checkbox"/> TCU (bottom)</li> <li><input type="checkbox"/> Comfort Gloves</li> <li><input type="checkbox"/> Moleskin</li> <li><input type="checkbox"/> Wristlets</li> <li><input type="checkbox"/> Socks</li> </ul> </li> <li><input type="checkbox"/> He-2 Ziplock Bag (same as above)</li> <li><input type="checkbox"/> He-3 Ziplock Bag (same as above)</li> </ul> <input type="checkbox"/> EMU Battery S/N TBD <input type="checkbox"/> LiOH Cartridge S/N TBD <input type="checkbox"/> Helmet S/N TBD <input type="checkbox"/> Helmet Cover <input type="checkbox"/> EV2 (Tm) Gloves <input type="checkbox"/> Wrist Mirrors (2) <input type="checkbox"/> Remove tethers from EMU ( <u>NOTE</u> : only tethers listed below should be transferred to ISS)
<p style="text-align: center;"><b><u>EVA Systems Transfer Bag</u></b></p> <input type="checkbox"/> Inflight Restraint Bag (Empty Mesh Bag) <input type="checkbox"/> EMU Servicing Kit labeled "Shuttle" <input type="checkbox"/> FDF EVA Checklist – 1 of 2 <input type="checkbox"/> EVA Exercise Prebreathe Cue Card <input type="checkbox"/> CEVIS Shoes (EV1 and EV2) <input type="checkbox"/> EMU Battery (S/N TBD) <input type="checkbox"/> Cooling Loop Jumper (S/N TBD)	<p style="text-align: center;"><b><u>EVA Tool Transfer Bag</u></b></p> <input type="checkbox"/> Inflight Restraint Bag (Empty Mesh Bag) <ul style="list-style-type: none"> <li><input type="checkbox"/> Ret Eq Tether (EQ-EQ w/Pip pin) (3) S/N xxx, S/N xxx, S/N xxxx</li> <li><input type="checkbox"/> Ret Eq Tether (EQ-EQ) (3) S/N xxx, S/N xxx, S/N xxxx</li> <li><input type="checkbox"/> OI WIF (P/N SEG33106861-301, S/N 1038)</li> <li><input type="checkbox"/> Ballstack (P/N SEG33106870-701, S/N 1010)</li> <li><input type="checkbox"/> QD Button Depress Tool</li> <li><input type="checkbox"/> 1-in SPDs (xx)</li> <li><input type="checkbox"/> 1.5-in SPDs (xx)</li> </ul>

# POST EVA 3 EMU RECONFIG

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## EVA TRANSFER BAG PREP AND SCU ROUTING

1. Perform EVA TRANSFER BAG PREP per table

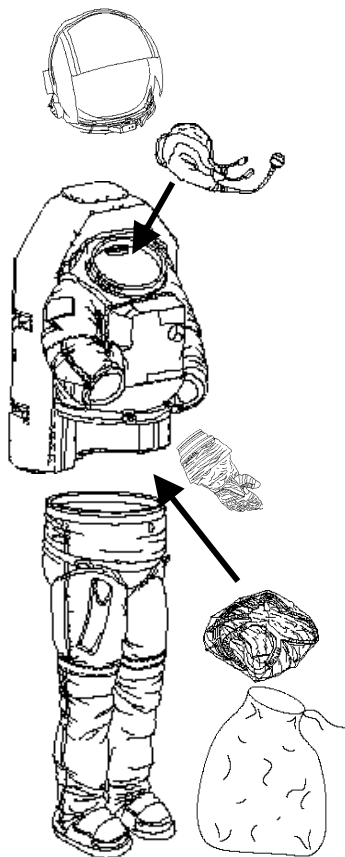
<b><u>EVA Systems Transfer Bag</u></b>	<b><u>EVA Tool Transfer Bag</u></b>
<ul style="list-style-type: none"><li><input type="checkbox"/> Inflight Restraint Bag (Empty Mesh Bag)</li><li><input type="checkbox"/> EMU Servicing Kit labeled "Shuttle"</li><li><input type="checkbox"/> FDF EVA Checklist (1)</li><li><input type="checkbox"/> EVA Exercise Prebreathe Cue Card</li><li><input type="checkbox"/> CEVIS Shoes (EV1 and EV2)</li><li><input type="checkbox"/> EMU Battery (S/N TBD)</li><li><input type="checkbox"/> Cooling Loop Jumper (1) (S/N TBD)</li></ul>	<ul style="list-style-type: none"><li><input type="checkbox"/> Inflight Restraint Bag (Empty Mesh Bag)</li><li><input type="checkbox"/> Ret Eq Tether (EQ-EQ w/Pip pin) (3) (S/N TBD, S/N TBD, S/N TBD)</li><li><input type="checkbox"/> Retractable Eq Tether (EQ-EQ) (3) (S/N TBD, S/N TBD, S/N TBD)</li><li><input type="checkbox"/> OI WIF (P/N SEG33106861-301, S/N 1038)</li><li><input type="checkbox"/> Ballstack (P/N SEG33106870-701, S/N 1010)</li><li><input type="checkbox"/> QD Button Depress Tool</li><li><input type="checkbox"/> 1-in SPDs (xx)</li><li><input type="checkbox"/> 1.5-in SPDs (XX)</li></ul>

# POST EVA 3 EMU RECONFIG (Cont)

## PRE-UNDOCK EMU RECONFIGURATION

A 1. Perform EV1 EMU reconfiguration for EMU TBD (XL) per below figure

### EV1 (LA) EMU TBD (XL)



- 1. ✓Comm cap installed in EMU
- 2. ✓DIDB Restraint Bag in HUT
- 3. Remove lights and EMU TV from helmet, stow on ISS Helmet
- 4. Install helmet, ✓Helmet cover installed, sun visors down
- 5. Remove Metox (install caps), stow in M-02 Bag on A/L1D1
- 6. Remove EMU battery (S/N TBD), stow in M-02 Bag
- 7. Install EMU battery (S/N TBD)
- 8. Install used LiOH from EVA 1 (S/N TBD)
- 9. Remove REBA, stow in M-02 Bag on A/L1D1
- 10. Remove ISS Cuff C/L, stow in ISS EMU Equipment Bag
- 11. Install EV1 (LA) gloves
- 12. Stow LCVG (LA) in HUT
- 13. Stow EV Crew Options Kit (LA) in HUT
- 14. Install EV1 (LA) LTA

### EV1 EMU TBD FINAL RETURN CONFIGURATION

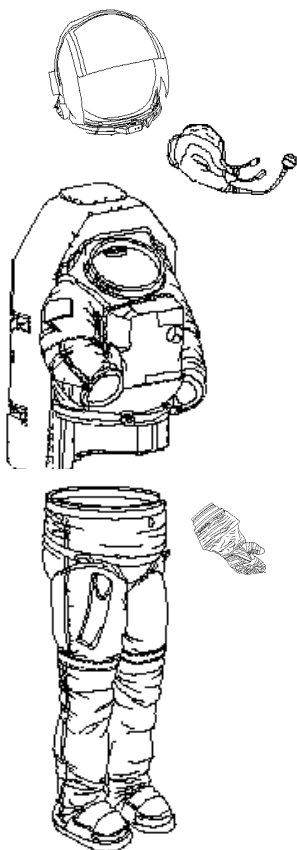
- EMU TBD – XL
- EMU Battery TBD
- LiOH TBD
- Comm Cap (LA)
- Helmet S/N TBD
- LCVG (LA)
- ECOK (LA)
- Lower Arms – O3
- Arm Rings – None
- Gloves (LA)
- LTA (LA)
- Tethers
- Patches, Stripes, Flag
- Wrist Mirrors
- No EMU TV, Helmet Lights, or REBA
- No ISS Cuff Checklist

Cont next page

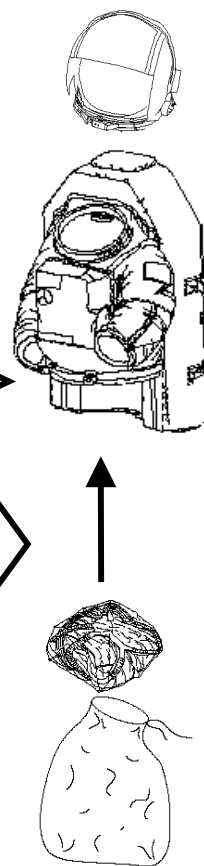
## POST EVA 3 EMU RECONFIG (Cont)

B 1. Perform Reconfiguration of EMU 3006 (L) to EMU 3016 (XL) per below figure

### EV2 (He) EMU 3006 (L)



### EMU 3016 (XL) - RETURNING



### EMU 3016 (XL) FINAL RETURN CONFIGURATION

- 1. Transfer Comm Cap to EMU 3016
- 2. ✓ DIDB Restraint Bag in both EMUs
- 3. Install helmet, ✓ Helmet cover installed, sun visors down
- 4. Remove Metox (install caps); stow in M-02 Bag on A/L1D1
- 5. Transfer Vent Port Plugs to EMU 3006
- 6. Remove EMU battery (S/N TBD), stow in M-02 Bag
- 7. Install EMU battery (S/N TBD) in EMU 3016
- 8. Install used LiOH from EVA 1 (S/N TBD) in EMU 3016
- 9. Remove ISS Cuff C/L, stow in EMU Equipment Bag
- 10. Transfer EV2 (O0) lower arms (Red wrist - right), Transfer EV2 (Tm) gloves, ✓ Lower arm lock buttons (3 per arm) locked and power harness cable connected (at lower arm/upper arm interface)
- 11. Stow LCVG (He) in EMU 3016 HUT
- 12. Stow EV2 Crew Options Kit (He) in EMU 3016 HUT
- 13. Transfer EV2 (He) LTA
- 14. Transfer Waist Tethers, Wrist Tethers, Wrist Mirrors
- 15. Transfer EV2 white stripes, crew patch, and flag

- EMU 3016 – XL
- EMU Battery TBD
- LiOH TBD
- Comm Cap (He)
- Helmet S/N TBD
- LCVG (He)
- ECOK (He)
- Lower Arms – O0
- Arm Rings – None
- Gloves (Tm)
- LTA (He)
- Tethers
- Patches, Stripes, Flag
- Wrist Mirrors
- No EMU TV, Helmet Lights, or REBA
- No ISS Cuff Checklist

**NOTE**  
Helmets stay with the PLSS they were launched with. Sellers Helmet S/N 1048 should be stowed on SEMU #3016 (XL)

Cont next page



## POST EVA 3 EMU RECONFIG (Cont)

### POST EVA 3 TRANSFER

#### NOTE

This procedure assumes that transfer items were preconfigured per EVA TRANSFER BAG PREP and PRE-UNDOCK EMU RECONFIGURATION

3. Transfer following EMU equipment to shuttle:

<b>Item</b>	<b>Destination</b>	<b>Transfer Status</b>
EMU TBD (LA)	A/L stbd (EV1)	
EMU 3016 (He)	A/L port (EV2)	
EVA Systems Transfer Bag	Temp stow Middeck	
EVA Tool Transfer Bag	Temp stow Middeck	

4. Report transfer status to MCC-H

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## TIMELINES

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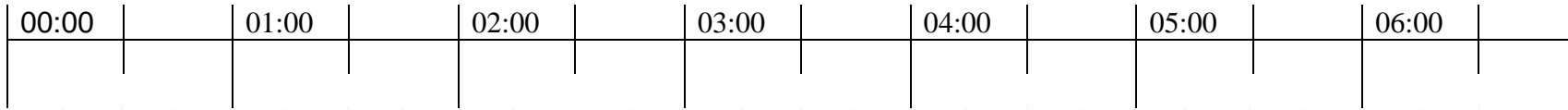
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TIMELINES

**TIMELINES**

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# 11A EVA TIMELINE OVERVIEW



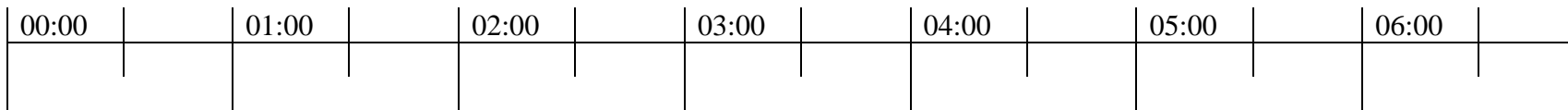
Egr	EVA Setup	Nadir Utility Tray	FHRC SPDs	Stinger SPDs <small>DLA</small>	Drag Links	Zenith Utility Tray	Node WETA Install	EVA C/U	Ing
Egr	EVA Setup	CETA Cart Launch Locks <small>MTStop</small>			Drag Links	CETA (cont)	Node WETA Install	EVA C/U	Ing

Egr	EVA Setup	P1/S0 Fluid Jumper Install	Stbd Keel	P1 WETA Install	Port Keel	CETA Relocate	EVA Cleanup	Ing
Egr	EVA Setup	P1/S0 Fluid Jumper Install	Stbd Keel	P1 WETA Install <small>RTLs &amp; P1/P3</small>	Port Keel	CETA Relocate	EVA Cleanup	Ing

Egr	EVA Setup	Z1/P6 SPDs	Z1/Lab SPDs	Lab HX SPDs *	P1 Pump Module	CID 7/8 <small>MBSU Reconfig</small>	S0 Shunt Jumpers	S1 FHRC	EVA Cleanup	Ing
Egr	EVA S/U	<small>CID 7/8 CL</small>	RBVM SPDs (12)		RBVM SPDs (6)		ATA Umbilical Mate	S1 Pump Module SPDs	EVA Cleanup	Ing

↑  
SSRMS Walk-off

↑  
MT Translation to WS 4



Tasks requiring SSRMS

## EVA BRIEFING CARD

Suit donning: EVA Prep at MET \_\_\_\_/\_\_\_\_ \_\_\_\_:\_\_\_\_ \_\_\_\_ (\_\_\_\_ early/late)  
Start Purge at MET \_\_\_\_/\_\_\_\_ \_\_\_\_:\_\_\_\_ \_\_\_\_  
PET 00:00 at MET \_\_\_\_/\_\_\_\_ \_\_\_\_:\_\_\_\_ \_\_\_\_

Airlock Configuration: Tools/Equipment Stowage  
Safety Tethering

Egress: MWS configuration/tethers  
BRT  
PGT  
RMS position/safety tether management

Setup: APFR

Procedures: RMS positions, APFR setting changes  
Comm protocols with IV and RMS  
Detailed procedure review:  
Tools  
Torque/turns  
Stowage  
Special precautions  
Ground constraints  
No touch/hazardous areas  
Ku and S band constraints  
Contingency procedures

Emergencies: Lost comm  
EMU malfunctions  
Lost tools  
Lost crewmember  
DCS

Cleanup: APFR

Ingress: RMS position/safety tether management  
Tool inventory

Suit doffing: Responsibilities

PET HR : MIN	IV/SSRMS	11A EVA 1 EV1	EV2	PET HR : MIN
00:00		<u>POST DEPRESS/EGRESS</u> (00:15)	<u>POST DEPRESS/EGRESS</u> (00:15)	00:00
		<u>EVA 1 SETUP</u> (00:30)	<u>EVA 1 SETUP</u> (00:30)	
		<u>NADIR TRAY MATE</u> (00:40)	<u>CETA CART LAUNCH LOCKS</u> (02:20)	
01:00	<ul style="list-style-type: none"> <li>• MCC Go for Nadir Tray Mate</li> </ul>			01:00
	Notify MCC Nadir Utilities Mated	<u>FHRC HOSE BOX SPDs</u> (01:00)		
		<u>STINGER SPDs</u> (00:40)	<ul style="list-style-type: none"> <li>• MT Stop Rotate</li> </ul>	
02:00		<ul style="list-style-type: none"> <li>• DLA Pip Pins</li> <li>• Stinger launch restraint bolts</li> </ul>		02:00
		<u>DRAG LINK REMOVAL</u> (00:30)	<u>DRAG LINK REMOVAL</u> (00:30)	03:00
03:00	<ul style="list-style-type: none"> <li>• MCC Go for Zenith Tray Mate</li> </ul>	<u>ZENITH TRAY MATE</u> (00:50)	<u>LAUNCH RESTRAINT CLEANUP</u> (0:50)	04:00
	Notify MCC Zenith Utilities Mated	<u>NODE WETA INSTALL</u> (01:35)	<ul style="list-style-type: none"> <li>• Mini Tool Inventory</li> </ul>	04:00
			<u>NODE WETA INSTALL</u> (01:35)	
05:00	<ul style="list-style-type: none"> <li>• MCC Go for Node WETA connector mate</li> </ul>	<u>EVA 1 CLEANUP</u> (00:15)	<u>EVA 1 CLEANUP</u> (00:15)	06:00
	Notify MCC WETA connectors mated and thermal cover removed (Go to activate heaters)	<u>A/L INGRESS and PRE REPRESS</u> (00:15)	<u>A/L INGRESS and PRE REPRESS</u> (00:15)	
06:00				

# PRE EVA 1 TOOL CONFIG

## EVA 1

### EV1

#### EMU D-Rings

- 1 - Waist Tether (Lf)

#### MWS

- 2 – Wire ties
- 2 – Adj tethers (D-ring to wire tie, ea. side)
- 2 – RETs (1 w/pip-pin) (D-ring to wire tie, ea. side)
- Swing Arm (Rt)

- RET (for PGT)

- EVA camera (inside Rt on integral RET)

- BRT (Lf)

- SAFER

### EV2

#### EMU D – Rings

- 1 - Tether Extender (Lf)
- 2 - Waist Tethers
- 2 - Adj Tethers (1 ea. Wrist)

#### MWS

- Small trash bag (back Lf)
- 2 - Wire ties
- 1 – RET (Lf D-ring to tether extender)
- 1 – RET w/ pip pin (Rt D-ring to wire tie)
- Swing Arm (Rt)
  - PGT w/ 7/16 X 6-in socket (socket back) (s/n 1004 or 1008)
  - RET

- BRT (Lf)
  - 2 Wire Ties

- SAFER

### CREWLOCK D-RING

- Tether Extender
  - Crew Hook Lock
  - RET

### TETHER SUMMARY:

- 13 -sm-sm RETs
- 3 -sm-sm RETs w/ pip pin
- 3 -lg-sm RETs
- 5 -Adj. Tethers
- 5 -Fish Stringers

### CREWLOCK

- Med ORU Bag
  - Lg-sm RET -> UIA Lf D-ring (stays in A/L)
  - Adj Tether (on opening side of bag)
  - 2 - Fish Stringers
  - Fish Stringer w/ 7 1.5-in SPDs (1 w/ wire tie for PM)
  - Crewlock bag (on empty stringer sm hook)
    - EVA Ratchet w/ 5/8 X 8-in socket on integral C/L RET
    - EVA Camera (own RET to d-ring)
    - Socket Caddy on integral C/L RET
      - 5/8 X 8-in socket
      - 7/16 X 9-in socket
    - Round Scoop on integral C/L RET
    - 1.5-in SPD on integral C/L RET
    - 1.5-in SPD
      - RET
    - 0.5-in SPD
      - RET
- Ball Stack w/ MUT EE (clamp to UIA Rt HR)
  - RET -> SCU restraint D-ring near hatch
- Bungee
- WETA (Remove outer IV bag and connector cap)
  - Round Scoop
  - Lg-sm RET -> seat track tether point (stays in A/L)
- PGT w/ 7/16 X 6-in socket (s/n 1004 or 1008, fwd HR)
  - Lg-sm RET (stays in A/L)
- S0/S1 Crewlock bag – in endcone behind EV hatch
  - RET
  - Fish stringer w/ 1.5-in SPDs (7)
  - 1-in SPDs (2) on integral C/L RETs
  - 0.5-in SPD
    - RET
  - Wire tie caddy
    - RET

### SPD SUMMARY:

- 0.5-in: P1 Pump Module (1), S1 Pump Module (1)
- 1.0-in: S0 Shunt Jumpers (2)
- 1.5-in: P1 FHRC (4), P1 Stinger (2), P1 Pump Module (3), S1 FHRC (4), S1 Pump Module (3)

### CREWLOCK (cont)

- Staging Bag
  - Fish Stringer w/ QD Tools:
    - 1.5-in QRT (FHRC/Stinger Cont)
    - ¾-1 in QRT (
    - 1.5-in QD Bail Lever (FHRC/Stinger Cont)
    - ¾-1 in QD Bail Lever
    - 1-in QD Cap Tool
  - ½-in QD Cap Tool
  - 1-in Button Depress Tool
  - 1-in Anti-Kickback Tool
- Torque Wrench in thermal bag (SSAS)
  - RET w/ pip pin
- GP Caddy w/ 4 SSAS Bolts (wire-tied in pairs)
  - RET
- Socket Caddy
  - RET
  - 7/16 X 6-in socket
  - RAD (SSAS)
- Wire Tie Caddy (in pocket)

### IV Bag

- PGT with battery (s/n 1006) (spare)
- EVA Ratchet (CETA backup)
- Socket Caddy
  - ½ X 8-in socket (IV Hatch)
  - 7/16 X 12-in socket
- Connector Cleaner Tool Caddy
- Helmet Light Battery (spare)
- DCM Plug
- 2 pr - Adj Thermal Mittens
- Hydrazine Detector Kit

### JOINT A/L EXTERNAL

- 2 - Crewlock Safety Tether w/Hook Lock

### S0 TRUSS

- 2 - Safety Tether w/Hook Lock on handrail bridge
- 2 – Tether Shuttles on handrail bridge



# EVA 1 INHIBIT PAD

## ORBITER

<b>RCS</b>	If EV crew < 27 ft from FRCS:
IV	1. √DAP: A12/VERN
O14,15,16	2. √RJDF F1, F2, F3, F4 MANF DRIVER (four) – OFF
MCC-H	3. √RCS F – ITEM 1 EXEC (*) √JET DES F1U – ITEM 17 (*) F3U – ITEM 19 (*) F2U – ITEM 21 (*)

<b>Orbiter Antennas</b>	
MCC-H	1. √KU-BAND EVA Mask - active

<b>TCS</b>	
L12	1. √TCS POWER - OFF

## RSOS

<b>MCS</b>	
MCC-M	1. √FGB Manifold valves (eighteen) – closed 2. √FGB MCS unpowered 3. √SOYUZ manifolds (ten) closed 4. √SOYUZ MCS - unpowered

<b>FGB Antennas</b>	
MCC-M	1. √Kurs P [KYPC P] - Deactivate 2. √TORU [TOPY] - Deactivate

<b>SM Antennas (MCC-M)</b>	
MCC-M	1. Global Timing Sys 1 (400.1MHz) [GTS] – Deactivate

## USOS

<b>LAB Window</b>	
IV	If EV crew near window, close window shutter

<b>PCU</b>	<b>NOTE</b>
	PCUs may require up to 1 hr warm-up period before they are operational
MCC-H	1. √PCUs (two) operational, in discharge mode
	If only one PCU operational:
	2. √SSU is shunted for the first 10 min of each insolation period
	If no PCUs operational:
	3. One array will be oriented at least 105 deg from the velocity vector and the other array will be shunted for the first 10 min of each insolation period

## NOTES, CAUTIONS, AND WARNINGS

## EVA 1

### NOTES

Inspect connectors for debris, bent pins, and cable bend radii

### CAUTION

Avoid inadvertent contact with:

- Grapple fixture shafts (have coating)
- Grapple fixture target pin
- SVS Targets
- SSRMS/MBS operating cameras & lights (heat source)
- MBS VDU, MCU, CRPCMs & Cameras (silver Teflon tape radiative surface)
- Passive UMA
- Deployed TUS cable
- PMA 1 MDM sunshade
- EVA crane
- Deployed MISSEs (A/L)
- CID Switches
- SASA – Antenna and Z-93 paint
- S0 Radiators (silver Teflon tape)
- S0 GPS Antenna (Z-93 paint)
- Lights (Z-93 paint)

### CAUTION (Cont)

Thermal Constraints:

- EVA connectors may become hot if left uncovered. Limited handling may be needed
- PMA handrails may be hot. Limited handling may be needed

Keepout Zones:

- UHF Antenna (PLB, Lab) = 1 foot

For structural reasons:

- Avoid vigorous body motions, quick grabs and kickoff tether restraints
- Avoid performing shaking motions (sinusoidal functions) more than four cycles

If any of these occur, wait 2-5 min to allow structural response to dissipate

For fiber optic cables:

- Avoid bend radii less than 10 times cable diameter
- Avoid pulling on cable during mate/demate

### WARNING

Sharp Edges:

- PMA umbilical launch restraints exposed bolt threads
- Fuse tether buckles stowed in Node Bag
- Inner edges of WIF sockets
- PRLA ground wiper

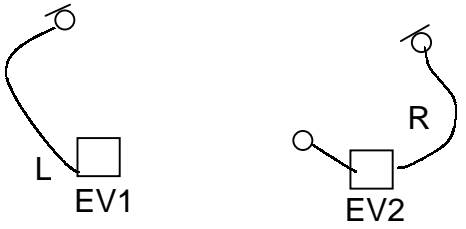
Pinch Hazard:

- EVA connectors. Use caution when mating/locking
- EV side of crewlock hatch during hatch operations (also snag hazard)

Contact Hazard:

- Lab window shutter during operation. Remain clear of Lab window

**EVA 1 EGRESS / SETUP (00:40)**

TASK (PET)	IV	EV1	EV2
<p>00:00 (00:05)</p> <p>00:10 (00:15)</p>	<p><u>INITIAL CONFIG</u></p> <p>Inner D-ring/extender near hatch</p> <p>UIA panel – Rt d-ring</p> 	<p><u>EGRESS</u> (00:10)</p> <p>√ Left waist tether to crewlock internal D-ring extender (w/ hook lock)</p> <ol style="list-style-type: none"> <li>1. Open thermal cover, egress crewlock</li> <li>2. Retrieve crewlock fwd safety tether, attach to right side, √ reel unlocked, √hook lock installed</li> <li>3. Release waist tether from internal D-ring</li> <li>4. Attach waist tether to safety tether reel (double tether)</li> <li>5. √ SAFER Man Isol vlv – OP (dn) &amp; HCM (dn)</li> </ol> <p><u>EVA SETUP</u> (00:30)</p> <ol style="list-style-type: none"> <li>1. Receive ORU bag, temp stow on A/L HR</li> <li>2. Receive MUT EE/Ballstack, temp stow on A/L HR</li> <li>3. Receive WETA, stow on ballstack (use ballstack RET for transfer, then hook to HR)</li> <li>4. Receive PGT, stow on swingarm</li> <li>5. Transfer remaining crewlock safety tether to EV2</li> <li>6. If time allows, relocate APFR from A/L port toolbox to stbd; Y/P=12/MM; 9,MM,F,12</li> <li>7. Translate to S0 handrail bridge; retrieve safety tether</li> <li>8. Retrieve APFR from CETA 1 Port swingarm, translate to CETA 2 on P1</li> </ol>	<p><u>EGRESS</u></p> <p>√ Right waist tether to UIA panel right D-ring</p> <p><u>EVA SETUP</u></p> <ol style="list-style-type: none"> <li>1. Transfer ORU bag to EV1</li> <li>2. Transfer MUT EE/Ballstack to EV1</li> <li>3. Attach Ballstack RET to WETA, transfer WETA to EV1</li> <li>4. Transfer PGT to EV1</li> <li>5. Receive crewlock safety tether from EV1, attach to left side, double tether, √ reel unlocked</li> <li>6. Release right waist tether, attach to self</li> <li>7. Egress crewlock, √hook lock installed √ SAFER Man Isol vlv – OP (dn) &amp; HCM (dn)</li> <li>8. Close crewlock thermal cover</li> </ol>

**EVA 1 EGRESS / SETUP (00:40) (Cont)**

	IV	EV1	EV2
00:40 (00:45)		9. Translate to S0 Port (outboard) MTS strut, perform safety tether swap (leave A/L tether unlocked) 10. Install APFR in CETA WIF 03, zenith swingarm, APFR clocking 6 (Y/P=3,GG) <b>COMPLETE</b>	9. Retrieve ORU bag; stow on BRT 10. Translate to S0 handrail bridge; retrieve safety tether 11. Translate to S0 Port (inboard) MTS Strut, perform safety tether swap (leave A/L tether unlocked) 12. Stow ORU bag on CETA cart (grid E) <b>COMPLETE</b>

**NADIR UTILITY TRAY MATE (00:40)**

**EVA 1**

TASK (PET)	IV	EV1				
<p>00:00 (00:45)</p> <p>APFR Initial Config: 8,FF,C,12</p> <p>√ MCC Go for Nadir Tray Mate</p> <p>If no comm.:</p> <ul style="list-style-type: none"> <li>* Go to mate all connectors except P4 and P5 *</li> <li>* For P4 and P5 mate: *</li> <li>* <table border="1"> <tr><td style="text-align: center;"><u>CAUTION</u></td></tr> <tr><td style="text-align: center;">Verify status of DDCU converter only. Do not change status</td></tr> </table> *</li> <li>* Task:8A:S0 Act Deact: DDCU LA2A: Converter* *</li> <li>* √ Converter Status – OFF *</li> <li>* √ Output Voltage &lt; 5V *</li> </ul> <p>Notify MCC Nadir Utilities Mated</p> <p>WVS: EV1 center cam (P1 Utility tray and harness routing)</p> <p>00:40 (01:25)</p>	<u>CAUTION</u>	Verify status of DDCU converter only. Do not change status		<p>1. Configure APFR in S0 WIF 42: 8,PP,C,12</p> <p>2. Open P1 and S0 shrouds</p> <p>3. Ingress APFR; release TA clamps as req'd</p> <p>← <input type="checkbox"/></p> <p>4. On IV GO, perform following demates/mates, stowing each P1 cap on respective S0 receptacle:</p> <table border="1"> <tr><td style="text-align: center;"><u>WARNING</u></td></tr> <tr><td style="text-align: center;">MCC Go required for P4 and P5</td></tr> </table> <p><b>S0 panel A262 -&gt; P1 panel A50</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> P3 from J835 to J3</li> <li><input type="checkbox"/> P6 from J1 to J6</li> <li><input type="checkbox"/> P5 from J837 to J5</li> </ul> <p><b>S0 panel A263 -&gt; P1 panel A50</b></p> <p>Note: Do not demate P825/J825</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> P2 from J834 to J2</li> <li><input type="checkbox"/> P7 from J830 to J7</li> <li><input type="checkbox"/> P4 from J836 to J4</li> <li><input type="checkbox"/> P1 from J833 to J1</li> </ul> <p>← <input type="checkbox"/></p> <p>← <input type="checkbox"/></p> <p>5. Close P1 and S0 shrouds</p> <p>6. Relocate APFR from S0 WIF 42 to S0 WIF 37 (3,PP,F,12) (For FHRC task: Retrieve SPD stringer from CETA; translate to FHRC)</p> <p>COMPLETE</p>	<u>WARNING</u>	MCC Go required for P4 and P5
<u>CAUTION</u>						
Verify status of DDCU converter only. Do not change status						
<u>WARNING</u>						
MCC Go required for P4 and P5						

# NADIR UTILITY TRAY TASK DATA SHEET

**Tools:**

EV1 (FF)	EV2
APFR	N/A

**EVA Fasteners:**

Fastener Name	Label	Head Size	Qty	Install Torque (ft-lb)	Release Torque (ft-lb)	Failure Torque (ft-lb)	Turns	RPM
None								

**EVA Connectors:**

Harness	From S0	To P1	Clamps (#)	Conn Size	Function
P1 (W4010)	J833	J1		37	Primary Power 2A
P2 (W4002)	J834	J2		37	Primary Power 2B
P3 (W4016)	J835	J3		25	Primary Power 3A
P4 (W4102)	J836	J4		33	Secondary Power 2B
P5 (W4140)	J837	J5		33	Secondary Power 3A
P6 (W4203)	J1	J6		25	1553 A, Instrumentation, Audio (RS-422)
P7 (W4401)	J830	J7		21	Video/Sync-1, HRDL (UCCAS-1)

**Foot Restraints:**

Task	WIF	APFR Setting
Nadir Utility Mate	S0 - 42	8,PP,C,12

**Other:**

- Required for P1 LTA
- WVS closeouts of P1 utility tray and harness routing required
- APFR relocated to WIF 37 for EVA 2 fluid jumpers
- Safety community gave permission to omit CID 5 off as a safety inhibit (single fault tolerant).

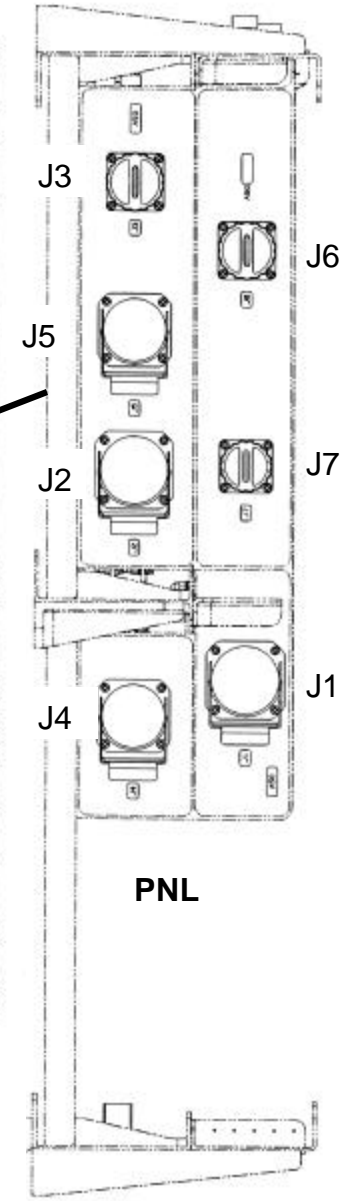
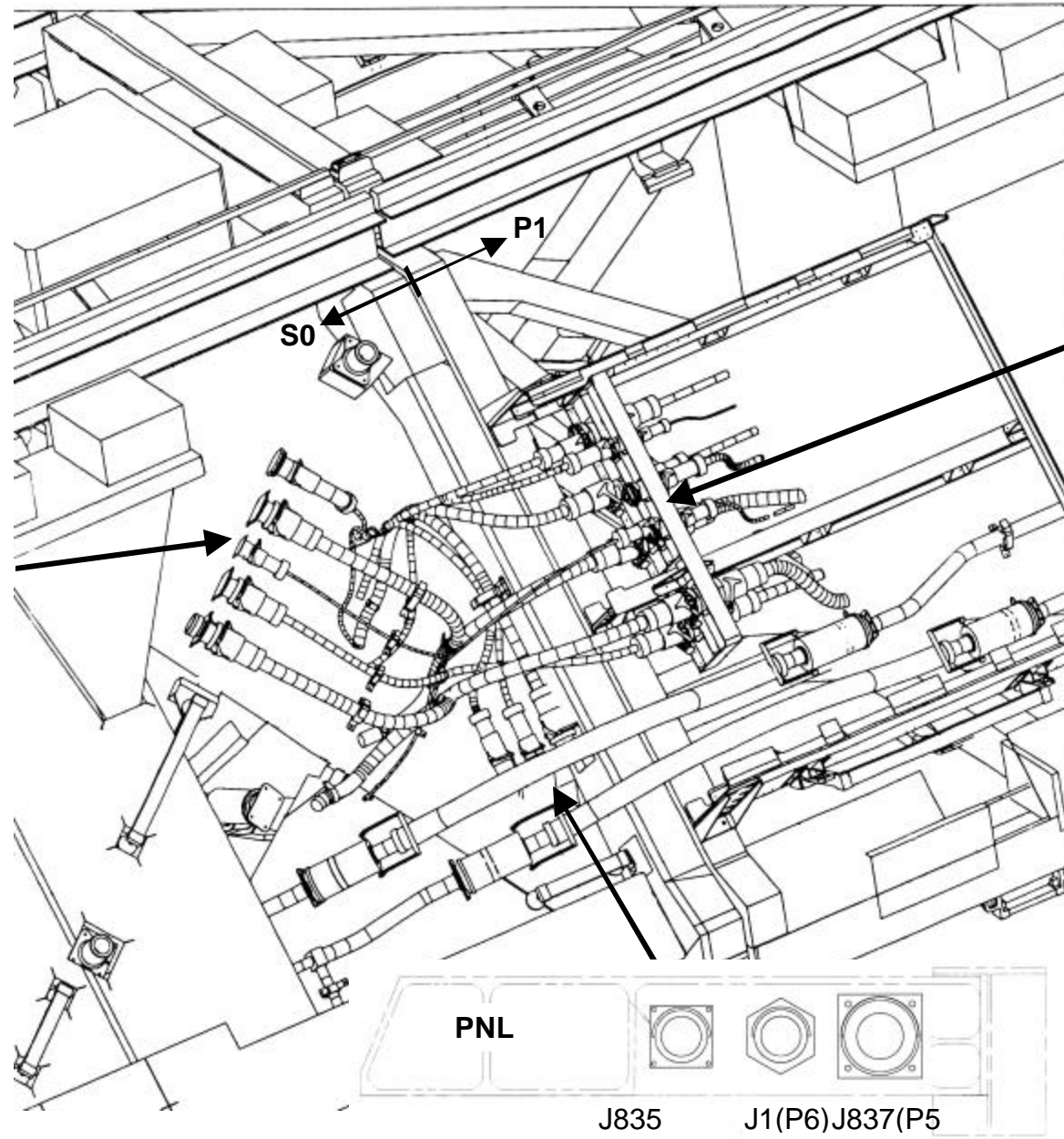
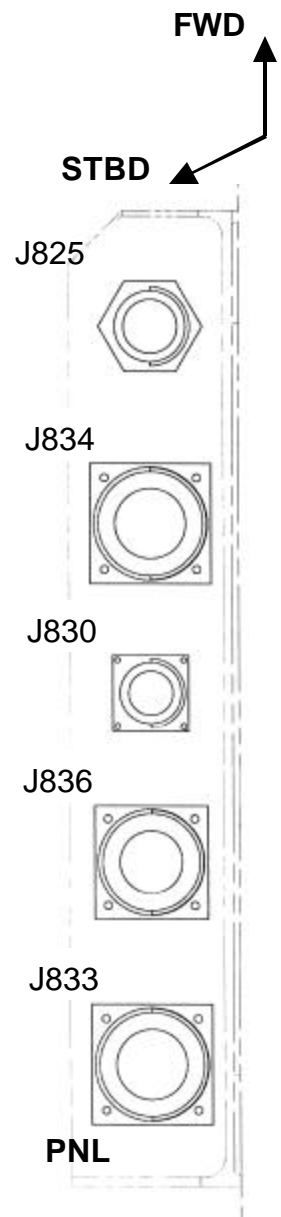
**Notes / Cautions / Warnings:**

- P4 and P5 require inhibits (Go required from MCC)

**Timeline Impacts**

- Nadir tray utilities have the shortest LTA thermal clocks so these mates are the highest priority for P1 activation (i.e. EVA 1)
- All mates except P4 and P5 can be done at any time (i.e. no powerdown / inhibits required)
- MCC begins Nadir Tray Prep (required for P4 and P5 & takes ~30 minutes) after all MBA SSAS bolts are driven because it's desirable to have 2 power strings.

# NADIR UTILITY TRAY



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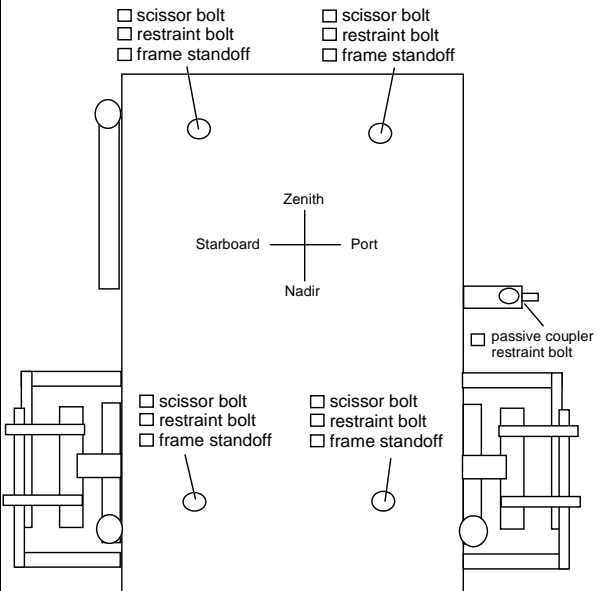
# CETA CART LAUNCH LOCKS (02:50)

# EVA 1

TASK (PET)	IV	EV1	EV2
<p>00:00 (00:45)</p> <p>00:15 (01:00)</p> <p>00:50 (01:35)</p>		<p>WVS: EV2 center cam (MT stop in stow posn showing pip pin and lanyard)</p>	<p><b>CETA CART PREP (00:15)</b></p> <ol style="list-style-type: none"> <li>Temp stow crewlock bag</li> <li>Deploy fish stringers (2) across CETA cart</li> <li>Temp stow SPD stringer on CETA zenith handrail</li> <li>Install round scoop on stbd stanchion dummy box @ 2:00</li> </ol> <p><b>BRAKE HANDLE RELEASE (00:35)</b></p> <ol style="list-style-type: none"> <li><b>PGT: B7, CCW 3, 30.5, 7/16 x 6-in ext.</b> Release brake shaft launch lockbolts (2) 11-12 turns, stow in trash bag</li> <li><b>PGT: B7, CCW 3, 30.5</b> Release stbd brake handle clamp bolts (2) 14-16 turns</li> <li>Deploy stbd brake handles (2); lock sliders</li> <li><b>PGT: B7, CCW 3, 30.5</b> Release brake handle bracket bolts (4) 14-16 turns</li> <li>Stow brackets (2) on fish stringer</li> <li>Repeat steps 5-9 for port brake handles</li> </ol> <p><b>SWING ARM / COUPLER RELEASE (00:20)</b></p> <ol style="list-style-type: none"> <li><b>PGT: B7, CCW 3, 30.5</b> Release zenith swingarm pip pin &amp; bolt 14-15 turns, stow in trash bag</li> <li>Rotate zenith swingarm to 13</li> </ol> <p><b>NOTE</b></p> <p>MT stop pip pin must be fully inserted to clear MT translation path envelope</p> <ol style="list-style-type: none"> <li>Rotate S0 MT stop to stowed position, verify full insertion of pip pin</li> </ol> <p>← <input type="checkbox"/></p>

**CETA CART LAUNCH LOCKS (02:50) (cont)**

**EVA 1**

TASK (PET)	IV	EV1	EV2
<p>01:10 (01:55)</p> <p>02:15 (03:00)</p>	 <p>02:15 (03:00) <b>30 min break-out for Drag Links: Starts at ~02:20 (03:35). Resume CETA ~02:50 (03:35)</b></p>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p><b>CAUTION</b></p> <p>Parking brake must not be engaged while frame standoffs are in place</p> </div> <p><b>Mini Tool Inventory:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Med ORU Bag</li> <li><input type="checkbox"/> Adj Tether</li> <li><input type="checkbox"/> 2 Stringers with:             <ul style="list-style-type: none"> <li><input type="checkbox"/> Brake Handle Bracket (4)</li> <li><input type="checkbox"/> Frame Standoffs (4)</li> <li><input type="checkbox"/> Restraint Bolts (4)</li> </ul> </li> <li><input type="checkbox"/> Crewlock Bag             <ul style="list-style-type: none"> <li><input type="checkbox"/> EVA Ratchet w/ 5/8-in ext</li> <li><input type="checkbox"/> Socket Caddy w/                 <ul style="list-style-type: none"> <li><input type="checkbox"/> 7/16 x 6-in ext</li> <li><input type="checkbox"/> 5/8 x 8-in ext</li> </ul> </li> <li><input type="checkbox"/> Stringer w/ 3 1.5-in SPDs, 1 ½-in SPD</li> </ul> </li> </ul>	<ol style="list-style-type: none"> <li>14. Release stbd TFR swingarm pip pin &amp; wire tie, stow in trash bag</li> <li>15. Release port TFR swingarm pip pin &amp; wire tie, stow in trash bag</li> </ol> <p>If access OK:</p> <ol style="list-style-type: none"> <li>16. <b>PGT: A2, CCW 2, 30.5</b> Release passive coupler restraint bolt 10 turns, stow in trash bag</li> </ol> <p><b>LAUNCH LOCK RELEASE (01:05)</b></p> <ol style="list-style-type: none"> <li>17. Restrain CETA cart w/ adj tether</li> <li>18. <b>PGT: B5, CCW 3, 30.5</b> Release scissor bolts (4) 30 turns</li> <li>19. Verify scissor mechanism fully open</li> <li>20. <b>EVA Ratchet, 5/8-in ext.</b> Break torque on restraint bolts (4) 1 turn</li> <li>21. Verify torque decreases (wedge not binding)</li> <li>22. Swap PGT socket to 5/8 x 8-in ext.</li> <li>23. <b>PGT: B7, CCW 3, 30.5, 5/8-in ext</b> Release restraint bolts (4) 9-10 turns</li> <li>24. Stow restraints (4) on fish stringer</li> </ol> <div style="border: 1px solid black; padding: 10px; text-align: center;"> <p><b>WARNING</b></p> <p><b>P1 truss location label under port/nadir frame standoff may have a sharp edge</b></p> </div> <ol style="list-style-type: none"> <li>25. Release frame standoffs (4); stow on stringer</li> <li>26. Engage parking brake for overnight park</li> <li>27. Swap PGT socket to 7/16 x 9-in ext</li> </ol> <p><b>LAUNCH RESTRAINT CLEANUP (00:35)</b></p> <p>← <input type="checkbox"/> Perform Mini Tool Inventory</p> <ol style="list-style-type: none"> <li>28. Stow CETA Fish Stringers (2) in ORU bag</li> <li>29. Relocate EVA Camera to MWS swingarm</li> </ol>

**CETA CART LAUNCH LOCKS (02:50) (cont)****EVA 1**

<b>TASK (PET)</b>	<b>IV</b>	<b>EV1</b>	<b>EV2</b>
03:20 (04:05)			30. Attach Crewlock bag w/ following contents to ORU bag: EVA ratchet w/ 5/8-in ext Socket Caddy w/ 7/16 x 6-in ext 5/8 x 8-in ext  COMPLETE

## CETA CART LAUNCH LOCKS TASK DATA SHEET

### Tools:

EV1	EV2 (FF)
N/A	Fish Stringers (2)
	Round Scoop
	PGT
	EVA Ratchet
	7/16", 6-in wobble
	5/8", 8-in ext
	Sm Trash Bag
	Med ORU Bag

### EVA Fasteners:

Fastener Name	Label	Head Size	Qty	Install Torque (ft-lb)	Release Torque (ft-lb)	Failure Torque (ft-lb)	Turns	RPM
Brake Shaft Launch Lock Bolt	None	7/16	2	N/A	6.7	46.7 Thread root	11 – 12	30 max
Brake Handle Clamp Bolt	None	7/16	4	N/A	6.7	46.7 Thread root	14 – 16	30 max
Brake Handle Bracket Bolt	None	7/16	12	N/A	6.7	46.7 Thread root	14 - 16	30 max
Scissor Bolt	None	7/16	4	N/A	2	24.2 Thread root	40 25-40 max	30 max
Main Launch Restraint Bolt	None	5/8	4	N/A	50.4	255 – 300 Thread root	9	30 max
Swingarm Pip Pin Bolt	None	7/16	1	N/A	6.7	46.7 Thread root	14 – 15	30 max
Passive Coupler Launch Restraint Bolt	None	7/16	1	N/A	1.7	4.2 Thread root	10	30 max

### EVA Connectors:

Harness	From S0	To P1	Clamps (#)	Conn Size	Function
None					

### Foot Restraints:

Task	WIF	APFR Setting
None		

### Other:

- CETA cart used for EVA 2 keel pin and WETA tasks
- WVS closeouts of MT stop in stow position required

### Notes / Cautions / Warnings:

- Brake shaft launch lock and frame standoff must be removed before brakes can be used
- P1 truss location label under port/nadir frame standoff may have a sharp edge

### Timeline Impacts

- CETA launch locks must be removed so CETA can be used for keel pin and WETA tasks. CETA must be relocated on EVA 2 to support MT translation to WS 7 for EVA 3.
- APFR from CETA WIF 03 is relocated as a get ahead for EVA 2 fluid jumpers

**P1 FHRC SPD INSTALLATION (01:00)**

**EVA 1**

TASK (PET)	IV	EV1	EV2
00:00 (01:25)  <input type="checkbox"/> F168 / M4 (zenith) <input type="checkbox"/> F166 / M6 (nadir)  WVS: EV 2 – center cam (closeup of each SPD installed)  <input type="checkbox"/> F169 / M3 (zenith) <input type="checkbox"/> F167 / M5 (nadir)  WVS: EV1 – center cam (closeup of each SPD installed)  01:00 (02:25)		1. Retrieve SPD stringer from CETA, translate to FHRC 2. Stow stringer near FHRC; retrieve SPDs (2) 3. Temp stow PGT & EVA Camera 4. If req'd, remove FHRC shrouds 5. For fwd QDs, F168/M4 and F166/M6: <ul style="list-style-type: none"> <li>• Remove booties</li> <li>• From truss interior, install aft part of SPD from button side</li> <li>• Pull bail against aft SPD</li> <li>• From fwd face, install fwd part of SPD opposite button side</li> <li>• Push bail against fwd SPD; √ button down</li> </ul> 6. Retrieve SPDs (2) from fish stringer ← <input type="checkbox"/> <ul style="list-style-type: none"> <li>• Install booties</li> </ul> 7. For aft QDs, F169/M3 and F167/M5: <ul style="list-style-type: none"> <li>• Remove booties</li> <li>• From truss interior, install aft part of SPD from button side</li> <li>• Push bail against fwd SPD</li> <li>• Install fwd part of SPD from button side</li> <li>• Push bail against fwd SPD; √ button down</li> </ul> ← <input type="checkbox"/> <ul style="list-style-type: none"> <li>• Install booties</li> </ul> 8. If req'd, reinstall FHRC shrouds (2) 9. √ SAFER Man Isol vlv – OP (dn) & HCM (dn)  STINGER BOLTS: 10. <b>PGT: A7, CCW 2, 30.5</b> Disengage stinger bolts B10 & B11 <input checked="" type="checkbox"/> turns COMPLETE	

# P1 FHRC SPD TASK DATA SHEET

**Tools:**

EV1 (FF)	EV2
Fish Stringer	N/A
1.5-in SPDs (4)	

**EVA Fasteners:**

Fastener Name	Label	Head Size	Qty	Install Torque (ft-lb)	Release Torque (ft-lb)	Failure Torque (ft-lb)	Turns	RPM
Stinger launch bolts	B10 B11	7/16	2		9.2	TBD	TBD	30

**EVA Fluid QDs:**

Harness	Female QD	Male QD	Clamps (#)	QD Size	Function
	F167	M5	N/A	1.5-in	
	F166	M6	N/A	1.5-in	
	F169	M3	N/A	1.5-in	
	F168	M4	N/A	1.5-in	

**Foot Restraints:**

Task	WIF	APFR Setting
None		

**Other:**

- Required before 12A.1
- WVS closeouts for each QD with SPD installed

**Notes / Cautions / Warnings:**

None

**Timeline Impacts**

- P1 FHRC QDs cannot be accessed on EVA 3 with MT at WS 7
- Stinger bolts B10 and B11 are disengaged as get aheads to aid in potential TRRJ rotation troubleshooting

**P1 STINGER SPD INSTALLATION (00:40)**

**EVA 1**

TASK (PET)	IV	EV1	EV2
00:00 (02:25)  00:40 (03:05)	<ul style="list-style-type: none"> <li><input type="checkbox"/> F165 / M1 (Zenith)</li> <li><input type="checkbox"/> F164 / M2 (Nadir)</li> </ul> <p>WVS: EV1 – center cam (closeup of each SPD installed)</p>	<ol style="list-style-type: none"> <li>1. Retrieve SPDs (2) from fish stringer</li> <li>2. Translate to P1 bay 12</li> <li>3. For QDs F165/M1 and F164/M2                             <ul style="list-style-type: none"> <li>• Remove booties</li> <li>• Install aft part of SPD from button side</li> <li>• Push bail against fwd SPD</li> <li>• Install fwd part of SPD from button side</li> </ul> </li> <li>4. Remove, stow DLA pip pins (2)</li> <li>5. √ SAFER Man Isol vlv – OP (dn) &amp; HCM (dn)</li> <li>6. Retrieve PGT &amp; EVA Camera</li> <li>7. Retrieve stringer; stow on CETA cart</li> </ol> <p>COMPLETE</p>	<p>If assistance req'd for button depress:</p> <ul style="list-style-type: none"> <li>* EV2 ingress face 1 to stbd on TRRJ *</li> <li>* and depress button while EV1 moves *</li> <li>* bail *</li> </ul>

# P1 STINGER SPDs TASK DATA SHEET

**Tools:**

EV1 (FF)	EV2
Fish Stringer	N/A
1.5-in SPDs (2)	

**EVA Fasteners:**

Fastener Name	Label	Head Size	Qty	Install Torque (ft-lb)	Release Torque (ft-lb)	Failure Torque (ft-lb)	Turns	RPM
None								

**EVA Fluid QDs:**

Harness	Female QD	Male QD	Clamps (#)	QD Size	Function
	F164	M2	N/A	1.5-in	
	F165	M1	N/A	1.5-in	

**Foot Restraints:**

Task	WIF	APFR Setting
None		

**Other:**

- Required before 12A.1
- WVS closeouts of QDs with SPDs installed

**Notes / Cautions / Warnings:**

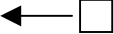
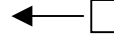
- None

**Timeline Impacts:**



**DRAG LINK REMOVAL (00:30)**

**EVA 1**

TASK (PET)	IV	EV1	EV2
00:00 (03:05)		<p><u>STBD DRAG LINK</u> (00:15)</p> <ol style="list-style-type: none"> <li>1. Translate to stbd drag link</li> <li>2. BRT to HR (fairlead safety tether over CETA and keel zenith HR)</li> <li>3. Tether to drag link tether point</li> </ol>	<p><u>STBD DRAG LINK</u></p> <ol style="list-style-type: none"> <li>1. Translate to stbd drag link</li> <li>2. BRT to stbd keel pin nadir HR</li> </ol>
00:15 (03:20)	WVS: EV1 or EV2 center cam (view of each stowage fitting)	<ol style="list-style-type: none"> <li>4. <b>PGT: B7, CCW 3, 30.5, 6-in ext</b> After EV2 complete, disengage drag link to P1 bolt, 10.5 turns</li> <li>5. Reconfigure PGT: A2, CW 2, 30.5</li> <li>6. Remove drag link from fitting</li> <li>7. <b>PGT: A2, CW 2, 30.5</b> Wrap excess length of lanyard, install drag link bolt, 10.5 turns</li> </ol>  <p><u>PORT DRAG LINK</u> (00:15)</p> <ol style="list-style-type: none"> <li>8. BRT to HR 3654</li> <li>9. Tether to port drag link handhold</li> </ol>	<ol style="list-style-type: none"> <li>3. <b>PGT: B7, CCW 3, 30.5, 9-in ext</b> Disengage drag link to keel pin attach bolt 10.5 turns</li> <li>4. Remove drag link from fitting</li> <li>5. <b>Hand tight</b> Reinstall bolt in drag link ~4 turns</li> <li>6. Stow drag link in stowage bracket spring clip</li> <li>7. Assist EV1</li> </ol> <p><u>PORT DRAG LINK</u></p> <ol style="list-style-type: none"> <li>8. BRT to port keel pin nadir HR</li> <li>9. <b>PGT: B7, CCW 3, 30.5</b> Disengage drag link to keel pin attach bolt 10.5 turns, remove drag link from fitting</li> <li>10. <b>Hand tight</b> Reinstall bolt in drag link ~4 turns</li> </ol>
00:30 (03:35)	WVS: EV1 or EV2 center cam (view of each stowage fitting)	<ol style="list-style-type: none"> <li>10. <b>PGT: B7, CCW 3, 30.5</b> After EV2 complete, disengage drag link to P1 bolt 10.5 turns</li> <li>11. Reconfigure PGT: A2, CW 2, 30.5</li> <li>12. Remove drag link from fitting</li> <li>13. <b>PGT: A2, CW 2, 30.5</b> Wrap excess length of lanyard, install drag link bolt, 10.5 turns</li> </ol>  <p>COMPLETE</p>	<ol style="list-style-type: none"> <li>11. Stow drag link in stowage bracket spring clip</li> <li>12. Assist EV1</li> <li>13. Retrieve SPD stringer, stow on outside of ORU bag</li> </ol> <p>COMPLETE</p>

## DRAG LINK REMOVAL TASK DATA SHEET

### Tools:

EV1 (FF)	EV2 (FF)
BRT	BRT
PGT w/ any 7/16-in socket	PGT w/ any 7/16-in socket

### EVA Fasteners:

Fastener Name	Label	Head Size	Qty	Install Torque (ft-lb)	Release Torque (ft-lb)	Failure Torque (ft-lb)	Turns	RPM
Drag Link bolt Removal	None	7/16	2	N/A	12.8	32.3 Nutplate rivet	10.5	30
Drag Link bolt Installation	None	7/16	2	3.3	N/A	23.9 Nut Element	10.5	30

NOTE: drag link bolt reinstalled in drag link has no torque requirement

### EVA Connectors:

Harness	From	To	Clamps (#)	Conn Size	Function
None					

### Foot Restraints:

Task	WIF	APFR Setting
None		

### Other:

- WVS closeouts of drag links in stowage brackets

### Notes / Cautions / Warnings:

None

### Timeline Impacts:

- Two EV crewmembers required for drag link task because it's done free float
- Required before keel pin removal. Keel pin removal required before EVA 3 and 12A

**ZENITH UTILITY TRAY MATE (00:50)**

**EVA 1**

TASK (PET)	IV	EV1
<p>00:00 (03:35)</p> <p>√ MCC Go for Zenith Tray Mate</p> <p>If no comm.:</p> <p>* Go to mate all connectors except P13 &amp; P14 *</p> <p>* For P13 and P14: *</p> <p>* *</p> <p>* <b>CAUTION</b> *</p> <p>* Verify status of DDCU converter *</p> <p>* only. Do not change status *</p> <p>* *</p> <p>* Task:8A:S0 Act Deact: DDCU LA4A: *</p> <p>* Converter *</p> <p>* √ Converter Status – OFF *</p> <p>* √ Output Voltage &lt; 5V *</p> <p>Notify MCC Zenith Utilites Mated</p> <p>WVS: EV1 center cam (P1 Utility tray and harness routing)</p> <p>00:50 (04:25)</p>		<div style="border: 1px solid black; padding: 5px; text-align: center;"> <p><u>CAUTION</u></p> <p>S0 GPS Antennas to left of worksite are No Touch</p> </div> <p>1. Configure APFR in CETA: Zenith swingarm @ 13; Y/P=3/GG; APFR 6,UU,G,12</p> <p>2. Ingress APFR, open P1 shroud</p> <p>3. Open S0 shroud, release TA clamps as required</p> <p>← <input type="checkbox"/></p> <p>4. On IV Go perform following demates/mates, stowing each P1 cap on its respective S0 receptacle:</p> <div style="border: 2px solid black; padding: 5px; text-align: center;"> <p><u>WARNING</u></p> <p>MCC Go required for P13 and P14 mate</p> </div> <p><b>S0 panel A259 -&gt; P1 panel A51</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> P12 from J817 to J12</li> <li><input type="checkbox"/> P19 from J813 to J19</li> <li><input type="checkbox"/> P11 from J816 to J11</li> <li><input type="checkbox"/> P17 from J820 to J17</li> </ul> <p><b>S0 panel A258 -&gt; P1 panel A51</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> P13 from J818 to J13</li> <li><input type="checkbox"/> P16 from J811 to J16</li> <li><input type="checkbox"/> P14 from J819 to J14</li> <li><input type="checkbox"/> P18 from J812 to J18</li> <li><input type="checkbox"/> P15 from J1 to J15</li> </ul> <p>← <input type="checkbox"/></p> <p>← <input type="checkbox"/></p> <p>5. Close P1 and S0 shrouds</p> <p>6. Egress APFR</p> <p>7. Relocate APFR from zenith swingarm to stbd swingarm Y/P = 3/KK, APFR = 5, PP, K, 12</p> <p>COMPLETE</p>

## ZENITH UTILITY TRAY TASK DATA SHEET

### Tools:

EV1 (FF)	EV2
None	N/A

### EVA Fasteners:

Fastener Name	Label	Head Size	Qty	Install Torque (ft-lb)	Release Torque (ft-lb)	Failure Torque (ft-lb)	Turns	RPM
None								

### EVA Connectors:

Harness	From S0	To P1	Clamps (#)	Conn Size	Function
P11 (W4005)	J816	J11		37	Primary Power 4A
P12 (W4007)	J817	J12		37	Primary Power 4B
P13 (W4103)	J818	J13		33	Secondary Power 1A
P14 (W4143)	J819	J14		33	Secondary Power 4B
P15 (W4208)	J1	J15		25	1553 B
P16 (W4402)	J811	J16		21	Video/Sync-2, HRDL (UCCAS-2)
P17 (W4314)	J820	J17		25	Instrumentation
P18 (W4407)	J812	J18		15	Video/Sync-3
P19 (W4502)	J813	J19		21	UHF Antenna

### Foot Restraints:

Task	WIF	APFR Setting
Zenith Tray Mate	CETA Zenith Swingarm	Swingarm @ 13; Y/P = 3/GG; APFR 6,UU,G,12

### Other:

- Required for P1 LTA
- WVS closeouts of nadir utility tray and harness routing

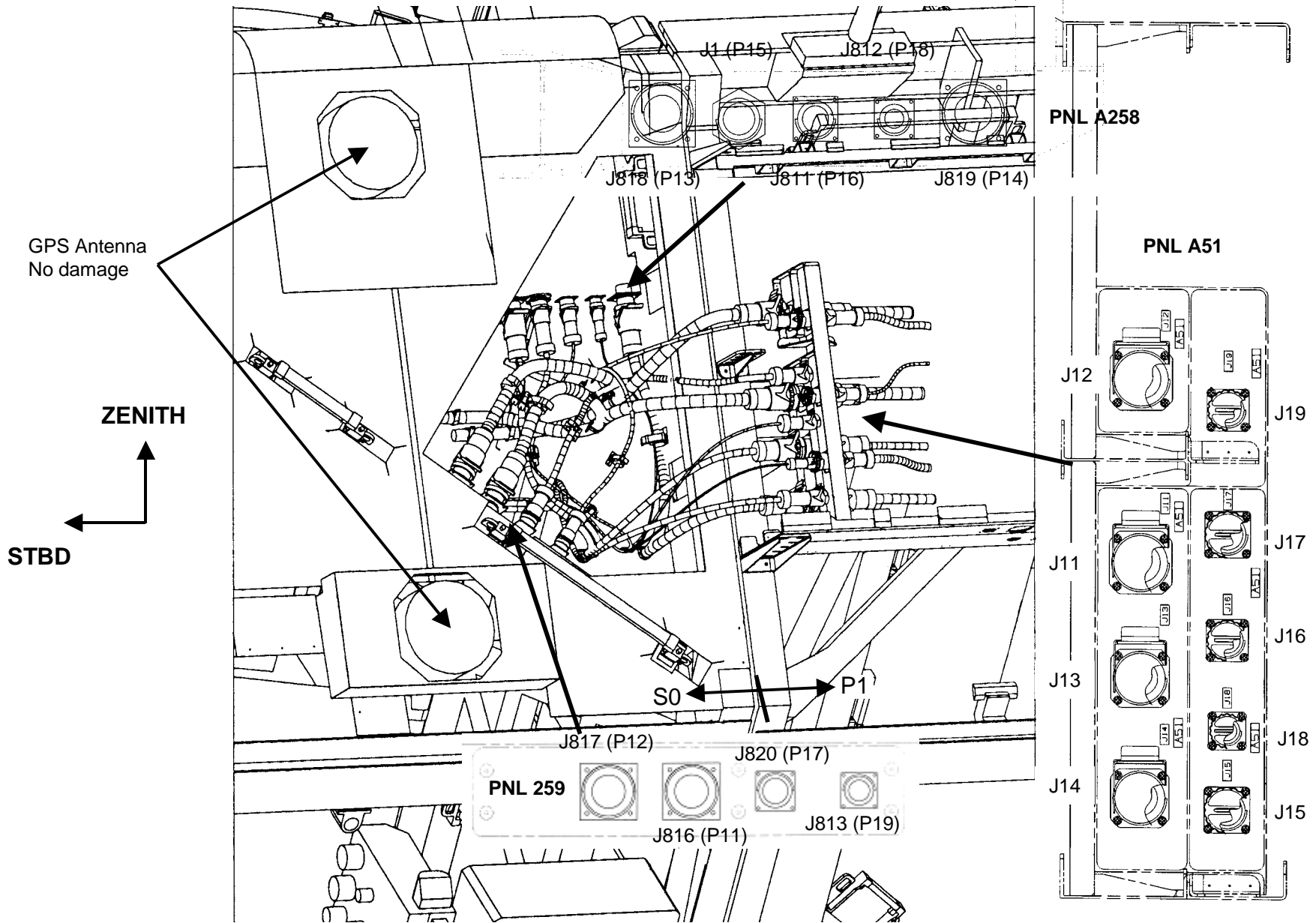
### Notes / Cautions / Warnings:

- P13 and P14 required inhibits (Go required from MCC)

### Timeline Impacts:

- P1 LTA thermal clock ends after zenith tray mated and MCC powers zenith tray
- Prior to Go for P13 & P14 of zenith tray mate, MCC has to power up the nadir tray and power down the zenith tray. Estimated time for MCC to complete this is 1.5 hours.
- APFR relocated to stbd CETA swingarm as a get ahead for EVA 2 fluid jumpers

# ZENITH UTILITY TRAY



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**NODE WETA INSTALL (01:35)**

**EVA 1**

TASK (PET)	IV	EV1	EV2
00:00 (04:25)		<p><u>WETA STANCHION RETRIEVAL</u> (00:25)</p> <ol style="list-style-type: none"> <li>1. Translate to STBD keel pin</li> <li>2. <b>PGT: B7, CCW 3, 30.5, 6-in ext</b> Disengage launch restraint bolts (2) 8.5 turns</li> <li>3. Slide stanchion out of keel interfaces (zenith)</li> <li>4. Translate to airlock w/ stanchion</li> <li>5. Safety tether swap at S0 Port Outbd MTS strut</li> </ol>	<ol style="list-style-type: none"> <li>1. Translate to CETA, retrieve ORU &amp; crewlock bags (stow SPD stringer if req'd)</li> <li>2. Translate to A/L, safety tether swap at S0 Port MTS Strut</li> <li>3. Temp stow ORU &amp; crewlock bags at airlock HR 0563</li> </ol>
00:25 (04:50)	APFR Initial Config: <b>TBD</b>	<p><u>DUMMY BOX RELEASE</u> (00:25)</p> <ol style="list-style-type: none"> <li>6. √A/L Stbd Toolbox APFR: Y/P=12/MM; 9,MM,F,12</li> <li>7. Ingress A/L Stbd Toolbox APFR</li> <li>8. Tether to stanchion; stabilize stanchion during dummy box release</li> </ol>	<p><u>DUMMY BOX RELEASE</u></p> <ol style="list-style-type: none"> <li>4. <b>PGT: A5, CCW 2, 30.5, 9-in ext</b> Release outer bolts (2) 12-13 turns Tether to dummy box Release center jacking bolt 29-30 turns</li> <li>5. Remove dummy box</li> <li>6. Reconfigure PGT: A5, CW 2, 30.5</li> </ol>
00:50 (05:15)		<p><u>WETA INSTALL ON STANCHION</u> (00:15)</p> <ol style="list-style-type: none"> <li>9. Stabilize WETA stanchion during WETA install</li> <li>10. Attach WETA/Stanchion to BRT</li> </ol>	<p><u>WETA INSTALL ON STANCHION</u></p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p><b>CAUTION</b> WETA UHF and S-band antennas are no touch</p> </div> <ol style="list-style-type: none"> <li>7. Temp stow dummy box on/near ORU bag</li> <li>8. Retrieve WETA from temp stow on A/L HR</li> <li>9. Install WETA on Stanchion</li> <li>10. <b>PGT: A5, CW 2, 30.5</b> Engage center jacking bolt 29-30 turns</li> <li>11. Release RET from WETA</li> <li>12. <b>PGT: A4, CW 2, 30.5</b> Engage outer bolts (2) 12-13 turns</li> </ol>

**NODE WETA INSTALL(01:35) (Cont)**

**EVA 1**

TASK (PET)	IV	EV1	EV2										
<p>01:05 (05:30)</p> <p>01:15 (05:40)</p> <p>01:35 (06:00)</p>	<p>IV - √ MCC Go for WETA connector mate</p> <p>If no comm.: *</p> <table border="1"> <thead> <tr> <th>RPCM [X]</th> <th>RPC [Y]</th> </tr> </thead> <tbody> <tr> <td>N13B</td> <td>14</td> </tr> <tr> <td>N13B</td> <td>15</td> </tr> <tr> <td>N1 RS1</td> <td>7</td> </tr> <tr> <td>N1 RS1</td> <td>8</td> </tr> </tbody> </table> <p>* N1:EPS: RPCM [X] RPC [Y] * √ RPC Position – op * WVS: EV 1 center cam (Closeup – WETA to NODE connections) IV – Notify MCC WETA connectors mated &amp; thermal cover removed (Go to activate htrs)</p>	RPCM [X]	RPC [Y]	N13B	14	N13B	15	N1 RS1	7	N1 RS1	8	<p>11. Egress APFR</p> <p><u>WETA INSTALL</u> (00:10)</p> <p>12. Translate to Node WETA install location</p> <p>13. Soft dock stanchion to mounting plate (CP-12, stbd/aft/zenith)</p> <p>14. <b>PGT: B6, CW 2, 30.5</b> Drive stanchion bolt 10 turns until it drops out of launch position</p> <p>15. Engage stanchion bolt (6 lbf push force reqd) to hardstop, ~16.5 turns</p> <p><u>CONNECTOR MATE</u> (00:20)</p> <p>← <input type="checkbox"/></p> <p>16. Demate caps (3) from Node panel</p> <p>17. Demate connectors (3) from stanchion Stow caps (3) on stanchion dummy panel</p> <p>18. Remove WETA thermal cover &amp; round scoop w/ RET</p> <p>19. Release stanchion TA clamps (2)</p> <p>20. Mate stanchion connectors to Node:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> P2 to J677 (fiber optic)</li> <li><input type="checkbox"/> P3 to J678</li> <li><input type="checkbox"/> P4 to J679</li> </ul> <p>21. Close TA clamps; bundle thermal cover, stow in MWS</p> <p>← <input type="checkbox"/></p> <p>← <input type="checkbox"/></p> <p>COMPLETE</p>	<p>13. Assist EV1</p> <p><u>WETA INSTALL</u></p> <p>14. Monitor EV1 w/ WETA; translate to Node WETA install location (Optional BRT: Node HR 0101)</p> <p>15. Assist EV1 as req'd</p> <p>16. Retrieve ingress aid from APFR in PMA 1/01-02</p> <p>COMPLETE</p>
RPCM [X]	RPC [Y]												
N13B	14												
N13B	15												
N1 RS1	7												
N1 RS1	8												



## NODE WETA INSTALL TASK DATA SHEET

### Tools:

EV1 (FF)	EV2 (FF)
PGT w/ 6-in ext	PGT w/ 9-in ext
Round Scoop	Round Scoop
BRT	BRT

### EVA Fasteners:

Fastener Name	Label	Head Size	Qty	Install Torque (ft-lb)	Release Torque (ft-lb)	Failure Torque (ft-lb)	Turns	RPM
Stanchion Launch Restraint Bolt	---	7/16	2	N/A	16.7	50.1 Nutplate rivet	8.5	30 max
Dummy Box Outer Bolts	---	7/16	2	N/A	6.2	38.8	11.5-13	30 max
Dummy Box Center Jacking Bolt	---	7/16	1	N/A	6.2	38.8	29-30	30 max
WETA Outer Bolts	---	7/16	2	5.0	N/A	31.0	11.5 - 13	30 max
WETA Center Jacking Bolt	---	7/16	1	6.9	N/A	31.0	29-30	30 max
Stanchion Orbit Restraint Bolt	---	7/16	1	23.0	N/A	37.5 bolt head deform.	10, then 16.5	30 max

### EVA Connectors:

Harness	From WETA Stanchion	To Node	Clamps (#)	Conn Size	Function
W8200 (Fiber Optic)	P2	J677	2	15	Operational power and video/command signals
W8200	P3	J678		15 shell, 13 insert	Heaters
W8200	P4	J679		15	Not Functional

### Foot Restraints:

Task	WIF	APFR Setting
Dummy Box Release (EV1)	A/L Stbd Toolbox	Y/P 12/MM 9,MM,F,12
WETA Install (optional, EV2)	PMA1 WIF 01-02	10,KK,E,12

### Other:

- WVS closeouts of WETA to Node connections
- "Racetrack" faces Fwd when stanchion is installed

### Notes / Cautions / Warnings:

- WETA UHF and S-band antennas are no touch
- When driving stanchion bolts with 6-in wobble, do not remove PGT / socket and restart. Wobble will not re-engage bolt if bolt partially driven
- For stanchion connector P2: avoid bend radii less than 10 times cable diameter. Avoid pulling on cable during mate/demate

### Timeline Impacts

- WETA thermal clock is 9 hours with thermal cover and 4 hours with no thermal cover
- WETA installation required on 11A because dummy boxes must be returned and processed for reflight on ULF-1
- WETA thermal cover must be removed before WETA heater activation
- Two WETAs can fit in the airlock at the same time at some additional hardware risk
- Ingress aid is retrieved as a get ahead for EVA 2 for use on the SSRMS APFR

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**EVA 1 CLEANUP / INGRESS (00:25)**

TASK (PET)	IV	EV1	EV2
00:00 (06:00)		<p><u>CLEANUP</u> (00:15)</p> <ol style="list-style-type: none"> <li>1. Translate to airlock; perform tool inventory</li> <li>2. Tether &amp; transfer ballstack/MUT EE to EV2</li> <li>3. Transfer WETA dummy box w/ round scoop &amp; tether to EV2</li> <li>4. Transfer ORU Bag/crewlock bag to EV2</li> <li>5. Transfer round scoop to EV2</li> <li>6. Transfer PGT to EV2</li> </ol>	<p><u>CLEANUP</u></p> <ol style="list-style-type: none"> <li>1. Translate to airlock, stow ingress aid on UIA Rt HR (fwd/nadir), stow PGT</li> <li>2. Perform Tool Inventory</li> <li>3. Ingress Joint A/L</li> <li>4. <b>Pass RET to EV1 for ballstack</b></li> <li>5. Receive ballstack/MUT EE, stow in airlock</li> <li>6. Receive WETA dummy box w/round scoop &amp; tether, stow in airlock on UIA Lf HR</li> <li>7. Stow ORU bag/crewlock bag in airlock (RET on seat track above IV hatch)</li> <li>8. Receive round scoop; stow in airlock</li> <li>9. Receive PGT, stow in airlock</li> </ol>
00:15 (06:15)		<p><u>INGRESS</u> (00:10)</p> <ol style="list-style-type: none"> <li>1. Receive EV2 safety tether; stow on hatch HR standoff D-ring (aft)</li> <li>2. Ingress Joint A/L</li> <li>3. Connect waist tether to crewlock internal D-ring</li> <li>4. Disconnect from airlock safety tether, unlock, stow on hatch HR standoff D-ring (fwd)</li> </ol> <p>4. Hatch thermal cover – close DCM 5. Water – OFF 6. Outer Hatch – close and lock 7. Go to PRE REPRESS</p>	<p><u>INGRESS</u></p> <ol style="list-style-type: none"> <li>1. Connect right waist tether to UIA panel D-ring</li> <li>2. Disconnect from airlock safety tether, unlock, hand to EV1</li> </ol> <p>DCM 3. Water – OFF</p>
00:25 (06:25)		<p>7. Go to PRE REPRESS (DEPRESS/REPRESS Cue Card)</p>	<p>4. Go to PRE REPRESS (DEPRESS/REPRESS Cue Card)</p>

# POST EVA 1 TOOL CONFIG

## EV1

### EMU D-Rings

- 1 - Waist Tether (Lf)

### MWS

- 2 – Wire ties
- 2 – Adj tethers (D-ring to wire tie, ea. side)
- 2 – RETs (1 w/pip-pin)
  - Round Scoop
  - WETA Thermal Cover
- Swing Arm (Rt)
  - RET (from PGT)
  - EVA camera (inside Rt w/ own RET)
- BRT (Lf)
- SAFER

## EV2

### EMU D – Rings

- 1 - Tether Extender (Lf)
- 2 - Waist Tethers
- 1 - Adj Tether (1 left on CETA)

### MWS

- Small trash bag (back Lf)
- 2 - Wire ties
- 1 – RET (Lf D-ring)
- 1 – RET w/ pip pin (Rt D-ring to wire tie)
- Swing Arm (Rt)
  - PGT w/ 7/16 X 9-in socket (socket back)
    - RET
  - EVA Camera
- BRT (Lf)
  - 2 Wire Ties
- SAFER

## CREWLOCK D-RING

- Tether Extender
  - Crew Hook Lock
  - RET

## TETHER SUMMARY:

- 14 – sm-sm RETs
- 2 – sm-sm RETs w/ pip pin
- 3 – lg-sm RETs
- 4 – Adj. Tethers
- 5 – Fish Stringers

## CREWLOCK

*Note: Items in italics were inventoried during CETA cleanup*

- Bungee
- Lg-sm RET (stays in A/L)
- Med ORU Bag (RET -> UIA Lf D-ring)*
  - Adj Tether*
  - Fish Stringer w/ 3 1.5-in PM SPDs (if not installed)*
  - 2 - Fish Stringers w/ CETA launch locks*
- Crewlock bag (on outside of ORU bag)*
  - EVA Ratchet w/ 5/8 X 8-in socket*
  - Socket Caddy*
    - 5/8 X 8-in socket*
    - 7/16 X 6-in socket*
  - 2 - RETs
- Ball Stack w/ MUT EE (clamp to UIA Rt HR, RET to SCU restraint D-ring near hatch)
  - RET
- Stanchion Dummy Box
  - Round Scoop
  - Lg-sm RET (stays in A/L)
- PGT w/ 7/16 X 6-in socket (fwd HR)
  - Lg-sm RET (stays in A/L)
- S0/S1 Crewlock bag – in endcone behind EV hatch
  - RET
  - Fish stringer w/ 1.5-in SPDs (7)
  - 1-in SPDs (2) on integral C/L RETs
  - 0.5-in SPD
    - RET
  - Wire tie caddy
    - RET

## CETA LAUNCH LOCKS IN ORU BAG

- 4 – Brake Handle brackets
- 4 – Launch Restraint Bolts
- 4 – Frame Standoffs

## CETA LAUNCH LOCKS IN EV2 TRASH BAG

- 1 – Brake Shaft launch lock
- 1 – Swingarm pip pin w/ bolt
- 2 – Swingarm pip pin w/ wire tie

## CREWLOCK

- Staging Bag
  - Fish Stringer w/ QD Tools:
    - 1.5-in QRT (FHRC/Stinger Cont)
    - ¾-1 in QRT (
    - 1.5-in QD Bail Lever (FHRC/Stinger Cont)
    - ¾-1 in QD Bail Lever
    - 1-in QD Cap Tool
    - ½-in QD Cap Tool
    - 1-in Button Depress Tool
    - 1-in Anti-Kickback Tool
  - Torque Wrench in thermal bag (SSAS)
    - RET
  - GP Caddy w/ 4 SSAS Bolts (wire-tied in pairs)
    - RET
  - Socket Caddy
    - RET
    - 7/16 X 6-in socket
    - RAD (SSAS)
  - Wire Tie Caddy (in pocket)
- IV Bag
  - PGT with battery (s/n 1006) (spare)
  - EVA Ratchet (CETA backup)
  - Socket Caddy
    - ½ X 8-in socket (IV Hatch)
    - 7/16 X 12-in socket
  - Connector Cleaner Tool Caddy
  - Helmet Light Battery (spare)
  - DCM Plug
  - 2 pr - Adj Thermal Mittens
  - Hydrazine Detector Kit

## JOINT A/L EXTERNAL

- 2 - Crewlock Safety Tether w/Hook Lock

## S0TRUSS

- 2 - Safety Tether w/Hook Lock on handrail bridge
- 2 – Tether Shuttles on handrail bridge

PET HR : MIN	IV/SSRMS	11A EVA 2 EV1	EV2	PET HR : MIN
00:00		<u>POST DEPRESS/EGRESS</u> (00:15)	<u>POST DEPRESS/EGRESS</u> (00:15)	00:00
		<u>EVA 2 SETUP</u> (00:45)	<u>EVA 2 SETUP</u> (00:45)	
01:00		<u>S0-P1 FLUID JUMPER INSTALL</u> (01:30)	<u>S0-P1 FLUID JUMPER INSTALL</u> (01:30)	01:00
	Notify MCC Opening F178 Jumper valve • MCC Go for F104 Jumper valve open			
02:00				02:00
	Notify MCC Opening F98 Jumper valve • MCC Go for F52 Jumper valve open			
03:00		<u>STBD KEEL PIN REMOVAL</u> (00:35)	<u>STBD KEEL PIN REMOVAL</u> (00:35)	03:00
		<u>P1 WETA INSTALL</u> (00:55)	<u>P1 WETA INSTALL</u> (00:45)	
	• MCC Go for P1 WETA connector mate Notify MCC starting SSAS RTL test Notify MCC P1 WETA thermal cover removed			
04:00		<u>PORT KEEL PIN REMOVAL</u> (00:30)	<u>P1/P3 LINE CLAMPS/SSAS RTL TEST</u> (00:10) <u>PORT KEEL PIN REMOVAL</u> (00:30)	04:00
	SSRMS: CETA RELEASE	<u>CETA RELOCATE</u> (01:15)	<u>CETA RELOCATE</u> (01:15)	
05:00	SSRMS: CETA INSTALL			05:00
06:00		<u>CLEANUP</u> (00:30)	<u>CLEANUP</u> (00:30)	06:00
		<u>A/L INGRESS and PRE REPRESS</u> (00:15)	<u>A/L INGRESS and PRE REPRESS</u> (00:15)	

## EVA 2

### PRE EVA 2 TOOL CONFIG

#### EV1

##### EMU D-Rings

- 1 - Waist Tether – (L)

##### MWS

- 2 - Wire ties
- 1 – RET (Rt D-ring to SPD & wire tie)
- 1 – RET (Rt D-ring)
  - 1.5-in SPD
- 1 – RET (Lf D-ring)
  - 1.5-in SPD
- 1 - RET w/ pip pin (Rt D-ring to swingarm)
- 1 - Adj Tether (Rt D-ring to wire tie)
- Swing Arm (Rt)
  - EVA Camera (inside) w/ own RET
  - RET (for PGT)
- BRT (Lf)
- SAFER

#### EV2

##### EMU D - Rings

- 1 - Tether Extender (Lf)
- 2 - Waist Tethers
- 1 - Adj Tether (wrist)

##### MWS

- 2- Wire Ties
- 1 – RET (Lf D-ring to tether extender)
- 1 – RET w/ pip pin (Rt D-ring)
  - 1.5-in SPD
- 1 – RET (Rt D-ring)
  - 1.5-in SPD
- Sm Trash Bag (Lf rear)
- Swing Arm (Rt)
  - PGT w/7/16 X 9" socket (s/n 1005)
  - RET
- BRT (Lf) w/ 2 wire ties
- SAFER

#### CREWLOCK D-RING

- Tether Extender
  - Crew Hook Lock
  - RET

#### CREWLOCK

- √ SCU Routing (EV2- zenith of nadir/fwd handrail)
- Crewlock bag (shorten tether)
- Lg-sm RET (stays in A/L)
  - APFR ingress aid (on integral C/L RET)
    - Adj Tether (wrapped around ingress aid to bag)
  - EVA camera (own RET to D-ring)
  - WIF adapter w/ pip pin
    - RET
- Bungee
- WETA
  - Lg-sm RET (stays in A/L)
  - Round Scoop
- Ball Stack, MUT EE (clamp to HR to Rt of UIA)
  - RET (to SCU restraint D-ring)
- PGT w/7/16 X 6" socket (1003)
  - Lg-sm RET (stays in A/L)
- S0/S1 Crewlock bag – in endcone behind EV hatch
  - RET
  - Fish stringer w/ 1.5-in SPDs (7)
  - 1-in SPDs (2) on integral C/L RETs
  - 0.5-in SPD
    - RET
  - Wire tie caddy
    - RET

#### TETHER SUMMARY:

- 13 – sm-sm RETs
- 2 – sm-sm RETs w/ pip pin
- 3 – lg-sm RETs
- 3 – Adj. Tethers
- 2 – Fish Stringers

#### Staging Bag

- Fish Stringer w/ QD Tools:
  - 1.5-in QRT (FHRC/Stinger Cont)
  - ¾-1 in QRT (
  - 1.5-in QD Bail Lever (FHRC/Stinger Cont)
  - ¾-1 in QD Bail Lever
  - 1-in QD Cap Tool
  - ½-in QD Cap Tool
  - 1-in Button Depress Tool
  - 1-in Anti-Kickback Tool
- Socket Caddy
  - RET
  - 7/16 X 6-in socket
  - RAD
- Wire Tie Caddy (in pocket)
- IV Bag
  - PGT with battery (s/n 1006) (spare)
  - EVA Ratchet
  - Socket Caddy
    - ½ X 8-in socket (IV Hatch)
    - 7/16 X 12-in socket
  - Connector Cleaner Tool Caddy
  - Helmet Light Battery (spare)
  - DCM Plug
  - 2 pr - Adj Thermal Mittens
  - Hydrazine Detector Kit

#### JOINT A/L EXTERNAL

- 2 - Crewlock Safety Tether w/Hook Lock

#### S0

- 2 - Safety Tether w/Hook Lock on port fwd MTS struts
- 2 – Tether Shuttles on S0 handrail bridge

## EVA 2 INHIBIT PAD

### ORBITER

<b>RCS</b>	
	If EV crew < 27 ft from FRCS:
IV	1. √DAP: A12/VERN
O14,15,16	2. √RJDF F1, F2, F3, F4 MANF DRIVER (four) – OFF
MCC-H	3. √RCS F – ITEM 1 EXEC (*)
	√JET DES F1U – ITEM 17 (*)
	F3U – ITEM 19 (*)
	F2U – ITEM 21 (*)

<b>Orbiter Antennas</b>	
MCC-H	1. √KU-BAND EVA Mask - active

<b>TCS</b>	
L12	1. √TCS POWER - OFF

### RSOS

<b>MCS</b>	
MCC-M	1. √FGB Manifold valves (eighteen) – closed
	2. √FGB MCS unpowered
	3. √SOYUZ manifolds (ten) closed
	4. √SOYUZ MCS - unpowered

<b>SM Antennas (MCC-M)</b>	
MCC-M	1. Global Timing Sys 1 (400.1MHz) [GTS] – Deactivate

### USOS

<b>LAB Window</b>	
IV	If EV crew near window, close window shutter

<b>PCU</b>	
	<b>NOTE</b>
	PCUs may require up to 1 hr warm-up period before they are operational
MCC-H	1. √PCUs (two) operational, in discharge mode
	If only one PCU operational:
	2. √SSU is shunted for the first 10 min of each insolation period
	If no PCUs operational:
	3. One array will be oriented at least 105 deg from the velocity vector and the other array will be shunted for the first 10 min of each insolation period

## NOTES, CAUTIONS, AND WARNINGS

## EVA 2

### NOTES

Inspect connectors for debris, bent pins, and cable bend radii

### CAUTION

Avoid inadvertent contact with:

- Grapple fixture shafts (have coating)
- Grapple fixture target pin
- SVS Targets
- SSRMS/MBS operating cameras & lights (heat source)
- MBS VDU, MCU, CRPCMs & Cameras (silver Teflon tape radiative surface)
- Passive UMA
- Deployed TUS cable
- Deployed MISSEs (A/L)
- SASA – Antenna and Z-93 paint
- S0 Radiators (silver Teflon tape)
- S0 GPS Antenna (Z-93 paint)
- Lights (Z-93 paint)

### CAUTION (Cont)

Thermal Constraints:

- EVA connectors may become hot if left uncovered. Limited handling may be needed

Keepout Zones:

- UHF Antenna (PLB, Lab) = 1 foot

For structural reasons:

- Avoid vigorous body motions, quick grabs and kickoff tether restraints
- Avoid performing shaking motions (sinusoidal functions) more than four cycles

If any of these occur, wait 2-5 min to allow structural response to dissipate

For fiber optic cables:

- Avoid bend radii less than 10 times cable diameter
- Avoid pulling on cable during mate/demate

### WARNING

Fluid QDs:

- If QD is in FID when valve is opened (bail fwd), QD will leak and fluid line may whip

Sharp Edges:

- PMA umbilical launch restraints exposed bolt threads
- Fuse tether buckles stowed in Node Bag
- Inner edges of WIF sockets
- PRLA ground wiper

Pinch Hazard:

- EVA connectors. Use caution when mating/locking
- EV side of crewlock hatch during hatch operations (also snag hazard)

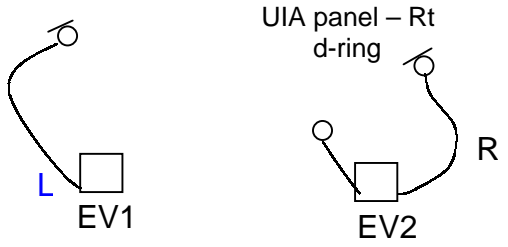
Contact Hazard:

- Lab window shutter during operation. Remain clear of Lab window



**EVA 2 EGRESS / SETUP (00:55)**

**EVA 2**

TASK (PET)	IV	EV1	EV2
<p>00:00 (00:05)</p> <p>00:10 (00:15)</p>	<p><u>INITIAL CONFIG</u></p> <p>Inner D-ring/extender near hatch</p>  <p>UJA panel – Rt d-ring</p>	<p><u>EGRESS</u> (00:10)</p> <p>√ Left waist tether to crewlock internal D-ring extender (w/ hook lock)</p> <ol style="list-style-type: none"> <li>1. Open thermal cover, egress crewlock</li> <li>2. Retrieve crewlock fwd safety tether, attach to right side, √reel unlocked, √hook lock installed</li> <li>3. Give EV2 GO to release EV1 waist tether from internal D-ring</li> <li>4. Attach left waist tether to safety tether reel (double tether)</li> <li>5. √ SAFER Man Isol vlv – OP (dn) &amp; HCM (dn)</li> </ol> <p><u>EVA SETUP</u> (00:45)</p> <ol style="list-style-type: none"> <li>1. Receive crewlock bag, temp stow w/integral tether on A/L HR (leave RET in A/L)</li> <li>2. Receive MUT EE/Ballstack, stow on A/L HR</li> <li>3. Receive WETA, stow on Ballstack (use ballstack RET for transfer, then hook to HR)</li> <li>4. Receive PGT, stow on swingarm</li> <li>5. Transfer remaining crewlock safety tether to EV2</li> <li>6. Obtain WETA w/ Ballstack/MUT EE from temp stow, attach to BRT</li> <li>7. Translate to S0, retrieve tether shuttle</li> </ol>	<p><u>EGRESS</u></p> <p>√ Right waist tether to UJA panel right (fwd) D-ring</p> <ol style="list-style-type: none"> <li>1. Release EV1 left waist tether from internal crewlock D-ring</li> <li>2. Transfer crewlock bag / ingress aid to EV1</li> <li>3. Transfer MUT EE/Ballstack to EV1</li> <li>4. Attach Ballstack RET to WETA</li> <li>5. Transfer WETA to EV1</li> <li>6. Transfer PGT to EV1</li> <li>7. Receive crewlock safety tether from EV1, attach to left side, double tether, √reel unlocked</li> <li>8. Release right waist tether, attach to self</li> <li>9. Egress crewlock. √hook lock installed</li> <li>10. Close crewlock thermal cover</li> <li>11. √ SAFER Man Isol vlv – OP (dn) &amp; HCM (dn)</li> <li>12. Obtain C/L bag from temp stow, attach to BRT</li> </ol>

**EVA 2 EGRESS / SETUP (00:55) (Cont)**

**EVA 2**





TASK (PET)	IV	EV1	EV2
00:55 (01:00)		<p><u>EVA SETUP (cont)</u>                      8. Temp stow WETA on port outbd S0 MTS strut handrail                      9. Install tether shuttle on MT rail, √locked                      10. Perform safety tether swap at port S0 MTS struts                      11. Translate to CETA, temp stow WETA w/ MUT EE to CETA zenith HR (RET to CETA HR)</p> <p>COMPLETE</p>	<p><u>EVA SETUP (cont)</u>                      13. Translate to S0 (monitor EV1 trans past MT), retrieve tether shuttle                      14. Install tether shuttle on MT rail, √locked                      15. Perform safety tether swap at port inbd S0 MTS strut                      16. Translate to CETA, stow crewlock bag, retrieve Adj. Tether</p> <p>COMPLETE</p>

# S0-P1 FLUID JUMPER INSTALL (01:30)

# EVA 2

TASK (PET)	IV	EV1	EV2
00:00 (01:00)	<p><b>Fluid Jumper Launch Config:</b>  <b>Port Wedge Face</b> (stbd-most) – Short                      (F52/M1 zenith, F98/M2 nadir)  <b>Zenith Face</b> (zenith-most) – Long                      (F104/M1 stbd, F178/M2 port)                      Installed first and nadir-most</p>	<p><u>JUMPER RETRIEVAL (00:30)</u>                      1. √APFR in S0 WIF S0-37: 3,PP,F,12</p> <p>2. Open S0 shrouds</p> <p>3. Translate to S0 port wedge face</p> <p>4. Demate zenith QD (F52) of port jumper:</p> <ul style="list-style-type: none"> <li>• Open TA clamps and QD bootie</li> <li>• √ Alignment / side loads</li> <li>• Pull back trigger to demate</li> <li>• Close TA clamps</li> </ul> <p>5. Demate both ends (F104, F178) of zenith jumper; transfer to EV2:</p> <ul style="list-style-type: none"> <li>• Open TA clamps and QD booties</li> <li>• Tether to jumper</li> <li>• Pull back trigger to demate</li> <li>• Close TA clamps</li> <li>• Transfer to EV2 (F178 first)</li> </ul> <p>6. Ingress APFR (WIF 37)</p> <p>7. Receive short jumper; temp stow</p> <p>8. Receive long jumper</p>	<p><u>JUMPER RETRIEVAL</u>                      1. √Brake handles clear of swingarm</p> <p>2. √APFR in stbd TFR:                      Swingarm - 29; Y/P=3/KK; 5,PP,K,12</p> <p>3. Open P1 shroud, translate to S0 port wedge face</p> <p>4. Demate nadir QD (F98) of port jumper:</p> <ul style="list-style-type: none"> <li>• Open TA clamps and QD bootie</li> <li>• Tether to jumper</li> <li>• √ Alignment / side loads</li> <li>• Pull back trigger to demate</li> </ul> <p>5. Temp stow with one TA clamp &amp; RET</p> <p>6. Receive F104/F178 jumper; tether &amp; temp stow on wedge face with one TA clamp</p> <p>7. Transfer F52 end of short jumper to EV1</p> <p>8. Transfer F104 end of long jumper to EV1</p> <p>9. Ingress CETA APFR</p>
00:30 (01:30)		<p><u>INSTALL F104/F178 JUMPER (00:10)</u>                      9. Remove dust cap from M7, stow on MWS</p> <p>10. Inspect female and male QDs</p>	<p><u>INSTALL F104/F178 JUMPER</u>                      10. Remove dust cap from M1, stow on MWS</p> <p>11. Inspect female and male QDs</p>

**S0-P1 FLUID JUMPER INSTALL (01:30) (Cont)**

TASK (PET)	IV	EV1	EV2										
	<table border="1"> <tr> <td><b>S0 A513</b></td> <td></td> <td><b>Nadir Jumper</b></td> <td></td> <td><b>P1 A501</b></td> </tr> <tr> <td>M7</td> <td>←</td> <td>F104 – Long – F178</td> <td>→</td> <td>M1</td> </tr> </table>	<b>S0 A513</b>		<b>Nadir Jumper</b>		<b>P1 A501</b>	M7	←	F104 – Long – F178	→	M1	<p>11. Mate long jumper QD F104 to S0 M7:</p> <ul style="list-style-type: none"> <li>• √Release ring pulled back, fwd white band not visible</li> <li>• Mate QD to male, fwd white band visible (F104 side first)</li> <li>• Snap-back test: fwd white band still visible</li> <li>• Pull test</li> <li>• Check gap</li> </ul>	<p>12. Mate long jumper QD F178 to P1 M1:</p> <ul style="list-style-type: none"> <li>• √Release ring pulled back, fwd white band not visible</li> <li>• Mate QD to male, fwd white band visible (F104 side first)</li> <li>• Snap-back test: fwd white band still visible</li> <li>• Pull test</li> <li>• Check gap</li> </ul>
<b>S0 A513</b>		<b>Nadir Jumper</b>		<b>P1 A501</b>									
M7	←	F104 – Long – F178	→	M1									
<p>00:40 (01:40)</p> <p>00:55 (01:55)</p>	<p style="text-align: center;"><b>NOTE</b></p> <p style="text-align: center;">Valve leak check takes ~ 3 min</p> <p>Notify MCC: Opening Jumper Valve F178</p> <p>If no comm.: Perform {ETCS LOOP B S0-P1 JUMPER INSTALLATION PRESSURE VERIFICATION} (SODF:ASSM OPS), steps all.</p> <p>√ MCC Go for Jumper Valve F104 Opening</p> <p>√ MCC Go for good leak check on first jumper WVS: Long Jumper (close-up of both QDs, mated &amp; valve open)</p>	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <p><b>CAUTION</b></p> <p>QDs limited to 1 troubleshooting cycle. Do not rotate or side load QD after valve open</p> </div> <p><u>OPEN F104/F178 JUMPER VALVES</u> (00:15)</p> <p>12. √QD Bail path clear (orient jumper)</p> <p>13. On MCC GO: </p> <ul style="list-style-type: none"> <li>• Install fwd part of SPD (black aft)</li> <li>• Open valve – F104 (move bail fwd)</li> <li>• Install aft part of SPD (black fwd)</li> <li>• Push bail against fwd part of SPD</li> </ul> <p> </p> <p>14. Install QD bootie over F104</p> <p><u>INSTALL F52/F98 JUMPER</u> (00:10)</p> <p>15. Remove dust cap from M8, stow on MWS</p> <p>16. Inspect female and male QDs</p>	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <p><b>CAUTION</b></p> <p>QDs limited to 1 troubleshooting cycle. Do not rotate or side load QD after valve open</p> </div> <p><u>OPEN F104/F178 JUMPER VALVES</u></p> <p>13. √QD Bail path clear (orient jumper)</p> <p>14. </p> <ul style="list-style-type: none"> <li>• Install fwd part of SPD (black aft)</li> <li>• Open valve - F178 (move bail fwd)</li> <li>• Install aft part of SPD (black fwd)</li> <li>• Push bail against fwd part of SPD</li> </ul> <p>15. Install QD bootie over F178</p> <p><u>INSTALL F52/F98 JUMPER</u></p> <p>16. Remove dust cap from M2, stow on MWS</p> <p>17. Inspect female and male QDs</p>										

**S0-P1 FLUID JUMPER INSTALL (01:30) (Cont)**

TASK (PET)	IV	EV1	EV2										
<p>01:05 (02:05)</p> <p>01:30 (02:30)</p>	<table border="1"> <tr> <td><b>S0 A514</b></td> <td></td> <td><b>ZenithJumper</b></td> <td></td> <td><b>P1 A502</b></td> </tr> <tr> <td>M8</td> <td>←</td> <td>F52 – Short – F98</td> <td>→</td> <td>M2</td> </tr> </table> <p>Notify MCC: opening jumper valve F98</p> <p>√ MCC Go for Jumper Valve F52 Opening</p> <p>WVS: Short Jumper (close-up of both QDs, mated &amp; valve open)</p> <p>WVS: Jumper Overview (overview showing both QDs mated with booties installed)</p>	<b>S0 A514</b>		<b>ZenithJumper</b>		<b>P1 A502</b>	M8	←	F52 – Short – F98	→	M2	<p>17. Mate short jumper QD F52 to S0 M8:</p> <ul style="list-style-type: none"> <li>• √Release ring pulled back, fwd white band not visible</li> <li>• Mate QD to male, fwd white band visible (F52 side first)</li> <li>• Snap-back test: fwd white band still visible</li> <li>• Pull test</li> <li>• Check gap</li> </ul> <p><u>OPEN F52/F98 JUMPER VALVES (00:25)</u></p> <p>18. √QD Bail path clear (orient jumper)</p> <p>19. On MCC GO: ← □</p> <ul style="list-style-type: none"> <li>• Install fwd part of SPD (black aft)</li> <li>• Open valve – F52 (move bail fwd)</li> <li>• Install aft part of SPD (black fwd)</li> <li>• Push bail against fwd part of SPD</li> </ul> <p>← □</p> <p>20. Install QD bootie over F52</p> <p>← □</p> <p>21. Close S0 utility tray shroud</p> <p>22. Stow QD caps in crewlock bag</p> <p>COMPLETE</p>	<p>18. Mate short jumper QD F98 to P1M2:</p> <ul style="list-style-type: none"> <li>• √Release ring pulled back, fwd white band not visible</li> <li>• Mate QD to male, fwd white band visible (F52 side first)</li> <li>• Snap-back test: fwd white band still visible</li> <li>• Pull test</li> <li>• Check gap</li> </ul> <p><u>OPEN F52/F98 JUMPER VALVES</u></p> <p>19. √QD Bail path clear (orient jumper)</p> <p>20. ← □</p> <ul style="list-style-type: none"> <li>• Install fwd part of SPD (black aft)</li> <li>• Open valve – F98 (move bail fwd)</li> <li>• Install aft part of SPD (black fwd)</li> <li>• Push bail against fwd part of SPD</li> </ul> <p>21. Install QD bootie over F98</p> <p>22. Close P1 utility tray shroud</p> <p>23. Egress APFR, stow CETA swingarm</p> <p>Reconfigure Pitch/Yaw fitting to <b>P = GG</b></p> <p>24. Stow QD caps in crewlock bag</p> <p>COMPLETE</p>
<b>S0 A514</b>		<b>ZenithJumper</b>		<b>P1 A502</b>									
M8	←	F52 – Short – F98	→	M2									

## S0-P1 FLUID JUMPER TASK DATA SHEET

### Tools:

EV1 (FF)	EV2 (FF)
1.5-in SPDs (2)	1.5-in SPDs (2)

### EVA Fasteners:

Fastener Name	Label	Head Size	Qty	Install Torque (ft-lb)	Release Torque (ft-lb)	Failure Torque (ft-lb)	Turns	RPM
None								

### EVA QDs:

Jumper	From S0	To P1	Clamps (#)	QD Size	Function
F104 / F178	M7	M1	N/A	1.5-in	
F52 / F98	M8	M2	N/A	1.5-in	

### Foot Restraints:

Task	WIF	APFR Setting
Jumper Install – S0 side	WIF S0-37	3, PP, F, 12
Jumper Install – P1 side	Stdb TFR WIF	Swingarm – 29; Y/P=3/BB; 5, PP, K, 1 (NBL)

### Other:

- WVS closeouts required for QD with SPD installed and overview after booties are installed

### Notes / Cautions / Warnings:

- QDs are limited to 1 troubleshooting cycle
- Do not rotate or side load QD after valve open

### Timeline Impacts

- Required for 12A.1
- Timeline assumes both APFRs configured as a get ahead on EVA 1
- 2 crewmembers required to install fluid jumpers
- CETA cart required for P1 side of jumpers (i.e. must be done prior to CETA relocate)
- MCC comm. required for valve opening to monitor for leaks

**STBD KEEL PIN REMOVAL (00:35)**

**EVA 2**

TASK (PET)	IV	EV1	EV2
00:00 (02:30)		<p><u>STBD KEEL PIN RELEASE (00:25)</u></p> <ol style="list-style-type: none"> <li>1. Ingress stbd TFR; release parking brake</li> <li>2. Translate CETA cart to S0, Bay 04 (eye-level with Bay 02 – 04 intersection)</li> <li>3. Engage parking brake</li>   <li>4. <b>PGT: B4, CCW 2, 30.5, 6-in wobble</b> Release zenith keel pin bolt, 22 turns</li> <li>5. <b>PGT: A3, CW 2, 10.5</b> Rotate keel pin free, reinstall bolt, 22 turns</li> <li>6. Tether to keel handrail zenith standoff</li> <li>7. Ingress port TFR</li>   <li>8. <b>PGT: B4, CCW 2, 30.5</b> Release nadir keel pin bolt, 22 turns</li> <li>9. Remove keel pin</li> </ol>	<p><u>STBD KEEL PIN RELEASE</u></p> <ol style="list-style-type: none"> <li>1. Translate to stbd keel pin (zenith)</li>   <li>2. <b>PGT: A2, CW 2, 10.5, 9-in ext</b> Tighten zenith then nadir nut clamp bolts (2), 6 turns</li>   <li>3. Remove keel pin latch pip-pins (2), insert in stowage location (hole "B")</li>   <li>4. Ingress stbd TFR</li> </ol>
00:25 (02:55)		<p><u>STBD KEEL PIN STOW (00:10)</u></p> <ol style="list-style-type: none"> <li>10. <b>PGT: A3, CW 2, 10.5</b> Reinstall nadir keel pin bolt, 22 turns</li>   <li>11. GCA EV2 to keel pin stowage location (inbd)</li> <li>12. Install keel pin into stowage brackets (drag link bracket otbd, passive/zenith side first)</li> </ol>	<p><u>STBD KEEL PIN STOW</u></p> <ol style="list-style-type: none"> <li>5. Translate CETA to keel pin stowage location (eye-level just inside bay 6 – btwn 8550 &amp; 8520), set parking brake, egress TFR</li>   <li>6. Install keel pin into stowage brackets (drag link bracket otbd, passive/zenith side first)</li> </ol>
00:35 (03:05)		<ol style="list-style-type: none"> <li>13. Install keel pin latch pip-pin in hole "C"</li> </ol> <p>COMPLETE</p>	<p>COMPLETE</p>

## STBD KEEL PIN REMOVAL TASK DATA SHEET

### Tools:

EV1 (FF)	EV2 (FF)
PGT	PGT
9-in ext or 6-in wobble	9-in ext or 6-in wobble

### EVA Fasteners:

Fastener Name	Label	Head Size	Qty	Install Torque (ft-lb)	Release Torque (ft-lb)	Failure Torque (ft-lb)	Turns	RPM
Nut Clamp Bolt	---	7/16	1	3.3	N/A	5.4 at thread root	6	30 max
Keel Pin Bolt - Removal	---	7/16	2	N/A	14	22.2 at thread root	22	30 max
Keel Pin Bolt - Installation	---	7/16	2	5.8	N/A	11.8 at thread root	22	30 max

### EVA Connectors:

Harness	From S0	To P1	Clamps (#)	Conn Size	Function
None					

### Foot Restraints:

Task	WIF	APFR Setting
None		

### Other:

- No WVS closeouts required

### Notes / Cautions / Warnings:

- Keel pins cannot be stowed with clevis brackets facing each other (interference)
- Keel pin bolts can interfere with each other in stowage location. Push first keel pin toward bulkhead before stowing second one

### Timeline Impacts:

- CETA cart required to perform keel pin task
- WETA stanchion and drag link must be removed before keel pin removal
- Keel pins must be removed / stowed prior to the morning of EVA 3 for MT translation to WS 7. Also required prior to 12A
- Keel pin bolts must be re-installed in order to stow keel pins inside truss



**P1 WETA INSTALL (00:55)**

**EVA 2**

TASK (PET)	IV	EV1	EV2
00:00 (03:05)		<p><u>DUMMY BOX REMOVAL (00:10)</u></p> <ol style="list-style-type: none"> <li>Ingress Port TFR, translate CETA to Port keel pin, engage parking brake, egress TFR</li> <li>Retrieve WETA/Scoop from CETA (leave Ballstack/MUT EE on CETA), translate to port keel pin</li> </ol>	<p><u>DUMMY BOX REMOVAL</u></p> <ol style="list-style-type: none"> <li>BRT to Port keel center or lower HR (leave space for EV1 BRT)</li> <li><b>PGT: A7, CCW 2, 30.5, 9-in ext</b> Release outer bolts (2) ~12 turns Tether to dummy box Release center jacking bolt ~29-30 turns</li> <li>Remove dummy box, temp stow on Face 1 handrail</li> </ol>
00:10 (03:15)		<p><u>WETA INSTALL ON STANCHION (00:20)</u></p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p><b>CAUTION</b> WETA UHF and S-band antennas are no touch</p> </div> <ol style="list-style-type: none"> <li>Transfer WETA to EV2</li> <li><b>PGT: B3, CCW 2, 30.5, 6-in ext</b> Disengage launch restraint bolts (2) 8.5 turns</li> <li>Slide stanchion out of keel interfaces (nadir)</li> <li>Translate WETA/Stanchion to P1 outboard zenith camera port</li> </ol>	<p><u>WETA INSTALL ON STANCHION</u></p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p><b>CAUTION</b> WETA UHF and S-band antennas are no touch</p> </div> <ol style="list-style-type: none"> <li>Receive WETA from EV1</li> <li>Install WETA on Stanchion</li> <li><b>PGT: A5, CW 2, 30.5, 9-in ext</b> Engage center jacking bolt ~29-30 turns Engage outer bolts (2) ~12 turns</li> <li>Translate to P1 outboard zenith camera port (fairlead to port)</li> </ol>
00:30 (03:35)		<p><u>WETA INSTALL (00:10)</u></p> <ol style="list-style-type: none"> <li>Hand WETA/Stanchion to EV2</li> <li>Soft dock stanchion to mounting plate (racetrack port)</li> <li><b>PGT: B6, CW 2, 30.5, 6-in ext</b> Drive stanchion bolt 10 turns until it drops out of launch position</li> <li>Engage stanchion bolt (6 lbf push force reqd) to hardstop, ~16.5 turns</li> </ol>	<p><u>WETA INSTALL</u></p> <ol style="list-style-type: none"> <li>Receive WETA/Stanchion from EV1, stabilize upright</li> <li>Assist EV1 as req'd</li> </ol> <p>COMPLETE</p>

**P1 WETA INSTALL (00:55) (Cont)**

**EVA 2**

TASK (PET)	IV	EV1	EV2
00:40 (03:45)	√ MCC Go for WETA connector mate If no comm:  * √ P12B A RPC 1 – OPEN * * √ RPC 15 – OPEN * * √ P11A A RPC 2 – OPEN * * √ RPC 16 – OPEN *  WVS: EV 1 center cam (Closeup – WETA to P1 connections)	<u>CONNECTOR MATE (00:15)</u> ← <input type="checkbox"/> 11. Demate caps (3) from P1 panel, stow on MWS 12. Open TA clamps on stanchion 13. Demate connectors from stanchion: P2, P3, P4 14. Install caps/deadface on stanchion: P2/J2, P3/J3, P4/J4 15. Tether to, remove WETA thermal cover; bundle in MWS 16. Remove round scoop & RET from WETA, close TA clamps 17. Mate stanchion connectors to P1: <input type="checkbox"/> P2/J2 (fiber optic) <input type="checkbox"/> P4/J4 <input type="checkbox"/> P3/J3 ← <input type="checkbox"/>	
00:55 (04:00)	Notify MCC P1 WETA Thermal Cover removed	← <input type="checkbox"/> COMPLETE	

# P1 WETA INSTALL TASK DATA SHEET

## Tools:

EV1 (FF)	EV2 (FF)
PGT w/ 6-in ext	PGT w/ 9-in ext
Round scoop	BRT
	Round scoop

## EVA Fasteners:

Fastener Name	Label	Head Size	Qty	Install Torque (ft-lb)	Release Torque (ft-lb)	Failure Torque (ft-lb)	Turns	RPM
Stanchion Launch Restraint Bolt	---	7/16	2	N/A	16.7	64.7	8.5	30 max
Dummy Box Outer Bolts	---	7/16	2	N/A	6.2	38.8	11.5-13	30 max
Dummy Box Center Jacking Bolt	---	7/16	1	N/A	6.2	38.8	29-30	30 max
WETA Outer Bolts	---	7/16	2	5	N/A	31	11.5 - 13	30 max
WETA Center Jacking Bolt	---	7/16	1	6.9	N/A	31.0	29-30	30 max
Stanchion Mounting Bolt	---	7/16	1	23	N/A	64.7	8.5	30 max

## EVA Connectors:

Harness	From S0	To P1	Clamps (#)	Conn Size	Function
(Fiber Optic)	P2	J2		15	Operational power and video/command
	P3	J3		15	Heaters
	P4	J4		15	Not functional

## Foot Restraints:

Task	WIF	APFR Setting
WETA stanchion Install (optional)	P1 WIF 2 31	9,MM,F,12 10,FF,B,3

## Other:

- WVS closeouts of WETA to P1 connections
- "Racetrack" faces Fwd when stanchion is installed

## Notes / Cautions / Warnings:

- WETA UHF and S-band antennas are no touch
- When driving stanchion bolts with 6-in wobble, do not remove PGT / socket and restart. Wobble will not re-engage bolt if bolt partially driven.
- For stanchion connector P2: avoid bend radii less than 10 times cable diameter. Avoid pulling on cable during mate/demate

## Timeline Impacts

- WETA thermal clock is 9 hours with thermal cover and 4 hours with no thermal cover
- WETA installation required on 11A because dummy boxes must be returned and processed for reflight on ULF-1
- WETA thermal cover must be removed before WETA heater activation
- Two WETAs can fit in the airlock at the same time at some additional hardware risk

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**PORT KEEL PIN REMOVAL (00:30)**

**EVA 2**

TASK (PET)	IV	EV1	EV2
00:00 (04:00)		<p><u>PORT KEEL PIN RELEASE (00:15)</u></p> <ol style="list-style-type: none"> <li>1. <b>PGT: B4, CCW 2, 30.5</b> Release zenith keel pin bolt, 22 turns</li> <li>2. <b>PGT: A3, CW 2, 10.5</b> Rotate keel pin free, reinstall bolt, 22 turns</li> <li>3. Ingress port TFR Move CETA ~12-in to port, engage parking brake</li> <li>4. <b>PGT: B4, CCW 2, 30.5</b> Release nadir keel pin bolt, 22 turns</li> <li>5. Remove keel pin</li> </ol>	<p><u>PORT KEEL PIN RELEASE</u></p> <ol style="list-style-type: none"> <li>1. <b>PGT: A2, CW 2, 10.5</b> Tighten zenith &amp; nadir nut clamp bolts, 6 turns</li> <li>2. Retrieve dummy box from handrail, stow on crewlock bag w/ adj tether</li> <li>3. ✓ Stowed keel pin pushed twd bulkhead</li> <li>4. Ingress stbd TFR</li> </ol>
00:15 (04:15)		<p><u>PORT KEEL PIN STOW (00:15)</u></p> <ol style="list-style-type: none"> <li>6. <b>PGT: A3, CW 2, 10.5</b> Remove keel pin, reinstall bolt, 22 turns</li> <li>7. GCA EV2 to keel pin stowage location</li> <li>8. Install keel pin into zenith (passive) stowage bracket, rotate into nadir latch</li> <li>9. Install keel pin latch pip-pin (hole "C")</li> </ol> <p>COMPLETE</p>	<p><u>PORT KEEL PIN STOW</u></p> <ol style="list-style-type: none"> <li>5. Translate CETA to keel pin to stowage location (btwn 8550 &amp; 8520), egress TFR</li> <li>6. Install keel pin into zenith (passive) stowage bracket, rotate into nadir latch</li> </ol> <p>If not completed earlier:</p> <ol style="list-style-type: none"> <li>7. <b>PGT: B7, CCW 3, 10.5</b> Release passive coupler restraint bolt, stow in trash bag</li> <li>8. Adjust brake handles as reqd to access TRRJ DLAs</li> <li>9. Remove &amp; stow DLA pip pins (2)</li> </ol>
00:30 (04:30)		COMPLETE	COMPLETE

# PORT KEEL PIN REMOVAL TASK DATA SHEET

**Tools:**

EV1 (FF)	EV2 (FF)
PGT	PGT
9-in ext or 6-in wobble	9-in ext or 6-in wobble

**EVA Fasteners:**

Fastener Name	Label	Head Size	Qty	Install Torque (ft-lb)	Release Torque (ft-lb)	Failure Torque (ft-lb)	Turns	RPM
Nut Clamp Bolt	---	7/16	1	3.3	N/A	5.4 at thread root	6	30 max
Keel Pin Bolt - Removal	---	7/16	2	N/A	14	22.2 at thread root	22	30 max
Keel Pin Bolt - Installation	---	7/16	2	5.8	N/A	11.8 at thread root	22	30 max

**EVA Connectors:**

Harness	From S0	To P1	Clamps (#)	Conn Size	Function
None					

**Foot Restraints:**

Task	WIF	APFR Setting
Port Keel Pin Release	CETA Stbd TFR	

**Other:**

- No WVS closeouts required

**Notes / Cautions / Warnings:**

**Timeline Impacts:**

- CETA cart required to perform keel pin task
- WETA stanchion and drag link must be removed before keel pin removal
- Keel pins must be removed / stowed prior to the morning of EVA 3 for MT translation to WS 7. Also required prior to 12A
- Can't reach port keel pin if safety-tethered to S0 stbd MTS struts

**CETA RELOCATE (01:15)**

**EVA 2**

TASK (PET)	IV/SSRMS	EV1	EV2
00:00 (04:30)	SSRMS: 2.201 CETA Relocate, APFR Install Posn (SODF:RBT:11A)	<p><u>CETA REMOVAL FROM P1</u> (00:30)</p> <ol style="list-style-type: none"> <li>Translate to S0; swap to A/L safety tether</li> <li>Retrieve end of EV2's truss safety tether, attach to SSRMS, install hook lock</li> <li>Stow EV1 truss safety tether and tether shuttles (2) on CETA cart, clear of wheel bogies</li> </ol> <p>MINI TOOL INVENTORY:</p> <ul style="list-style-type: none"> <li>Dummy box</li> <li>Crewlock Bag</li> <li>Ballstack/MUT EE</li> <li>Tether shuttles (2)</li> <li>Safety Tether</li> </ul> <ol style="list-style-type: none"> <li>Release CETA brakes</li> </ol> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <p align="center"><u>CAUTION</u> Do not impart loads into CETA cart with &lt; 4 of 4 wheel bogies latched closed</p> </div> <ol style="list-style-type: none"> <li>On EV2 GO, release CETA wheel bogies (2) CCW starting from port/nadir</li> <li>Assist EV2/M1 with GCA</li> </ol>	<p><u>CETA REMOVAL FROM P1</u></p> <ol style="list-style-type: none"> <li>Translate CETA cart to ~S0 Bay 4, engage parking brake Stow CETA port brake handles in up position</li> <li>Retrieve WIF Adapter from crewlock bag, install on SSRMS</li> <li>Waist tether to SSRMS handrail</li> <li>Install APFR from CETA &amp; Ingress aid on SSRMS: 12,PP,F,6</li> <li>Ingress APFR, tether to CETA with Rt waist tether, hold CETA at grids D &amp; F</li> <li>Give EV1 GO when ready</li> </ol> <ol style="list-style-type: none"> <li>Remove CETA from MT Rails</li> </ol>
00:30 (05:00)	SSRMS: 2.201 CETA Relocate, CETA Install on S1 (SODF:RBT:11A)	<p><u>CETA INSTALL ON S1</u> (00:45)</p> <ol style="list-style-type: none"> <li>Retrieve EV2's A/L safety tether, translate to stbd side of MT/CETA1</li> </ol>	<p><u>CETA INSTALL ON S1</u></p> <ol style="list-style-type: none"> <li>Mnvr to Stbd side of MT/CETA1</li> </ol>



**CETA RELOCATE (01:15) (cont)**

**EVA 2**

TASK (PET)	IV/SSRMS	EV1	EV2
01:15 (05:45)		<p>CETA INSTALL ON S1 (cont)</p> <p>8. √CETA1 brake handles in up position, swingarms stowed</p> <p>9. √CETA1 coupler in CAPTURE</p> <p>10. GCA SSRMS to CETA install posn</p> <p>11. Assist EV2</p> <p>12. Rotate and lock wheel bogies (4) onto MT rail</p> <p style="text-align: center;"><u>NOTE</u></p> <p>CETA to CETA max coupling rate is 1 inch/sec</p> <p>13. √CETA2 port brake handles in up position Couple CETA2 to CETA1 CETA 1 Coupler – LOCK √Brakes released</p> <p>COMPLETE</p>	<p><u>CETA INSTALL ON S1 (cont)</u></p> <p>9. Install CETA on MT rail</p> <p>10. Egress APFR</p> <p>11. Tether swap to airlock tether</p> <p>COMPLETE</p>

## CETA RELOCATE TASK DATA SHEET

### Tools:

EV1 (FF)	EV2 (FF)
N/A	APFR
	WIF Adapter

### EVA Fasteners:

Fastener Name	Label	Head Size	Qty	Install Torque (ft-lb)	Release Torque (ft-lb)	Failure Torque (ft-lb)	Turns	RPM
None								

### EVA Connectors:

Harness	From S0	To P1	Clamps (#)	Conn Size	Function
None					

### Foot Restraints:

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

### Other:

#### Notes / Cautions / Warnings:

- Do not impart loads into CETA with less than 4 of 4 wheel bogies engaged
- When coupling CETAs to each other, max rate is <1 in/sec

#### Timeline Impacts:

- CETA relocation is done at the end of the EVA because CETA cart is needed for S0-P1 fluid jumper installation and keel pin removal/stowage. CETA Cart also functions as the Tether Shuttle stop for EVA2. Tether shuttles must be used in order to reach the P1 WETA, P1/P3 line clamp and RTL test worksites.
- Required for EVA3 in order to move MT to WS7 for RBVM SPD task. Not enough time to relocate CETA on EVA 3 and move MT to WS7 – would have to drop RBVM task. This would in turn preclude Inc.6 from releasing radiator beam launch locks, and performing radiator deploy and TRRJ checkout prior to 12A

**EVA 2 CLEANUP/INGRESS (00:40)**

**EVA 2**

TASK (PET)	IV/RMS	EV1	EV2
00:00 (05:45)	SSRMS: 2.201 CETA Relocate, APFR Removal (SODF:RBT:11A)  APFR: C=____, P=____, R=____, Y=____	<p><u>CLEANUP (00:30)</u></p> <ol style="list-style-type: none"> <li>Retrieve tether shuttles (2) &amp; safety tether from CETA2, stow on S0 handrail bridge, lock tether shuttles on stowage rail</li> <li>Install scoop on ballstack</li> <li>Retrieve ballstack/MUT EE from CETA</li> <li>Perform Tool Inventory</li> <li>Translate to Joint A/L</li> <li>Transfer PGT to EV2</li> <li>Transfer ballstack/MUT EE to EV2</li> </ol>	<p><u>CLEANUP (00:30)</u></p> <ol style="list-style-type: none"> <li>Remove safety tether from SSRMS, temp stow on CETA 2</li> <li>Remove APFR/Ingress aid from SSRMS, stow on CETA Zenith swingarm, report settings ← <input type="checkbox"/></li> <li>Retrieve WIF Adapter from SSRMS, stow in Crewlock bag</li> <li>Retrieve crewlock bag w/ dummy box &amp; safety tether, stow on BRT</li> <li>Perform Tool Inventory</li> <li>Translate to Joint A/L, stow safety tether on S0 handrail bridge</li> <li>Ingress Joint A/L, stow crewlock bag</li> <li>Connect right waist tether to UIA panel right (fwd) D-ring</li> <li>Disconnect from crewlock safety tether, unlock, stow on hatch HR standoff D-ring</li> <li>Receive PGT, stow</li> <li>Receive Ballstack/MUT EE, stow</li> </ol>
00:30 (06:15)		<p><u>INGRESS (00:10)</u></p> <ol style="list-style-type: none"> <li>Connect left waist tether to crewlock internal D-ring extender (w/ hook lock)</li> <li>Disconnect from crewlock safety tether, unlock, stow on hatch HR standoff D-ring</li> <li>Ingress Joint A/L</li> </ol>	<p><u>INGRESS</u></p>
00:40 (06:25)		<p>DCM</p> <ol style="list-style-type: none"> <li>Water – OFF</li> <li>Hatch thermal cover – close</li> <li>Outer Hatch – close and lock</li> <li>Go to PRE REPRESS (<u>DEPRESS/REPRESS</u> Cue Card)</li> </ol>	<p>DCM</p> <ol style="list-style-type: none"> <li>Water – OFF</li> <li>Go to PRE REPRESS (<u>DEPRESS/REPRESS</u> Cue Card)</li> </ol>

## POST EVA 2 TOOL CONFIG

### EV1

#### EMU D-Rings

- 1 - Waist Tether – (L)

#### MWS

- 2 - Wire ties
- 1 – RET (Rt D-ring to wire tie)
- 1 – RET (Rt D-ring)
- 1 – RET (Lf D-ring)
- 1 - RET w/ pip pin (Rt D-ring to swingarm)
- 1 - Adj Tether (Rt D-ring to wire tie)
- Swing Arm (Rt)
  - EVA Camera (inside) w/ own RET
  - RET (from PGT)
- BRT (Lf)

- SAFER

### EV2

#### EMU D - Rings

- 1 - Tether Extender (Lf)
- 2 - Waist Tethers
- 2 - Adj Tethers (1 ea. wrist)

#### MWS

- 2- Wire Ties
- 1 – RET (Lf D-ring)
- 1 – RET w/ pip pin (Rt D-ring)
- 1 – RET (Rt D-ring)
- Sm Trash Bag (Lf rear)
- Swing Arm (Rt)
  - PGT w/7/16 X 9" socket (s/n 1005)
    - RET
- BRT (Lf) w/ 2 wire ties

- SAFER

### CREWLOCK D-RING

- Tether Extender
  - Crew Hook Lock
  - RET

### CREWLOCK

- √ SCU Routing (EV2- zenith of nadir/fwd handrail)

- Crewlock bag
- Lg-sm RET
  - EVA camera (own RET to D-ring)
  - WIF adapter w/ pip pin
    - RET
  - Stanchion Dummy Box
    - Adj Tether

- Bungee
- Lg-sm RET
- Ball Stack, MUT EE, Round Scoop (clamp to HR to Rt of UIA)
  - RET (to SCU restraint D-ring)
- PGT w/7/16 X 6" socket (1003)
  - Lg-sm RET (stays in A/L)

- S0/S1 Crewlock bag – in endcone behind EV hatch
  - RET
  - Fish stringer w/ 1.5-in SPDs (7)
  - 1-in SPDs (2) on integral C/L RETs
  - 0.5-in SPD
    - RET
  - Wire tie caddy
    - RET

### TETHER SUMMARY:

- 13 – sm-sm RETs
- 2 – sm-sm RETs w/ pip pin
- 3 – lg-sm RETs
- 4 – Adj. Tethers
- 2 – Fish Stringers

- Staging Bag

- Fish Stringer w/ QD Tools:
  - 1.5-in QRT (FHRC/Stinger Cont)
  - ¾-1 in QRT (
  - 1.5-in QD Bail Lever (FHRC/Stinger Cont)
  - ¾-1 in QD Bail Lever
  - 1-in QD Cap Tool
  - ½-in QD Cap Tool
  - 1-in Button Depress Tool
  - 1-in Anti-Kickback Tool
- Socket Caddy
  - RET
  - 7/16 X 6-in socket
  - RAD

- Wire Tie Caddy (in pocket)

- IV Bag

- PGT with battery (s/n 1006) (spare)
- EVA Ratchet
- Socket Caddy
  - ½ X 8-in socket (IV Hatch)
  - 7/16 X 12-in socket
- Connector Cleaner Tool Caddy
- Helmet Light Battery (spare)
- DCM Plug
- 2 pr - Adj Thermal Mittens
- Hydrazine Detector Kit

### JOINT A/L EXTERNAL

- 2 - Crewlock Safety Tether w/Hook Lock

### S0

- 2 - Safety Tether w/Hook Lock on port fwd MTS struts
- 2 – Tether Shuttles on S0 handrail bridge

PET HR : MIN	IV/SSRMS	11A EVA 3 EV1	EV2	PET HR : MIN
00:00		<u>POST DEPRESS/EGRESS</u> (00:15)	<u>POST DEPRESS/EGRESS</u> (00:15)	00:00
	Notify MCC CID 7 & 8 ON (Start DDCU Checkout)	<u>EVA 3 SETUP</u> (00:20)	<u>EVA 3 SETUP</u> (00:20) • CID 7/8 ON (Close)	
	Notify MCC Starting Z1/P6 SPD Installation SSRMS: APFR Ingress	<u>Z1 / P6 SPDs</u> (00:20)	<u>RBVM SPDs</u> (SSRMS) (01:45)	
01:00	Notify MCC Starting Z1/Lab SPD Installation	<u>Z1 / LAB SPDs</u> (00:40)		01:00
	Notify MCC Starting Lab HX SPD Installation	<u>LAB HEAT EXCHANGER</u> (01:00)		
02:00	SSRMS: APFR Ingress / Egress			02:00
	Notify MCC Go for SSRMS Walkoff	<u>P1 PUMP MODULE SPDs</u> (00:35)	<u>RBVM SPDs</u> (FF) (01:30)	
03:00	√ MCC Go for CID 7 MBSU Bypass Jumper Reconfig	<u>CID 7/8 MBSU RECONFIG</u> (00:40)		03:00
	√ MCC Go for CID 8 MBSU Bypass Jumper Reconfig			
04:00	Notify MCC opening ATA F175 √ MCC Go for opening NTA F173 √ MCC Go for opening NTA F172	<u>S0 SHUNT JUMPER SPDs</u> (01:10)	<u>CONNECT ATA UMBILICALS</u> (00:45)	04:00
	If EV1,2 complete with S0/P1 tasks, notify MCC Go for MT translation to WS4		<u>S1 PUMP MODULE SPDs</u> (01:10)	
05:00		<u>S1 FHRC SPDs</u> (00:45)		05:00
		<u>CLEANUP</u> (00:30)	<u>CLEANUP</u> (00:30)	
06:00		<u>A/L INGRESS and PRE REPRESS</u> (00:15)	<u>A/L INGRESS and PRE REPRESS</u> (00:15)	06:00

# EVA 3

## PRE EVA 3 TOOL CONFIG

### EV1

#### EMU D-Rings

- 1 - Waist Tether (Lf)

#### MWS

- 2 - Wire ties
- 1 - Adj tether (Rt D-ring to wire tie)
- 1 - RET (Rt D-ring)
  - 1-in SPD (Z1/P6)
- 1 - RET (Rt D-ring to wire tie & SPD)
- Sm trash bag (left back)
- 1 - RET (Lf D-ring)
  - 1-in SPD (Z1/P6)
- 1 - RET w/ pip pin (Lf D-ring to wire tie & SPD)
- Swing Arm (Rt)
  - EVA Camera (inside) w/ own RET
- BRT (Lf)
- SAFER

### EV2

#### EMU D - Rings

- 1 - Tether Extender (Lf)
- 2 - Waist Tethers
- 2 - Adj tethers (1 ea. wrist)

#### MWS

- 2 - Wire ties
- 1 - RET (Rt D-ring)
- 1 - RET w/ pip pin (Rt D-ring to wire tie)
- Trash bag (Lf rear)
- 1 - RET (Lf D-ring)
- Safety Tether (SSRMS)
- Swing Arm (Rt)
  - EVA camera (outside) w/ own RET
- BRT (Lf w/ 2 wire ties)
- SAFER

### CREWLOCK D-RING

- Tether Extender
  - Crew Hook Lock
  - RET

### CREWLOCK

- 1 - Waist Tether (on UIA Rt d-ring)
- √ SCU Routing (EV2-zenith of nadir/fwd handrail)
- Fluid QD Stowage Bag (port zenith handrail)
  - 2 Adj Tethers
  - TBD Gap Spanners (1-301)
- Crewlock bag #1 (EV1) - fwd port
- Lg-sm RET (to Rt UIA)
  - Fish stringer w/ 1-in SPDs (4) and 1.5-in SPDs (3)
    - Wire tie on one 1.5-in SPD lanyard
  - 0.5-in SPD on integral C/L RET
- Crewlock bag #2 (EV2) - aft port
- Lg-sm RET (to Lf UIA)
  - Fish stringer w/ 1-in SPDs (6) & 0.5-in SPD w/ bootie extender
  - Fish stringer w/ 1-in SPDs (7)
  - 1-in SPDs (4) on integral C/L RETs
  - WIF Adapter
    - RET
  - 1-in SPD
    - RET
- Crewlock bag #3 (S0/S1 SPDs) – fwd port
- Lg-sm RET
  - Fish stringer w/ 1.5-in SPDs (7), one w/ wire tie
  - 1-in SPDs (4) on integral C/L RETs
  - 0.5-in SPD
    - RET
  - Wire tie caddy
    - RET

### SPD SUMMARY

#### **Crewlock bag #1**

- 1-in SPDs: Z1/Lab (2), Lab HX (2)
- 1.5-in SPDs: P1 Pump Module (3)
- 0.5-in SPDs: P1 Pump Module (1)

#### **Crewlock bag #2**

- 1-in SPDs: RBVMs (18)
- 0.5-in SPDs: ATA (1)

#### **Crewlock bag #3**

- 1.5-in SPDs: S1 FHRC (4), S1 Pump Module (3)
- 1-in SPDs: S0 Shunt Jumpers (4),
- 0.5-in SPDs: S1 Pump Module (1)

### CREWLOCK (Cont'd)

- Staging Bag
  - Fish Stringer w/ QD Tools:
    - 1.5-in QRT (FHRC/Stinger Cont)
    - ¾-1 in QRT (
    - 1.5-in QD Bail Lever (FHRC/Stinger Cont)
    - ¾-1 in QD Bail Lever
    - 1-in QD Cap Tool
    - ½-in QD Cap Tool
    - 1-in Button Depress Tool
    - 1-in Anti-Kickback Tool
  - Socket Caddy
    - RET
    - 7/16 X 6-in socket
    - RAD
    - Wire Tie Caddy (in pocket)
    - PGT w/ 6-in socket (s/n 1006) (spare)
      - RET
  - IV Bag
    - EVA Ratchet
    - Socket Caddy
      - ½ X 8-in socket (IV Hatch)
      - 7/16 X 12-in socket
    - Connector Cleaner Tool Caddy
    - Helmet Light Battery (spare)
    - DCM Plug
    - 2 pr - Adj Thermal Mittens
    - Hydrazine Detector Kit

### JOINT A/L EXTERNAL

- 2 - Crewlock Safety Tether w/Hook Lock

### S0

- 2 - Safety Tether w/Hook Lock on port fwd MTS struts
- 2 - Tether Shuttles on S0 handrail bridge

### APFRs

- A/L Tool box 1 WIF
- S0 WIF 37
- Stbd CETA Cart

## EVA 3 INHIBIT PAD

### ORBITER

<b>RCS</b>	
	If EV crew < 27 ft from FRCS:
IV	1. √DAP: A12/VERN
O14,15,16	2. √RJDF F1, F2, F3, F4 MANF DRIVER (four) – OFF
MCC-H	3. √RCS F – ITEM 1 EXEC (*)
	√JET DES F1U – ITEM 17 (*)
	F3U – ITEM 19 (*)
	F2U – ITEM 21 (*)

<b>Orbiter Antennas</b>	
MCC-H	1. √KU-BAND EVA Mask - active

<b>TCS</b>	
L12	1. √TCS POWER - OFF

### RSOS

<b>MCS</b>	
MCC-M	1. √FGB Manifold valves (eighteen) – closed
	2. √FGB MCS unpowered
	3. √SOYUZ manifolds (ten) closed
	4. √SOYUZ MCS - unpowered

<b>SM Antennas (MCC-M)</b>	
MCC-M	1. Global Timing Sys 1 (400.1MHz) [GTS] – Deactivate

### USOS

<b>USOS ISS Antennas</b>	
Ku-BAND (SGANT)	
	<b>NOTE</b>
	Ku-Band keepout zone of 1 meter maintained to preclude possibility of EMU or equipment contact with antenna
	1. Ku-Band – 1 meter

<b>LAB Window</b>	
IV	If EV crew near window, close window shutter

<b>PCU</b>	<b>NOTE</b>
	PCUs may require up to 1 hr warm-up period before they are operational
MCC-H	1. √PCUs (two) operational, in discharge mode
	If only one PCU operational:
	2. √SSU is shunted for the first 10 min of each insolation period
	If no PCUs operational:
	3. One array will be oriented at least 105 deg from the velocity vector and the other array will be shunted for the first 10 min of each insolation period

## EVA 3 NOTES, CAUTIONS, AND WARNINGS

### NOTES

Inspect connectors for debris, bent pins, and cable bend radii

### CAUTION

Avoid inadvertent contact with:

- Grapple fixture shafts (have coating)
- Grapple fixture target pin
- SVS Targets
- SSRMS/MBS operating cameras & lights (heat source)
- MBS VDU, MCU, CRPCMs & Cameras (silver Teflon tape radiative surface)
- Passive UMA
- Deployed TUS cable
- PMA 1 MDM sunshade
- EVA crane
- Deployed MISSEs (A/L)
- CID Switches
- SASA – Antenna and Z-93 paint
- S0 Radiators (silver Teflon tape)
- S0 GPS Antenna (Z-93 paint)
- Lights (Z-93 paint)

### CAUTION (Cont)

Thermal Constraints:

- EVA connectors may become hot if left uncovered. Limited handling may be needed
- PMA handrails may be hot. Limited handling may be needed

Keepout Zones:

- UHF Antenna (PLB, Lab) = 1 foot

For structural reasons:

- Avoid vigorous body motions, quick grabs and kickoff tether restraints
- Avoid performing shaking motions (sinusoidal functions) more than four cycles

If any of these occur, wait 2-5 min to allow structural response to dissipate

### WARNING

Fluid QDs:

- If QD is in FID when valve is opened (bail fwd), QD will leak and fluid line may whip

Sharp Edges:

- PMA umbilical launch restraints exposed bolt threads
- Fuse tether buckles stowed in Node Bag
- Inner edges of WIF sockets
- PRLA ground wiper

Pinch Hazard:

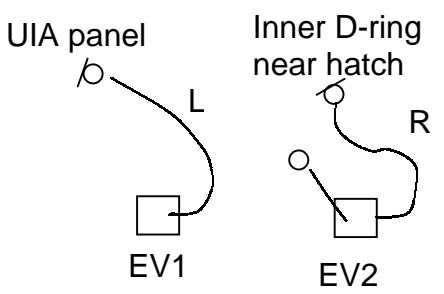
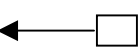
- EVA connectors. Use caution when mating/locking
- EV side of crewlock hatch during hatch operations (also snag hazard)

Contact Hazard:

- Lab window shutter during operation. Remain clear of Lab window



**EVA 3 EGRESS / SETUP (00:30)**

TASK (PET)	IV/SSRMS	EV1 (FF)	EV2 (FF)
<p>00:00 (00:05)</p> <p>00:10 (00:15)</p>	<p><u>INITIAL CONFIG</u></p>  <p>UJA panel</p> <p>Inner D-ring near hatch</p> <p>EV1</p> <p>EV2</p> <p>Notify MCC CID 7 &amp; 8 ON (Start DDCU Test)</p>	<p><u>EGRESS</u> (00:10)</p> <p>√ Left waist tether to UJA panel right (fwd) D-ring</p> <ol style="list-style-type: none"> <li>1. Release EV2 right waist tether from internal D-ring</li> </ol> <p><u>EVA SETUP</u> (00:20)</p> <ol style="list-style-type: none"> <li>2. Transfer crewlock bag #2 to EV2</li> <li>3. Transfer crewlock bag #1 to EV2</li> <li>4. Transfer crewlock bag #3 to EV2</li> <li>5. Receive crewlock safety tether from EV2, attach to right side, unlock reel, √ hook lock installed</li> <li>6. Release left waist tether from UJA D-ring and attach to safety tether reel (double tether)</li> <li>7. Egress crewlock</li> <li>8. √ SAFER Man Isol Vlv – OP (dn)</li> <li>9. Close crewlock thermal cover</li> <li>10. Retrieve MMOD T-handle tools (2) from port airlock toolbox; stow in crewlock bag #1</li> <li>11. Retrieve crewlock bag #1</li> </ol> <p>COMPLETE</p>	<p><u>EGRESS</u></p> <p>√ Right waist tether to crewlock internal D-ring</p> <ol style="list-style-type: none"> <li>1. Open thermal cover, egress crewlock</li> <li>2. Retrieve crewlock fwd safety tether, attach to left side, double tether, unlock reel, √ hook lock installed</li> <li>3. Give EV1 GO to release EV2 waist tether from internal D-ring</li> <li>4. √ SAFER Man Isol Vlv – OP (dn)</li> </ol> <p><u>EVA SETUP</u></p> <ol style="list-style-type: none"> <li>5. Receive crewlock bag #2, install on BRT</li> <li>6. Temp stow crewlock bag #1</li> <li>7. Stow crewlock bag #3 outside airlock</li> <li>8. Transfer remaining crewlock safety tether to EV1</li> <li>9. Translate to S0 handrail bridge; retrieve safety tether</li> <li>10. Translate to WIF S0-37</li> <li>11. Temp stow crewlock bag #2 &amp; SSRMS safety tether on APFR</li> <li>12. Translate to S0 bay 04, CID 7/8</li> <li>13. CID 7 – ON (cl) (nadir)</li> <li>14. CID 8 – ON (cl) (zenith)</li> </ol>  <ol style="list-style-type: none"> <li>15. Translate to port MTS strut; perform safety tether swap</li> <li>16. Retrieve APFR w/ crewlock bag #2 from WIF S0-37</li> </ol>

**EVA 3 EGRESS/SETUP (00:30) (Cont)**

	<b>IV/RMS</b>	<b>EV1</b>	<b>EV2</b>
00:30 (00:35)			17. Translate to center of radiator beam; fairlead (adj tether on face 6 HR 3651) 18. Temp stow APFR w/ crewlock bag #2 in WIF P1-19 COMPLETE

**Z1-P6 SPD INSTALLATION (00:20)**

**EVA 3**

TASK (PET)	IV/SSRMS	EV1 (FF)	EV2
<p>00:00 (00:35)</p> <p>00:20 (00:55)</p>	<p>Notify MCC starting Z1/P6 SPD installation</p> <p>WVS: EV1 – center cam (closeup of SPDs installed on QDs)</p>	<ol style="list-style-type: none"> <li>1. Translate to Z1 – P6 QD worksite; temp stow crewlock bag #1</li> <li>2. Release shroud Z1/02/03-19A - may only need to release zenith straps (2)</li> <li>3. Perform for F6 and F8               <ul style="list-style-type: none"> <li>• Inspect QD aft white line</li> <li>• Rotate locking collar to unlock</li> <li>• Push bail fwd</li> <li>• Verify button can depress; install SPD</li> <li>• √ 4 capture points – collar boss (2), bail boss (2)</li> <li>• √ Capture hooks engaged with push test on levers</li> <li>• Perform pull test</li> <li>• √ Button depressed by moving bail aft then fwd</li> <li>• Repeat push / pull test</li> </ul> </li> <li>4. Reinstall Z1/02/03-19A shroud</li> <li>5. Retrieve crewlock bag #1</li> </ol> <p>COMPLETE</p>	

## Z1-P6 SPD TASK DATA SHEET

### Tools:

EV1 (FF)	EV2 (FF)
1.0-in SPDs (2)	N/A

### EVA Fasteners:

Fastener Name	Label	Head Size	Qty	Install Torque (ft-lb)	Release Torque (ft-lb)	Failure Torque (ft-lb)	Turns	RPM
None								

### EVA QDs:

Fluid Line on Z1	Receptacle On P6	Clamps (#)	QD Size	Function
F6	M6	N/A	1.0-in	
F8	M8	N/A	1.0-in	

### Foot Restraints:

Task	WIF	APFR Setting
None		

### Other:

- WVS closeouts required for QD with SPD installed

### Notes / Cautions / Warnings:

- CMGs are not rated for EVA kickloads – inadvertent contact only
- QDs are limited to 1 troubleshooting cycle
- Do not rotate or side load QD when valve open
- Ammonia contamination risk exists when QD button is depressed and bail starts to move
- **Do not close QD – could result in loop shutting down**

### Timeline Impacts

- Required as soon as possible
- Wet QDs should be scheduled early in EVA to allow time for Ammonia bakeout / decontamination if required
- MCC is preconditioning loop B about 1 hour prior to the EVA to drop temperature to aid in reducing pressure inbetween QD seals
- MCC will run internal cooling system on a single loop in case the external loop is shut down as a result of QD valve accidentally closing or being closed because of a leak

**RBVM SPD INSTALLATION (03:05)**

**EVA 3**

TASK (PET)	IV/SSRMS	EV1	EV2 (SSRMS)
00:00 (00:35)	SSRMS: 2.303 RBVM EVA SUPPORT, APFR Pickup Posn		<p><u>SSRMS SETUP</u> (00:30)</p> <ol style="list-style-type: none"> <li>1. Install Safety tether on SSRMS handrail</li> <li>2. Perform safety tether swap; verify hook guard installed</li> <li>3. Remove fish stringer w/ 0.5-in SPD, temp stow near P1 WIF 19</li> <li>4. Retrieve WIF adapter from crewlock bag #2; install on SSRMS</li> <li>5. Transfer crewlock bag #2 to BRT</li> <li>6. Install APFR on SSRMS: 12, PP, L, 6</li> <li>7. Ingress APFR</li> </ol>
00:30 (01:05)	SSRMS: 2.303 RBVM EVA SUPPORT, RBVM Start Posn		<p><u>SPD INSTALLATION</u> (00:45)</p> <ol style="list-style-type: none"> <li>8. Mnvr to stbd most RBVM</li> </ol> <p>Perform for RBVM QD M1 and radiator junction box QD M3 (M1):</p> <ol style="list-style-type: none"> <li>9. Retrieve SPDs as req'd from crewlock bag</li> </ol> <div style="border: 1px solid black; padding: 5px; text-align: center; margin: 10px 0;"> <p><b><u>CAUTION</u></b> Avoid contact with RBVM and electrical / fluid lines</p> </div> <ol style="list-style-type: none"> <li>10. Perform for 1" QDs M1 on RBVM and 1" QD M3 (M1) on radiator junction box :             <ul style="list-style-type: none"> <li>• Remove QD thermal cover bootie</li> <li>• Rotate locking collar to unlock</li> <li>• Verify button can depress; install SPD</li> <li>• √ 4 capture points – collar boss (2), bail boss (2)</li> <li>• √ Capture hooks engaged with push test on levers</li> <li>• Perform pull test</li> <li>• √ Button depressed by moving bail aft then fwd</li> </ul> </li> </ol>

**RBVM SPD INSTALLATION (03:05) (Cont)**

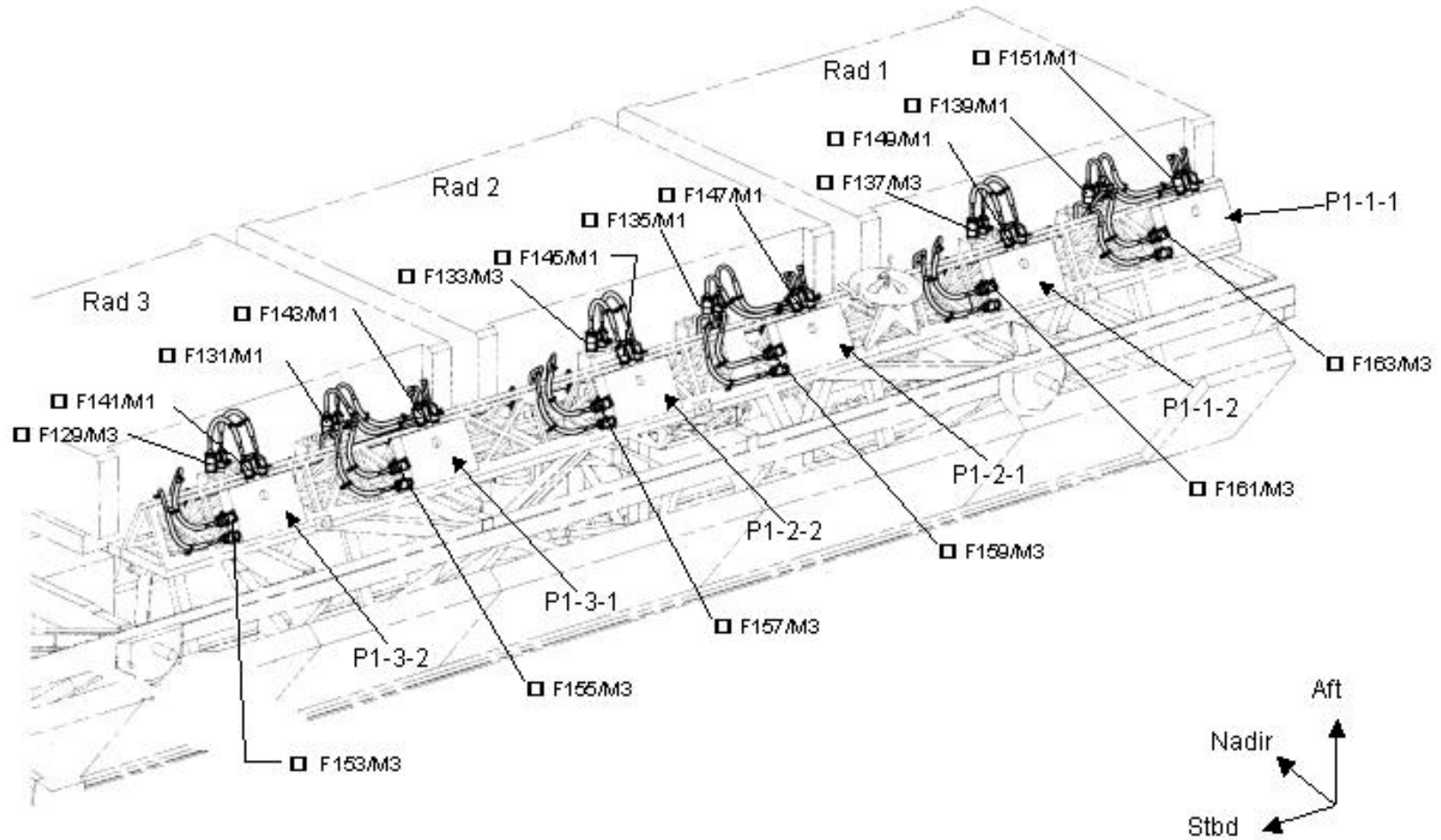
**EVA 3**

TASK (PET)	IV/RMS	EV1	EV2 (SSRMS)
<p>01:15 (01:50)</p> <p>01:45 (02:20)</p>	<p>WVS: EV1 – center cam (closeup of SPDs installed on QDs)</p> <p>SSRMS: 2.303 RBVM EVA SUPPORT, APFR Egress</p> <p>APFR: CETA2 WIF 4: ____, ____, ____, ____ (zenith fixed WIF)</p> <p>Notify MCC Go for SSRMS walkoff</p> <p>WVS: EV1 – center cam (closeup of SPD installed on QD)</p>		<ul style="list-style-type: none"> <li>• Repeat push / pull test</li> </ul> <p>← <input type="checkbox"/></p> <ul style="list-style-type: none"> <li>• Install QD thermal cover bootie</li> <li>• For RBVM M1 QDs only: Verify RBVM MLI top extension flap secured</li> </ul> <p>11. Retrieve fish stringer and crewlock bag #2</p> <p><u>SSRMS CLEANUP</u> (00:30)</p> <p>12. Mvnr to WIF P1-19</p> <p>13. Egress APFR; temp stow crewlock bag #2 if req'd</p> <p>14. Remove APFR; stow in CETA2 WIF 4</p> <p>← <input type="checkbox"/></p> <p>15. Remove WIF adapter from SSRMS; stow in crewlock bag #2</p> <p>16. Perform safety tether swap (anchor SSRMS safety tether near WIF P1-19)</p> <p>← <input type="checkbox"/></p> <p><u>RBVM QD M3</u> (01:30)</p> <p>17. Perform for 1" M3 QDs (6) on RBVM</p> <ul style="list-style-type: none"> <li>• Retrieve SPDs (3 at a time) from stringer</li> <li>• Remove QD thermal cover bootie</li> <li>• Rotate locking collar to unlock</li> <li>• Verify button can depress; install SPD</li> <li>• √ 4 capture points – collar boss (2), bail boss (2)</li> <li>• √ Capture hooks engaged with push test on levers</li> <li>• Perform pull test</li> <li>• √ Button depressed by moving bail aft then fwd</li> <li>• Repeat push / pull test</li> </ul> <p>← <input type="checkbox"/></p>

**RBVM SPD INSTALLATION (03:05) (Cont)****EVA 3**

TASK (PET)	IV/RMS	EV1	EV2 (SSRMS)
03:05 (03:50)			<ul style="list-style-type: none"><li>• Install QD thermal cover bootie</li><li>• Remove RBVM thermal sensor flap</li><li>• Verify RBVM MLI side extension flap secured</li></ul> 18. Perform safety tether swap to truss tether at WIF P1-19, retrieve SSRMS tether COMPLETE

# RBVM SPD OVERVIEW





## RBVM SPD TASK DATA SHEET

### Tools:

EV1 (FF)	EV2 (FF)
N/A	1.0-in SPDs (18)

### EVA Fasteners:

Fastener Name	Label	Head Size	Qty	Install Torque (ft-lb)	Release Torque (ft-lb)	Failure Torque (ft-lb)	Turns	RPM
None								

### EVA QDs:

Fluid Line	From Junction Box	To RBVM	RBVM	Clamps (#)	QD Size	Function
	F129	M3	3-2	N/A	1.0-in	RBVM to Junction Box
	F141	M1	3-2	N/A	1.0-in	
	F131	M1	3-1	N/A	1.0-in	RBVM to Junction Box
	F143	M1	3-1	N/A	1.0-in	
	F133	M3	2-2	N/A	1.0-in	RBVM to Junction Box
	F145	M1	2-2	N/A	1.0-in	
	F135	M1	2-1	N/A	1.0-in	RBVM to Junction Box
	F147	M1	2-1	N/A	1.0-in	
	F137	M3	1-2	N/A	1.0-in	RBVM to Junction Box
	F149	M1	1-2	N/A	1.0-in	
	F139	M1	1-1	N/A	1.0-in	RBVM to Junction Box
	F151	M1	1-1	N/A	1.0-in	
Fluid Line	From Truss	To RBVM		Clamps (#)	QD Size	Function
	F153	M3	3-2	N/A	1.0-in	
	F155	M3	3-1	N/A	1.0-in	
	F157	M3	2-2	N/A	1.0-in	
	F159	M3	2-1	N/A	1.0-in	
	F161	M3	1-2	N/A	1.0-in	
	F163	M3	1-1	N/A	1.0-in	

### Foot Restraints:

Task	WIF	APFR Setting
SSRMS	SSRMS WIF	12,PP,L,6

### Other:

- WVS closeouts required for QD with SPD installed

### Notes / Cautions / Warnings:

- QDs are limited to 1 troubleshooting cycle
- Do not rotate or side load QD when valve open
- Avoid EMU and hardware contact with radiator

### Timeline Impacts

- Required for 12A.1 before system is filled with ammonia
- Junction box SPDs (6) require SSRMS. Upper RBVM SPD are done from the SSRMS along with the junction SPDs for timeline efficiency and easier access.
- The 6 lower RBVM SPDs are done FF because they are easier to access and this allows the SSRMS to walk-off to the lab earlier
- SSRMS walk-off is required prior to MT translation per flight rules. This minimizes the risk to the SSRMS if the MT is stuck inbetween worksites
- The MT must be translated prior to or during an EVA. The SSRMS portion of the RBVM task is early in the EVA so the SSRMS walk-off and MT translation can be done as early in the EVA as possible.
- RBVM SPDs must be completed prior to the stage EVA in order for the INC 6 crew to release the radiator beam launch locks. After the radiator beam launch locks are released, the radiator beam must be tied down with PRDs if the EV crew needs to work on the aft side of P1 (ref. section 18 flight rules). If the RBLLs can't be released, the radiator can't be deployed and the TRRJ can't be checked out (all planned for 11A stage).
- The SSRMS cannot reach the RBVM SPDs from the lab. The MT needs to be in worksite 7. Worksite 6 may work but has not been evaluated for EVA access to other tasks on face 1 or for SSRMS positions. W/S 5 blocks S0 Bay 4 which is required for CID 7/8 MBSU reconfig.

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**Z1-LAB SPD INSTALLATION (00:40)**

**EVA 3**

TASK (PET)	IV/SSRMS	EV1 (FF)	EV2
00:00  (00:55)          00:40 (01:35)	Notify MCC starting Z1/Lab SPD installation          WVS: EV1 – center cam (closeup of each SPD installed on QD)	1. Translate to Z1-Lab QD worksite; temp stow crewlock bag #1 2. Retrieve SPDs(2) from crewlock bag 3. Perform for F5/M7 and F7/M8: Remove QD thermal cover bootie ← <input type="checkbox"/> • Inspect QD aft white line • <input checked="" type="checkbox"/> Rotate locking collar to unlock • Push bail fwd • Verify button can depress; install SPD • √ 4 capture points – collar boss (2), bail boss (2) • √ Capture hooks engaged with push test on levers • Perform pull test • √ Button depressed by moving bail aft then fwd • Repeat push / pull test  ← <input type="checkbox"/> • Install QD thermal cover bootie COMPLETE	

## Z1-LAB SPD TASK DATA SHEET

### Tools:

EV1 (FF)	EV2 (FF)
1.0-in SPDs (2)	N/A

### EVA Fasteners:

Fastener Name	Label	Head Size	Qty	Install Torque (ft-lb)	Release Torque (ft-lb)	Failure Torque (ft-lb)	Turns	RPM
None								

### EVA QDs:

From Z1	To Lab	Clamps (#)	QD Size	Function
F5	M7	N/A	1.0-in	
F7	M8	N/A	1.0-in	

### Foot Restraints:

Task	WIF	APFR Setting
None		

### Other:

- WVS closeouts required for QD with SPD installed
- In order to use the button depress tool on the inner QD, the outer QD will likely need to be demated
- Visibility to SPD is marginal and EV only has single hand access. Only ½ of the SPD capture points can be verified.

### Notes / Cautions / Warnings:

- QDs are limited to 1 troubleshooting cycle
- Do not rotate or side load QD when valve open
- Ammonia contamination risk exists when QD button is depressed and bail starts to move
- **Do not close QD – could result in loop shutting down**

### Timeline Impacts

- Required as soon as possible
- Wet QDs should be scheduled early in EVA to allow time for Ammonia bakeout / decontamination if required
- MCC is preconditioning loop B about 1 hour prior to the EVA to drop temperature to aid in reducing pressure inbetween QD seals
- MCC will run internal cooling system on a single loop in case the external loop is shut down as a result of QD valve accidentally closing or being closed because of a leak

**LAB HX SPD INSTALLATION (01:00)**

**EVA 3**

TASK (PET)	IV/RMS	EV1 (FF)	EV2
<p>00:00 (01:35)</p> <p>00:25 (02:00)</p> <p>00:35 (02:10)</p> <p>01:00 (02:35)</p>	<p>Notify MCC starting Lab HX SPD installation</p> <p><input type="checkbox"/> F77/M3 <input type="checkbox"/> F76/M4</p> <p>WVS: EV 1 – center cam (closeup of each SPD Installed on QD)</p>	<p><u>MMOD SHIELD REMOVAL</u> (00:25)</p> <ol style="list-style-type: none"> <li>1. Retrieve SPDs (2) &amp; MMOD T-handle tools (2) from crewlock bag #1</li> <li>2. Translate to Lab MTL heat exchanger</li> <li>3. Install MMOD T-handle tool into shield</li> <li>4. Install RET from T-handle to Aft MTS Strut HR</li> <li>5. Release Dzus fasteners (3)</li> <li>6. Temp stow shield using second RET</li> <li>7. Peel back MLI to access QDs</li> </ol> <p><u>SPD INSTALLATION</u> (00:10)</p> <ol style="list-style-type: none"> <li>8. Retrieve SPDs (2) from crewlock bag ← <input type="checkbox"/></li> <li>9. Perform for QDs F77/M3 &amp; F76/M4: <ul style="list-style-type: none"> <li>• Inspect QD aft white line</li> <li>• Rotate locking collar to unlock</li> <li>• Push bail fwd</li> <li>• Verify button can depress; install SPD</li> <li>• ✓ 4 capture points: collar boss (2), bail boss (2)</li> <li>• ✓ Capture hooks engaged with push test on levers</li> <li>• Perform pull test</li> <li>• ✓ Button depressed by moving bail aft then fwd</li> <li>• Repeat push / pull test</li> </ul> </li> </ol> <p>← <input type="checkbox"/></p> <p><u>MMOD SHIELD / MLI INSTALLATION</u> (00:25)</p> <ol style="list-style-type: none"> <li>10. Install MLI (3 of 4 sides req'd??)</li> <li>11. Install MMOD shield</li> <li>12. Engage 2 outer Dzus fasteners</li> <li>13. Remove RETs (2) and T-handles tool; stow in crewlock bag</li> <li>14. Retrieve crewlock bag #1</li> </ol> <p>COMPLETE</p>	

## LAB HEAT EXCHANGER SPD TASK DATA SHEET

### Tools:

EV1 (FF)	EV2 (FF)
1.0-in SPDs (2)	N/A
MMOD Shield T-handle tool (2)	

### EVA Fasteners:

Fastener Name	Label	Head Size	Qty	Install Torque (ft-lb)	Release Torque (ft-lb)	Failure Torque (ft-lb)	Turns	RPM
¼ Turn Fastener	---	1/4	3	2.5-3.3	2.5-3.3	5.8	1/4	Manual

### EVA QDs:

From S0	To HX	Clamps (#)	QD Size	Function
F77	M3	N/A	1.0-in	
F76	M4	N/A	1.0-in	

### Foot Restraints:

Task	WIF	APFR Setting
None		

### Other:

- WVS closeouts required for QD with SPD installed
- Button depress tool may not fit on QDs

### Notes / Cautions / Warnings:

- QDs are limited to 1 troubleshooting cycle
- Do not rotate or side load QD when valve open
- Ammonia contamination risk exists when QD button is depressed and bail starts to move
- Do not close QD – could result in loop shutting down
- MMOD Shields: Shield underside can be easily damaged; use caution when handling
- MMOD Shield ¼ turn fasteners may have a sharp edge

### Timeline Impacts

- Required as soon as possible
- Wet QDs should be scheduled early in EVA to allow time for Ammonia bakeout / decontamination if required
- MCC is preconditioning loop B about 1 hour prior to the EVA to drop temperature to aid in reducing pressure inbetween QD seals
- MCC will run internal cooling system on a single loop in case the external loop is shut down as a result of QD valve accidentally closing or being closed because of a leak

**P1 PUMP MODULE SPD INSTALLATION (00:35)**

**EVA 3**

TASK (PET)	IV/SSRMS	EV1 (FF)	EV2
<p>00:00 (02:35)</p> <p> <input type="checkbox"/> F171/M1  <input type="checkbox"/> F170/M2  <input type="checkbox"/> F176/M3                 </p> <p> <input type="checkbox"/> F177/M4                 </p> <p>WVS: EV1 – center cam (closeup of each SPD installed on QD)</p> <p>00:35 (03:10)</p> <p>Tool Inventory:  <input type="checkbox"/> Empty fish stringer  <input type="checkbox"/> 2 MMOD T-handle tools                 </p>		<p>1. Translate to S0 handrail bridge; retrieve safety tether</p> <p>2. Translate to port MTS strut; perform safety tether swap</p> <p>3. Retrieve crewlock bag #1; translate to pump module worksite</p> <p>4. Retrieve 1.5-in SPDs (3) and 0.5-in SPD</p> <p>5. Remove face 1 thermal shroud</p> <p>6. Perform for F171/M1, F170/M2 and F176/M3:</p> <ul style="list-style-type: none"> <li>• Install aft part of SPD</li> <li>• Pull bail aft against SPD</li> <li>• Install fwd part of SPD</li> <li>• Push bail against fwd SPD; √ button down</li> </ul> <p>7. Perform for F177/M4:</p> <ul style="list-style-type: none"> <li>• Pull bail aft ~ ¼ inch (until aft white line hidden)</li> <li>• Install SPD (slider aft)</li> <li>• Push SPD slider forward</li> <li>• Secure bail in SPD slider; engage lock button</li> </ul> <p>8. Wire tie 1.5-in SPDs (3) to fluid line, bail or surrounding structure                      ← <input type="checkbox"/></p> <p>9. Install face 1 thermal shroud</p> <p>10. Retrieve crewlock bag #1 &amp; perform Tool Inventory                      ← <input type="checkbox"/></p> <p>COMPLETE</p>	

# P1 PUMP MODULE SPD TASK DATA SHEET

**Tools:**

EV1 (FF)	EV2 (FF)
1.5-in SPDs (3)	N/A
0.5-in SPD	

**EVA Fasteners:**

Fastener Name	Label	Head Size	Qty	Install Torque (ft-lb)	Release Torque (ft-lb)	Failure Torque (ft-lb)	Turns	RPM
None								

**EVA QDs:**

From P1	To Pump Module	Clamps (#)	QD Size	Function
F171	M1	N/A	1.5-in	
F170	M2	N/A	1.5-in	
F176	M3	N/A	1.5-in	
F177	M4	N/A	0.5-in	

**Foot Restraints:**

Task	WIF	APFR Setting
None		

**Other:**

- WVS closeouts required for QD with SPD installed

**Notes / Cautions / Warnings:**

- QDs are limited to 1 troubleshooting cycle
- Do not rotate or side load QD after valve open

**Timeline Impacts**

- Required for 12A.1 prior to filling system with ammonia

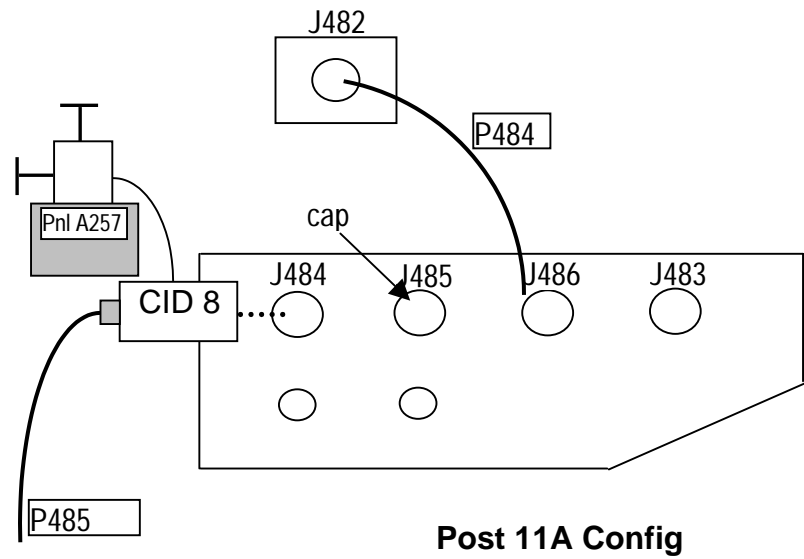
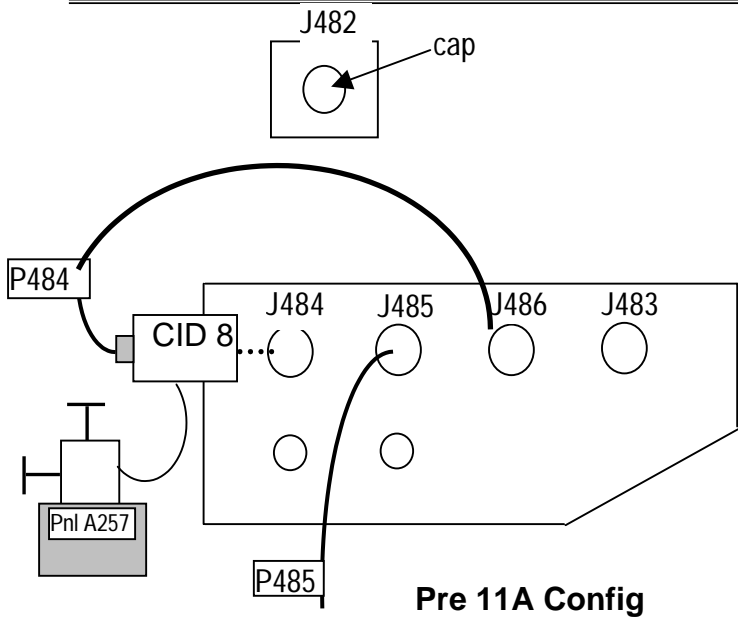
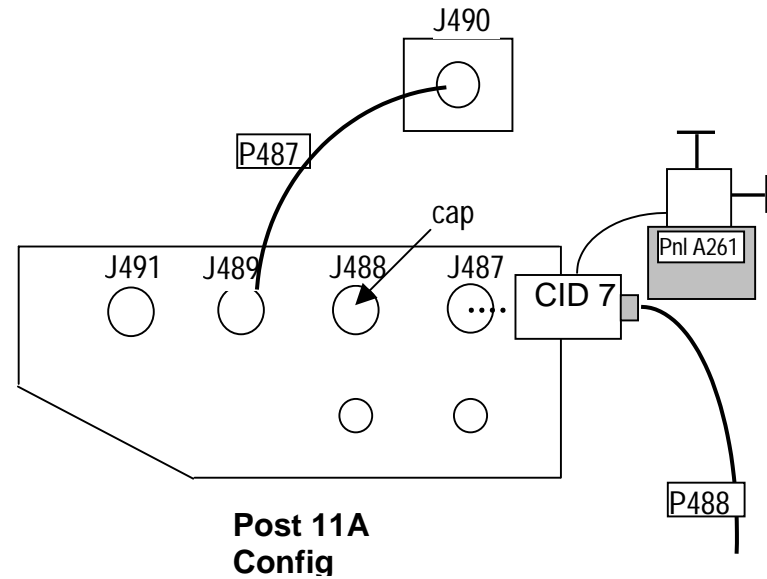
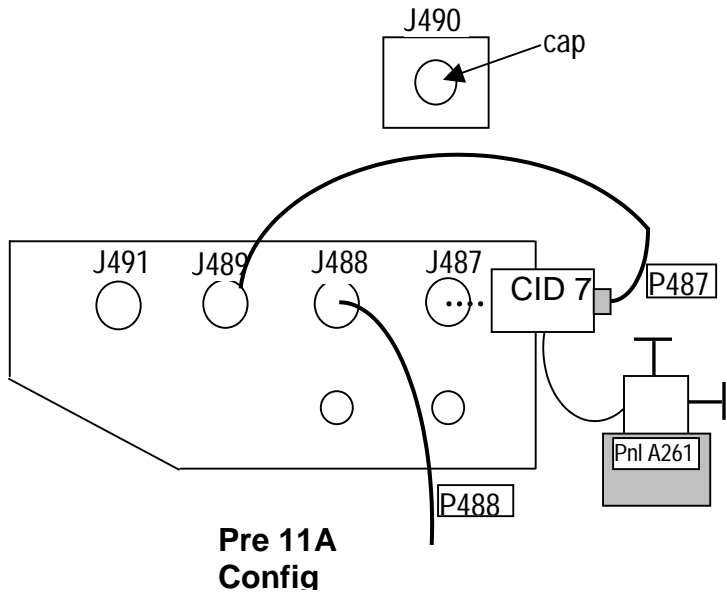


**CID 7 & 8 MBSU RECONFIG (00:40)**

**EVA 3**

TASK (PET)	IV/RMS	EV1 (FF)	EV2
00:00 (03:10)	<p><u>INITIAL CONFIG:</u> APFR: S0 WIF 47 - 9,PP,F,12</p> <p>√ MCC Go for CID 7 MBSU Bypass Jumper Reconfig If no comm...: * √ MBSU 2 RBI 8 – OPEN *</p> <p>* √ RBI 1 – OPEN *</p>	<p><u>CID 7 RECONFIG (NADIR-2B) (00:20)</u></p> <ol style="list-style-type: none"> <li>1. Translate to S0 Bay 04; temp stow crewlock bag #1</li> <li>2. Remove APFR from WIF 47 to WIF 48</li> <li>3. Configure APFR 4,PP,F,12</li> <li>4. CID 7 – OFF (open)</li> </ol> <p>← <input type="checkbox"/></p> <ol style="list-style-type: none"> <li>5. Tether and remove cap from J490</li> <li>6. Demate P487 from CID 7</li> <li>7. Mate P487 to J490</li> <li>8. Demate P488 from J488</li> <li>9. Mate P488 to CID 7</li> <li>10. Install cap on J488</li> </ol>	
00:20 (03:30)	<p>√ MCC Go for CID 8 MBSU Bypass Jumper Reconfig If no comm...: * √ MBSU 4 RBI 8 – OPEN *</p> <p>* √ RBI 1 – OPEN *</p>	<p><u>CID 8 RECONFIG (ZENITH-4B) (00:20)</u></p> <ol style="list-style-type: none"> <li>11. Relocate APFR to S0 WIF 47</li> <li>12. Configure APFR 9,PP,F,11 (APFR roll A or B for initial installation)</li> <li>13. CID 8 – OFF (open)</li> </ol> <p>← <input type="checkbox"/></p> <ol style="list-style-type: none"> <li>14. Tether and remove cap from J482</li> <li>15. Demate P484 from CID 8</li> <li>16. Mate P484 to J482</li> <li>17. Demate P485 from J485</li> <li>18. Mate P485 to CID 8</li> <li>19. Install cap on J485</li> <li>20. Remove APFR; install in WIF S0-42: P=PP,R=F</li> </ol>	
00:40 (03:50)		COMPLETE	

# CID 7 & 8 MBSU RECONFIG OVERVIEW



## CID 7 & 8 MBSU RECONFIG TASK DATA SHEET

### Tools:

EV1 (FF)	EV2 (FF)
APFR	N/A

### EVA Fasteners:

Fastener Name	Label	Head Size	Qty	Install Torque (ft-lb)	Release Torque (ft-lb)	Failure Torque (ft-lb)	Turns	RPM
None								

### EVA Connectors:

Jumper	From	To	Clamps (#)	Conn Size	Function
Dustcap	J490	J488	N/A		
P487	CID 7 box	J490	N/A		
P488	J488	CID 7 box	N/A		
Dustcap	J482	J485	N/A		
P483	CID 8 box	J482	N/A		
P485	J485	CID 8 box	N/A		

### Foot Restraints:

Task	WIF	APFR Setting
CID 7 Reconfig	WIF S0-48	4,PP,F,12
CID 8 Reconfig	WIF S0-47	9,PP,F,11

### Other:

- WVS closeouts required for final CID 7 & 8 MBSU wiring

### Notes / Cautions / Warnings:

- Inhibits required prior to MBSU rewiring

### Timeline Impacts

- Required for 12A in order to provide power to P3/P4
- APFR used because electrical harnesses are large
- CID 7/8 closed at beginning of EVA in order to power S0 MBSUs, S0 DDCUs, S1 and P1 DDCUs so this hardware can be checked out. This checkout required about 2.5 hours.
- CID 7/8 cannot be closed and left in that config overnight because the MBSUs will overheat. With the CIDs closed, the MBSUs are automatically powered and cannot be turned off.
- MBSU panel reconfig must happen before MT translation because it is located inside S0, bay 04

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## S0 SHUNT JUMPER SPD TASK DATA SHEET

### Tools:

EV1 (FF)	EV2 (FF)
1.0-in SPDs (4)	N/A

### EVA Fasteners:

Fastener Name	Label	Head Size	Qty	Install Torque (ft-lb)	Release Torque (ft-lb)	Failure Torque (ft-lb)	Turns	RPM
None								

### EVA QDs:

Fluid Line	Receptacle	Clamps (#)	QD Size	Function
F212	M5	N/A	1.0-in	
F212 (F213)	M6	N/A	1.0-in	
F210	M3	N/A	1.0-in	
F211	M4	N/A	1.0-in	

### Foot Restraints:

Task	WIF	APFR Setting
None		

### Other:

- WVS closeouts required for QD with SPD installed

### Notes / Cautions / Warnings:

- QDs are limited to 1 troubleshooting cycle
- Do not rotate or side load QD after valve open
- S0 port jumper F213 was inadvertently labeled F212 on the bootie and the line. The male is correctly labeled on the panel

### Timeline Impacts

- Required for 12A.1 before system is filled with ammonia
- INC-6 has trained to do this task if 11A cannot do it

## ATA UMBILICAL MATE (00:45)

## EVA 3

TASK (PET)	IV/SSRMS	EV1 (FF)	EV2
00:00 (03:50)	SSRMS: ATA Viewing             Notify MCC opening ATA F175   <input type="checkbox"/> F175/M3		<ol style="list-style-type: none"> <li>Translate to ATA</li> <li>Retrieve 0.5-in SPD from crewlock bag #2</li> <li>Release shrouds covering NTA and ATA</li> <li>Release TA clamps (6) on NTA lines (2) (leave 1 closed on each line)</li> <li>Release TA clamp on each ATA fluid lines</li> <li>Perform following demates\mates:           <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p style="text-align: center;"><b>CAUTION</b></p> <p style="text-align: center;">While mating QDs, verify safety tether not routed under lines</p> </div> <p><b>NADIR:</b></p> <ol style="list-style-type: none"> <li>Tether and demate ATA M1 and M3 dust caps</li> </ol> <p><u>ATA to PM</u></p> <ol style="list-style-type: none"> <li>Demate ATA F175 from M5; install dust cap on M5</li> <li>Inspect female and male QDs</li> <li>Mate ATA F175 to ATA M3 as follows:               <ul style="list-style-type: none"> <li>✓ Release ring pulled back, fwd white band not visible</li> <li>• Mate QD to male, fwd white band visible</li> <li>• Snap-back test: fwd white band still visible</li> <li>• Pull test</li> <li>• Check gap</li> </ul> </li> <li>← <input type="checkbox"/> Open valve (bail fwd); install SPD with slider aft</li> <li>Push SPD slider fwd</li> <li>Secure bail in slider; engage lock button</li> <li>Install MLI flap and QD bootie</li> </ol> </li> </ol>

**ATA UMBILICAL MATE (00:45) (Cont)**

**EVA 3**

TASK (PET)	IV/SSRMS	EV1 (FF)	EV2
	<p>√ MCC Go for opening NTA F173  <input type="checkbox"/> F173/M1</p> <p>WVS: EV2 center cam (All fluid connections to ATA)</p> <p><input type="checkbox"/> F174/M4</p>		<p><u>NTA to ATA</u></p> <p>15. Demate NTA F173 from M2; install dust cap on M2</p> <p>16. Inspect female and male QDs</p> <p>17. Mate NTA F173 to ATA M1 as follows:</p> <ul style="list-style-type: none"> <li>• √ Release ring pulled back, fwd white band not visible</li> <li>• Mate QD to male, fwd white band visible</li> <li>• Snap-back test: fwd white band still visible</li> <li>• Pull test</li> <li>• Check gap</li> </ul> <p>← <input type="checkbox"/></p> <p>18. Open valve (bail fwd); lock collar &amp; install bootie</p> <p>← <input type="checkbox"/></p> <p><b>ZENITH:</b></p> <p>19. Tether and demate ATA M2 and M4 dust caps</p> <p><u>ATA to Vent Panel</u></p> <p>20. Demate ATA F174 from M6; install dust cap on M6</p> <p>21. Inspect female and male QDs</p> <p>22. Mate ATA F174 to ATA M4 as follows:</p> <ul style="list-style-type: none"> <li>• √ Release ring pulled back, fwd white band not visible</li> <li>• Mate QD to male, fwd white band visible</li> <li>• Snap-back test: fwd white band still visible</li> <li>• Pull test</li> <li>• Check gap</li> </ul> <p>23. Open valve (bail fwd); lock collar &amp; install bootie</p>



**ATA UMBILICAL MATE (00:45) (Cont)**

**EVA 3**

TASK (PET)	IV/SSRMS	EV1 (FF)	EV2
00:45 (04:35)	<p>√ MCC Go for opening NTA F172  <input type="checkbox"/> F172/M2</p> <p>WVS: EV2 center cam (All fluid connections to ATA)</p>		<p><u>NTA to ATA</u></p> <p>24. Demate NTA F172 from M3; install dust cap on M3</p> <p>25. Inspect female and male QDs</p> <p>26. Mate NTA F172 to ATA M2 as follows:</p> <ul style="list-style-type: none"> <li>• √ Release ring pulled back, fwd white band not visible</li> <li>• Mate QD to male, fwd white band visible</li> <li>• Snap-back test: fwd white band still visible</li> <li>• Pull test</li> <li>• Check gap</li> </ul> <p>← <input type="checkbox"/></p> <p>27. Open valve (bail fwd); lock collar &amp; install bootie</p> <p>← <input type="checkbox"/></p> <p>24. Verify umbilicals clear of shroud, reinstall thermal shrouds</p> <p>COMPLETE</p>

## ATA UMBILICAL MATE TASK DATA SHEET

### Tools:

EV1 (FF)	EV2 (FF)
N/A	0.5-in SPD

### EVA Fasteners:

Fastener Name	Label	Head Size	Qty	Install Torque (ft-lb)	Release Torque (ft-lb)	Failure Torque (ft-lb)	Turns	RPM
None								

### EVA QDs:

Jumper	From	To	Clamps (#)	QD Size	Function
ATA F175	ATA M5	ATA M3	1	0.5-in	Pump module to ATA
QD Cap	ATA M3	ATA M5	N/A	0.5-in	
NTA F173	NTA M2	ATA M1	3	0.5-in	
QD Cap	ATA M1	NTA M2	N/A	0.5-in	
ATA F174	ATA M6	ATA M4	1	0.5-in	ATA to vent line
QD Cap	ATA M4	ATA M6	N/A	0.5-in	
NTA F172	NTA M3	ATA M2	3	0.5-in	
QD Cap	ATA M2	NTA M3	N/A	0.5-in	

### Foot Restraints:

Task	WIF	APFR Setting
None		

### Other:

- WVS closeouts required for QD with SPD installed and final ammonia line mates

### Notes / Cautions / Warnings:

- QDs are limited to 1 troubleshooting cycle
- Do not rotate or side load QD when valve open

### Timeline Impacts

- Required by 12A.1 in order to fill system with ammonia
- MCC is doing a leak check after each valve is opened

**S1 PUMP MODULE SPD INSTALLATION (01:10)**

**EVA 3**

TASK (PET)	IV/SSRMS	EV1	EV2 (FF)
<p>00:00 (04:35)</p> <p>If EV1,2 complete with S0/P1 tasks, notify MCC Go for MT translation to WS4</p> <p><input type="checkbox"/> F44/M1 <input type="checkbox"/> F45/M2 <input type="checkbox"/> F48/M3</p> <p><input type="checkbox"/> F49/M4</p> <p>WVS: EV2 – center cam (closeup of SPD installed on QD)</p> <p>01:10 (05:45)</p>			<p>1. Translate to port MTS strut; perform safety tether swap to airlock tether</p> <p>2. Stow truss safety tether on S0 handrail bridge</p> <p>3. Retrieve 1.5-in SPDs (3) and 0.5-in SPD from crewlock bag #3</p> <p>4. Remove face 1 thermal shroud ← <input type="checkbox"/></p> <p>5. Perform for F44/M1, F45/M2 and F48/M3:</p> <ul style="list-style-type: none"> <li>• Install aft part of SPD</li> <li>• Pull bail aft against SPD</li> <li>• Install fwd part of SPD</li> <li>• Push bail against fwd SPD; ✓ button down</li> </ul> <p>6. Perform for F49/M4:</p> <ul style="list-style-type: none"> <li>• Pull bail aft ~0.25 inches</li> <li>• Install SPD (slider aft)</li> <li>• Push SPD slider forward</li> <li>• Secure bail in SPD slider; engage lock button</li> </ul> <p>7. Wire tie 1.5-in SPDs (3) to fluid line, bail or surrounding structure ← <input type="checkbox"/></p> <p>8. Install face 1 thermal shroud</p> <p>9. Retrieve crewlock bag #2</p> <p>COMPLETE</p>

# S1 PUMP MODULE SPD TASK DATA SHEET

**Tools:**

EV1 (FF)	EV2 (FF)
1.5-in SPDs (3)	N/A
0.5-in SPD	

**EVA Fasteners:**

Fastener Name	Label	Head Size	Qty	Install Torque (ft-lb)	Release Torque (ft-lb)	Failure Torque (ft-lb)	Turns	RPM
None								

**EVA QDs:**

From P1	To Pump Module	Clamps (#)	QD Size	Function
F44	M1	N/A	1.5-in	
F45	M2	N/A	1.5-in	
F48	M3	N/A	1.5-in	
F49	M4	N/A	0.25-in	

**Foot Restraints:**

Task	WIF	APFR Setting
None		

**Other:**

- WVS closeouts required for QD with SPD installed

**Notes / Cautions / Warnings:**

- QDs are limited to 1 troubleshooting cycle
- Do not rotate or side load QD after valve open

**Timeline Impacts**

- Required for 12A.1 before system is filled with ammonia
- INC-6 is trained to do this task if 11A cannot complete it
- MT translation can begin after both EVs are working on S1. Waiting until the crew is on S1 minimizes the safety tether reconfigurations (across face 1) required before the MT can translate.

**S1 FHRC SPD INSTALLATION (00:45)**

**EVA 3**

TASK (PET)	IV/SSRMS	EV1 (FF)	EV2
<p>00:00 (05:00)</p> <p>00:45 (05:45)</p>	<p>If EV1,2 complete with S0/P1 tasks, notify MCC Go for MT translation to WS4</p> <p><input type="checkbox"/> F41 / M4 <input type="checkbox"/> F43 / M6</p> <p>WVS: EV2 – center cam (closeup of each SPD installed)</p> <p><input type="checkbox"/> F40 / M3 <input type="checkbox"/> F42 / M5</p> <p>WVS: EV1 – center cam (closeup of each SPD installed)</p>	<p>← <input type="checkbox"/></p> <ol style="list-style-type: none"> <li>1. Temp stow crewlock bag #3 near FHRC worksite</li> <li>2. Retrieve 1.5-in SPDs (2)</li> <li>3. If req'd, remove FHRC shrouds</li> <li>4. For fwd QDs, F41/M4 and F43/M6:               <ul style="list-style-type: none"> <li>• From truss interior, remove booties</li> <li>• Install aft part of SPD from button side</li> <li>• Pull bail against aft SPD</li> <li>• From fwd face, install fwd part of SPD opposite button side</li> <li>• Push bail against fwd SPD; ✓ button down</li> </ul> </li> <li>5. Retrieve 1.5-in SPDs (2) from crewlock bag #3</li> <li>← <input type="checkbox"/></li> <li>6. Install booties on F41 and F43</li> <li>7. For aft QDs, F40/M3 and F42/M5:               <ul style="list-style-type: none"> <li>• From truss interior, remove booties</li> <li>• Install aft part of SPD from button side</li> <li>• Pull bail against aft SPD</li> <li>• Install fwd part of SPD from button side</li> <li>• Push bail against fwd SPD; ✓ button down</li> </ul> </li> <li>← <input type="checkbox"/></li> <li>• Install booties</li> <li>8. If req'd, reinstall FHRC shrouds (2)</li> <li>9. ✓ SAFER Man Isol vlv – OP (dn)</li> </ol> <p>COMPLETE</p>	<p><b>EV2</b></p>

## S1 FHRC SPD TASK DATA SHEET

### Tools:

EV1 (FF)	EV2 (FF)
1.5-in SPDs (4)	N/A

### EVA Fasteners:

Fastener Name	Label	Head Size	Qty	Install Torque (ft-lb)	Release Torque (ft-lb)	Failure Torque (ft-lb)	Turns	RPM
None								

### EVA Connectors:

Jumper	From S1	To FHRC	Clamps (#)	QD Size	Function
	F41	M4	N/A	1.5-in	
	F43	M6	N/A	1.5-in	
	F40	M3	N/A	1.5-in	
	F42	M5	N/A	1.5-in	

### Foot Restraints:

Task	WIF	APFR Setting
None		

### Other:

- WVS closeouts required for QD with SPD installed

### Notes / Cautions / Warnings:

- QDs are limited to 1 troubleshooting cycle
- Do not rotate or side load QD after valve open

### Timeline Impacts

- Required for 12A.1 before system is filled with ammonia
- INC-6 is trained to do this task if 11A cannot complete it
- MT translation can begin after both EVs are working on S1. Waiting until the crew is on S1 minimizes the safety tether reconfigurations (across face 1) required before the MT can translate.

**EVA 3 CLEANUP/INGRESS (00:40)**

TASK (PET)	IV/SSRMS	EV1	EV2
00:00 (05:45)		<p><u>CLEANUP</u> (00:30)</p> <ol style="list-style-type: none"> <li>1. Perform TOOL INVENTORY</li> <li>2. Translate to crewlock; stow safety tether on S0 handrail bridge</li> <li>4. Ingress crewlock</li> <li>5. Connect left waist tether to UIA panel D-ring</li> <li>6. Disconnect from crewlock safety tether, unlock, stow on hatch HH standoff D-ring</li> <li>7. Receive crewlock bag #2 from EV2</li> </ol>	<p><u>CLEANUP</u> (00:30)</p> <ol style="list-style-type: none"> <li>1. Retrieve crewlock bag #2, stow on BRT</li> <li>2. Perform TOOL INVENTORY</li> <li>3. Translate to truss safety tether at P1 WIF 19; perform safety tether swap</li> <li>4. Stow SSRMS safety tether on EMU d-ring</li> <li>5. Translate to port MTS strut; swap to airlock tether</li> <li>6. Translate to crewlock; stow truss safety tether on S0 handrail bridge</li> <li>5. Transfer crewlock bag #2 to EV1</li> </ol>
00:30 (06:15)		<p><u>INGRESS</u></p> <p>DCM 8. Water – OFF</p>	<p><u>INGRESS</u> (00:10)</p> <ol style="list-style-type: none"> <li>6. Ingress Joint A/L</li> <li>7. Connect waist tether to crewlock internal D-ring</li> <li>8. Disconnect from crewlock safety tether, unlock, stow on hatch HH standoff D-ring</li> <li>9. Hatch thermal cover – close</li> </ol>
00:40 (06:25)		<p>9. Go to PRE REPRESS (<u>DEPRESS/REPRESS</u> Cue Card)</p>	<p>DCM 10. Water – OFF</p> <ol style="list-style-type: none"> <li>11. Outer Hatch – close and lock</li> <li>12. Go to PRE REPRESS (<u>DEPRESS/REPRESS</u> Cue Card)</li> </ol>

## POST EVA 3 TOOL CONFIG

### EV1

#### EMU D-Rings

- 1 - Waist Tethers (Lf)

#### MWS

- 2 - Wire ties
- 1 - Adj tether (Rt D-ring)
- 1 - RET (Rt D-ring)
- 1 - RET (Rt D-ring)
- 1 - RET (Lf D-ring)
- 1 - RET w/ pip pin (Lf D-ring)
- Swing Arm (Rt)
  - EVA Camera (inside)
  - Sm trash bag (outside)
- BRT (Lf)
- SAFER

### EV2

#### EMU D - Rings

- 1 - Tether Extender (Lf)
- 2 - Waist Tethers
- 2 - Adj tethers (1 ea. wrist)

#### MWS

- 2 - Wire ties
- 1 - RET (Rt D-ring)
- 1 - RET (Lf D-ring)
- 1 - RET w/ pip pin (Rt D-ring)
- Trash bag (Lf rear)
- Safety Tether (SSRMS)
- Swing Arm (Rt)
  - EVA camera
- BRT (Lf w/ 2 wire ties)
- SAFER

### CREWLOCK D-RING

- Tether Extender
  - Crew Hook Lock
  - RET

### TETHER SUMMARY

- 12 -sm-sm RETs
- 2 -sm-sm RETs w/ pip pin
- 3 -lg-sm RETs
- 5 -Adj
- 5 -Fish Stringers

### CREWLOCK

- 1 - Waist Tether (on UIA Rt d-ring)
- √ SCU Routing (EV2-zenith of nadir/fwd handrail)
- Fluid QD Stowage Bag (port zenith handrail)
  - 2 Adj Tethers
- Crewlock bag #1 (EV1)
- Lg-sm RET (to Rt UIA)
  - Fish stringer
  - Wire tie caddy on integral C/L RET
  - MMOD T-handle tools (2) on integral C/L RETs
- Crewlock bag #2 (EV2)
- Lg-sm RET (to Lf UIA)
  - Fish stringer
  - Fish stringer
  - WIF Adapter
    - RET
  - RET
- Crewlock bag #3 (S0/S1 SPDs)
- Lg-sm RET
  - Fish stringer
  - RET
  - Wire tie caddy
  - RET

### CREWLOCK (Cont'd)

- Staging Bag
  - Fish Stringer w/ QD Tools:
    - 1.5-in QRT (FHRC/Stinger Cont)
    - ¾-1 in QRT (
    - 1.5-in QD Bail Lever (FHRC/Stinger Cont)
    - ¾-1 in QD Bail Lever
    - 1-in QD Cap Tool
    - ½-in QD Cap Tool
    - 1-in Button Depress Tool
    - 1-in Anti-Kickback Tool
  - Socket Caddy
    - RET
    - 7/16 X 6-in socket
    - RAD
    - Wire Tie Caddy (in pocket)
    - PGT w/ 6-in socket (s/n 1006) (spare)
      - RET
  - IV Bag
    - EVA Ratchet
    - Socket Caddy
      - ½ X 8-in socket (IV Hatch)
      - 7/16 X 12-in socket
    - Connector Cleaner Tool Caddy
    - Helmet Light Battery (spare)
    - DCM Plug
    - 2 pr - Adj Thermal Mittens
    - Hydrazine Detector Kit

### JOINT A/L EXTERNAL

- 2 - Crewlock Safety Tether w/Hook Lock

### S0

- 2 - Safety Tether w/Hook Lock on port fwd MTS struts
- 2 - Tether Shuttles on S0 handrail bridge




## 11A EVA GET-AHEADs

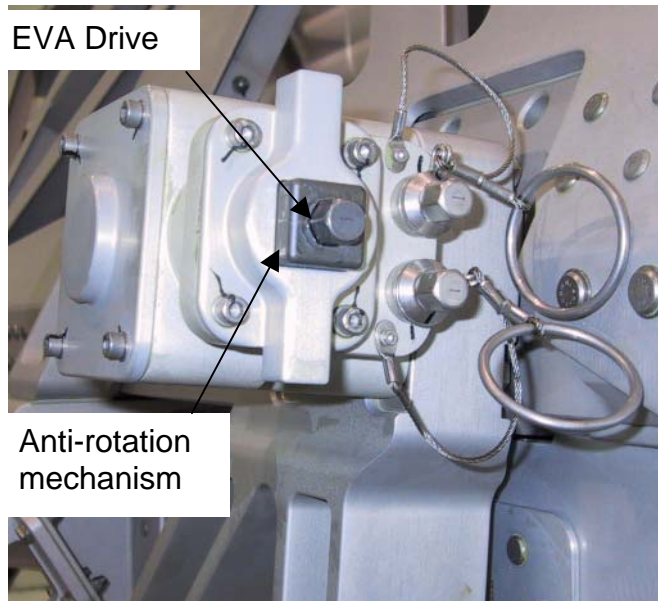
<b>Priority</b>	<b>Task</b>	<b>Estimated Duration</b>
1	Install Fluid QD Toolbag on Airlock	0:30
2	Release Radiator Beam Launch Locks	
3	Deploy UHF Antenna	

### FLUID QD TOOLBAG INSTALLATION (00:30)

TASK (PET)	IV	EV1	EV2
<p>00:00 (XX:XX)</p> <p>00:30 (XX:XX)</p>		<ol style="list-style-type: none"> <li>1. Retrieve Fluid QD toolbag with TBD gap spanners from airlock</li> <li>2. Translate to crewlock zenith/fwd</li> <li>3. Orient bag with handle facing crewlock toolboxes, place between handrails 0557 and 0556</li> <li>4. Ensure that xx corner of bag is no more port than yy</li> <li>5. Hook XX on TBD corner of bag to handrail YY</li> <li>6. Hook XX on TBD corner of bag to handrail YY</li> <li>7. Hook XX on TBD corner of bag to handrail YY</li> <li>8. Hook XX on TBD corner of bag to handrail YY</li> <li>9. Cinch down all straps evenly, verify xx corner of bag is still no more Port than yy.</li> </ol>	

## RADIATOR BEAM LAUNCH LOCK RELEASE (01:45)

TASK (PET)	IV	EV1	EV2
00:00 (00:35)		<ol style="list-style-type: none"> <li>1. <b>PGT: AX, CW 2, X.X, 6-in wobble</b></li> <li>2. Release zenith launch locks in order per <b>per table</b>: Outboard → Inboard</li> <li>3. Open RBVM <b>flaps</b> (near locks <b>TBD</b>)</li> <li>4. Depress hex lock (must be held in during drive rotation) Rotate drive CW 60 – 62 revs</li> <li>5. Rotate lock to stowed position Note: struts will require manual alignment (<b>1 and 9</b>)</li> <li>6. ✓Hinge pin engaged (pull test)</li> <li>7. Deploy shroud over struts <b>1, 2, 4, 6, 7 and 9</b></li> </ol>	<ol style="list-style-type: none"> <li>1. <b>PGT: AX, CW 2, X.X, 6-in wobble</b></li> <li>2. Release nadir launch locks in order per table: Outboard → Inboard leaving nadir center lock <b>#14 for EVA Cleanup</b></li> <li>3. Depress hex lock (must be held in during drive rotation) Rotate drive CW 60 – 62 revs</li> <li>4. Rotate lock to stowed position Note: struts will require manual alignment (<b>10 and 18</b>)</li> <li>5. ✓Hinge pin engaged (pull test)</li> <li>6. Deploy shroud over struts <b>10, 11, 13, 15, 16, and 18</b></li> </ol>
01:45 (02:20)			



## UHF ANTENNA DEPLOY (00:30)

TASK (PET)	IV	EV
00:00  (02:05)	Receive GO from ISS (or MCC-H) for UHF cable connect  (√ Inhibits): UHF ANTENNA POWER SAFING, steps <b>TBD</b> (SODF: ASSY OPS: EPS)          WVS: EV center cam: Base bolt, cable routing, connections, deployed antenna	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center;"><u>CAUTION</u> UHF cylinders very sensitive to contact. Avoid touching or routing tethers nearby</p> </div> <p><u>ANTENNA ROTATE / INSTALL</u> <b>(XX:XX)</b></p> <ol style="list-style-type: none"> <li>1. Translate to UHF antenna</li> <li>2. BRT to vertical handrail located along center of zenith side of P1</li> <li>3. <b>PGT: A7, CCW 2, 30.5</b> Release bolt 1 (port-most), ~10-11 turns.</li> <li>4. <b>PGT: A7, CCW 2, 30.5</b> Release bolts 2 and 3 (mid-section), 10-11 turns</li> <li>5. Stow PGT</li> <li>6. BRT to Top-Mounted Handhold</li> <li>7. Remove Pip Pin</li> </ol> <p style="text-align: center;"><b><u>NOTE</u></b> To limit impact forces, maximum rotational rate of UHF antenna should not exceed 6 deg/sec</p> <ol style="list-style-type: none"> <li>8. Deploy boom and engage zip nut</li> <li>9. Re-install Pip Pin</li> <li>10. <b>PGT: A2, CW 2, 10.5.</b> Tighten boom base bolt.</li> </ol> <p><u>CABLE CONNECT</u> <b>(XX:XX)</b></p> <ol style="list-style-type: none"> <li>11. Remove, temp stow antenna connector cap J402 on panel A51</li> <li>12. Release cable from TA clamps (3)</li> <li>13. Demate P3 from <del>panel A25</del> UHF antenna panel A25 dummy (J13)</li> <li>14. Mate P3 to J402</li> <li>15. Restrain cable in TA clamps (<b>2</b>), close all clamps</li> <li>16. Stow connector cap on panel A25 dummy (J13)</li> </ol>

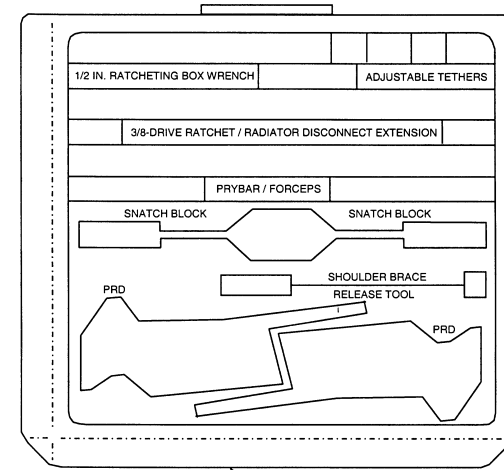
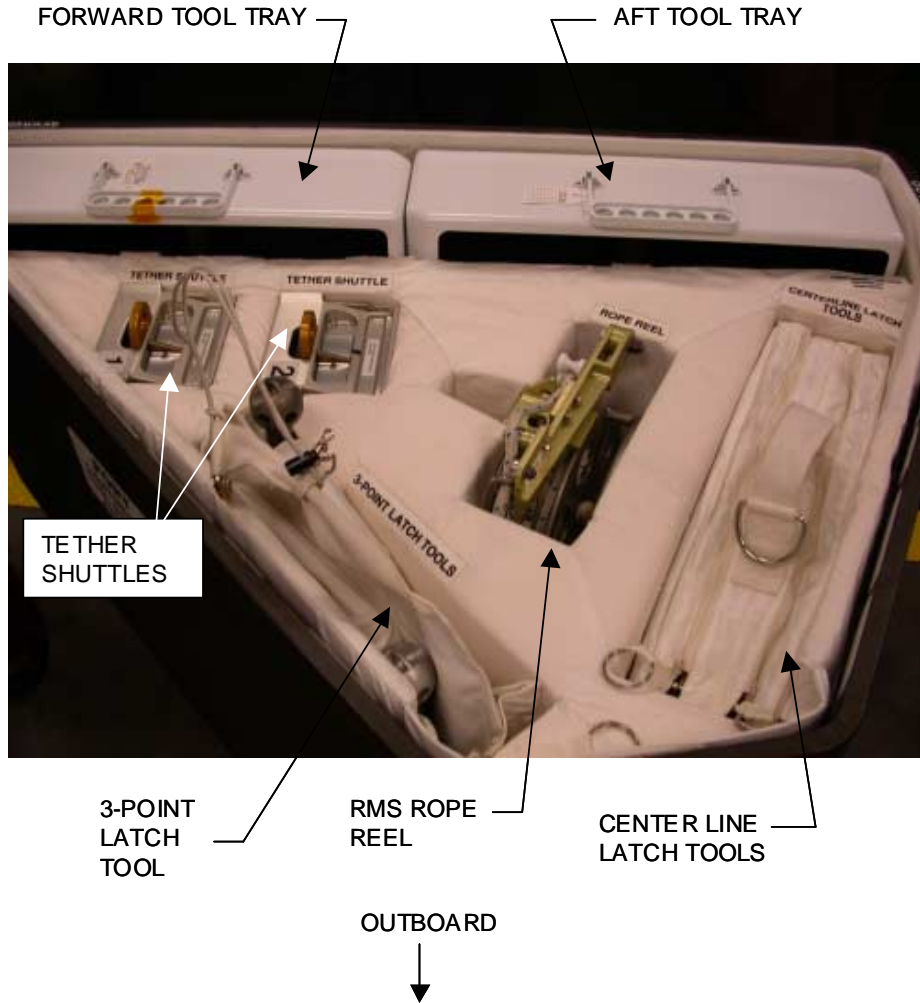
TOOLS AND STOWAGE

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TOOLS AND  
STOWAGE

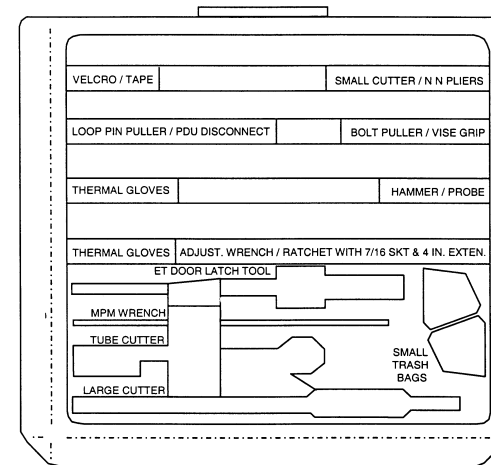
# TOOLS AND STOWAGE

## PORT LIGHTWEIGHT TOOL STOWAGE ASSEMBLY



V849-660502-001  
TRAY ASSY

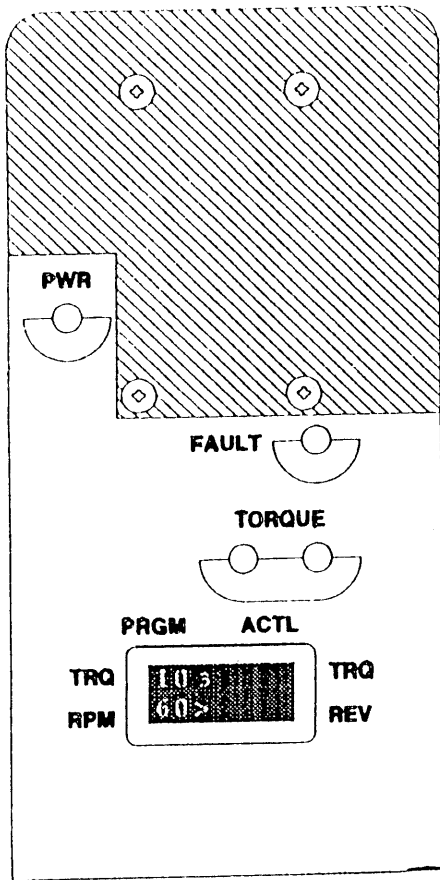
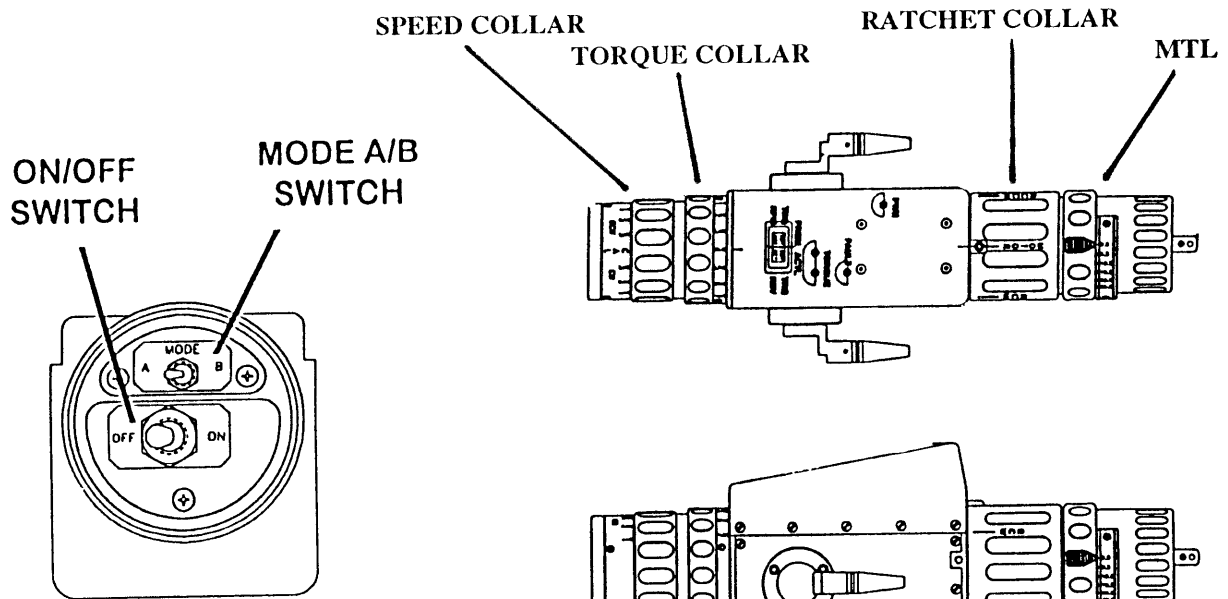
FORWARD TRAY LAYOUT & LABEL CONFIG



V849-660501-001  
TRAY ASSY

AFT TRAY LAYOUT & LABEL CONFIG

# PISTOL GRIP TOOL



LEDs AND DISPLAY

# STS-113 PGT SETTINGS TABLE

## TORQUE SETTINGS:

SETTING	TORQUE SETPOINT (FT-LB)	TORQUE WINDOW	TORQUE THRESHOLD	TURN LIMIT
A1	2.5	±1.0	±1.0	Infinite
A2	3.8	±1.0	±1.0	Infinite
A3	4.8	±1.0	±1.0	Infinite
A4	6.3	±1.0	±1.0	Infinite
A5	7.0	±1.0	±1.0	Infinite
A6	8.3	±1.0	±1.0	Infinite
A7	9.2	±1.0	±1.0	Infinite
B1	12.0	±1.0	±1.0	Infinite
B2	16.0	±1.2	±1.0	Infinite
B3	18.4	±1.7	±1.0	Infinite
B4	19.4	±1.9	±1.0	Infinite
B5	22.0	±2.0	±1.0	Infinite
B6	24.0	±2.0	±1.0	Infinite
B7	25.5	±2.0	±1.0	Infinite

## SPEED SETTINGS:

SETTING	RPM
CW1	10
CW2	30
CW3	60
CCW1	10
CCW2	30
CCW3	60

## POWER MANAGEMENT:

FUNCTION	MIN
Auto Sleep	15
Auto Off	30

## MULTI-SETTING TORQUE LIMITER (MTL) SETTINGS

(ft-lb)
2.5
5.5
10.5
15.5
23.5
30.5



## ISS EMU EQUIPMENT BY ITEM

ITEM	LOCATION	QTY
4" Ext, 1/4" Drive	A/L101_A2(bin D2)	1
1/2" Socket, 1/4" Drive	A/L101_A2(bin D2)	1
5/32" Hex Head, 1/4" Drive	A/L101_A2(bin D2)	1
3" Common Tip Screwdriver	A/L101_A2(bin D2)	1
6" Long Adjustable Wrench	A/L101_A2(bin D2)	1
#0 Phillips Screwdriver	A/L101_A2(bin D2)	1
Airlock Contingency Tool Kit	A/L101_A2(bin D2)	1
Battery, EMU	M-02 Bag	5
Battery, PGT	BSA	5
Battery, REBA	M-02 Bag/ISS EMUs	4
Bends Treatment Adapter	M-02 Bag	1
CCC (EMU Metox)	CTB S/N 1234/M-02	8
CDMK	LAB1D4_A2	1
CEVIS shoes	ISS CEVIS shoe bag	1 pr
Charger, Battery Pack Assy. (EHIP Charger)	A/L100, 1.0 CTB	2
Charger, Middeck EMU Battery	M-02 Bag	1
Charger, REBA	A/L100, 1.0 CTB	2
Cooling Loop Jumper	M-02 bag (EMU Eq. Bag)	1
CSA-CP	LAB1D4	2
Cue Card, Depress/Repress	C-Lk	1
Cuff Checkilst	EMU Servicing	3
DCM Plug	C-Lk - IV Bag	1
Disposable In-Suit Drink Bags (DIDB) w/ fill tool	M-02 Bag	5
DIDB Restraint Bag	ISS EMUs M-02	3 1
Drive Handle, 1/4" Drive	A/L101_A2(bin D2)	1
EHIP/PGT Y Cable	A/L100, 1.0 CTB	1
EMU Servicing Kit	M-02 Bag	1
EMU TV	CTB 1216, CTB 1063	2
EMU Water Recharge Bag (PWR)	A/L1D1	8
Gold Salt Kit	C-Lk-IV Bag	1

ITEM	LOCATION	QTY
Hardcopy 1.3.501 Hatch Malf Proc	A/L101_A2(bin D2)	1
Heart Rate Monitor	(see Exp 5 crew)	1
Helmet Lights, EHIP	ISS EMUs	2
Helmet Light Bulbs (spot)	A/L100 SPCE Main. Kit	3
Helmet Light Bulbs (flood)	A/L100 SPCE Main. Kit	3
Hydrazine Draeger Tubes (N2O4)	C-Lk-IV Bag	6
ISS Contamination Sampler	C-Lk-IV Bag	2
LTA Donning Handles (pair)	ISS EMU Equip. Bag	1
MAG	Node Deck	8
Masks, Quick Don (prebreathe)	C-Lk PHA Bags PHA Spares Bag	2 1
ORU Tools	SPCE Maintenance Kit, E-Lk CTB 1075	1
PCMCIA Card Kit (2crds)	EMU Servicing Kit	1
PCMCIA Cards (on ISS)	See Exp 5 Crew (Pre-programmed)	2
PHA Bag 60-ft hose	C-Lk	2
PHA Bag 90-ft hose	A/L1D0	1
Pigtail, Biomed	EMU Servicing Kit	4
PSA 28V Utility Adapter	M-02	1
Ratchet, 1/4" Drive	A/L101_A2(bin D2)	1
REBA/BSA Cable	A/L100, 1.0 CTB M-02 Bag	1 1
REBA Jumper Cable	A/L100, 1.0 CTB	1
Roll of Gray Tape	A/L101_A2(bin D2)	1
SAFER w/bag	ISS C-Lk	2
SCOF	ISS EMU Equip. Bag	2
Signal Conditioners	EMU Servicing Kit	4
Sizing Rings, Leg (0.5")	ISS EMU Thomas	1 pr

## ISS EMU EQUIPMENT BY ITEM (Cont)

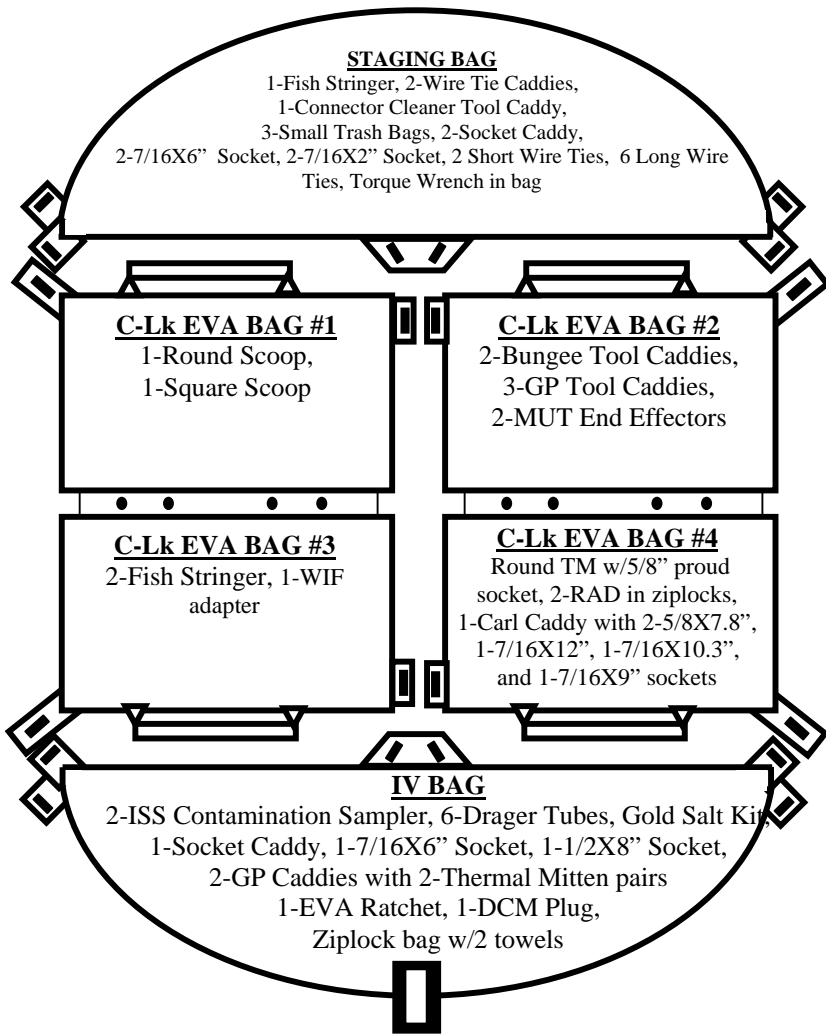
ITEM	LOCATION	QTY
Sizing Ring Kit, Leg (1.0")	ISS EMU Treschev ISS EMU Budarin	1 pr
VAJ Hoses	NOD1P4_D	3
VAJ Hose Coupler (M-M)		1
Valsalva	Servicing Kit	8
Vent Port Plugs, PLSS	ISS EMUs	3 pr
Vice Grips	A/L101_A2(bin D2)	1
Wire Cutters	A/L101_A2(bin D2)	1
Wrist Mirror, EMU	ISS Equip. Bag M-02	4

### ISS EMU EQUIPMENT BY LOCATION

LOCATION	DESCRIPTION	QTY
A/L1D0	PHA (spare)	1
A/L1D0, CTB 1063	EMU TV 1 (S/N 1007)	1
A/L1D1	EMU Water Recharge Bag (PWR)	8
A/L1D1, M-02 bag	Bag, EMU Equipment (Airlock)	1
	Battery, EMU	5
	Battery, REBA	2
	Stowed in ISS EMUs	2
	Bends Treatment Adapter (BTA)	1
	Charger, Middeck EMU Battery	1
	EMU Servicing Kit (S/N 5002)	1
	PSA Utility Adapter	1
	REBA/BSA Cable	1
	DIDB	5
	DIDB Restraint	1
	Metox Canisters	4
	A/L1O0, 1.0 CTB	Charger, EHIP Battery Pack
Charger, REBA Pack Assy.		2
REBA/BSA Cable		1
REBA Jumper Cable		1
EHIP/PGT Cables		2
PGT/EHIP Y-cable		1
A/L1O0, 1.0 CTB 1216	EMU TV 2 (1005)	1
A/L1O0, 0.5 CTB	SPCE Maintenance Kit	1
	Helmet Light Bulbs (spot)	3
	Helmet Light Bulbs (flood)	3
A/L1O1_A2, CTB 1234	Metox Canisters	4
A/L1O1_A2 (bin D2)	Airlock Contingency Tool Kit	1
	4" Ext, 1/4" Drive	1

LOCATION	DESCRIPTION	QTY	
A/L1O1_A2 (bin D2) (Continued)	1/2" Socket, 1/4" Drive	1	
	5/32" Hex Head, 1/4" Drive	1	
	3" Common Tip Screwdriver	1	
	6" Long Adjustable Wrench	1	
	#0 Phillips Screwdriver	1	
	Drive Handle, 1/4" Drive	1	
	Hardcopy1.3.501 Hatch Malf Proc	1	
	Ratchet, 1/4" Drive	1	
	Roll of Gray Tape	1	
	Vice Grips	1	
	Wire Cutters	1	
	BSA	Battery, Helmet Light (EHIP)	9
		Battery, PGT	5
C-Lk	Cue Card, Depress/Repress	1	
	PHA (prime)	2	
	SAFER w/battery	3	
C-Lk, IV Bag (C-Lk)	Gold Salt Kit	1	
	Hydrazine Draeger Tubes (N2O4)	6	
	ISS Contamination Sampler	2	
	DCM Plug	1	
C-Lk, Staging Bag		1	
C-Lk, EVA Bags		4	
C-Lk, 1.0 CTB	EMU Covers	1	
LAB1D4	CSA-CP	2	
	Vacuum Access Jumper	3	
	VAJ Hose Coupler	1	
Node Deck	MAGs - Large	4	
	MAGs - Medium	4	

**POST 9A EVA TOOL STOWAGE**  
**CREWLOCK ENDCONE BAGS**



**EQUIPMENT LOCK ON EMUS**

- A/L1A1 (EMU 1)**  
 MWS Baseplate  
 MWS T-Bar w/ 2 wire ties  
 Right Swing Arm  
 BRT w/2 wire ties

- A/L1F1 (EMU 2)**  
 MWS Baseplate  
 MWS T-Bar w/ 2 wire ties  
 Right Swing Arm  
 BRT w/2 wire ties

**A/L 1D1 ON FLOOR**

- CTB 1161 (PGT HDW)**  
 2-PGTs, 2-PGT Programming Cable  
 1-RS422 Card and adapter,  
 1-PGT battery

- CTB 1013 (MUT&MWS)**  
 2-Tool Carriers, 2-MUT Base,  
 3-MWS End Effector, 1-BRT,  
 3-MWS Left Swing Arm,  
 2-MWS Keystap, 1-MWS base,  
 1-MWS T-bar, 5-Tether Extenders,  
 Ziplock bag with 2-Drop proof tether adapters & 3-money clips (no lanyards),  
 5 Long Wire Ties

**A/L1 O1 A2 CEILING**

- Airlock Contingency IFM Tool Kit

**OTHER CREWLOCK ITEMS**

- 1 - CDRA bed, 1 - CETA Luminare in foam
- 2 - Wireless external video
- 1 - Dbl CTB 1076 Crew Provisions
- 1 - 0.5-in SPD, 4 - 1.0-in SPDs, 7 - 1.5-in SPDs
- 1 - QD Toolbag,
- 1 - 0.25-in Cap Tool, 2 - 0.5-in Cap Tool, 1 - 1.0-in Cap Tool,
- 2 - 1.0-in QRTs, 2 - 1.0-in QRTs,
- 2 - 1.5-in QD Bail Levers, 2 - 1.0-in QD Bail Levers
- 2 - Gap Spanners (-301), 2 - Gap Spanners (-303), 2 - Gap Spanners (-307)
- 2 - Fish Stringers
- 4 - SSAS Contingency Bolts
- 1-7/16X18" socket
- 1 - Ballstack

**CREWLOCK ITEMS**

- 3-SAFER, 3-PBH Bags
- 2-CBM Tether point installed in seat track above IV Hatch
- 1-Lg ORU Transfer Bag, 1-Med ORU Transfer Bag,
- 1-Lg ORU transfer Bag with internal tether loops
- 1-Med ORU transfer Bag with internal tether loops,
- 2-Sm ORU Transfer Bag with internal tether loops
- 1 - tether extender installed on crewlock D ring
- 1 - money clip with lanyard on tether extender

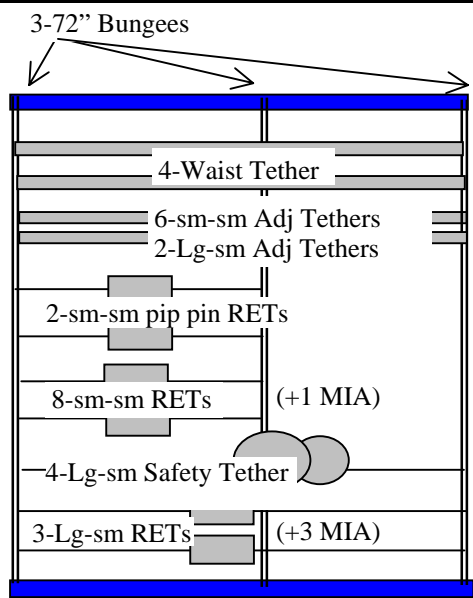
**A/L 1D2 SOFT COVER CLOSEOUT**

- CTB 1222**  
 1-Spare EMU umbilical
- HALF CTB 1055 (O2/N2 Regs..)**  
 2 - 1" QD Extenders (EAS),  
 O2/N2 Regs/Relief valves, 1-CLPA thermal blanket
- CTB 1022 (Unique Tools)**  
 EVA Ohmeter, 5-9V Batteries,  
 2-BMRRM Vice Clamp Tools,  
 6-FLAPS & thermal blankets,  
 NPV bottom cover, NH3 Vent tool,  
 1-0.25" QD Cap Tool,

- Half CTB 1114 (ORLAN EVA)**  
 2 - OTA, 1-APFR/RS Adapter  
 5-Comfort Gloves, 4-Fresnel Lens,  
 3-ORU Tethers, 1-Equip Tether Reel

- HALF CTB 1043 (P/TV)**  
 2-F5 cameras, 1-28 mm lens,  
 1-35mm lens, 1-50 mm lens,  
 2-F5 thermal blanket,  
 2-sport viewfinder, 2-EVA camera mounts, 1-EVA bracket (long)

**TETHER STAGING AREA**  
**ON TOP OF A/L 1D2 ON 20" IV HANDRAILS**



## ISS EVA TOOLS BY ITEM

DESCRIPTION	PART NUM	Q	LOC	COMMENTS
1/4" & 1/2" ALLEN DRIVER	SED39127091-301	3	A/L external	Toolbox 2, slot 5
1/4" & 1/2" ALLEN DRIVER	SED39127091-302	2	A/L external	Toolbox 2, slot 5
3/16" ALLEN DRIVER	SED39123183-301	1	Node bag	Pocket B, on socket caddy
5/32" BALL END ALLEN DR	SEG33108851-301	1	Node bag	Pocket B, on socket caddy
5/32" BALL END ALLEN DR	SEG33108851-301	1	Z1	Port Toolbox Slot #7
5/32" BALL END ALLEN DR	SEG33108851-301	1	Z1	Stbd Toolbox Slot #7
APFR 1	SEG33106857-301	1	S0 WIF 42	(12:00, VV, F, 12)
APFR 2	SEG33106857-301	1	S0 WIF 47	(9:00, PP, F, 12)
APFR 3	SEG33106857-301	1	CETA 1 WIF 1	(6, PP) (3:00, YY, F, 12)
APFR 4 (TS, heat shield)	SEG33106857-301	1	Node WIF 5	(6:00, PP, B, 12)
APFR 5 (TS, ingress aide, heat shield)	SEG33106857-301	1	PMA1 WIF 2	(12:00, KK, F, 6)
APFR 6 (SMDP, heat shield)	SEG33106857-301	1	PMA1 WIF 4	(4:00, PP, A, 6)
APFR 7	SEG33106857-301	1	A/L Toolbox #2 WIF	(6, GG) (9:00, YY, J, 12)
APFR INGRESS AID	SED39127050-303	1	PMA1 WIF 2	On APFR 5
ARTICULATING SOCKET	SED33105422-313	1	Node Bag	Pocket F, on PFR
ARTICULATING SOCKET	SED33105422-313	1	Node bag	Pocket G, in 96 BOLT BAG
BAG, 96 BOLT TOOLS	SEG33110766-301	1	Node bag	Pocket G
BAG, AUX 01	SEG33111904-301	1	Node	attached to Node Bag
BAG, AUX 02	SEG33113891-301	1	P6	P6 Fwd, HR 5313 & 5310
BAG, CREWLOCK EVA #1	SEG33111751-301	1	A/L C-Lk	Stbd endcone, Zenith fwd
BAG, CREWLOCK EVA #2	SEG33111751-303	1	A/L C-Lk	Stbd endcone, Zenith aft
BAG, CREWLOCK EVA #3	SEG33111751-303	1	A/L C-Lk	Stbd endcone, Nadir fwd
BAG, CREWLOCK EVA #4	SEG33111751-301	1	A/L C-Lk	Stbd endcone, Nadir aft
BAG, CREWLOCK IVA	SEG33111739-301	1	A/L C-Lk	Stbd endcone, Nadir
BAG, CREWLOCK STAGING	SEG33111739-303	1	A/L C-Lk	Stbd endcone, Zenith
BAG, MSS w/ EXTENSION CABLES	1F1200-1	1	MBS	Hr 8404 & 8406
BAG, NODE	SEG33110764-301	1	Node bag	HRs 100 & 113
BAG, OHTS	SEG33110765-301	1	Node	attached to Node Bag
BAG, ORU TRANSFER (LG w/ tether loops)	SEG33114494-307	1		
BAG, ORU TRANSFER (LG)	SEG33114494-301	1	A/L C-Lk	
BAG, ORU TRANSFER (MED w/tether loops)	SEG33114494-309	1	A/L C-Lk	
BAG, ORU TRANSFER (MED)	SEG33114494-303	1	A/L C-Lk	
BAG, ORU TRANSFER (SM w/tether loops)	SEG33114494-311	2	A/L C-Lk	
BAG, TRASH (Lg)	SEG33106937-301	1	Z1	Port Toolbox Slot #6
BAG, TRASH (Lg)	SEG33106937-301	1	Z1	Stbd Toolbox Slot #6

DESCRIPTION	PART NUM	Q	LOC	COMMENTS
BAG, TRASH Sm)	SEG33106678-301	3	A/L C-Lk	Staging Bag
BAG, TRASH Sm)	SEG33106678-301	1	Z1	Port Toolbox Slot #6
BALLSTACK	SEG33106870-701	1	PMA1 WIF 2	on TS
BALLSTACK	SEG33106870-701	1	PMA1 WIF 5	on crane
BATTERY, 9 VOLT	528-41350-6	4	A/L1D2	CTB (Unique EVA Tools)
BLANKET, NIKON F5 THERMAL EVA	SED33105013-301	2	A/L1D2	Half CTB (ISS Photo/TV EVA Hardware Bag)
BMRRM ANTI-ROTATION LATCH TOOL	SEG33113643-301	1	Z1	Stbd Toolbox Slot #2
BMRRM VICE CLAMP TOOL	SEG33114423-301	2	A/L1D2	CTB (Unique EVA Tools)
BOLT PULLER	SEG33106912-701	1	A/L external	Toolbox 1, Panel # 9
BOLTS, SSAS CONTINGENCY	1F80666-1	4		
BRACKET, EVA (LONG)	10159-10009-02	1	A/L1D2	Half CTB (ISS Photo/TV EVA Hardware Bag)
BRIDGE CLAMP	SED33107177-301	1	Node bag	Pocket F, on PFR
BRIDGE CLAMP	SED33107177-301	1	Node bag	Pocket G, in 96 BOLT BAG
BRT, BODY RESTRAINT TETHER	SEG33110400-305	2	A/L E-Lk	on EMUs on MWS baseplate
BRT, BODY RESTRAINT TETHER	SEG33110400-305	1	A/L1D1	CTB (MUT & MWS parts)
BUNGEE, 72"	SED32103198-302	3	A/L E-Lk	Tether staging area A/L1D2
CADDY, BILATERL (bungie)	SEG33106936-303	2	A/L C-Lk	Crewlock EVA Bag #2
CADDY, BILATERL (bungie)	SEG33106936-303	1	A/L external	Toolbox 1, Panel # 8
CADDY, BILATERL (bungie)	SEG33106936-303	1	Node bag	fish stringer
CADDY, CARL SOCKET	1800CALLCARL	1	A/L C-Lk	Crewlock EVA Bag #4
CADDY, ISS GP	SEG33113531-301	3	A/L C-Lk	Crewlock EVA Bag #2
CADDY, ISS GP	SEG33113531-301	2	A/L C-Lk	IV Bag (with thermal mittens)
CADDY, ISS GP	SEG33113531-301	1	Z1	Stbd Toolbox Panel #8
CADDY, SOCKET	SEG33106938-301	1	A/L C-Lk	IV Bag
CADDY, SOCKET	SEG33106938-301	2	A/L C-Lk	Staging Bag
CADDY, SOCKET	SEG33106938-301	1	Node bag	Pocket B
CADDY, SOCKET	SEG33106938-301	1	Node bag	Pocket H
CADDY, WIRE TIE	SEG33111586-301	2	A/L C-Lk	Staging Bag
CAMERA, NIKON F5	SED33110611-307	2	A/L1D2	Half CTB (ISS Photo/TV EVA Hardware Bag)
CANNON CONNECTOR HANDLE	S22698-006-005	2	Z1	Stbd Toolbox Panel #8, in ISS GP caddy
CBM TETHER POINT	SEG33111459-301	2	A/L C-Lk	Installed in seat track above IV hatch
CBM TETHER POINT	SEG33111459-301	2	Node bag	Pocket B
CCC JUMPER	1J00125-1	1	P6	P6 AUX BAG
CETA CONNECTOR COVER	NZGL-RPC-N-15- O-MS	1	A/L C-Lk	
CETA LUMINAIRE	1F03046-1	1	A/L C-Lk	

## ISS EVA TOOLS BY ITEM (Cont)

DESCRIPTION	PART NUM	Q	LOC	COMMENTS
CETA LUMINAIRE	1F03046-1	2	Lab interior	
CETA TOOLBOX #1	SEG33106287-301	1	Z1 Port	Z1 Truss Port
CETA TOOLBOX #2	SEG33106287-301	1	Z1 Stbd	Z1 Truss Stbd
CHEATER BAR	SEG33106926-301	1	Z1	Port Toolbox Panel #8
CHEATER BAR	SEG33106926-301	1	Z1	Stbd Toolbox Panel #8
CLPA THERMAL BLANKET		1	A/L1D2	Half CTB 1055 (O2/N2 reg.)
CONN CLNR TOOL CADDY	SEG33111707-301	1	A/L C-Lk	Staging Bag
CONN CLNR TOOL PROPELLANT CARTRIDGE	SDG33111831-001	2	A/L C-Lk	Staging Bag-in caddy
CONNECTOR CLEANER TOOL	CCT8128	1	A/L C-Lk	Staging Bag-in caddy
CONNECTOR CLEANER TOOL KIT	SJG33111630-301	1	A/L C-Lk	Staging Bag
CONNECTOR COVER DDCU-J1	SSQ22680-030-17	4	P6	P6 AUX BAG
CONNECTOR COVER DDCU-J2/J3	SSQ22680-030-18	1	P6	P6 AUX BAG
CONNECTOR TOOL, SM LOCKING ELECT	GE2021560	1	Node bag	Pocket B
CRANE, (OTD, ORU TRANSFER DEVICE)	SEG33106254-303	1	PMA1 WIF 5	PMA1 WIF 5
CUTTER, COMPOUND (sm)	SED33104404-305	1	A/L external	Toolbox 2, Slot #1
CUTTER, GENERAL PURPOSE (lg)	SEG33106915-301	1	A/L external	Toolbox 2, Panel # 9
D-HANDLE	SEG33107678-301	1	Z1	Port toolbox D handle fitting
D-HANDLE	SEG33107678-301	1	Z1	Stbd toolbox microconical fitting, on round scoop
DROP PROOF TETHER ADAPTER	SEG33106947-301	2	A/L1D2	CTB (MUT & MWS parts) in ziplock w/money clips
DROP PROOF TETHER ADAPTER	SEG33106947-301	2	Node bag	Pocket B, on socket caddy
EVA 35mm CAMERA MOUNT	SED33113695-301	2	A/L1D2	Half CTB (ISS Photo/TV EVA Hardware Bag)
EVA OHM METER	SEG33112454-701	1	A/L1D2	CTB (Unique EVA Tools)
FISH STRINGER (Adj Fuse Tether)	SED39127200-701	2	Node bag	Pocket E & K D-rings
FISH STRINGER (Adj Fuse Tether)	SED39127200-705	2	A/L C-Lk	Crewlock EVA Bag #3
FISH STRINGER (Adj Fuse Tether)	SED39127200-705	1	A/L C-Lk	Staging Bag
FISH STRINGER (Adj Fuse Tether)	SEG39127200-705	2		
FLUID LINE ANCHOR PATCH .5"	1F98569-1	2	A/L1D2	CTB (Unique EVA Tools)
FLUID LINE ANCHOR PATCH .75"	1F98528-1	2	A/L1D2	CTB (Unique EVA Tools)

DESCRIPTION	PART NUM	Q	LOC	COMMENTS
FLUID LINE ANCHOR PATCH 1.0"	1F98570-1	2	A/L1D2	CTB (Unique EVA Tools)
FORCEPS	SEG33106916-701	1	A/L external	Toolbox 1, Slot #5
GAP SPANNER (18 - 21")	SEG33109930-301	2		
GAP SPANNER (18-21")	SEG33109930-301	1	DC1	on STRELA
GAP SPANNER (21 - 30")	SEG33109930-303	2		
GAP SPANNER (21-30")	SEG33109930-305	1	Node	HR 0112 to Lab HR 0208
GAP SPANNER (21-30")	SEG33109930-303	2	Node bag	Pocket M D-ring
GAP SPANNER (30-45")	SEG33109930-305	4	DC1	on STRELA
GAP SPANNER (45 - 72")	SEG33109930-307	2		
GAP SPANNER (45-72")	SEG33109930-307	1	Lab	HR 0255 - 0256
GAP SPANNER (45-72")	SEG33109930-307	1	Node	HR 0101 to PMA1 HR 0001
GAP SPANNER (45-72")	SEG33109930-307	2	DC1	on STRELA
GAP SPANNER (45-72")	SEG33109930-307	1	PMA2	PMA2
HAMMER	SEG33106917-301	1	A/L external	Toolbox 1, Slot #1
H-JUMPER CHANNEL 1/4	R082151-1	1	PMA1/FGB	PMA1/FGB ZENITH
H-JUMPER CHANNEL 2/3	R082152-1	1	PMA1/FGB	PMA1/FGB ZENITH
HYDRAZINE BRUSH	SEG33106935-301	1	A/L external	Toolbox 1, Slot #6
HYDRAZINE BRUSH	SEG33106935-301	1	Node bag	Pocket L
HYDRAZINE DETECTION KIT (GOLD SALT)	SJD39135916-301	1	A/L C-Lk	IV Bag
HYDRAZINE DRAEGER TUBE (N2O4)	SED39117159-302	6	A/L C-Lk	IV Bag
IAPFR	SEG33108667-301	1	Z1 WIF 1	(12:00, PP, F, 12)
IAPFR	SEG33108667-301	1	Z1 WIF 4	(12:00, PP, F, 12)
ISS CONTAMINATION SAMPLER	SEG39136040-301	2	A/L C-Lk	IV Bag
LENS, NIKKOR 28mm	SED33105019-301	1	A/L1D2	Half CTB (ISS Photo/TV EVA Hardware Bag)
LENS, NIKKOR 35mm	SED3311975-301	1	A/L1D2	Half CTB (ISS Photo/TV EVA Hardware Bag)
LENS, NIKKOR 50mm	SED33104372-303	1	A/L1D2	Half CTB (ISS Photo/TV EVA Hardware Bag)
MAGNETOMETER PFR	17KC.30010.1570-	1	SM	on Handrails, Plane I/IV
MAGNETOMETER POLE	17KCM.2001-0-	1	SM	Plane I
MAST CANISTER HANDLING DEVICE	RH000090-1	1	Node	Aux Bag
MECHANICAL FINGER	SEG33106918-301	1	A/L external	Toolbox 1, Panel # 9
MONEY CLIP (crew hook lock)		3	A/L1D1	CTB (MUT & MWS parts) in ziplock - no lanyards
MUT BASE (MULTI-USE TETHER)	SEG33106869-303	2	A/L1D1	CTB (MUT & MWS parts)
MUT END EFFECTOR	SEG33106890-303	2	A/L C-Lk	Crewlock EVA Bag #2
MWS KEY STRAP ASSY	SEG33110812-301	2	A/L1D1	CTB (MUT & MWS parts)
MWS BASEPLATE	SEG33110490-301	2	A/L E-Lk	on EMUs
MWS BASEPLATE	SEG33110490-301	1	A/L1D1	CTB (MUT & MWS parts)

### ISS EVA TOOLS BY ITEM (Cont)

DESCRIPTION	PART NUM	Q	LOC	COMMENTS
MWS END EFFECTOR	SEG33110492-301	3	A/L1D1	CTB (MUT & MWS parts)
MWS GIMBAL (T-BAR)	SEG33110493-301	2	A/L E-Lk	on EMUs on MWS baseplate
MWS GIMBAL (T-BAR)	SEG33110493-301	1	A/L1D1	CTB (MUT & MWS parts)
MWS LH SWINGARM	SEG33110491-304	3	A/L1D1	CTB (MUT & MWS parts)
MWS RH SWINGARM	SEG33110491-303	2	A/L E-Lk	on EMUs on MWS baseplate
NEEDLE NOSE PLIERS	SEG33106921-301	1	A/L external	Toolbox 1, Slot #2
NH3 VENT TOOL	1F98589-1	1	A/L1D2	CTB (Unique EVA Tools)
NH3 VENT TOOL	1F98589-1	1	Z1 tray	F5 location, HR 6010
NPV BOTTOM COVER	683-11615-2	1	A/L1D2	CTB (Unique EVA Tools)
NPV Vent Flange Assy		1	A/L1D2	Missing.
ODS CLAMP	SED39127245-301	2	Node bag	Pocket G, in 96 BOLT BAG
ORU STANCHION (TERA)	SEG33106255-601	1	S0	Port wedge face launch posn
OTA	SEG33112324-301	2	A/L1D2	Half CTB 1114 ORLAN EVA
OTA INTERFACE BLOCK	SEG33112325-301	3	A/L1D2	Half CTB 1114 ORLAN EVA
OTA ORLAN TETHER ADAPTER ASSY	SEG33112326-301	2	A/L1D2	Half CTB 1114 ORLAN EVA
P6 SECONDARY FEEDBACK JUMPER	1J00128-1	1	P6	P6 AUX BAG
PAD, (PFR ATTACH DEV)	10159-10053-03	1	Node bag	Pocket A
PFR	SED33105308-307	1	Node Bag	Pocket F
PGT BATTERIES (NiMH)	SEG33110979-303	1	A/L1D1	CTB (PGT Hardware)
PGT BATTERIES (NiMH)	SEG33110979-303	5	A/L1F1	BSA
PGT PROGRAM CABLE RS422	528-21137-1 GC1557007-002	2	A/L1D1	CTB (PGT Hardware)
PGT RS422 ADAPTER	SEZ3921212-301	1	A/L1D1	CTB (PGT Hardware)
PGT RS422 DUAL PORT PCMCIA CARD	SDZ39129284-301	1	A/L1D1	CTB (PGT Hardware)
PGT, PISTOL GRIP TOOL	GE1557000	2	A/L1D1	CTB (PGT Hardware)
PIN STRAIGHTENER	SEG33106913-301	1	Node bag	Pocket K
PRD	SEG33109242-303	1	A/L external	Toolbox 2, Slot #7
PRD (PAYLOAD RETENTION DEVICE)	SEG33109242-303	1	A/L external	Toolbox 1, Slot #7
PROBE	SEG33106923-701	1	Node bag	Pocket J
PRY BAR	SDG33106924-001	1	Node bag	in caddy on fish stringer
QD BAIL DRIVE TOOL (1 IN)	SEG33111830-301	1	Z1	Stbd Toolbox Slot #2
QD BAIL LEVER (1.5 IN)	SEG33113837-701	2		
QD BAIL LEVER (3/4 - 1 IN)	SEG33113838-703	2		
QD CAP TOOL (1 IN)	GD2043325-	1	Node bag	Pocket E
QD CAP TOOL (1 IN)	GD2043325	1		
QD CAP TOOL (1/2 IN)	GD2043730	2		
QD CAP TOOL (1/4 IN)	GD2043725	1	A/L1D2	CTB (Unique EVA Tools)
QD CAP TOOL (1/4 IN)	GD2043725	1		
QD EXTENDER (EAS)	RH000054-1 RH000054-11	2	A/L1D2	Half CTB 1055 (O2/N2 regs..)
QD RELEASE TOOL (1.5 IN)	SEG33114617-701	2		

DESCRIPTION	PART NUM	Q	LOC	COMMENTS
QD RELEASE TOOL (3/4 - 1 IN)	SEG33113838-703	2		
QD TOOLBAG (Vent Tool Bag)	SEG33114667-301	1		
RACU JUMPER CH 1/4	1J00126-1	1	P6	P6 AUX BAG
RACU JUMPER CH 2/3	1J00127-1	1	P6	P6 AUX BAG
RIGHT ANGLE DRIVE	SEG33106925-301	2	A/L C-Lk	Crewlock EVA Bag #4
RIGHT ANGLE DRIVE (W/7/16" SOCKET)	SEG33106925-303	2	Node bag	Pocket G, in 96 BOLT BAG
RUSSIAN ADJ TETHER	17KC.B9351.1100-	1	SM	HR 2443 to 2511
RUSSIAN ADJ TETHER	17KC.B9351.1100-	2	PMA1	WIF 4 ON SMDPs
RUSSIAN CAPTURE LATCH TOOL	33Y.6516.003	1	Node bag	Pocket C
RUSSIAN CHISEL	17KC.b9603-90	1	Node bag	Pocket C
RUSSIAN DRIFTPIN	17KC.b9603-70	1	Node bag	Pocket C
RUSSIAN EQUIPMENT TETHERS	17KC.B9351-900-	1	SM	between magnetometer foot restraint and HR 2512
RUSSIAN HANDLE	17KC.b9601-0	1	Node bag	Pocket C
RUSSIAN HOLDER	17KC.b9603-100	1	Node bag	Pocket C
RUSSIAN STRIKER TOOLS (KIT)	17KC.b9603-0	1	Node bag	Pocket C
RUSSIAN TELESCOPIC POLE W/ HOOK	17KC.b9308-100	1	FGB	HR 1032 & 1038
SCISSORS	SEG33106919-305	1	A/L external	Toolbox 2, Slot #1
SCOOP, ROUND	SEG33107677-301	2	Z1	Port Toolbox round fittings
SCOOP, ROUND	SEG33107677-301	1	Z1	Stbd Toolbox round fitting
SCOOP, ROUND	SEG33107677-301	1	A/L C-Lk	Crewlock EVA Bag #1
SCOOP, SQUARE	SEG33106330-301	2	Z1	Port toolbox square fitting
SCOOP, SQUARE	SEG33106330-301	1	Z1	Stbd Toolbox square fitting
SCOOP, SQUARE	SEG33106330-301	1	A/L C-Lk	Crewlock EVA Bag #1
SMDP ADAPTER	MZF/PROBE	1	PMA1	WIF 4 in APFR hex probe
SOCKET, 1/2" X 8" WOBL	SEG33108423-301	1	Z1	Port Toolbox Slot #7
SOCKET, 1/2" X 8" WOBL	SEG33108423-301	1	Z1	Stbd Toolbox Slot #7
SOCKET, 1/2" X 8" WOBL	SEG33108432-301	1	A/L C-Lk	IV Bag- on socket caddy
SOCKET, 3/8"	SDG33109235-001	1	Node bag	Pocket B, on socket caddy
SOCKET, 5/16" X 7" RIGID	SEG33106928-301	1	Z1	Port Toolbox Slot #7
SOCKET, 5/16" X 7" RIGID	SEG33106928-301	1	Z1	Stbd Toolbox Slot #7
SOCKET, 5/8" PRD-RND TM	SDG33107088-001	1	Z1	Port Toolbox Slot #5
SOCKET, 5/8" PRD-RND TM	SDG33107088-001	1	A/L C-Lk	Crewlock EVA Bag #4
SOCKET, 5/8" X 7.8" RIGID	SEG33106934-301	2	A/L C-Lk	Crewlock EVA Bag #4
SOCKET, 7/16" PRD-SQ TM	SDG33107087-005	1	Z1	Port Toolbox Slot #1
SOCKET, 7/16" PRD-SQ TM	SDG33107087-005	1	Z1	Stbd Toolbox Slot #1
SOCKET, 7/16" REC-SQ TM	SDG33107087-009	1	Z1	Port Toolbox Slot #1
SOCKET, 7/16" REC-SQ TM	SDG33107087-009	1	Z1	Stbd Toolbox Slot #1
SOCKET, 7/16" X 12" WOBL	SEG33106932-301	1	Z1	Port Toolbox Slot #3
SOCKET, 7/16" X 12" WOBL	SEG33106932-301	1	A/L C-Lk	Crewlock EVA Bag #4

### ISS EVA TOOLS BY ITEM (Cont)

DESCRIPTION	PART NUM	Q	LOC	COMMENTS
SOCKET, 7/16" X 18" WOBL	SEG33106933-301	1	Z1	Port Toolbox Panel #9
SOCKET, 7/16" X 18" WOBL	SEG33106933-301	1	A/L C-Lk	Staging Bag – in torque wrench bag
SOCKET, 7/16" X 2" RIGID	SEG33106930-301	1	Z1	Port Toolbox Slot #3
SOCKET, 7/16" X 2" RIGID	SEG33106930-301	2	A/L C-Lk	Staging Bag- on sockt caddy
SOCKET, 7/16" X 6" WOBL	SEG33106931-301	1	A/L C-Lk	IV Bag- on socket caddy
SOCKET, 7/16" X 6" WOBL	SEG33106931-301	2	A/L C-Lk	Staging Bag- on sockt caddy
SOCKET, 7/16" X 6" WOBL	SEG33106931-301	1	Z1	Port Toolbox Slot #3
SOCKET, 7/16" X 6" WOBL	SEG33106931-301	1	Z1	Stbd Toolbox Slot #3
SOCKET, 7/16" X 9" RIGID	SEG33106930-305	1	Z1	Port Toolbox Panel #9
SOCKET, 7/16" X 9" RIGID	SEG33106930-305	1	A/L C-Lk	Crewlock EVA Bag #4
SOCKET, 7/16" X 10.3" HST	10181-10008-2	1	A/L C-Lk	Crewlock EVA Bag #4
SOCKT, 7/16 FLSH-RND TM	SDG33107087-003	1	Z1	Port Toolbox Slot #5
SOCKT, 7/16 FLSH-RND TM	SDG33107087-003	1	Z1	Stbd Toolbox Slot #5
SOCKT, 7/16" FLSH-SQ TM	SDG33107087-007	1	Z1	Port Toolbox Slot #1
SOCKT, 7/16" FLSH-SQ TM	SDG33107087-007	1	Z1	Stbd Toolbox Slot #1
SOCKT, 7/16" PRD-RND TM	SDG33107087-001	1	Z1	Port Toolbox Slot #5
SOCKT, 7/16" PRD-RND TM	SDG33107087-001	1	Z1	Stbd Toolbox Slot #5
SPOOL POSITIONING DEVICE (1 IN)	SEG33114973	4		
SPOOL POSITIONING DEVICE (1.5 IN)	SEG33114974	7		
SPOOL POSITIONING DEVICE (1/2 IN)	SEG33114975-301	1		
STRELA BOOM	362 .151 2100-0	2	DC1	
STRELA EFGF ADAPTER	IDRD ANNEX 1	1	FGB	on grapple fixture
STRELA EXTENSION	362 .151 2700-0	2	DC1	
STRELA OPERATOR STATION	IDRD ANNEX 1	2	DC1	
STRELA RING	362 .151 2600-0	2	DC1	
STS-108 EVA CUE CARD	SED33113695-301	1	A/L1D2	Half CTB (ISS Photo/TV EVA Hardware Bag)
TEMPORARY THERMAL BLANKET	1F00782-1	6	A/L1D2	CTB (Unique EVA Tools)
TETHER EXTENSION	SEG33112321-701	5	A/L1D1	CTB (MUT & MWS parts)
TETHER EXTENSION	SEG33112321-701	1	A/L C-Lk	On D ring
TETHER, ADJ EQ (Lg-Sm)	SEG33106945-309	2	A/L E-Lk	Tether staging area A/L1D2
TETHER, ADJ EQUIP	SEG33106945-307	1	Z1	Port Toolbox Panel #8
TETHER, ADJ EQUIP	SEG33106945-307	1	Z1	Stbd Toolbox Panel #8
TETHER, ADJ EQUIP	SEG33106945-307	6	A/L E-Lk	Tether Staging area A/L1D2
TETHER, EQUIPMNT REEL	SEG39126549-305	1	PMA1 WIF 5	On Crane
TETHER, EQUIPMNT REEL	SEG39126549-305	1	A/L1D2	CTB 1022
TETHER, EQUIPMNT REEL	SEG39126549-305	1	A/L1D2	Half CTB (ORLAN EVA)
TETHER, LONG DURATION TIE-DOWN, 7'	SEG33113860-301	4	P6	P6 AUX BAG
TETHER, ORU	SEG33108800-301	1	Node WIF 5	on TS

DESCRIPTION	PART NUM	Q	LOC	COMMENTS
TETHER, ORU	SEG33108800-301	1	PMA1 WIF 2	on TS
TETHER, ORU	SEG33108800-301	1	PMA1 WIF 5	on crane
TETHER, ORU	SEG33108800-301	3	A/L1D2	Half CTB (ORLAN EVA)
TETHER, RET (w/pip pin)	SEG33106164-383	2	A/L E-Lk	Tether staging area A/L1D2
TETHER, RET (Lg-Sm)	SEG33106164-385	3		MIA
TETHER, RET (Lg-sm)	SEG33106164-385	3	A/L E-Lk	Tether staging area A/L1D2
TETHER, RET (sm-sm)	SEG33106164-381	8	A/L E-Lk	Tether staging area A/L1D2
TETHER, RET (sm-sm)	SEG33106164-381	1		MIA
TETHER, SAFETY (Lg-sm)	SEG33106674-303	1	A/L external	External Hatch D-ring
TETHER, SAFETY (Lg-sm)	SEG33106674-303	1	S0	S0 HR 3412 by CETA spur
TETHER, SAFETY (Lg-sm)	SEG33106674-303	4	A/L E-Lk	Tether staging area A/L1D2, 2 have red stripe, 1 has no money clip
TETHER, SAFETY (Lg-sm)	SEG33106674-303	1	Node WIF 5	on TS
TETHER, SAFETY (sm-sm)	SEG33106674-301	1	Node	HR 0102 (contaminated)
TETHER, SAFETY (sm-sm)	SEG33106674-301	1	A/L external	External Hatch D-ring
TETHER, SAFETY (sm-sm)	SEG33106674-301	1	S0	S0 HR 3412 by CETA spur
TETHER, SAFETY (sm-sm)	SEG33106674-301	2	Lab	on slidewire @ HR 0208
TETHER, WAIST	SEG33106943-301	4	A/L E-Lk	Tether staging area A/L1D2
THERMAL MITTENS, ADJ	0106-811540-003	2	A/L C-Lk	IV Bag- in GP caddy
THERMAL MITTENS, ADJ	0106-811540-004	2	A/L C-Lk	IV Bag- in GP caddy
TM, ROUND	SEG33106260-301	1	Z1	Port Toolbox Slot #5
TM, ROUND	SEG33106260-301	1	A/L C-Lk	Crewlock EVA Bag #4
TM, SQUARE	SEG33106261-301	1	Z1	Port Toolbox Slot #1
TM, SQUARE	SEG33106261-301	1	Z1	Stbd Toolbox Slot #1
TOOL BOARD, ADJ WRNCH	SEG33106318-301	1	A/L external	Toolbox 1, Slot #5
TOOL BOARD, PRD	SEG33106316-301	1	A/L external	Toolbox 2, Slot #7
TOOL BOARD, PRD	SEG33106316-301	1	A/L external	Toolbox 1, Slot #7
TOOL BOARD, QD BAIL	SEG33113713-301	1	Z1	Stbd Toolbox Slot #2
DRIVE TOOL				
TOOL BOARD, RATCHET	SEG33106300-301	1	Z1	Port Toolbox Slot #3
TOOL BOARD, RATCHET	SEG33106300-301	1	Z1	Stbd Toolbox Slot #3
TOOL BOARD, ROUND TM	SEG33106294-301	1	Z1	Port Toolbox Slot #5
TOOL BOARD, ROUND TM	SEG33106294-301	1	Z1	Stbd Toolbox Slot #5
TOOL BOARD, SOCKET	SEG33106302-301	1	Z1	Port Toolbox Slot #7
TOOL BOARD, SOCKET	SEG33106302-301	1	Z1	Stbd Toolbox Slot #7
TOOL BOARD, SQ TM	SEG33106296-301	1	Z1	Port Toolbox Slot #1
TOOL BOARD, SQ TM	SEG33106296-301	1	Z1	Stbd Toolbox Slot #1
TOOL BOARD, T-HANDLE, 8 IN. ALLEN DR	SEG33113832-301	1	A/L external	Toolbox 2, slot 5
TOOL BOARD, TRASH BAG	SEG33106292-301	1	Z1	Port Toolbox Slot #6
TOOL BOARD, TRASH BAG	SEG33106292-301	1	Z1	Stbd Toolbox Slot #6
TOOL BOARD,HAMMER	SEG33106320-301	1	A/L external	Toolbox 1, Slot #1
TOOL BOARD,HYDRAZINE BRUSH	SEG33106310-301	1	A/L external	Toolbox 1, Slot #6
TOOL BOARD,PLIERS	SEG33106314-301	1	A/L external	Toolbox 1, Slot #2



### ISS EVA TOOLS BY ITEM (Cont)

DESCRIPTION	PART NUM	Q	LOC	COMMENTS
TOOL BOARD,SM CUTTER	SEG33106308-301	1	A/L external	Toolbox 2, Slot #1
TOOL CARRIER	SEG33109980-301	2	A/L1D1	CTB (MUT & MWS parts)
TOOL PANEL, 18" SOCKET	SEG33106306-301	1	Z1	Port Toolbox Panel #9
TOOL PANEL, 18" SOCKET	SEG33106306-301	1	Z1	Stbd Toolbox Panel #9
TOOL PANEL,BOLT PULLR	SEG33106823-301	1	A/L external	Toolbox 1, Panel # 9
TOOL PANEL,CHEATR BAR	SEG33106304-301	1	Z1	Port Toolbox Panel #8
TOOL PANEL,CHEATR BAR	SEG33106304-301	1	Z1	Stbd Toolbox Panel #8
TOOL PANEL,LG CUTTER	SEG33106825-301	1	A/L external	Toolbox 2, Panel # 9
TOOL PANEL,TOOL CADDY	SEG33106324-301	1	A/L external	Toolbox 1, Panel # 8
TOOL STANCHION (TS)	SEG33106256-301	1	Node WIF 5	on APFR
TOOL STANCHION (TS)	SEG33106256-301	1	PMA1 WIF 2	on APFR
TOOL STANCHION (TS)	SEG33106256-301	1	S0	Port wedge face launch posn
TORQUE WRENCH	SEG33106948-301	1	A/L C-Lk	Staging Bag
TORQUE WRENCH BAG	SEG33110183-301	1	A/L C-Lk	Staging Bag
VIEWFINDER, SPORT DA-30	SED33110611-327	3	A/L1D2	Half CTB (ISS Photo/TV EVA Hardware Bag)

DESCRIPTION	PART NUM	Q	LOC	COMMENTS
WISE GRIP	SEG33106922-301	1	A/L external	Toolbox 1, Slot #5
WIF ADAPTER	SEG33106863-301	1	Node bag	Pocket M
WIF ADAPTER	SEG33106863-301	1	A/L C-Lk	Crewlock EVA Bag #3
WIF, ORBIT INSTALLABLE	SEG33106861-301	1	Node bag	Safety Tether Stringer
WIRE TIES, SPARE 16"		10	A/L C-Lk	Staging Bag
WIRE TIES, SPARE 32"		6	A/L C-Lk	Staging Bag
WIRE TIES, SPARE 32"		5	A/L1D1	CTB (MUT & MWS parts)
WRENCH, 3/8" DRIVE RATCHET	SEG33106927-303	1	A/L C-Lk	IV Bag
WRENCH, 3/8" DRIVE RATCHET	SEG33106927-303	1	Z1	Stbd Toolbox Slot #3
WRENCH, 3/8" DRIVE RATCHET	SEG33106927-303	1	Z1	Port Toolbox Slot #3
WRENCH, 7/16" BOX END RATCHET	SED39126186-701	2	Node bag	Pocket G, in 96 BOLT BAG
WRENCH, ADJ	SEG33106911-701	1	A/L external	Toolbox 1, Slot #5
Y BYPASS JUMPER	R081661-1 & -11	2	Node	Aux Bag 01

## ISS EVA TOOLS BY LOCATION

DESCRIPTION	PART NUM	Q	LOCATION
<b>ISS INTERNAL</b>		<b>CREWLOCK</b>	
CBM TETHER POINT	SEG33111459-301	2	Installed in seat track above IV hatch
ORU TRANSFER BAG (LG)	SEG33114494-301	1	Temp stowed in crewlock
ORU TRANSFER BAG (MED)	SEG33114494-303	1	
ORU TRANSFER BAG (MED w/ loops)	SEG33114494-309	1	
ORU TRANSFER BAG (SM w/ loops)	SEG33114494-311	2	
CETA LUMINAIRE	1F03046-1	1	
TETHER EXTENSION	SEG33112321-701	1	On D-ring
MONEY CLIP W/LANYARD		1	

ISS INTERNAL	CREWLOCK BAGS		
CREWLOCK EVA BAG #1	SEG33111751-301	1	Crewlock EVA Bag #1
SCOOP, ROUND (MCF OHTS)	SEG33107677-301	1	
SCOOP, SQUARE (MICRO OHTS)	SEG33106330-301	1	
CREWLOCK EVA BAG #2	SEG33111751-303	1	Crewlock EVA Bag #2
CADDY, BILATERAL TOOL (bungee)	SEG33106936-303	2	
CADDY, ISS GP (french hooks)	SEG33113531-301	3	
MUT END EFFECTOR	SEG33106890-303	2	
CREWLOCK EVA BAG #3	SEG33111751-303	1	Crewlock EVA Bag #3
TETHER, ADJ FUSE (fish stringer)	SED39127200-705	2	
WIF ADAPTER	SEG33106863-301	1	
CREWLOCK EVA BAG #4	SEG33111751-301	1	Crewlock EVA Bag #4
RIGHT ANGLE DRIVE	SEG33106925-301	2	
CARL SOCKET CADDY	1800CALLCARL	1	
SOCKET, 7/16" X 12" EXT WOBBLE	SEG33106932-301	1	
SOCKET, 5/8" X 7.8" EXT RIGID	SEG33106934-301	2	
SOCKET, 7/16 X 10.3" EXT WBL – HST	10181-10008-2	1	
SOCKET, 7/16" X 9" EXT RIGID	SEG33106930-305	1	
TORQUE MULTIPLIER (TM), ROUND	SEG33106260-301	1	
SOCKET, 5/8" PROUD-ROUND TM	SDG33107088-001	1	
IVA BAG	SEG33111739-301	1	IV Bag
HYDRAZINE DETECTN KIT-GOLD SALT	SJD39135916-301	1	
HYDRAZINE DRAEGER TUBE (N2O4)	SED39117159-302	6	
ISS CONTAMINATION SAMPLER	SEG39136040-301	2	
SOCKET CADDY	SEG33106938-301	1	
SOCKET, 1/2"X8" WOBBLE	SEG33108432-301	1	
SOCKET, 7/16"X6" WOBBLE	SEG33106931-301	1	
WRENCH, 3/8" DRIVE RATCHET	SEG33106927-303	1	
CADDY, ISS GP (french hooks)	SEG33113531-301	2	
THERMAL MITTENS, ADJ (left)	0106-811540-003	2	
THERMAL MITTENS, ADJ (right)	0106-811540-004	2	

DESCRIPTION	PART NUM	Q	LOCATION
<b>ISS INTERNAL</b>		<b>CREWLOCK BAGS (CONT)</b>	
STAGING BAG	SEG33111739-303	1	Staging Bag
CADDY, WIRE TIE	SEG33111586-301	2	
CONNECTOR CLEANER TOOL KIT	SJG33111630-301	1	
CONNECTOR CLEANER TOOL CADDY	SEG33111707-301	1	
CONNECTOR CLEANER TOOL	CCT8128	1	
PROPELLANT CARTRIDGE	SDG33111831-001	2	
SOCKET CADDY	SEG33106938-301	2	
SOCKET, 7/16"X2" RIGID	SEG33106930-301	2	
SOCKET, 7/16"X6" WOBBLE	SEG33106931-301	2	
TETHER, ADJ FUSE (fish stringer)	SED39127200-705	1	
TRASH BAG – SM	SEG33106678-301	3	
TORQUE WRENCH BAG	SEG33110183-301	1	
TORQUE WRENCH	SEG33106948-301	1	
SOCKET, 7/16" X 18" EXT WOBBLE	SEG33106933-301	1	
SPARE WIRE TIES – 16"	SDG33108130-001	?	Approx 10 expected spares
SPARE WIRE TIES – 32"	SDG33108130-001	?	Approx 6 expected spares

ISS INTERNAL	EQUIPMENT LOCK		
MINI-WORKSTATION BASEPLATE	SEG33110490-301	2	on EMUs
MWS GIMBAL (T-BAR)	SEG33110493-301	2	
MWS RH SWINGARM	SEG33110491-303	2	
BRT, BODY RESTRAINT TETHER	SEG33110400-305	2	
BUNGEE, 72"	SED32103198-302	3	Tether staging area on blue IV handrail in front of A/L1D2
TETHERS:			
ADJUSTABLE EQUIPMENT (sm-sm)	SEG33106945-307	6	
ADJUSTABLE EQUIPMENT (Lg-Sm)	SEG33106945-309	2	
RETRACTABLE EQUIP (RET) (sm-sm)	SEG33106164-381	8	
RETRACTABLE EQUIP (RET) (sm-sm)	SEG33106164-381	1	missing
RETRACTABLE EQUIP (RET) (lg-sm)	SEG33106164-385	3	Replacements up on 9A missing
RET (Lg-Sm)	SEG33106164-385	3	
RET (sm-sm w/pip pin)	SEG33106164-383	2	
SAFETY (Lg-sm)	SEG33106674-303	4	Note 1 has no money clip
WAIST	SEG33106943-301	4	
PGT, PISTOL GRIP TOOL	GE1557000	2	A/L1D1, CTB Labelled (PGT Hardware)
PGT BATTERY (NiMH)	SEG33110979-303	1	
PGT PROGRAM CABLE RS422	528-21137-1	1	
PGT PROGRAM CABLE RS422	GC1557007-002	1	
RS422 ADAPTER	SEZ3921212-301	1	
RS422 DUAL PORT PCMCIA CARD	SDZ39129284-301	1	

## ISS EVA TOOLS BY LOCATION (Cont)

DESCRIPTION	PART NUM	Q	LOCATION
<b>ISS INTERNAL</b>		<b>EQUIPMENT LOCK-cont</b>	
BRT, BODY RESTRAINT TETHER	SEG33110400-305	1	A/L1D1, CTB Labelled
MINI-WORK STATION LH SWINGARM	SEG33110491-304	3	(MUT & MWS parts)
MWS BASEPLATE	SEG33110490-301	1	
MWS END EFFECTOR	SEG33110492-301	3	
MWS GIMBAL (T-BAR)	SEG33110493-301	1	
MWS KEY STRAP ASSY	SEG33110812-301	2	
MUT BASE (MULTI-USE TETHER)	SEG33106869-303	2	
TETHER EXTENSION	SEG33112321-701	5	
TOOL CARRIER	SEG33109980-301	2	
DROP PROOF TETHER ADAPTER	SEG33106947-301	2	
MONEY CLIP (no lanyard)		3	
SPARE WIRE TIES – 32"	SDG33108130-001	5	
BATTERY, 9 VOLT	528-41350-6	4	A/L1D2, CTB Labelled
BMRRM VICE CLAMP TOOL	SEG33114423-301	2	(Unique EVA Tools)
EVA OHM METER	SEG33112454-701	1	
FLUID LINE ANCHOR PATCH .5"	1F98569-1	2	
FLUID LINE ANCHOR PATCH .75"	1F98528-1	2	
FLUID LINE ANCHOR PATCH 1.0"	1F98570-1	2	
NH3 VENT TOOL	1F98589-1	1	
NPV BOTTOM COVER	683-11615-2	1	
QD CAP TOOL (.25")	GD2043725	1	
TEMPORARY THERMAL BLANKET	1F00782-1	6	
OTA, ORLAN TETHER ADAPTER ASSY	SEG33112326-301	2	A/L1D2, Half CTB Labelled
OTA	SEG33112324-301	2	(ORLAN EVA)
OTA INTERFACE BLOCK	SEG33112325-301	1	
ORU TETHER REELS	SEG33108800-301	3	
EQUIPMENT TETHER REELS	SEG39126549-305	1	
QD Extenders (EAS)	RH000054-1	1	A/L1D2, Half CTB Labelled
	RH000054-11	1	(O2/N2 regs/relief vlvs)
CLPA THERMAL COVER		1	
BLANKET, NIKON F5 THERMAL EVA	SED33105013-301	2	A/L1D2, Half CTB Labelled
BRACKET, EVA (LONG)	10159-10009-02	1	(ISS Photo/TV EVA
CAMERA, NIKON F5	SED33110611-307	2	Hardware Bag)
EVA 35mm CAMERA MOUNT	SED33113695-301	2	
LENS, NIKKOR 28mm	SED33105019-301	1	
LENS, NIKKOR 35mm	SED3311975-301	1	
LENS, NIKKOR 50mm	SED33104372-303	1	
STS-108 EVA CUE CARD	SED33113695-301	1	
VIEWFINDER, SPORT DA-30	SED33110611-327	3	
PGT BATTERIES (NiMH)	SEG33110979-303	5	A/L1F1, BSA

DESCRIPTION	PART NUM	Q	LOCATION
<b>ISS EXTERNAL</b>		<b>AIRLOCK</b>	
APFR 7	SEG33106857-301	1	A/L Toolbox #2 WIF (6,GG) (9:00, YY, J, 12)
SAFETY TETHER (lg-sm)	SEG33106674-303	1	External Hatch D-rings
SAFETY TETHER (sm-sm)	SEG33106674-301	1	
SAFETY TETHER (sm-sm)	SEG33106674-301	1	HR 0513

ISS EXTERNAL	AIRLOCK-TOOLBOX # 1		
AIRLOCK TOOLBOX #1 (ETSD)	SEG33106288-301	1	Crewlock FWD, STBD
TOOL PANEL, TOOL CADDY	SEG33106324-301	1	Panel # 8
CADDY, BILATERAL TOOL (bungie)	SEG33106936-303	1	
TOOL PANEL, BOLT PULLER	SEG33106823-301	1	Panel # 9
BOLT PULLER	SEG33106912-701	1	
MECHANICAL FINGER	SEG33106918-301	1	
TOOL BOARD, HAMMER	SEG33106320-301	1	Slot #1
HAMMER	SEG33106917-301	1	
TOOL BOARD, PLIERS	SEG33106314-301	1	Slot #2
NEEDLE NOSE PLIERS	SEG33106921-301	1	
TOOL BOARD, ADJ. WRENCH	SEG33106318-301	1	Slot #5
FORCEPS	SEG33106916-701	1	
WISE GRIP	SEG33106922-301	1	
WRENCH, ADJ	SEG33106911-701	1	
TOOL BOARD, HYDRAZINE BRUSH	SEG33106310-301	1	Slot #6
HYDRAZINE BRUSH	SEG33106935-301	1	
TOOL BOARD, PRD CARRIER	SEG33106316-301	1	Slot #7
PRD (PAYLOAD RETENTION DEVICE)	SEG33109242-303	1	

ISS EXTERNAL	AIRLOCK-TOOLBOX # 2		
AIRLOCK TOOLBOX #2 (ETSD)	SEG33106288-301	1	Crewlock FWD, PORT
TOOL PANEL, LARGE CUTTER	SEG33106825-301	1	Panel # 9
CUTTER, GENERAL PURPOSE (lg)	SEG33106915-301	1	
TOOL BOARD, SMALL CUTTER	SEG33106308-301	1	Slot #1
CUTTER, COMPOUND (sm)	SED33104404-305	1	
SCISSORS	SEG33106919-305	1	
TOOL BOARD, T-HANDLE, 8 IN. ALLEN	SEG33113832-301	1	Slot #5
1/4" & 1/2" ALLEN DRIVER - Short	SED39127091-301	3	
1/4" & 1/2" ALLEN DRIVER - Long	SED39127091-303	2	
TOOL BOARD, PRD CARRIER	SEG33106316-301	1	Slot #7
PRD (PAYLOAD RETENTION DEVICE)	SEG33109242-303	1	

### ISS EVA TOOLS BY LOCATION (Cont)

DESCRIPTION	PART NUM	Q	LOCATION
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ISS EXTERNAL		DC1	
STRELA OPERATOR STATION	IDRD ANNEX 1	2	
STRELA BOOM	362 .151 2100-0	2	
STRELA EXTENSION	362 .151 2700-0	2	
STRELA RING	362 .151 2600-0	2	
GAP SPANNER (18-21")	SEG33109930-301	1	
GAP SPANNER (30-45")	SEG33109930-305	4	
GAP SPANNER (45-72")	SEG33109930-307	2	

ISS EXTERNAL		FGB	
RUSSIAN TELESCOPIC POLE W/ HOOK	17KC.b9308-100	1	HR 1032 & 1038

ISS EXTERNAL		LAB	
GAP SPANNER (45-72")	SEG33109930-307	1	HR 0255 - 0256
SAFETY TETHER (sm-sm)	SEG33106674-301	2	on slidewire @ HR 0208

ISS EXTERNAL		MBS	
MSS BAG WITH EXTENSION CABLES	1f7129901	1	HR 8404 & 8406

ISS EXTERNAL		NODE	
OHTS BAG	SEG33110765-301	1	attached to Node Bag
ECOMM/ORLAN CABLE	SEG39130689-301	1	attached to Node bag, coiled up
AUX BAG 01	SEG33111904-301	1	Aux Bag attached to Node Bag
MAST CANISTER HANDLING DEVICE	RH000090-1	1	
Y BYPASS JUMPER	R081661-1	1	
Y BYPASS JUMPER	R081661-11	1	
SAFETY TETHER (sm-sm)	SEG33106674-301	1	HR 0102 (contaminated)
GAP SPANNER (21-30")	SEG33109930-305	1	Node HR 0112 to Lab HR 0208
APFR (has Thermal Sheild)	SEG33106857-301	1	Node WIF 5 (6,PP,B,12)
TOOL STANCHION (TS)	SEG33106256-301	1	
ORU TETHER	SEG33108800-301	1	
SAFETY TETHER (lg-sm)	SEG33106674-303	1	
GAP SPANNER (45-72")	SEG33109930-307	1	PMA1 HR 0001- Node HR 0101

DESCRIPTION	PART NUM	Q	LOCATION
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ISS EXTERNAL		NODE BAG	
NODE BAG	SEG33110764-301	1	Node HRs 100 & 113
PAD, (PFR ATTACHMENT DEVICE)	10159-10053-03	1	Pocket A
SOCKET CADDY	SEG33106938-301	1	Pocket B
DROP PROOF TETHER ADAPTER	SEG33106947-301	2	Pocket B
3/16" ALLEN DRIVER	SED39123183-301	1	Pocket B
5/32" ALLEN BALL END DRIVER	SEG33108851-301	1	Pocket B
SOCKET, 3/8"	SDG33109235-001	1	Pocket B
CBM TETHER POINT	SEG33111459-301	2	Pocket B
CONNECTOR TOOL, SM LOCK ELECT	GE2021560	1	Pocket B
RUSSIAN CAPTURE LATCH TOOL	33Y.6516.003	1	Pocket C
RUSSIAN CHISEL	17KC b9603-90	1	Pocket C
RUSSIAN DRIFTPIN	17KC b9603-70	1	Pocket C
RUSSIAN HANDLE	17KC.b9601-0	1	Pocket C
RUSSIAN HOLDER	17KC b9603-100	1	Pocket C
RUSSIAN STRIKER TOOLS (KIT)	17KC.b9603-0	1	Pocket C
QD CAP TOOL	GD2043325	1	Pocket E
FISH STRINGER, ADJ	SED39127200-701	2	Pocket E & K D-rings
CADDY, ISS (BUNGEE)	SEG33106936-303	1	Pocket E & K D-rings
PRY BAR	SDG33106924-001	1	Pocket E & K D-rings
WIF, ORBIT INSTALLABLE	SEG33106861-301	1	Pocket E & K D-rings
PFR	SED33105308-307	1	Pocket F
ARTICULATING SOCKET	SED33105422-313	1	Pocket F
BRIDGE CLAMP	SED33107177-301	1	Pocket F
BAG, 96 BOLT TOOLS	SEG33110766-301	1	Pocket G
ARTICULATING SOCKET	SED33105422-313	1	Pocket G
BRIDGE CLAMP	SED33107177-301	1	Pocket G
ODS CLAMP	SED39127245-301	2	Pocket G
RIGHT ANGLE DRIVE (W/7/16" SOCKT)	SEG33106925-303	2	Pocket G
7/16" BOX END RATCHET WRENCH	SED39126186-701	2	Pocket G
SOCKET CADDY	SEG33106938-301	1	Pocket H
PROBE	SEG33106923-701	1	Pocket J
PIN STRAIGHTENER	SEG33106913-301	1	Pocket K
HYDRAZINE BRUSH	SEG33106935-301	1	Pocket L
WIF ADAPTER	SEG33106863-301	1	Pocket M
GAP SPANNER (21-30")	SEG33109930-303	2	Pocket M D-ring

ISS EXTERNAL		P6	
P6 AUX BAG 02 (EPS JUMPERS)	SEG33113891-301	1	P6 AUX BAG, P6 Fwd, HR 5313 & 5310
CCC JUMPER	1J00125-1	1	
CONNECTOR COVER DDCU-J1	SSQ22680-030-17	4	
CONNECTOR COVER DDCU-J2/J3	SSQ22680-030-18	1	
P6 SECONDARY FEEDBACK JUMPER	1J00128-1	1	
RACU JUMPER CABLE CH 1/4	1J00126-1	1	
RACU JUMPER CABLE CH 2/3	1J00127-1	1	
LONG DURATION TIE-DOWN TETHER	SEG33113860-301	4	

### ISS EVA TOOLS BY LOCATION (Cont)

DESCRIPTION	PART NUM	Q	LOCATION
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ISS EXTERNAL		PMA1	
APFR 5 (has Thermal Shield)	SEG33106857-301	1	PMA1 WIF2 (12, KK, F, 6)
APFR INGRESS AIDE	SED39127050-303	1	
TOOL STANCHION (TS)	SEG33106256-301	1	
BALLSTACK	SEG33106870-701	1	
ORU TETHER	SEG33108800-301	1	
APFR 6 (has Thermal Shield)	SEG33106857-301	1	PMA1 WIF 4 (4, PP, A, 6)
SMDP Adapter	MZF/PROEE	1	
SMDP Russian Adjustable Tethers		6	
CRANE, (OTD, ORU TRANSFER DEVICE)	SEG33106254-303	1	PMA1 WIF 5
BALLSTACK	SEG33106870-701		
ORU TETHER	SEG33108800-301		
H-JUMPER CHANNEL 1/4	R082151-1	1	PMA1/FGB ZENITH
H-JUMPER CHANNEL 2/3	R082152-1	1	

ISS EXTERNAL		PMA2	
GAP SPANNER (45-72")	SEG33109930-307	1	PMA2

ISS EXTERNAL		S0	
APFR 1	SEG33106857-301	1	WIF 12 (6:00, WW, L, 2)
APFR 2	SEG33106857-301	1	S0 WIF 47 (9, PP, F, 12)
ORU STANCHION (TERA)	SEG33106255-601	1	Port Wedge Face (launch)
SAFETY TETHER (Lg-sm)	SEG33106674-303	1	S0 HR 3412 by CETA spur
TETHER SHUTTLE	SEG33106198-303	2	S0 Stowage rail
TOOL STANCHION (TS)	SEG33106256-301	1	Port Wedge Face (launch)

ISS EXTERNAL		SM	
RUSSIAN EQUIPMENT TETHERS	17KC.B9351-900-	1	between magnetometer foot restraint and HR 2512
RUSSIAN ADJ TETHER	17KC.B9351.1100-	1	HR 2443 to 2511
MAGNETOMETER PFR	17KC.30010.1570	1	on Handrails, Plane I/IV
MAGNETOMETER POLE	17KCM.2001-0-	1	Plane I

ISS EXTERNAL		Z1	
NH3 VENT TOOL	1F98589-1	1	Z1 tray, F5 loc, HR 6010
IAPFR	SEG33108667-301	1	Z1 WIF 1 (12, PP, F, 12)

DESCRIPTION	PART NUM	Q	LOCATION
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ISS EXTERNAL		Z1 (cont)	
IAPFR	SEG33108667-301	1	Z1 WIF 4 (12, PP, F, 12)

ISS EXTERNAL		Z1-PORT TOOLBOX	
CETA TOOLBOX #1	SEG33106287-301	1	Z1 Truss Port
D-HANDLE	SEG33107678-301	1	external D handle fitting
SCOOP, ROUND	SEG33107677-301	2	external microconical fittings
SCOOP, SQUARE	SEG33106330-301	2	external micro-square fitting
TOOL PANEL, CHEATER BAR	SEG33106304-301	1	Panel #8
CHEATER BAR	SEG33106926-301	1	
ADJ EQUIP TETHER (sm-sm)	SEG33106945-307	1	
TOOL PANEL, 18" SOCKET	SEG33106306-301	1	Panel #9
SOCKET, 7/16" X 18" EXT WOBBLE	SEG33106933-301	1	
SOCKET, 7/16" X 9" EXT	SEG33106930-305	1	
TOOL BOARD, SQ TM	SEG33106296-301	1	Slot #1
SOCKET, 7/16" FLUSH-SQ TM	SDG33107087-007	1	
SOCKET, 7/16" PROUD-SQ TM	SDG33107087-005	1	
SOCKET, 7/16" RECESSED - SQ TM	SDG33107087-009	1	
TORQUE MULTIPLIER (TM), SQUARE	SEG33106261-301	1	
TOOL BOARD, RATCHET	SEG33106300-301	1	Slot #3
SOCKET, 7/16" X 12" EXT WOBBLE	SEG33106932-301	1	
SOCKET, 7/16" X 2" EXT RIGID	SEG33106930-301	1	
SOCKET, 7/16" X 6" EXT WOBBLE	SEG33106931-301	1	
WRENCH, 3/8" DRIVE RATCHET	SEG33106927-303	1	
TOOL BOARD, ROUND TM	SEG33106294-301	1	Slot #5
SOCKET, 5/8" PROUD-ROUND TM	SDG33107088-001	1	
SOCKET, 7/16" FLUSH-ROUND TM	SDG33107087-003	1	
SOCKET, 7/16" PROUD-ROUND TM	SDG33107087-001	1	
TORQUE MULTIPLIER (TM), ROUND	SEG33106260-301	1	
TOOL BOARD, TRASH BAG	SEG33106292-301	1	Slot #6
LG TRASH BAG	SEG33106937-301	1	
SM TRASH BAG	SEG33106678-301	1	
TOOL BOARD, SOCKET	SEG33106302-301	1	Slot #7
5/32" BALL END ALLEN DRIVER	SEG33108851-301	1	
SOCKET, 1/2" X 8" EXT WOBBLE	SEG33108423-301	1	
SOCKET, 5/16" X 7" EXT RIGID	SEG33106928-301	1	

### ISS EVA TOOLS BY LOCATION (Cont)

DESCRIPTION	PART NUM	Q	LOCATION
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ISS EXTERNAL	Z1-STBD TOOLBOX		
CETA TOOLBOX #2	SEG33106287-301	1	Z1 Truss Stbd
SCOOP, ROUND D-HANDLE	SEG33107677-301 SEG33107678-301	1 1	external microconical fittings
SCOOP, SQUARE	SEG33106330-301	1	external micro-square fitting
TOOL PANEL, CHEATER BAR CHEATER BAR ADJ EQUIP TETHER (sm-sm) CADDY, ISS GENERAL PURPOSE CANNON CONNECTOR HANDLE	SEG33106304-301 SEG33106926-301 SEG33106945-307 SEG33113531-301 S22698-006-005	1 1 1 1 2	Panel #8
TOOL PANEL, 18" SOCKET	SEG33106306-301	1	Panel #9
TOOL BOARD, SQ TM SOCKET, 7/16" FLUSH-SQ TM SOCKET, 7/16" PROUD-SQ TM SOCKET, 7/16" RECESSED - SQ TM TORQUE MULTIPLIER (TM), SQUARE	SEG33106296-301 SDG33107087-007 SDG33107087-005 SDG33107087-009 SEG33106261-301	1 1 1 1 1	Slot #1
TOOL BOARD, QD BAIL DRIVE TOOL BMRRM ANTI-ROTATION LATCH TOOL QD BAIL DRIVE TOOL (1 IN)	SEG33113713-301 SEG33113643-301 SEG33111830-301	1 1 1	Slot #2
TOOL BOARD, RATCHET SOCKET, 7/16" X 6" EXT WOBBLE WRENCH, 3/8" DRIVE RATCHET	SEG33106300-301 SEG33106931-301 SEG33106927-303	1 1 1	Slot #3
TOOL BOARD, ROUND TM SOCKET, 7/16" FLUSH-ROUND TM SOCKET, 7/16" PROUD-ROUND TM	SEG33106294-301 SDG33107087-003 SDG33107087-001	1 1 1	Slot #5
TOOL BOARD, TRASH BAG LG TRASH BAG	SEG33106292-301 SEG33106937-301	1 1	Slot #6
TOOL BOARD, SOCKET 5/32" BALL END ALLEN DRIVER SOCKET, 1/2" X 8" EXT WOBBLE SOCKET, 5/16" X 7" EXT RIGID	SEG33106302-301 SEG33108851-301 SEG33108423-301 SEG33106928-301	1 1 1 1	Slot #7

ISS EXTERNAL	CETA 1 (P1)		
APFR 3	SEG33106857-301	1	CETA1 WIF 1 (6,PP) (3:00,YY,F,12)

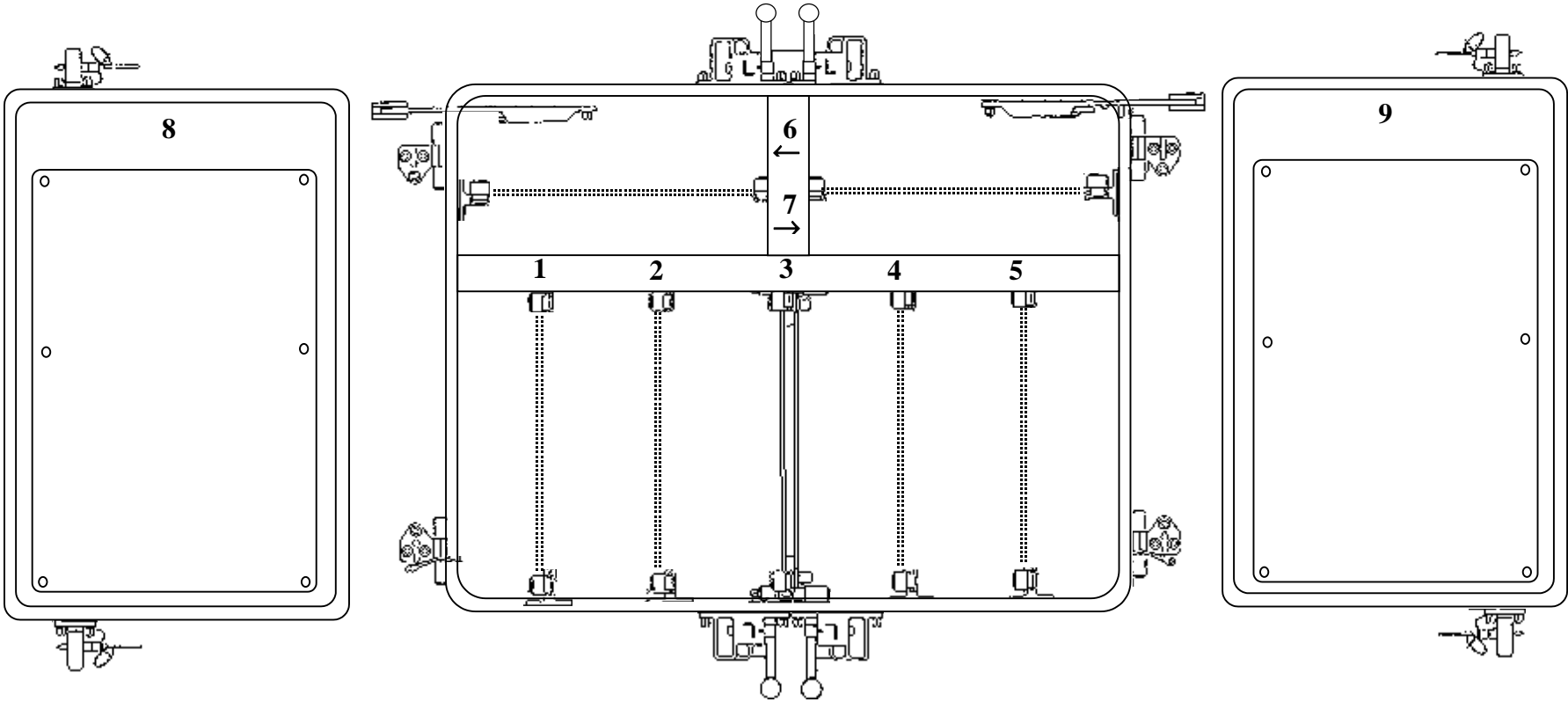
DESCRIPTION	PART NUM	Q	LOCATION
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AIRLOCK INTERNAL	TBD POST-9A LOCATION		
BAG, ORU TRANSFER (LG w/ tether loops)	SEG33114494-307	1	
BOLTS, SSAS CONTINGENCY	1F80666-1	4	
FISH STRINGER (Adj Fuse Tether)	SEG39127200-705	2	
GAP SPANNER (18 – 21")	SEG33109930-301	2	
GAP SPANNER (21 – 30")	SEG33109930-303	2	
GAP SPANNER (45 – 72")	SEG33109930-307	2	
QD BAIL LEVER (1.5 IN)	SEG33113837-701	2	
QD BAIL LEVER (3/4 – 1 IN)	SEG33113838-703	2	
QD CAP TOOL (1 IN)	GD2043325	1	
QD CAP TOOL (1/2 IN)	GD2043730	2	
QD CAP TOOL (1/4 IN)	GD2043725	1	
QD RELEASE TOOL (1.5 IN)	SEG33114617-701	2	
QD RELEASE TOOL (3/4 – 1 IN)	SEG33113838-703	2	
QD TOOLBAG (Vent Tool Bag)	SEG33114667-301	1	
SPOOL POSITIONING DEVICE (1 IN)	SEG33114973	4	
SPOOL POSITIONING DEVICE (1.5 IN)	SEG33114974	7	
SPOOL POSITIONING DEVICE (1/2 IN)	SEG33114975-301	1	
TETHER, RET (Lg-sm)	SEG33106164-385	3	

## TOOLBOX STOWAGE

	Z1 PORT TOOLBOX	Z1 STBD TOOLBOX	A/L TOOLBOX 1	A/L TOOLBOX 2
<b>SLOT # 1</b>	SQUARE TM BOARD SQ TORQUE MULTIPLIER 7/16" FLUSH SQ SOCKET 7/16" PROUD SQ SOCKET 7/16" RECESSED SQ SOCKET	SQUARE TM BOARD SQ TORQUE MULTIPLIER 7/16" FLUSH SQ SOCKET 7/16" PROUD SQ SOCKET 7/16" RECESSED SQ SOCKET	HAMMER BOARD HAMMER	CABLE CUTTER BOARD COMPOUND CUTTERS (SM) SCISSORS
<b>SLOT # 2</b>		QD BAIL TOOL BOARD BMRRM LATCH TOOL QD BAIL DRIVE TOOL (1")	PLIERS BOARD NEEDLE NOSE PLIERS	
<b>SLOT # 3</b>	RATCHET BOARD 3/8" DRIVE RATCHET 7/16" X 12" WOBBLE SOCKET 7/16" X 2" RIGID SOCKET 7/16" X 6" WOBBLE SOCKET	RATCHET BOARD 3/8" DRIVE RATCHET 7/16" X 6" WOBBLE SOCKET		
<b>SLOT # 4</b>				
<b>SLOT # 5</b>	ROUND TM BOARD RND TORQUE MULTIPLIER 5/8" PROUD RND SOCKET 7/16" FLUSH RND SOCKET 7/16" PROUD RND SOCKET	ROUND TM BOARD 7/16" FLUSH RND SOCKET 7/16" PROUD RND SOCKET	ADJ WRENCH BOARD FORCEPS VISE GRIPS WRENCH, ADJ	T-HANDLE TOOL BOARD 3-3" T-TOOLS 2-8" T-TOOLS
<b>SLOT # 6</b>	TRASH BAG BOARD LARGE TRASH BAG SMALL TRASH BAG	TRASH BAG BOARD LARGE TRASH BAG	HYDRAZINE BRUSH BOARD HYDRAZINE BRUSH	
<b>SLOT # 7</b>	SOCKET BOARD 5/32" BALL END ALLEN DR 1/2" X 8" WOBBLE SOCKET 5/16" X 7" RIGID SOCKET	SOCKET BOARD 5/32" BALL END ALLEN DR 1/2" X 8" WOBBLE SOCKET 5/16" X 7" RIGID SOCKET	PRD CARRIER PRD	PRD CARRIER PRD
<b>PANEL # 8</b>	CHEATER BAR PANEL CHEATER BAR ADJ EQUIP TETHER	CHEATER BAR PANEL CHEATER BAR ADJ EQUIP TETHER CADDY, ISS GEN PURPOSE 2 CANNON CONN TOOLS	TOOL CADDY PANEL CADDY, ISS (BUNGEE)	
<b>PANEL # 9</b>	18" SOCKET PANEL 7/16" X 18" WOBBLE SOCKET 7/16" X 9" RIGID SOCKET	18" SOCKET PANEL	BOLT PULLER PANEL BOLT PULLER MECHANICAL FINGER	LARGE CUTTER PANEL GP CUTTER (LARGE)
<b>EXTERNAL</b>	2 SQUARE SCOOPS 2 ROUND SCOOPS D-HANDLE	1 SQUARE SCOOP 1 ROUND SCOOP D-HANDLE		

TOOLBOX PANEL AND SLOT LABELS





## SHUTTLE EMU EQUIPMENT BY ITEM

ITEM	S/N or ID	UP	DOWN	LOCATION
1" Fastening Tape, Loop	TBD	0	3	Mesh bag, ISS5
1" Fastening Tape, Loop	TBD	3	0	Mesh bag, ISS6
7/8" DIA. Crew Identifier	TBD	0	12	Mesh bag, ISS5
7/8" DIA. Crew Identifier	TBD	12	0	Mesh bag, ISS6
Adjustable Thermal Mittens		2 pr	2 pr	Port TSA
Battery, EMU	TBD	1	0	EMU 3006
Battery, EMU	TBD	0	1	EMU 3016
Battery, EMU	TBD	1	1	EMU TBD
Battery, EMU	TBD	1	0	TBD
Battery, EMU	TBD	0	1	TBD
Battery, EMU Helmet Light (EHIP)	1003, 1004	2	2	Vol H (Inbd)
Battery, EMU Helmet Light (EHIP)	1037, 1038	2	2	Vol H (Obd)
Bends Treatment Adapter (BTA)		1	1	TBD
Boot Kit (ISS6,5)	O1, O2	3 pr	3 pr	TBD
BSC Contingency Tool		1	1	EMU Equipment Bag
Comfort Gloves, Spectra	HE	3 pr	3 pr	Mesh Bag (HE)
Comfort Gloves, Spectra	LA	3 pr	3 pr	Mesh Bag (LA)
Comfort Gloves, Spectra	TBD	0	3	Mesh bag, ISS5
Comfort Gloves, Spectra	TBD	3	0	Mesh bag, ISS6
Comm Carrier Assy (Comm Cap)	ISS6,5	3	3	TBD
Comm Carrier Assy (Comm Cap) Prime & B/U	HE	2	2	EMU 3006 LTA Bag
Comm Carrier Assy (Comm Cap) Prime & B/U	LA	2	2	EMU TBD LTA Bag
Contaminant Control Cartridge (LiOH)	TBD	1	1	EMU 3006/3016
Contaminant Control Cartridge (LiOH)	TBD	1	1	EMU TBD

ITEM	S/N or ID	UP	DOWN	LOCATION
Contaminant Control Cartridge (LiOH)	TBD	4	4	TBD
Cooling Loop (Multiple Water Connector) Jumper		1	1	EMU Equipment Bag
Cue Card, Depress/Repress - Shuttle		1	1	TBD
Cuff Checklist - Shuttle		2	2	TBD
DCM Plug (ESCU Connector)		1	1	EVA Bag
DIDB		14	14	TBD
DIDB Restraint Bag		1	1	EMU 3006/3016
DIDB Restraint Bag		1	1	EMU TBD
EMU - Large (HE)	3006	1	0	Ext A/L Port
EMU - Xlarge (HE)	3016	0	1	Ext A/L Port
EMU - Xlarge (LA)	TBD	1	1	Ext A/L Stbd
EMU Equipment Bag	1001	1	1	Vol H (Inbd)
EMU EV Identifier	TBD	0	3	Mesh bag, ISS5
EMU EV Identifier	TBD	3	0	Mesh bag, ISS6
EMU Servicing Kit		1	1	Vol H
Ergometer Shoes (CEVIS use)	LA, HE	2 pr	2 pr	TBD
EVA Bag	TBD	1	1	Vol H (Obd)
EVA Checklist - Shuttle		2	2	TBD
EVA Scissor/Tether Assembly		1	1	EMU 3006/3016
EVA Scissor/Tether Assembly		1	1	EMU TBD
Feedwater Switch Guard		1	1	EMU 3006/3016
Feedwater Switch Guard		1	1	EMU TBD
Glove, EMU	TM	1 pr	1 pr	EMU 3006/3016
Glove, EMU	LA	1 pr	1 pr	EMU TBD
Glove, EMU (backup)	LA, TM	2 pr	2 pr	TBD
Glove, EMU (Prime & backup)	ISS6,5	6 pr	6 pr	TBD

## SHUTTLE EMU EQUIPMENT BY ITEM (Cont)

ITEM	S/N or ID	UP	DOWN	LOCATION
Helmet Light, EMU (EHIP)	1012	1	1	Vol H (Inbd)
Helmet Light, EMU (EHIP)	1011	1	1	Vol H (Obd)
Helmet, EMU (with Cover)	TBD	1	0	EMU 3006
Helmet, EMU (with Cover)	TBD	0	1	EMU 3016
Helmet, EMU (with Cover)	TBD	1	1	EMU TBD
Inflight Stowage Restraint Bag (Empty Mesh Bag)		1	1	Mesh Bag (LA)
LCVG (backup without Biomed)	LA,HE	2	2	TBD
LCVG (with Biomed)	HE	1	1	EMU 3006/3016
LCVG (with Biomed)	LA	1	1	EMU TBD
LCVG (without Biomed, Dry)	ISS6,5	3	3	TBD
Leg Segment Kit (ISS6,5)	O1,O2	6	6	TBD
Leg Segment Kit (LA backup)	O4	1	1	TBD
Lower Arm Kit (ISS5 arms)	OO,O3	0	6	TBD
Lower Arm Kit (ISS6 arms)	O1,O2,O3	6	0	TBD
LTA Donning Handle		2	2	EMU Equipment Bag
Maximum Absorption Garment (MAG)	TBD	7	7	Mesh Bag (HE)
Maximum Absorption Garment (MAG)	TBD	7	7	Mesh Bag (LA)
Maximum Absorption Garment (MAG)	TBD	0	9	Mesh bag, ISS5
Maximum Absorption Garment (MAG)	TBD	9	0	Mesh bag, ISS6
Mesh Bag (HE) (EV Crew Options Kit)	HE	1	1	EMU 3006/3016
Mesh Bag (ISS5) (EV Crew Options Kit)	ISS5	0	3	TBD
Mesh Bag (ISS6) (EV Crew Options Kit)	ISS6	3	0	TBD
Mesh Bag (LA) (EV Crew Options Kit)	LA	1	1	EMU TBD

ITEM	S/N or ID	UP	DOWN	LOCATION
Multiple Water Connector Cover (HUT line)		1	1	EMU 3006/3016
Multiple Water Connector Cover (HUT line)		1	1	EMU TBD
ORU EMU Mission Patch	TBD	0	3	Mesh bag, ISS5
ORU EMU Mission Patch	TBD	3	0	Mesh bag, ISS6
ORU EMU National Flag Patch	TBD	0	3	Mesh bag, ISS5
ORU EMU National Flag Patch	TBD	3	0	Mesh bag, ISS6
ORU Tool Kit, EMU	TBD	1	0	TBD
Pigtail Adapter (EVA Cable)	TBD	4	4	EMU Servicing Kit
Signal Conditioner	TBD	3	3	EMU Servicing Kit
Sizing Ring Kit, Arm 0.5-in	TM	2 pr	0 pr	TBD
Sizing Ring Kit, Leg 0.5-in	LA	1 pr	1 pr	TBD
Sizing Ring Kit, Leg 1.0-in	HE	0 pr	1 pr	TBD
Sock Liner	LA	3 pr	3 pr	Mesh Bag (LA)
SOP Checkout Fixture (SCOF)		2	2	EMU Equipment Bag
Sternal Harness	TBD	3	3	EMU Servicing Kit
Thermal Comfort Undergarment (TCU), bottom	HE	3	3	Mesh Bag (HE)
Thermal Comfort Undergarment (TCU), bottom	LA	3	3	Mesh Bag (LA)
Thermal Comfort Undergarment (TCU), bottom	TBD	0	3	Mesh bag, ISS5
Thermal Comfort Undergarment (TCU), bottom	TBD	3	0	Mesh bag, ISS6
Thermal Comfort Undergarment (TCU), top	HE	3	3	Mesh Bag (HE)
Thermal Comfort Undergarment (TCU), top	LA	3	3	Mesh Bag (LA)
Thermal Comfort Undergarment (TCU), top	TBD	0	3	Mesh bag, ISS5
Thermal Comfort Undergarment (TCU), top	TBD	3	0	Mesh bag, ISS6

## SHUTTLE EMU EQUIPMENT BY ITEM (Cont)

ITEM	S/N or ID	UP	DOWN	LOCATION
Thermal Socks	HE	3 pr	3 pr	Mesh Bag (HE)
Tube Socks	TBD	0	3	Mesh bag, ISS5
Tube Socks	TBD	2	0	Mesh bag, ISS6
Waist Brief Kit	ISS6	1	1	TBD
Wrist Mirror, EMU		2	2	EMU 3006/3016
Wrist Mirror, EMU		2	2	EMU TBD
Wristlets	HE	3 pr	3 pr	Mesh Bag (HE)
Wristlets	TBD	0	3	Mesh bag, ISS5
Wristlets	TBD	3	0	Mesh bag, ISS6

## SHUTTLE EMU EQUIPMENT BY LOCATION

LOCATION	ITEM	S/N or ID	UP	DN
EMU 3006	Battery, EMU	TBD	1	0
EMU 3006	Helmet, EMU (with Cover)	TBD	1	0
EMU 3006 LTA Bag	Comm Carrier Assy (Comm Cap) Prime & B/U	HE	2	2
EMU 3006/3016	Contaminant Control Cartridge (LiOH)	TBD	1	1
EMU 3006/3016	DIDB Restraint Bag		1	1
EMU 3006/3016	EVA Scissor/Tether Assembly		1	1
EMU 3006/3016	Feedwater Switch Guard		1	1
EMU 3006/3016	Glove, EMU	TM	1 pr	1 pr
EMU 3006/3016	LCVG (with Biomed)	HE	1	1
EMU 3006/3016	Mesh Bag (HE) (EV Crew Options Kit)	HE	1	1
EMU 3006/3016	Multiple Water Connector Cover (HUT line)		1	1
EMU 3006/3016	Wrist Mirror, EMU		2	2
EMU 3016	Battery, EMU	TBD	0	1
EMU 3016	Helmet, EMU (with Cover)	TBD	0	1
EMU Equipment Bag	BSC Contingency Tool		1	1
EMU Equipment Bag	Cooling Loop (Multiple Water Connector) Jumper		1	1
EMU Equipment Bag	LTA Donning Handle		2	2
EMU Equipment Bag	SOP Checkout Fixture (SCOF)		2	2
EMU Servicing Kit	Pigtail Adapter (EVA Cable)	TBD	4	4
EMU Servicing Kit	Signal Conditioner	TBD	3	3

LOCATION	ITEM	S/N or ID	UP	DN
EMU Servicing Kit	Sternal Harness	TBD	3	3
EMU TBD	Battery, EMU	TBD	1	1
EMU TBD	Contaminant Control Cartridge (LiOH)	TBD	1	1
EMU TBD	DIDB Restraint Bag		1	1
EMU TBD	EVA Scissor/Tether Assembly		1	1
EMU TBD	Feedwater Switch Guard		1	1
EMU TBD	Glove, EMU	LA	1 pr	1 pr
EMU TBD	Helmet, EMU (with Cover)	TBD	1	1
EMU TBD	LCVG (with Biomed)	LA	1	1
EMU TBD	Mesh Bag (LA) (EV Crew Options Kit)	LA	1	1
EMU TBD	Multiple Water Connector Cover (HUT line)		1	1
EMU TBD	Wrist Mirror, EMU		2	2
EMU TBD LTA Bag	Comm Carrier Assy (Comm Cap) Prime & B/U	LA	2	2
EVA Bag	DCM Plug (ESCU Connector)		1	1
Ext A/L Port	EMU - Large (HE)	3006	1	0
Ext A/L Port	EMU - Xlarge (HE)	3016	0	1
Ext A/L Stbd	EMU - Xlarge (LA)	TBD	1	1
Mesh Bag (HE)	Comfort Gloves, Spectra	HE	3 pr	3 pr
Mesh Bag (HE)	Maximum Absorption Garment (MAG)	TBD	7	7
Mesh Bag (HE)	Thermal Comfort Undergarment (TCU), bottom	HE	3	3
Mesh Bag (HE)	Thermal Comfort Undergarment (TCU), top	HE	3	3

## SHUTTLE EMU EQUIPMENT BY LOCATION (Cont)

LOCATION	ITEM	S/N or ID	UP	DN
Mesh Bag (HE)	Thermal Socks	HE	3 pr	3 pr
Mesh Bag (HE)	Wristlets	HE	3 pr	3 pr
Mesh Bag (LA)	Comfort Gloves, Spectra	LA	3 pr	3 pr
Mesh Bag (LA)	Inflight Stowage Restraint Bag (Empty Mesh Bag)		1	1
Mesh Bag (LA)	Maximum Absorption Garment (MAG)	TBD	7	7
Mesh Bag (LA)	Sock Liner	LA	3 pr	3 pr
Mesh Bag (LA)	Thermal Comfort Undergarment (TCU), bottom	LA	3	3
Mesh Bag (LA)	Thermal Comfort Undergarment (TCU), top	LA	3	3
Mesh bag, ISS5	1" Fastening Tape, Loop	TBD	0	3
Mesh bag, ISS5	7/8" DIA. Crew Identifier	TBD	0	12
Mesh bag, ISS5	Comfort Gloves, Spectra	TBD	0	3
Mesh bag, ISS5	EMU EV Identifier	TBD	0	3
Mesh bag, ISS5	ORU EMU Mission Patch	TBD	0	3
Mesh bag, ISS5	ORU EMU National Flag Patch	TBD	0	3
Mesh bag, ISS5	Thermal Comfort Undergarment (TCU), top	TBD	0	3
Mesh bag, ISS5	Tube Socks	TBD	0	3
Mesh bag, ISS5	Wristlets	TBD	0	3
Mesh bag, ISS5	Maximum Absorption Garment (MAG)	TBD	0	9
Mesh bag, ISS5	Thermal Comfort Undergarment (TCU), bottom	TBD	0	3
Mesh bag, ISS6	1" Fastening Tape, Loop	TBD	3	0
Mesh bag, ISS6	7/8" DIA. Crew Identifier	TBD	12	0
Mesh bag, ISS6	Comfort Gloves, Spectra	TBD	3	0
Mesh bag, ISS6	EMU EV Identifier	TBD	3	0

LOCATION	ITEM	S/N or ID	UP	DN
Mesh bag, ISS6	ORU EMU Mission Patch	TBD	3	0
Mesh bag, ISS6	ORU EMU National Flag Patch	TBD	3	0
Mesh bag, ISS6	Thermal Comfort Undergarment (TCU), bottom	TBD	3	0
Mesh bag, ISS6	Thermal Comfort Undergarment (TCU), top	TBD	3	0
Mesh bag, ISS6	Tube Socks	TBD	2	0
Mesh bag, ISS6	Wristlets	TBD	3	0
Mesh bag, ISS6	Maximum Absorption Garment (MAG)	TBD	9	0
Port TSA	Adjustable Thermal Mittens		2 pr	2 pr
TBD	Battery, EMU	TBD	1	0
TBD	Battery, EMU	TBD	0	1
TBD	Bends Treatment Adapter (BTA)		1	1
TBD	Boot Kit (ISS6,5)	O1, O2	3 pr	3 pr
TBD	Comm Carrier Assy (Comm Cap)	ISS6,5	3	3
TBD	Contaminant Control Cartridge (LiOH)	TBD	4	4
TBD	Cue Card, Depress/Repress - Shuttle		1	1
TBD	Cuff Checklist - Shuttle		2	2
TBD	DIDB		14	14
TBD	Ergometer Shoes (CEVIS use)	LA, HE	2 pr	2 pr
TBD	EVA Checklist - Shuttle		2	2
TBD	Glove, EMU (backup)	LA, TM	2 pr	2 pr
TBD	Glove, EMU (Prime & backup)	ISS6,5	6 pr	6 pr
TBD	LCVG (backup without Biomed)	LA,HE	2	2

## SHUTTLE EMU EQUIPMENT BY LOCATION (Cont)

LOCATION	ITEM	S/N or ID	UP	DN
TBD	LCVG (without Biomed, Dry)	ISS6,5	3	3
TBD	Leg Segment Kit (ISS6,5)	O1,O2	6	6
TBD	Leg Segment Kit (LA backup)	O4	1	1
TBD	Lower Arm Kit (ISS5 arms)	OO,O3	0	6
TBD	Lower Arm Kit (ISS6 arms)	O1,O2,O3	6	0
TBD	Mesh Bag (ISS5) (EV Crew Options Kit)	ISS5	0	3
TBD	Mesh Bag (ISS6) (EV Crew Options Kit)	ISS6	3	0
TBD	ORU Tool Kit, EMU	TBD	1	0
TBD	Sizing Ring Kit, Arm 0.5-in	TM	2 pr	0 pr
TBD	Sizing Ring Kit, Leg 0.5-in	LA	1 pr	1 pr
TBD	Sizing Ring Kit, Leg 1.0-in	HE	0 pr	1 pr
TBD	Waist Brief Kit	ISS6	1	1
Vol H	EMU Servicing Kit		1	1
Vol H (Inbd)	Battery, EMU Helmet Light (EHIP)	1003, 1004	2	2
Vol H (Inbd)	EMU Equipment Bag	1001	1	1
Vol H (Inbd)	Helmet Light, EMU (EHIP)	1012	1	1
Vol H (Obd)	Battery, EMU Helmet Light (EHIP)	1037, 1038	2	2
Vol H (Obd)	EVA Bag	TBD	1	1
Vol H (Obd)	Helmet Light, EMU (EHIP)	1011	1	1

## SHUTTLE TOOLS BY ITEM

ITEM	UP	DOWN	LOCATION
Adjustable Wrench (EV hatch)	1	1	Vol. H Outbd
Anti-Kickback Tool (1-in)	2	0	MA16D
Ballstack	1	1	MA9F
BRT	2	2	MA16J
Caddy, General Purpose	1	1	Vol. H Outbd
CETA Brake Handle Brackets	4	0	P1 CETA Cart
CETA Brake Shaft Launch Lock	1	0	P1 CETA Cart
CETA Frame Standoffs	4	0	P1 CETA Cart
CETA Launch Restraint Bolt	4	0	P1 CETA Cart
CETA Swingarm pip pin w/wire tie or bolted lanyard	3	0	P1 CETA Cart
Drop Proof Tether Adapter	2	2	MA16F
Fish Stringer	1	1	MA16F
Fish Stringer	1	1	
Fluid QD caps (1.5-in)	4	4	
MWS Baseplate	2	2	MA16F
MWS Keystrap	1	1	MA16F
MWS T-Bar Gimbal	2	2	MA16F
PGT	1	1	Stbd Ceiling Bag #1

ITEM	UP	DOWN	LOCATION
QD Button Depress Tool (1-in)	2	0	MA16J
Ratchet (3/8-in) w/ 7/16-in socket (EV hatch)	1	1	Vol. H Outbd
Socket, 12mm	2	0	MA9F
SPD (0.5-in)	2	0	MA9F
SPD (1.5-in)	13	0	MA9F
SPD (1-in )	24	0	MA16D
SPD bootie extender (0.5-in)	1	0	MA16D
SSAS Contingency Bolts	4	0	MA9F
Tether, Adj Equip	2	2	MA16F
Tether, Retractable (sm-sm)	0	1	
Tether, Retractable Equip (sm-sm w/ pip pin)	3	3	MA16F
Tether, Retractable Equip (sm-sm w/ pip pin)	0	2	
Tether, Retractable Equip (sm-sm)	2	2	EMUs
Tether, Retractable Equip (sm-sm)	3	3	Vol. D
Tether, Waist	4	4	Vol. D
WETA Dummy Boxes	2	2	
WIF, On-orbit Installable	1	1	MA16F

## SHUTTLE TOOLS BY LOCATION

LOCATION	ITEM	UP	DOWN
TBD	Fish Stringer	1	1
	Tether, Retractable (sm-sm)	0	1
	Tether, Retractable Equip (sm-sm w/ pip pin)	0	2
	Fluid QD Caps	4	4
	WETA Dummy Boxes	2	2
EMUs	Tether, Retractable Equip (sm-sm)	2	2
MA16D	Anti-Kickback Tool (1-in)	2	0
	SPD bootie extender (0.5-in)	1	0
	SPD (1-in )	24	0
MA16F	Drop Proof Tether Adapter	2	2
	Fish Stringer	1	1
	MWS Baseplate	2	2
	MWS Keystap	1	1
MA16F	MWS T-Bar Gimbal	2	2
	Tether, Adj Equip	2	2
	Tether, Retractable Equip (sm-sm w/ pip pin)	3	3
	WIF, On-orbit Installable	1	1
MA16J	BRT	2	2

LOCATION	ITEM	UP	DOWN
MA16J	QD Button Depress Tool (1-in)	2	0
MA9F	Ballstack	1	1
	Socket, 12mm	2	0
	SPD (0.5-in)	2	0
	SPD (1.5-in)	13	0
	SSAS Contingency Bolts	4	0
P1 CETA Cart	CETA Brake Handle Brackets	4	0
	CETA Brake Shaft Launch Lock	1	0
	CETA Frame Standoffs	4	0
	CETA Launch Restraint Bolt	4	0
	CETA Swingarm pip pin w/wire tie or bolted lanyard	3	0
Stbd Ceiling Bag #1	PGT	1	1
Vol. D	Tether, Retractable Equip (sm-sm)	3	3
	Tether, Waist	4	4
Vol. H Outbd	Adjustable Wrench (EV hatch)	1	1
	Caddy, General Purpose	1	1
	Ratchet (3/8-in) w/ 7/16-in socket (EV hatch)	1	1



**APFR MANAGEMENT STS-113 (11A)**

	<b>APFR 1</b> No shield 8A Pitch Knob problem	<b>APFR 2</b> No shield	<b>APFR 3</b> S/N 1005 No shield, 8A pitch knob problem	<b>APFR 4</b> (TS, safety tether, ORU tether)	<b>APFR 5</b> (TS, ingress aid, ORU tether)	<b>APFR 6</b>	<b>APFR 7</b>	<b>IAPFR 1</b> No shield	<b>IAPFR 2</b> No shield	<b>CRANE</b> (ballstack)	<b>TS</b>	<b>TERA</b> (headless)
<b>PREFLIGHT</b>	S0 WIF 42 (12,VV,F, 12)	S0 WIF 47 (9,PP,F,12)	CETA Cart 1 WIF 1 (port) Y/P=6,PP (3, YY, F, 12)	Node WIF 5 (6, PP, B, 12)	PMA1 WIF 2 (12, KK, F, 6)	PMA1 WIF 4 (4, PP, A, 6)	A/L Port Toolbox WIF2 Y/P=6,GG (9,YY,J, 12)	Z1 WIF 1 (12,PP,F,12)	Z1 WIF 4 (12, PP,F,12)	PMA1 WIF 5	S0 port wedge face	S0 port wedge face
<b>EVA 1</b>												
SETUP			CETA Cart 2 WIF 3 (zenith) Y/P=3,GG Clock=6				A/L Stbd Toolbox Y/P=12/MM (9,MM,F,12)					
NADIR TRAY	S0 WIF 42 (8,PP,C,12)											
	S0 WIF 37 (3,PP,F,12)											
ZENITH TRAY			CETA Cart 2 WIF 3 (zenith) Y/P=3,GG (6,UU,G,12)									
			CETA Cart 2 WIF 2 (stbd) Y/P=3,KK (5,PP,K,12)									
NODE WETA					Remove ingress aid		√ A/L Stbd Toolbox Y/P=12/MM (9,MM,F,12)					
<b>EVA 2</b>												
CETA RELOCATE			SSRMS (12,PP,F,6) Inst. ingress aid									
CLEANUP			CETA Cart 2 WIF 3 (zenith) Y/P=3,GG (__,PP,F,6)									
<b>EVA 3</b>												
RBVM SPDs	SSRMS (12,PP,L,6)											
	P1 WIF 14 (__,PP,L,6)											
CID 7 & 8 MBSU RECONFIG		S0 WIF 48 (4,PP,F,12)										
		S0 WIF 47 (9,PP,F,11)										
		S0 WIF 42 (__,PP,F,12)										

## APFR MANAGEMENT STS-113 (11A) (Cont)

	<b>APFR 1</b> No shield	<b>APFR 2</b> No shield	<b>APFR 3</b> S/N 1005 No shield Ingress aid	<b>APFR 4</b> (TS, safety tether, ORU tether)	<b>APFR 5</b> (TS, ORU tether)	<b>APFR 6</b> (SMDP in adapter)	<b>APFR 7</b>	<b>IAPFR 1</b> No shield	<b>IAPFR 2</b> No shield	<b>CRANE</b> (ballstack)	<b>TS</b>	<b>TERA</b> (headless )
<b>POSTFLIGHT</b>	P1 WIF 14 (PP,L,6)	S0 WIF 42 (PP,F,12)	CETA Cart 2 WIF 3 (zenith) Y/P=3,GG (PP,F,6)	Node WIF 5 (6, PP, B, 12)	PMA1 WIF 2 (12, KK, F, 6)	PMA1 WIF 4 (4, PP, A, 6)	A/L Stbd Toolbox Y/P=12/MM (9,MM,F,12)	Z1 WIF 1 (12, P,F,12)	Z1 WIF 4 (12, PP,F,12)	PMA1 WIF 5	S0 port wedge face	S0 port wedge face

## 11A (STS-113) SAFETY TETHER CONFIGURATION

	<b>1</b> SN 1009 Lg-sm No money clip	<b>2</b> SN 1006 Lg-sm Crew hook lock w/lanyard Red-stripe showing	<b>3</b> SN1011 Lg-sm Crew hook lock w/lanyard Red-stripe showing	<b>4</b> SN1001 (or 1015) Lg-sm Crew hook lock w/lanyard	<b>5</b> SN1015 (or 1001) Lg-sm Crew hook lock w/lanyard	<b>6</b> SN 1002,3,4,or5 Sm-sm Crew hook lock w/French hook lanyard	<b>7</b> SN1010 Lg-sm Crew hook lock w/lanyard	<b>8</b> SN1012 Sm-sm Crew hook lock w/lanyard	<b>9</b> SN 1002,3,4,or5 Sm-sm Crew hook lock w/French hook lanyard	<b>10</b> SN 1002,3,4,or5 Sm-sm Crew hook lock w/French hook lanyard	<b>11</b> SN1014 Lg-sm Crew hook lock w/lanyard	<b>12</b> SN 1002,3,4,or5 Sm-sm Crew hook lock w/French hook lanyard
<b>PREFLIGHT</b>	INSIDE Equipment Lock Tether Staging Area	INSIDE Equipment Lock Tether Staging Area	INSIDE Equipment Lock Tether Staging Area	INSIDE Equipment Lock Tether Staging Area	S0 HR 3412	S0 HR 3412	A/L Ext D- ring	Stbd side of A/L HH 0506	Lab slide wire Stowed fwd end	Lab slide wire Stowed fwd end	Node WIF 5 Contaminated	Node HH 0102 near node bag
<b>POSTFLIGHT</b>	No change	No change	No change	No change	No change	No change	No change	A/L Ext D- ring	No change	No change	No change	No change

NOTE: CHIT ISS0099 says that a red stripe safety tether should be compared in length to a good one. If the length is the same, it's good, just check it before use every time. If it is up to 6 in longer, it can still be used, but should be brought home and swapped out at the next opportunity. If it is more than 6 in longer, it is no go

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EMU/AIRLOCK CONSUMABLES TRACKING CUE CARD ..... FS CC 10-11 |

## WATER RECHARGE

### IF EMU NOT ALREADY POWERED UP:

#### EMU POWERUP

- If external airlock:
- BOTH DCM
1. Retrieve, position SCUs; remove DCM covers
  2. Connect SCUs to DCM, ✓locked
  3. PWR – BATT

#### CAUTION

EMU must be on BATT pwr when airlock pwr supply is turned on

- AW18H
4. PWR/BATT CHGR EMU 1,2 MODE (two) – PWR  
BUS SEL (two) – MNA(MNB)

- If external airlock:
- MD (flr)
- AW82B
- DCM
5. ✓EMU O2 ISOL VLV – OP
  6. EV1,2 O2 vlv (two) – OP
  7. PWR – SCU

#### WATER FILL (✓MCC for config, if reqd)

- If external airlock:
- MO13Q
- R11L
8. ✓ARLK H2O S/O VLV – OP (tb-OP)
  9. ✓SPLY H2O XOVR VLV closed (tb-CL or bp) (water transfer config):  
9. ✓SPLY H2O TKA OUTLET – CL (tb-CL)

#### SM 60 TABLE MAINT

- CRT
- R11L
- L1
- ML31C
- R11L
10. Use TKB quantity:  
PARAM ID – ITEM 1 +0 6 2 0 4 2 0 EXEC
  11. ✓RAD CNTLR OUT TEMP – NORM
  12. ✓FLASH EVAP CNTLR PRI A,B (two) – OFF
  13. SPLY H2O TKD OUTLET – CL (tb-CL)
  14. ✓SPLY H2O TKA OUTLET – CL (tb-CL)  
TKB OUTLET – CL (tb-CL)  
TKC OUTLET – OP (tb-OP)  
✓INLET – CL (tb-CL)

#### SM 60 TABLE MAINT

- CRT
15. Use TKC quantity:  
PARAM ID – ITEM 1+0 6 2 0 5 4 8 EXEC
  16. Log value before recharge

Recharge #	H2O TKB(C) %
1	
2	
3	
4	
5	

- AW82D
- CRT
17. ✓EMU 1,2 H2O WASTE tb (two) – CL  
SPLY (two) – OP (tb-OP)
  18. ✓H2O TKB(C) quantity decreasing


#### NOTE


Full charge requires ~15 min

TOP

EMU/AIRLOCK CONSUMABLES TRACKING CUE CARD

AIRLOCK Operations	EVA	METOX For 10.2 Ops (S/N or bar code)	PWR (EMU Water Bag) (S/N)	IRU EMU Fill Quantity Post EVA (lb)	PWR (dump / fill)
	1	/_____ (Cap and stow/ reuse for EVA 2)	1007 (remaining dump/refill post EVA 1)	EV1____/EV2____	1004 ____ / ____
	2	/_____ (Cap and stow)	1007 (refill post EVA 3)	EV1____/EV2____	1006 ____ / ____
	3	/_____ (Cap and stow)	No water refill post EVA 3	EV1____/EV2____	1007 ____ / ____ 1007 <u>N/A</u> / ____

 EV1 - LA EMU 3017	EVA	LiOH (S/N)	METOX (S/N or bar code)	EMU BATTERY	REBA (S/N)	Helmet Light Batt (S/N)
	1	2026	N/A	2032 (recharge POST EVA 1)	_____ (recharge)	____ / ____ (recharge)
	2	N/A	_____ (regen POST EVA 2)	2010 (recharge POST EVA 2)	_____ (recharge)	____ / ____ (recharge)
	3	N/A	_____ (regen POST EVA 3)	2029 (no recharge POST EVA 3)	_____ (recharge)	____ / ____ (recharge)

 EV2 - HE EMU 3009	EVA	LiOH (S/N)	METOX (S/N or bar code)	EMU BATTERY	REBA (S/N)	Helmet Light Batt (S/N)
	1	2025	N/A	2033 (recharge POST EVA 1)	_____ (recharge)	____ / ____ (recharge)
	2	N/A	_____ (regen POST EVA 2)	2026 (recharge POST EVA 2)	_____ (recharge)	____ / ____ (recharge)
	3	N/A	_____ (regen POST EVA 3)	2030 (no recharge)	_____ (recharge)	____ / ____ (recharge)

EVA-4a/113/O/A

(reduced copy)

FS CC 10-11

EVA/113/FIN



TOP  
BACK OF 'EMU/AIRLOCK CONSUMABLES TRACKING CUE CARD'

HOOK  
VELCRO



HOOK  
VELCRO

(reduced copy)  
FS CC 10-12

EVA-4b/113/O/A



EVA/113/FIN

EMU CONTINGENCY PROCS

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**DISPLAY LOSS DURING POWER TRANSFER (WARM RESTART)**

- DCM 1. FAN – OFF
- If PWR – SCU:
- AW18H 2. PWR/BATT CHGR EMU 1(2) BUS SEL – OFF (7 sec)
- DCM 3. PWR – BATT
- AW18H 4. ✓DISPLAY – ‘O2 POS – XX’
- 5. PWR/BATT CHGR EMU 1(2) MODE – PWR  
BUS SEL – MNA(MNB)
- DCM 6. ✓EMU INPUT 1(2) volts = 18.0–20.0
- 7. PWR – SCU
- 8. ✓DISPLAY – ‘O2 POS – XX’
- If PWR – BATT:
- 9. PWR – SCU
- AW18H 10. PWR/BATT CHGR EMU 1(2) BUS SEL – OFF (7 sec)
- DCM 11. PWR – BATT
- 12. ✓DISPLAY – ‘O2 POS – XX’
- 13. If reqd, FAN – ON

**VACUUM H2O RECHARGE (MANNED)**

**WARNING**  
Procedure should be used only if performing a contingency EVA

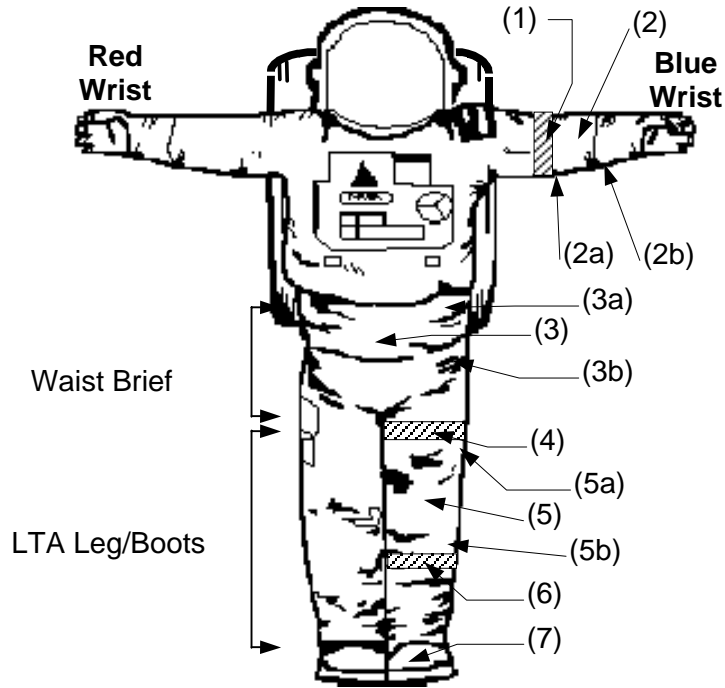
- EV 1. Perform AIRLOCK INGRESS, Cuff C/L, 43 (Close hatch, partially engage latches)
- DCM 2. ✓Helmet purge vlv – cl, locked
- 3. ✓PURGE vlv – cl (dn)
- 4. ✓WATER – OFF
- If external airlock:
- IV MO13Q 5. ✓ARLK H2O S/O VLV – OP (tb–OP)
- MD(flr) 6. ✓EMU O2 ISOL VLV – OP
- ML86B:C 7. ✓cb MNC EXT ARLK HTR LINE ZN 1,2 (two) – op
- EV 8. Remove DCM cover
- 9. Connect SCU to DCM
- 10. COMM mode – HL
- AW82B 11. ✓EV–1(EV–2) O2 vlv – OP
- AW18H 12. PWR/BATT CHGR EMU 1(2) BUS SEL – MNA(MNB)
- DCM 13. PWR – SCU (fwd), WARN TONE
- R11L If SPLY H2O XOVR VLV closed (tb–CL or bp) (water transfer config):
- 14. SPLY H2O TKA OUTLET – CL (tb–CL)
- If SPLY H2O XOVR VLV open (tb–OP) (nominal config):
- IV L1 15. ✓RAD CNTLR OUT TEMP – NORM
- 16. ✓FLASH EVAP CNTLR PRI A,B (two) – OFF
- ML31C 17. SPLY H2O TKD OUTLET – CL (tb–CL)
- R11L 18. SPLY H2O TKB OUTLET – CL (tb–CL)
- ✓TKA OUTLET – CL (tb–CL)
- TKC OUTLET – OP (tb–OP)
- EV AW82D 19. ✓EMU 1(2) H2O WASTE – CL (tb–CL)
- SPLY – OP (tb–OP)

**WARNING**  
O2 will be off. IV1 stand by inner hatch  
Equal vlvs for emergency repress

- EV DCM 20. O2 ACT – OFF, monitor SUIT P (✓SUIT P > 3.6)
- \* When SUIT P ≤ 3.6: \*
- \* O2 ACT – PRESS until SUIT P = 4.2–4.4 \*
- \* – OFF \*
- 21. STATUS: ✓H2O WP ~8–15 psi and stable for ~30 sec (indicates charging complete), then:
- O2 ACT – PRESS until SUIT P = 4.2–4.4
- EVA



STS-113/11A EMU SIZING TABLES



**NOTE**

Note any changes made in-flight to EMU size; record in EVA C/L

SEMU	HUT Size / SEMU #	(1) Arm Sizing Ring	(2a) Arm Cam	(2) Lower Arm	(2b) Wrist Cam	PhaseVI Glove
LA - up	XL / 3017	None	Short	O3	Short	6LA
- dn	XL / 3017	None	Short	O3	Short	6LA
Herrington - up	XL / 3005	None	Short	O0	Short	6TM
- dn	M / 3009	0.5	Long	O0	Long	6TM
Treschev (Exp5)	L / 3011	None	Short	O3 (065, 066)	Long	'Tv1' 6RY (6073)
Korzun (Exp5)	L / 3013	<b>0.5-inch (143, 144)</b>	Short	<b>O3 (127, 128)</b>	Long	'Kz1' 6MT (6139)
Whitson (Exp5) UF-2 Stage	M / <b>3009</b>	None	Short	O1 (157,158)	Long	'Wt1' 6WT (6115)
9A Stage	L / 3011	<b>0.5-inch (116, 117)</b>	Short	<b>O0 (265, 266)</b>	Long	'Wt1' 6WT (6115)
Bowersox (Exp6)	L / 3013	None	Short	O1	Long	6BX
Pettit (Exp6)	L / 3013	0.5 inch	Short	O3	Long	6LE
Budarin (Exp6)	L / 3011 XL / 3005	None 0.5"	Short Short	O2 O1	Long Long	6PZ 6PZ

LTA	(3a) Brief Upper Cam	(3) Waist Brief (S/N)	(3b) Brief Lower Cam	(4) Thigh Sizing Ring (S/N)	(5a) Leg Upper Cam	(5) Leg Segment (S/N)	(5b) Leg Lower Cam	(6) Leg Sizing Ring (S/N)	(7) Boot/Insert (S/N)
LA	Short	O1	Long	None	Short	O4	Long	0.5-inch	O2 / None
Herrington	N/A	O3 – 16XSf16	N/A	None	Short	O2	Long	1.5-inch	O2 / O2
Korzun (Exp5)	Long	O2 (2041)	Long	0.5-inch (117, 118)	Short	<b>O2 (063, 064)</b>	Long	<b>1.5-inch (141, 142)</b>	O2 (210)
Whitson (Exp5)	Short	O1 (2040)	Short	<b>0.5-inch (137, 138)</b>	Short	<b>O1 (059, 060)</b>	Long	<b>1.5-inch (123, 124)</b>	O1 (203)
Treschev (Exp5)	Short	O2 (2047)	Long	None	Short	<b>O2 (151, 152)</b>	Long	<b>1.0-inch (119, 120)</b>	O2 / O5 (217)
Bowersox (Exp6)	Short	O1	Long	None	Short	O1	Long	1.5 inch	O2 / O1LM
Pettit (Exp6)	Short	O1	Long	None	Short	O3	Long	1.5 inch	O2 / None
Budarin (Exp6)	Long	O2	Short	None	Short	O2	Short	1.0 inch	O2 / O2LM

## EMU CONTINGENCY RESIZE MATRIX

FOR LOSS OF:	EV1 (LA)	EV2 (Herrington)
HUT/PLSS	(X-Large ORU, SEMU 3017) Use Herrington HUT (X-Large ORU, SEMU 3005) 1. Remove LA lower arms (O3) from LA HUT 2. Remove Herrington lower arms (O0) from Herrington HUT 3. Install LA lower arms on Herrington HUT 4. Install LA LTA on Herrington HUT	(Medium ORU, SEMU 3009) Use Whitson HUT (Large ORU, SEMU 3011) 1. Install Herrington lower arms (O0) on Whitson HUT (no sizing rings) 2. Install Herrington LTA on Whitson HUT
LTA Brief	(O1 -- short/long) Use locker stowed spare adj. LTA brief (S/N TBD), verify S/L cam configuration 1. Install LTA brief (S/N TBD) on LA HUT 2. Install LA leg segments (O4), 0.5" leg sizing rings and boots	(16XSF16) Use locker stowed spare adj. LTA brief (S/N TBD), verify S/S cam configuration 1. Install LTA brief (S/N TBD) on Herrington HUT 2. Install Herrington leg segments (O2) without 1.0" sizing rings 3. Install locker stowed 0.5" leg sizing rings (116, 117) 4. Install Herrington boots
Gloves	(6 LA) Use EV1 backup gloves	(6 TM) Use EV2 backup gloves
LCVG	(O6, TBD) Use backup LCVG (TBD) 1. Transfer: biomed, dosimeter	(O4, TBD) Use backup LCVG (TBD) 1. Transfer: biomed, dosimeter
CCA	(O3/311, TBD) Use EV1 backup CCA (TBD)	(O4/317, TBD) Use EV2 backup CCA (TBD)
Lower Arm Segment	(O3: S/S, TBD, TBD) Use Treschev lower arm segment (O65, O66), verify S/S cam configuration 1. Install Treschev lower arm segment on LA HUT	(O0: L/L, TBD, TBD) Use Herrington XL HUT lower arm segment (TBD, TBD), verify L/L cam configuration 1. Remove XL HUT lower arm segment (TBD, TBD) 2. Install XL HUT lower arm segment (TBD, TBD) on Herrington M HUT
Leg Segment	(O4: S/L, TBD, TBD) Use locker stowed backup leg segment (O4), verify S/L cam configuration 1. Remove leg segment from LA LTA (do not remove sizing rings with leg segment) 2. Install backup leg segment (TBD, TBD) on LA LTA	(O2: S/L, TBD, TBD) Use Treschev leg segment (151, 152), verify S/L cam configuration 1. Remove Treschev leg segment (do not remove sizing rings with leg segments) 2. Remove Herrington leg segment (do not remove sizing rings with leg segments) 3. Install Treschev leg segment on Herrington LTA
Sizing Rings	(0.5" leg ring) Use locker stowed leg ring backup (116, 117)	(1.5" leg ring) Use Whitson or Kozun leg ring (123, 124, 141,142)
Boot/BSI	(O2/none) Use Korzun boot (O2/none), verify that there is no BSI or toe cap installed in boot 1. Swap boots	(O2/O2) Use Korzun boot (O2/none), verify that there is no BSI or toe cap installed in boot 1. Remove BSI from Herrington boot and install in Korzun boot 2. Install Korzun boot on Herrington LTA

UNSCHEDULED/CONTINGENCY EVA TASKS

I

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UNSCH/CONT  
EVA TASKS

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# 11A WORKAROUNDS CRIBSHEET

## Generic

<b>NZGL Connector</b>	A. Connector fails to release from dummy stowage	1. Inspect connector\bail for FOD 2. Increase force on bail
	B. Connector fails to mate	1. Detach from soft dock and inspect: Pins, FOD, EMI band, bend radius, bail linkages/rivets, soft dock springs, O-ring seal on non-active side, connector keying features 2. Cycle bail while disconnected
	C. Connector Pin bent	1. Report bent pin location to MCC 2. On MCC Go, retrieve pin straightener (Node bag); straighten
	D. Connector FOD	On MCC GO, obtain connector cleaner tool from A/L staging bag
	E. Connector EMI band bent	On MCC GO, obtain needle nose pliers or forceps to remove band
	F. Connector bail linkage failure	On MCC GO, re-attempt connector mate with broken bail. Vice grips may be used for additional leverage.
	G. Connector soft dock spring bent	On MCC GO, obtain needle nose pliers, attempt to remove bent spring
	H. Connector O-ring seal loose	1. Remove seal with tether hook 2. If no joy, on MCC GO, obtain needle nose pliers to remove seal
<b>TA CLAMP</b>	I. TA clamp fails to release	Use tether hook for additional leverage to open clamp
<b>MMOD Shield</b>	J. MMOD shield fastener fails to release	On MCC GO: 1. Retrieve prybar (Node Bag) and RPCM MLI 2. Release other MMOD shield fasteners 3. Place MLI cover over failed fastener 4. Insert prybar under MMOD shield by failed fastener; pry shield away from structure until fastener free
	<b>WARNING</b> Do not touch back side of MMOD shields or handle fastener fragments due to sharp edges	
	<b>WARNING</b> Fastener and shield/tool interface must be covered to avoid potential projectiles	
	K. MMOD shield fastener fails to engage	Engage other fasteners. 2 of 3 required.
	L. T-handle tool fails to engage shield	Remove adjacent fasteners; attempt reinstallation
<b>TSA</b>	M. Latch fails to open	Release 7/16" EVA bolt on latch bracket, rotate bracket clear of latch tongue.
	N. Latch fails to close	Close remaining latches (3 of 4 required for landing)
<b>APFR</b>	O. APFR fails to install in WIF	1. Verify APFR collar in install position 2. Attempt APFR install in alternate position. If no joy (APFR failure), use another APFR
	P. Joints fail to actuate	1. Verify no load is applied to joint 2. Increase force applied to free joint
<b>Safety Tether</b>	Q. Safety tether fails to tend	Pull out small amount of cable, allow reel to retract while holding cable slightly tensioned.

## 11A WORKAROUNDS CRIBSHEET (Cont)

### CETA CART

A. 5/8" launch restraint bolts will not release	1. Verify scissor mechanism is released from bolt shaft 2. Retrieve cheater bar (Z1 Stbd tool box) for additional torquing capability
B. Any 7/16" launch bolt	Go to take bolt to failure – increase torque as required
C. Wheel bogie fails to release	Perform CETA CART WHEEL BOGIE R&R
D. Parking brake fails to engage / disengage	Retry using other side
E. Dynamic brake fails to engage	Limit translation rates for manual stopping or Use parking brake as dynamic brake
F. CETA 1 active coupler fails (stbd side)	Swap CETA 1 failed coupler with CETA 2 active coupler: remove wire ties (2) and pip pins to release coupler
G. Coupler knob fails to lock	Leave in CAPTURE
H. Coupler know fails to unlock	Remove coupler: remove wire ties (2) and pip pins to release active coupler or bolt to release passive coupler
I. Swing arm fails to rotate	Do not force swing arm into position; use alternate swing arm / WIF
J. Swing arm fails to lock	Wire tie in stowed position

### DRAG LINK

A. Drag link bolt will not release	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;"> <p style="text-align: center;"><b>WARNING</b></p> <p style="text-align: center;">Nutplate rivets may break Potential sharp edges and debris</p> </div>	1. <b>PGT: to manual, RCCW, MTL = 30.5</b> (failure 32.3 ft-lbs) Re-attempt fastener release 2. Retry using Torque Wrench or EVA ratchet (Z1 toolbox)
B. Drag link attach bolt will not install in stowage flange		1. If only one bolt functional, orient drag link as required to use good bolt for clevis bracket <b>NOTE: Bolt re-installation not required for passive, spring-loaded fitting</b> 2. Wire tie or tether drag link in stowage position
C. Drag link attach bolt will not install in drag link		Wire tie bolt to drag link, minimize thread exposure

### WETA / DUMMY BOX

A. Dummy box outer or center jack bolt fails to disengage		1. <b>PGT: B7, CCW 2, 30.5</b> (failure 38.8 ft-lbs) Re-attempt fastener release 2. <b>PGT: to manual, RCCW, MTL = 30.5</b> , apply manual torque. 3. On MCC Go, retrieve manual ratchet, re-attempt
B. WETA center jack bolt fails to engage		1. Remove WETA, inspect rail and bolt interface for debris, attempt reinstall 2. <b>PGT: increase setting incrementally as required up to B7 (failure 31 ft-lb)</b>
C. WETA outer bolts fail to engage		Engage alternate bolt, then re-attempt failed bolt
D. Stanchion launch bolts fails to disengage from keel pin		1. <b>PGT: B7, CCW 2, 30.5</b> (failure 64.7 ft-lbs) Re-attempt fastener release 2. <b>PGT: to manual, RCCW, MTL = 30.5</b> , apply manual torque. 3. If no joy, retrieve manual ratchet, re-attempt
E. Stanchion fails to soft-dock onto ISS mounting plate		Attempt bolt installation without soft dock

## 11A WORKAROUNDS CRIBSHEET (Cont)

F. Stanchion bolt does not engage	<ol style="list-style-type: none"> <li>1. Release stanchion bolts, √stanchion alignment, re-attempt bolt install</li> <li>2. <b>PGT: B7, CCW 2, 30.5</b> Apply higher torque. If higher torque continues, stop at 3+ turns</li> <li>3. Remove stanchion, inspect bolt and truss interface. If bolt looks good, on MCC Go, attempt installation at alternate CP</li> </ol>
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### KEEL PIN

A. Nut clamp bolt fails to sufficiently engage	<ol style="list-style-type: none"> <li>1. Increase torque??</li> <li>2. Use vise grips (A/L Toolbox) to retain nut during keel pin bolt release. Adjustable Wrench will not fit flats of nut</li> </ol>
B. Keel pin bolt will not release	<ol style="list-style-type: none"> <li>1. <b>PGT: B7, CCW 2, 30.5</b> (failure 22.2 ft-lbs) Reattempt release</li> <li>2. <b>PGT: to manual RCCW, MTL = 30.5</b> Reattempt release</li> <li>3. Retry using Torque Wrench or EVA ratchet with cheater bar (Z1 toolbox)</li> </ol>
C. Keel pin bolt is released from nut, but will not release from bracket	Use bolt puller (A/L toolbox 1) to free bolt from bracket
D. Keel pin bolt will not reinstall	<ol style="list-style-type: none"> <li>1. <b>PGT: A7, CW2, 30.5</b> (9.2 ft-lbs, 30 rpm) reattempt using higher torque</li> <li>2. Stow keel pin such that failed fastener is not in pip pin bracket, may require installation in alternate location. Wire tie/tether as necessary</li> </ol>

### WET FLUID QD OPS

<p>A. QD button fails to depress</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center;"><b>CAUTION</b></p> <p>The handle may kick back if button is released and pressure is built up in the spring cavity from a leaking primary seal.</p> </div>	<ol style="list-style-type: none"> <li>1. Verify locking collar fully rotated</li> <li>2. Push bail towards open position (towards male), while reattempting button depress. If button depresses and QD venting required, install SPD while pushing bail towards open position.</li> <li>3. If no joy (1-in QD), install button depress tool (BDT): <ul style="list-style-type: none"> <li>• Unlock QD collar</li> <li>• Install aft key; ensure BDT plunger fully retracted</li> <li>• Install BDT; push BDT forward (towards male)</li> <li>• Rotate knob CW to hard stop; verify bail motion (if reqd, use PGT or ratchet on EVA bolt)</li> </ul> </li> <li>4. To remove BDT: <ul style="list-style-type: none"> <li>• Rotate knob CCW to hard stop</li> <li>• Depress hard dock lever; remove BDT</li> <li>• Remove aft key</li> </ul> </li> </ol>
B. Leaking QD – after SPD install	<ol style="list-style-type: none"> <li>1. Remove SPD; open valve (verify detent button up and aft white line visible). If leak stops, rotate locking collar to lock</li> <li>2. If no joy, close valve (verify detent button up and fwd white line visible); rotate locking collar to lock</li> </ol>

## 11A WORKAROUNDS CRIBSHEET (Cont)

### SPD FAILURES

A. 1-in SPD spring-loaded capture point fails to install	1. Manually pivot capture point into place 2. If no joy, reattempt using a different SPD
B. 1.5-in fwd SPD fails to engage	1. Install aft part of SPD; ensure bail against aft SPD 2. Wire tie bail to keep it against SPD; restrain fwd SPD with wire tie
C. 0.5-in SPD lock pin fails to engage	1. After bail secured in slider cutout; wire tie in place

### SEG TO SEG FLUID JUMPERS (Leak Response)

<p>A. Leaking QD – fwd SPD installed</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p style="text-align: center;"><b>CAUTION</b></p> <p style="text-align: center;">Minimize torsional and side loads when moving bail</p> </div>	<ol style="list-style-type: none"> <li>1. Remove SPD, fully open valve</li> <li>2. Verify button detent up and aft white line visible</li> <li>3. √MCC for leak stop</li> </ol> <p>For leaking QD:</p> <ol style="list-style-type: none"> <li>4. If other end of jumper has valve open; close valve (verify detent button up &amp; fwd white line visible)</li> <li>5. Perform FLUID QD OPS / QD Demating, all steps</li> <li>6. Perform FLUID QD OPS / QD Mating, steps 1-8 only (do not open valve)</li> <li>7. For non-leaking end, open valve (verify detent button up &amp; aft white line visible)</li> <li>8. On MCC Go, for leaking end, open valve (verify detent button up &amp; aft white line visible)</li> </ol>
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### ATA MATE (Leak Response)

<p>A. Leaking QD – no SPD</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p style="text-align: center;"><b>CAUTION</b></p> <p style="text-align: center;">Minimize torsional and side loads when moving bail</p> </div>	<ol style="list-style-type: none"> <li>1. Perform FLUID QD OPS / QD Demating, all steps</li> <li>2. Perform FLUID QD OPS / QD Mating, steps 1-8 only (do not open valve)</li> <li>3. On MCC Go, open valve (verify detent button up &amp; aft white line visible)</li> </ol>
<p>B. Leaking QD (F174) – SPD installed</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p style="text-align: center;"><b>CAUTION</b></p> <p style="text-align: center;">Minimize torsional and side loads when moving bail</p> </div>	<ol style="list-style-type: none"> <li>1. Remove SPD, fully open valve</li> <li>2. Verify button detent up and aft white line visible</li> <li>3. √MCC for leak stop</li> </ol> <p>For leaking QD:</p> <ol style="list-style-type: none"> <li>4. Perform FLUID QD OPS / QD Demating, all steps</li> <li>5. Perform FLUID QD OPS / QD Mating, steps 1-8 only (do not open valve)</li> <li>6. On MCC Go, open valve (verify detent button up &amp; aft white line visible)</li> </ol>

### RBVM / FHRC / Stinger / Pump Module

<p>A. Leaking QD</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p style="text-align: center;"><b>CAUTION</b></p> <p style="text-align: center;">Minimize torsional and side loads when moving bail</p> </div>	<ol style="list-style-type: none"> <li>1. Remove SPD, fully open valve</li> <li>2. Verify button detent up and aft white line visible</li> <li>3. √MCC for leak stop</li> </ol>
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## 11A WORKAROUNDS CRIBSHEET (Cont)

### FLUID QD – Mating OPS

MATING / FID CHECKS	
A. QD fails to mate	<ol style="list-style-type: none"> <li>1. Check for debris, damage, or crystals; cycle release ring</li> <li>2. Check alignment; verify no side loading present</li> </ol>
B. Release ring snap back test fails	<ol style="list-style-type: none"> <li>1. Push release ring forward</li> <li>2. Demate and remate QD</li> </ol>
C. Gap check fails (visual or FID gage)	<ol style="list-style-type: none"> <li>1. Retract release ring; demate/remate QD</li> </ol>
VALVE OPS	
D. Bail fails to actuate (to vlv open)	<ol style="list-style-type: none"> <li>1. Check for debris, damage, or crystals; attempt to actuate</li> <li>2. Retrieve and use QD bail lever tool</li> </ol>
E. Detent button fails to pop up after bail actuation (to vlv open)	<ol style="list-style-type: none"> <li>1. Neutralize sideloads and apply greater opening force to QD bail handle</li> <li>2. √MCC for use of QD bail lever tool to apply greater force</li> </ol>
LEAKING QD	
F. Female QD leaks during or after bail actuation (to vlv open)	<ol style="list-style-type: none"> <li>1. Return bail to closed position</li> <li>2. Perform release ring pull-back to verify no FID. If FID is observed, demate/remate QD.</li> <li>3. If no FID, neutralize sideloads and cycle bail to open position.</li> </ol>
G. Mated QD leaks (vlv open posn)	<ol style="list-style-type: none"> <li>1. Remove SPD, fully open valve (bail fwd)</li> <li>2. If leak continues, close valve (bail aft)</li> </ol>
H. Fluid cap will not mate	<ol style="list-style-type: none"> <li>1. Stow in trash</li> </ol>

### FLUID QD – Demating OPS

CAP REMOVAL	
A. Fluid cap will not demate	<ol style="list-style-type: none"> <li>1. For 1" and ¾": <ul style="list-style-type: none"> <li>• Retrieve QD cap tool (Node Bag Pocket E D-ring fish stringer)</li> <li>• Reconfigure PGT: (A4, CCW1, 10.5); install QD cap tool</li> <li>• Use cap tool to turn stuck cap a maximum of 2 turns (cap vents at ~2 turns). Finish removal of cap by hand (1 additional turn)</li> </ul> </li> <li>2. If force too great for hand actuation (may have leaking male), re-install QD cap, notify MCC; prepare for quick mate</li> </ol>
VALVE OPS	
B. Detent button fails to depress (to vlv close)	<ol style="list-style-type: none"> <li>1. Verify locking collar is rotated to un-locked posn <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center;"><b>CAUTION</b></p> <p style="text-align: center;">The handle may kick back if button is released and pressure is built up in the spring cavity from a leaking primary seal</p> </div> </li> <li>2. Push bail handle toward male (to open) to relieve load on button while depressing detent button.</li> <li>3. √MCC to reduce NH3 temperature at affected QD</li> <li>4. Use button depress tool – ref. WET FLUID QD OPS, A.3</li> </ol>
C. Bail fails to actuate or detent button fails to pop up after actuation (to vlv close)	<ol style="list-style-type: none"> <li>1. Neutralize possible side loading</li> <li>2. Increase force on bail</li> <li>3. Obtain and use QD lever tool</li> </ol>

## 11A WORKAROUNDS CRIBSHEET (Cont)

### FLUID QD – Demating OPS (Cont)

LEAKING QD	
D. Male QD leaks after cap removed	1. Re-install QD cap, notify MCC; prepare for quick mate
E. QD leaks during or after bail actuation (to vlv close)	1. If applicable, actuate (pull) sister QD bail (close QD); continue with fluid connection procedures 2. Cycle bail to open posn
F. After demate, female QD leaks	1. Fully mate to destination male QD as quickly as possible
G. After demate, male QD leaks	1. If applicable, actuate (pull) sister QD bail (close QD) 2. Install cap (exception: 1.5")
H. Frozen ammonia present on female/male QD	1. Leave QD exposed to vacuum; wait maximum of 5 min for sublimation (check periodically) 2. If ammonia still present after 5 min, continue with operation
DEMATING	
I. Female QD fails to demate	1. Verify locking collar has been successfully rotated under detent button (for ½", ¾", 1" QDs) – verifies button is all the way up 2. Neutralize sideloads or manipulate flexhose to relieve mating forces on female QD. 3. Apply greater retraction force to release ring and/or greater removal force to female QD. 4. Contact MCC for use of QD lever tool or QDBT to apply greater force

### Segment-to-Segment Attach System (SSAS)

A. Ready to Latch – fails to detect (2 of 3 required for GO to proceed)	1. EVA crew provide visual obs if RTL sensors are in question – verify cone in cup to continue
B. Capture Latch Assembly fails to open	1. Use EVA backup drive, 60 turns <b>PGT: A4, CCW 3, 30.5</b> (8.3 ft-lb, 60 rpm)
	2. Leave latch closed


## S0-P1 CAPTURE LATCH OVERRIDE

	IV/SSRMS	EV1 (FF)	EV2 (FF)
	<p>First stage capture complete, GO to limp SSRMS:</p> <ul style="list-style-type: none"> <li>* If manual drive jams, go to *</li> <li>* S0-P1PRD TRUSS MATE *</li> <li>* If less than 63.3 additional turns (105 total *</li> <li>* turns) before hard stop, capture latch *</li> <li>* closure not complete. Go to S0-P1 PRD *</li> <li>* TRUSS MATE *</li> </ul>	<p><u>Initial Config</u></p> <ol style="list-style-type: none"> <li>1. Translate to S0 capture latch, inspect latch interface for possible FOD</li> </ol> <p><u>CAPTURE LATCH MANUAL DRIVE (CLOSE)</u></p> <ol style="list-style-type: none"> <li>2. Release S0 zenith tray shroud and temp stow</li> <li>3. <b>PGT: A4, CW 3, 30.5, 6-in ext, stop on turns</b> Rotate drive 41.7 turns to topological capture ← <input type="checkbox"/></li> <li>4. <b>PGT: A4, CW 3, 30.5</b> After SSRMS limp, rotate drive to hard stop ~ 84.6 turns (126.3 total)</li> <li>5. <b>PGT: A4, CCW 2, 30.5, stop on turns</b> Rotate drive 5 turns to back off hardstop for final close position</li> <li>6. Close shroud</li> </ol> <p><u>CAPTURE LATCH MANUAL DRIVE (OPEN)</u></p> <ol style="list-style-type: none"> <li>1. Release S0 zenith tray shroud and temp stow</li> <li>2. <b>PGT: A4, CW 3, 30.5, 6-in</b> Rotate drive ~127 turns or less until capture latch open (hardstop)</li> </ol>	

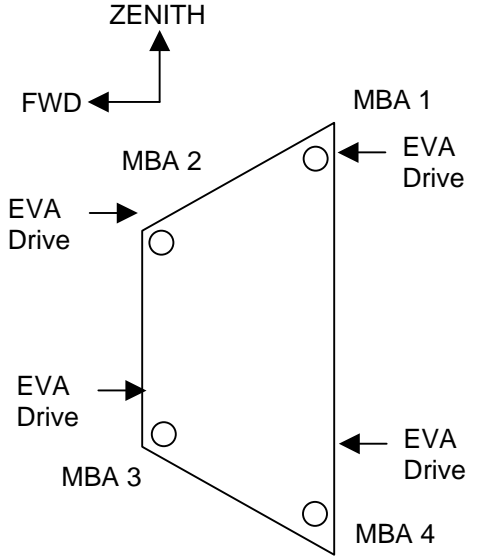
**S0-P1 PRD TRUSS MATE**

TASK (PET)	IV/SSRMS	EV1 (FF)	EV2 (FF)
	<div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <p style="text-align: center;"><u>CAUTION</u> Do not exceed 30 strokes on PRD. This will cause strap binding</p> </div> <p>First stage capture complete, GO to limp SSRMS Give EV Go to continue ratcheting PRDs</p>	<p><u>CAPTURE LATCH OVERRIDE WITH PRDs</u></p> <ol style="list-style-type: none"> <li>1. Install zenith PRD CETA ORU grid D – S0 (3545); fixed end on S0 HR</li> <li>2. BRT to HR 3545</li> </ol> <p>Perform next step simo with EV2:</p> <ol style="list-style-type: none"> <li>3. Pull minimum 6 inches slack in strap. Ratchet PRD snug (14 full strokes req'd)</li> <li>4. Verify coarse pins seated in cups</li> <li>5. Ratchet PFR until trusses fully seated (0.5 inch bulkhead clearance)</li> </ol> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <p style="text-align: center;"><u>CAUTION</u> Minimum PRD strap tension of 25 lbs req'd. Do not exceed 200 lbs (18 lbs PRD handle load)</p> </div> <ol style="list-style-type: none"> <li>6. Preload SSAS by ratcheting 2-3 additional times</li> </ol> <p><u>CONTINGENCY BOLT INSTALL</u></p> <ol style="list-style-type: none"> <li>7. <b>PGT: A1, CW2, 30.5, 5/8 x 7.8-in ext</b> Install contingency bolt 4B (face 6 aft) Install contingency bolt 3B (face 6 fwd)</li> <li>8. Release zenith PRD; temp stow</li> <li>9. <b>PGT: B7, CW2, 30.5</b> Preload bolt 4B</li> <li>10. Install locking cap onto bolt head</li> <li>11. <b>PGT: B7, CW2, 30.5</b> Preload bolt 3B</li> <li>12. Install locking cap onto bolt head</li> </ol>	<p><u>CAPTURE LATCH OVERRIDE WITH PRDs</u></p> <ol style="list-style-type: none"> <li>1. Retrieve PRDs from A/L Toolboxes (port/stbd) or from port TSA</li> <li>2. APFR S0-42 (11, QQ, F, 11)</li> <li>3. Install nadir PRD P1 (3615) – S0 (3550); fixed end on S0 HR</li> </ol> <p>Perform next step simo with EV1:</p> <ol style="list-style-type: none"> <li>4. Pull minimum 6 inches slack in strap. Ratchet PRD snug (14 full strokes req'd)</li> <li>5. Verify coarse pins seated in cups</li> <li>6. Ratchet PFR until trusses fully seated (0.5 inch bulkhead clearance)</li> </ol> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <p style="text-align: center;"><u>CAUTION</u> Minimum PRD strap tension of 25 lbs req'd. Do not exceed 200 lbs (18 lbs PRD handle load)</p> </div> <ol style="list-style-type: none"> <li>7. Preload SSAS by ratcheting 2-3 additional times</li> </ol> <p><u>CONTINGENCY BOLT INSTALL</u></p> <ol style="list-style-type: none"> <li>8. <b>PGT: A1, CW2, 30.5</b> Install contingency bolt 2B (face 2 fwd) Install contingency bolt 1B (face 2 aft)</li> <li>9. Release nadir PRD; temp stow</li> <li>10. <b>PGT: B7, CW2, 30.5</b> Preload bolt 2B</li> <li>11. Install locking cap onto bolt head</li> <li>12. <b>PGT: B7, CW2, 30.5</b> Preload bolt 1B</li> <li>13. Install locking cap onto bolt head</li> </ol>

**S0-P1 PRD TRUSS MATE (Cont)**

TASK (PET)	IV/SSRMS	EV1 (FF)	EV2 (FF)
	Perform nominal MBA bolting When MBA bolting complete, give EV Go for Contingency Bolt Remove	 <u>CONTINGENCY BOLT REMOVE</u> 13. Remove locking caps 14. <b>PGT: B7, CCW 2, 30.5</b> Release bolts 3B and 4B 15. Retrieve and stow PRD	<u>CONTINGENCY BOLT REMOVE</u> 14. Remove locking caps 15. <b>PGT: B7, CCW 2, 30.5</b> Release bolts 1B and 2B 16. Retrieve and stow PRD

## MBA BOLT OVERRIDE (00:XX)

TASK (PET)	IV	EV1 (FF)	EV2 (FF)
	<p>√ MCC Go for MBA drive (MBA gear train at/above min temp: 60F ~15.6C)</p> <p>IV - √ BTS closed            YES – Task Complete            NO – Give EV GO to increase to next torque setting (20% increase incrementally)</p> <p>IV - √ BTS closed            YES – Task Complete            NO – If NO BTS closed at 19.4 ft-lb (B4) MBA is failed, go to SSAS CONTINGENCY BOLT INSTALL</p> <p>Record torques and turns for MBAs:            MBA 3 _____ ft-lbs _____ turns            MBA 1 _____ ft-lbs _____ turns            MBA 2 _____ ft-lbs _____ turns            MBA 4 _____ ft-lbs _____ turns</p>	<p><u>MBA MOTOR FAILURE (SENSOR DATA)</u></p> <p>← <input type="checkbox"/></p> <p>1. <b>PGT: A6, CW3 (CCW3), 30.5, 6-in wobble</b>            Drive MBA to 8.3 ft-lb (100 in-lb) ~460 turns</p> <p>← <input type="checkbox"/> √ IV – BTS closed</p> <p>2. If no bolt tight switch, increase PGT torque incrementally from A7 (9.7 ft-lbs) up to B4 (19.4 ft-lbs)</p> <p>← <input type="checkbox"/> √ IV – BTS closed</p> <p><u>DUAL BBC FAILURE (NO SENSOR DATA)</u></p> <p>1. <b>PGT: B7, CW2, 30.5, 5/8 x 7.8-in ext then PGT: Pwr – OFF, RCW (Manual ratchet), 30.5</b>            Install one contingency bolt at specified MBA location and tighten to 30 ft-lb (360 in-lb), CW</p> <p>2. Install locking cap</p> <p>3. <b>PGT: A7, CCW 3, 30.5, 6-in wobble</b>            Torque <b>MBA 3</b> to 9.2 ft-lbs, 460 turns</p> <p>4. <b>PGT: B1, CCW 3, 30.5</b>            Torque <b>MBA 1</b> to 12.0 ft-lbs, 460 turns            Torque <b>MBA 2</b> to 12.0 ft-lbs, 460 turns</p> <p>5. <b>PGT: A7, CCW 3, 30.5</b>            Torque <b>MBA 4</b> to 9.2 ft-lbs, 460 turns</p> <p>6. Remove locking cap</p> <p>7. <b>PGT: Pwr – OFF, RCW (Manual ratchet), 30.5, 5/8 x 7.8-in ext then PGT: B7, CW2, 30.5</b>            Remove contingency bolt</p>	<p>Note: CCW for MBA 1, 2, CW for MBA 3, 4</p>  <p>Note: CCW for MBA 1, 2, CW for MBA 3, 4  <b>View Locking STBD</b></p>

## SSAS CONTINGENCY BOLT INSTALL

	IV/SSRMS	EV1 (FF)	EV2 (FF)
	<p>Locking Cap Install:</p> <ol style="list-style-type: none"> <li>1. Position locking cap on bolt without engaging cap</li> <li>2. Rotate cap CCW until tab contacts structure</li> <li>3. Fully seat cap onto bolt</li> </ol>	<p><u>MBA 1 ZENITH TRUNNION LONGERON</u></p> <ol style="list-style-type: none"> <li>1. <b>PGT: B6, CW2, 30.5, 5/8 x 7.8-in ext or PGT: B3, CW2, 30.5, RAD, 5/8 x 7.8-in ext</b> Install Bolt 1B (torque to 24 ft-lb / 290 in-lb)</li> <li>2. <b>PGT: B3, CW2, 30.5, RAD, 5/8 x 7.8-in ext</b> Install Bolt 1A (torque 25 ft-lb / 300 in-lb)</li> <li>3. Transfer 5/8 inch extension to torque wrench</li> <li>4. Manually torque Bolt 1A to 36 ft-lb (430 in-lb)</li> <li>5. Manually apply final torque of 48 ft-lb (575 in-lb) to Bolt 1B</li> <li>6. Install bolt locking cap (see install steps)</li> <li>7. Manually apply final torque of 48 ft-lb (575 in-lb) to Bolt 1A</li> <li>8. Install bolt locking cap (see install steps)</li> </ol> <p><u>MBA 2 ZENITH MT RAIL</u></p> <ol style="list-style-type: none"> <li>1. <b>PGT: B6, CW2, 30.5, 5/8 x 7.8-in ext</b> Install Bolt 2A (torque to 24 ft-lb / 290 in-lb)</li> <li>2. <b>PGT: B7, CW2, 30.5, 5/8 x 7.8-in ext</b> Install Bolt 2B (torque to 25 ft-lb / 300 in-lb)</li> <li>3. Transfer 5/8 inch extension to torque wrench</li> <li>4. Manually apply final torque of 48 ft-lb (575 in-lb) to Bolt 2B</li> <li>5. Install bolt locking cap (see install steps)</li> <li>6. Manually apply final torque of 48 ft-lb (575 in-lb) to Bolt 2A</li> <li>7. Install bolt locking cap (see install steps)</li> </ol> <p><u>MBA 3 NADIR MT RAIL</u></p> <ol style="list-style-type: none"> <li>1. <b>PGT: B7, CW2, 30.5, 5/8 x 7.8-in ext</b> Install Bolt 3A (torque to 25 ft-lb / 300 in-lb)</li> <li>2. <b>PGT: B7, CW2, 30.5, 5/8 x 7.8-in ext</b> Install Bolt 3B (torque to 25 ft-lb / 300 in-lb)</li> <li>3. Transfer 5/8 in extension to torque wrench</li> </ol>	<p><u>MBA 1 ZENITH TRUNNION LONGERON</u></p> <ol style="list-style-type: none"> <li>1. Assist EV1 as req'd</li> </ol> <p><u>MBA 2 ZENITH MT RAIL</u></p> <ol style="list-style-type: none"> <li>1. Assist EV1 as req'd</li> </ol> <p><u>MBA 3 NADIR MT RAIL</u></p> <ol style="list-style-type: none"> <li>1. Assist EV1 as req'd</li> </ol>

**SSAS CONTINGENCY BOLT INSTALL (Cont)**

	IV/RMS	EV1 (FF)	EV2 (FF)
		<p>4. Manually apply final torque of 56 ft-lb (670 in-lb) to Bolt 3B</p> <p>5. Install bolt locking cap (see install steps)</p> <p>6. Manually apply final torque of 56 ft-lb (670 in-lb) to Bolt 3A</p> <p>7. Install bolt locking cap (see install steps)</p> <p><u>MBA 4 NADIR TRUNNION LONGERON</u></p> <p>1. <b>PGT: B6, CW2, 30.5, 5/8 x 7.8-in ext or PGT: B3, CW2, 30.5, RAD, 5/8 x 7.8-in ext</b> Install Bolt 4B (torque to 24 ft-lb / 290 in-lb)</p> <p>2. <b>PGT: B3, CW2, 30.5, RAD, 5/8 x 7.8-in ext</b> Install Bolt 4A (torque 25 ft-lb / 300 in-lb)</p> <p>3. Transfer 5/8 inch extension to torque wrench</p> <p>4. Manually torque Bolt 4A to 36 ft-lb (430 in-lb)</p> <p>5. Manually apply final torque of 48 ft-lb (575 in-lb) to Bolt 4B</p> <p>6. Install bolt locking cap (see install steps)</p> <p>7. Manually apply final torque of 48 ft-lb (575 in-lb) to Bolt 4A</p> <p>8. Install bolt locking cap (see install steps)</p>	<p><u>MBA 4 NADIR TRUNNION LONGERON</u></p> <p>1. Assist EV1 as req'd</p>



## FLUID QD OPS

### QD Demating

1. Remove thermal cover or bootie as req'd
2. Release TA clamps as req'd
3. Verify aft white band is visible (non SPD ops)

CAUTION  
Minimize QD torsional and side loads during bail operations  
and QD demating

4. Close valve: depress detent button; move bail aft
5. ✓ Fwd white band visible and button detent pops up
6. Rotate locking collar to locked position (n/a for 1.5-in)
7. Assess side load potential prior to demate
8. Demate QD: Pull back on release ring or squeeze handles (1.5-in)
9. After demate, verify release ring aft (no fwd white line visible)

### QD Mating

1. Inspect male (seals, FOD) and female QD (locking fingers, FOD)
2. Verify detent button up and release ring retracted (no fwd white line visible)

CAUTION  
Minimize QD torsional and side loads during bail operations  
and QD mating

3. Assess side load potential prior to mate
4. Mate QD
5. ✓ Fwd white band visible (release ring has snapped forward)
6. Perform snap back test; verify release ring snaps forward & fwd white band visible
7. Perform pull test (stay clear of button and release ring)
8. Perform FID gap inspection
9. Open valve: depress detent button; push bail fwd
10. ✓ Aft white band visible
11. Verify detent button pops up
12. Rotate locking collar to locked posn (n/a for 1.5-in)

**NO-RMS CETA CART RELOCATE (TBD)**

## CETA CART WHEEL BOGIE R&R

### Wheel Bogie Removal

- EV2
1. ✓ Parking brake off
  2. **PGT: B1, CCW 2, 15.5, any 7/16 socket**  
Disengage ORU bolts (4) 8 turns
  3. Remove wheel bogie

### Wheel Bogie Installation

#### NOTE

Pip pin installation ensures proper brake pad alignment. If brake pad misaligned, wheel bogie cannot be installed due to interference with MT rails.

If CETA cart is not on rails during bogie installation, wheel bogie can be installed such that brake mechanism is not connected

- Both
1. Install CETA cart on rails; engage other bogies
- EV1
2. ✓ Parking brake off
- EV2
3. Lift wheel bogie brake linkage (pad) away from wheels (up)
  4. Insert pip pin to restrain brake linkages (frame standoff pip pin can be used)
  5. Install wheel bogie into tray guides
- \* If brake cable mechanical coupler interferes (i.e. will not seat in tray): \*
  - \* Pull dynamic brake handle while reattempting install \*
  - \* If no pip pin used and bogie will not fully install: \*
  - \* remove bogie, realign brake linkage and reattempt \*
6. **PGT: A6, CW 2, 10.5, any 7/16 socket**  
Engage ORU bolts (4) 8 turns
  7. Remove pip pin

## CETA CART WHEEL BOGIE TASK DATA SHEET

#### EVA Fasteners:

Fastener Name	Label	Head Size	Qty	Install Torque (ft-lb)	Release Torque (ft-lb)	Failure Torque (ft-lb)	Turns	RPM
Wheel bogie ORU bolt	none	7/16	4	7-10	10	TBD	8	30 max

**MSS EXTENSION CABLE INSTALL (00:45)**

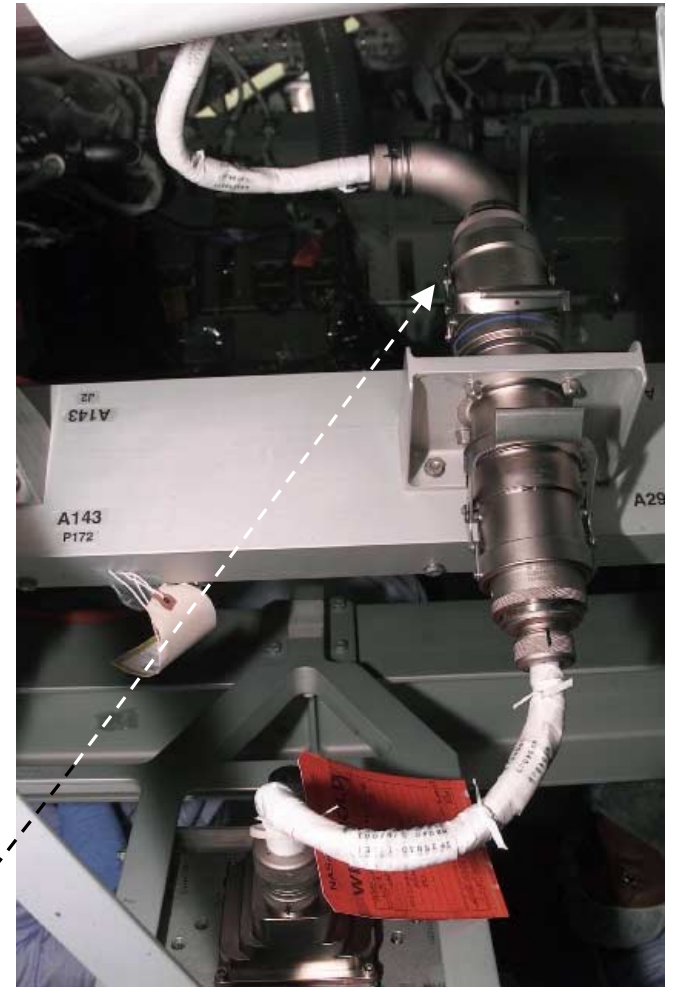
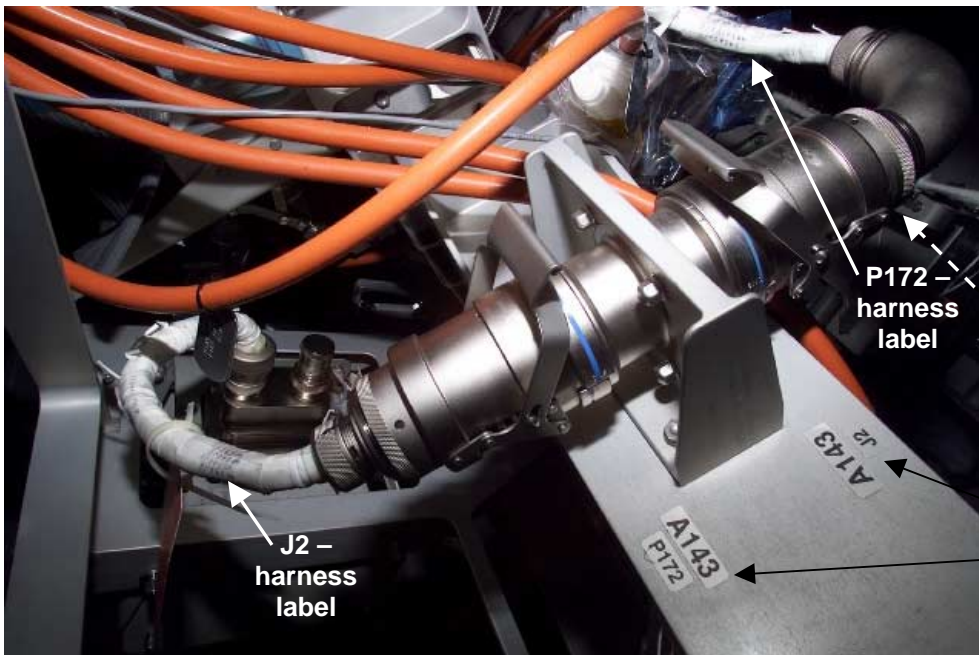
	IV/SSRMS	EV1 (FF)	EV2 (FF)																																									
	<p>√ MCC Go for MT power cable demate                      * If no comm.: Reference RPCM on Task *                      * Data Page: *                      S0 (P1): EPS: 'RPCM X' 1:  <u>RPCM X RPC 1</u>                      Verify 'RPC Position' – Op                      √Close Cmd – Inh</p> <table border="1"> <thead> <tr> <th>Worksite</th> <th>UMA Panel</th> <th>P Harness</th> <th>J Connector</th> <th>MBS Connection (RPCM)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">4 (S0, Bay 1)</td> <td>A294</td> <td>P174</td> <td>J2</td> <td>J35 (4B)</td> </tr> <tr> <td>A143</td> <td>P172</td> <td>J2</td> <td>J37 (3A)</td> </tr> <tr> <td rowspan="2">5 (S0, Bay 4)</td> <td>A292</td> <td>P763</td> <td>J2</td> <td>J35 (4B)</td> </tr> <tr> <td>A249</td> <td>P761</td> <td>J2</td> <td>J37 (3A)</td> </tr> <tr> <td rowspan="2">6 (P1, Bay 6)</td> <td>A118</td> <td>P645</td> <td>J2</td> <td>J35 (4B)</td> </tr> <tr> <td>A112</td> <td>P642</td> <td>J2</td> <td>J37 (3A)</td> </tr> <tr> <td rowspan="2">7 (P1, Bay 14)</td> <td>A119</td> <td>P246</td> <td>J2</td> <td>J35 (4B)</td> </tr> <tr> <td>A107</td> <td>P243</td> <td>J2</td> <td>J37 (3A)</td> </tr> </tbody> </table>	Worksite	UMA Panel	P Harness	J Connector	MBS Connection (RPCM)	4 (S0, Bay 1)	A294	P174	J2	J35 (4B)	A143	P172	J2	J37 (3A)	5 (S0, Bay 4)	A292	P763	J2	J35 (4B)	A249	P761	J2	J37 (3A)	6 (P1, Bay 6)	A118	P645	J2	J35 (4B)	A112	P642	J2	J37 (3A)	7 (P1, Bay 14)	A119	P246	J2	J35 (4B)	A107	P243	J2	J37 (3A)	<p style="text-align: center;"><u>NOTE</u></p> <p>MSS Extension Cable is coiled into 5 wire tied loops, each 7 feet long; wire ties are captive</p> <p>← <input type="checkbox"/></p> <ol style="list-style-type: none"> <li>Demate MT power cable connector                             <ul style="list-style-type: none"> <li><input type="checkbox"/> P35 from MBS J35 (4B)</li> <li>- OR -</li> <li><input type="checkbox"/> P37 from MBS J37 (3A)</li> </ul> </li> <li>Temp stow MT power cable connector P35 (P37) on JO13 or JO19 MT dummy connector</li> <li>Receive P2 connector from EV2</li> <li>Inspect P2 and MBS J35 (J37) and mate</li> <li>Assist EV2 with cable routing and securing</li> </ol> <p style="text-align: center;"><u>NOTE</u></p> <p>Each cable is labeled both on the harness and opposite side of the feed-through bracket. Verify that the connector being demated has a P label versus a J label.</p> <p>Refer to Worksite UMA Location Chart for the following steps:</p> <ol style="list-style-type: none"> <li>Enter truss segment for access to UMA panel</li> <li>At UMA panel, demate P harness from J2</li> <li>Inspect P harness and MSS extension cable J2; mate</li> <li>Secure extension cable at worksite using wire ties, as req'd</li> </ol>	<p style="text-align: center;"><u>NOTE</u></p> <p>MSS Extension Cable is coiled into 5 wire tied loops, each 7 feet long; wire ties are captive</p> <ol style="list-style-type: none"> <li>Retrieve MSS extension cable from bag</li> <li>Release wire ties from P2 end of extension cable bundle</li> <li>Remove protective cap from P2</li> <li>Transfer P2 connector to EV1</li> <li>Translate to passive UMA location closest to MT, releasing coils as req'd</li> <li>Remove protective cap from extension cable J2</li> <li>Open shroud at UMA location</li> <li>Transfer MSS extension cable J2 to EV1</li> </ol>
Worksite	UMA Panel	P Harness	J Connector	MBS Connection (RPCM)																																								
4 (S0, Bay 1)	A294	P174	J2	J35 (4B)																																								
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	A112	P642	J2	J37 (3A)																																								
7 (P1, Bay 14)	A119	P246	J2	J35 (4B)																																								
	A107	P243	J2	J37 (3A)																																								

MSS EXTENSION CABLE

Passive UMA Connections

Worksite 4 (S0, Bay 1)

Panel A143 (below)  
A294 (right)



P Connector - Demate this side

Panel

FS 16-19

EVA/113/FIN

## MSS EXTENSION CABLE TASK DATA SHEET

Tools:

EV1 (RMS)	EV2 (FF)
NA	Wire Tie Caddy

EVA Fasteners:

Fastener Name	Label	Head Size	Qty	Install Torque (ft-lb)	Release Torque (ft-lb)	Failure Torque (ft-lb)	Turns	RPM
None								

EVA Connectors:

From MBS	To MSS Ext. Cable	Truss Panel	Harness	From	To MSS Ext. Cable	Conn Size	Function
J35	P2	A143	W4122	P172	J2	33	RPCM S0 4B-A, Data
		A249	W4122	P761		33	RPCM S0 4B-B, Data
		A112	W5195	P642		33	RPCM P1 4B-F, Data
		A107	W5198	P243		33	RPCM P1 4B-E, Data
J37	P2	A294	W4121	P174	J2	33	RPCM S0 3A-A, Data
		A292	W4121	P763		33	RPCM S0 3A-B, Data
		A118	W5199	P645		33	RPCM P1 3A-F, Data
		A119	W5193	P246		33	RPCM P1 3A-E, Data

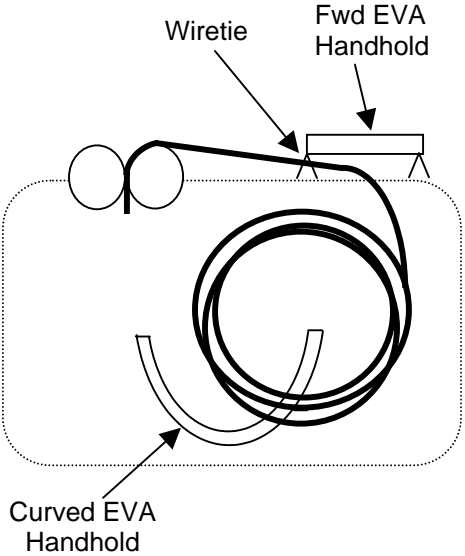
Foot Restraints:

Task	WIF	APFR Setting
None		

# TUS REEL DISCONNECT (00:XX)

	IV/SSRMS	EV1 (FF)	EV2 (FF)										
	<p>Prior to safing bolt retraction and TUS connector demate verify electrical inhibits in place:</p> <p>For Nadir TUS:  <u>TUS-2 (NADIR)</u>            MSS:MT:Power: 'TUS2' 'RPCM S0-3A-E' 18:  <u>RPCM S03A E RPC 18</u>            Verify 'RPC Position' – Op            √Close Cmd – Inh</p> <p>For Zenith TUS:  <u>TUS-1 (ZENITH)</u>            MSS: MT:Power: 'TUS1' 'RPCM S0-4B-F' 17:  <u>RPCM S04B F RPC 17</u>            Verify 'RPC Position' – Op            √Close Cmd – Inh</p>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p align="center"><u>CAUTION</u></p> <p>TUS cable is sensitive to excessive handling loads. Do not pinch or crimp cable. Minimum bend radius of cable is 2.5 inches</p> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p align="center"><u>CAUTION</u></p> <p>EV crew must maintain tension on TUS cable when cable is removed from IUA. Inadvertent sudden release of cable may create excessive free cable within TUS reel housing and could potentially jam reel and/or damage cable. After TUS cable is released from cable cutter, EV crew can slowly allow cable to retract into reel until tension arm encounters a hard stop (6-18 inches of cable)</p> </div> <p align="center">← <input type="checkbox"/></p> <p><u>TUS CABLE REMOVAL FROM IUA</u></p> <ol style="list-style-type: none"> <li>On IV GO, demate TUS connectors:</li> </ol> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">DEMATE TUS cables on MT</th> </tr> <tr> <th style="width: 50%;">TUS 1 (Zenith)</th> <th style="width: 50%;">TUS 2 (Nadir)</th> </tr> </thead> <tbody> <tr> <td>P54 - J023</td> <td>P54 - J025</td> </tr> <tr> <td>P52 – J1</td> <td>P52 - J1</td> </tr> <tr> <td>P53 – J027 (front side)</td> <td>P53 - J016 (aft side)</td> </tr> </tbody> </table> <ol style="list-style-type: none"> <li>Open cable cutter cover, lift then rotate handle</li> <li>Remove cable from cable cutter. (If cable is tensioned, slowly allow tension to be retracted into TUS reel)</li> <li>Close cable cutter cover</li> </ol>	DEMATE TUS cables on MT		TUS 1 (Zenith)	TUS 2 (Nadir)	P54 - J023	P54 - J025	P52 – J1	P52 - J1	P53 – J027 (front side)	P53 - J016 (aft side)	<div style="border: 3px double black; padding: 10px; margin-bottom: 10px;"> <p align="center"><b>WARNING</b></p> <p align="center"><b>Failure to engage IUA launch bolts (2) can result in stored energy and pinch point hazards</b></p> </div> <p align="center">← <input type="checkbox"/></p> <p><u>SAFE IUA CABLE CUTTER MECHANISMS</u></p> <ol style="list-style-type: none"> <li><b>PGT: A4, CW 2, 30.5, 7/16-6 in Ext</b> Engage IUA launch lock bolt (1 of 2), outboard, ~7 turns</li> <li><b>PGT: A4, CW 2, 30.5</b> Engage safing bolt (BOLT 3) 7 turns</li> </ol> <p><u>TUS CABLE REMOVAL FROM IUA</u></p> <ol style="list-style-type: none"> <li>Assist EV1 by applying tension to cable as necessary</li> </ol>
DEMATE TUS cables on MT													
TUS 1 (Zenith)	TUS 2 (Nadir)												
P54 - J023	P54 - J025												
P52 – J1	P52 - J1												
P53 – J027 (front side)	P53 - J016 (aft side)												

**TUS REEL DISCONNECT (00:XX) (Cont)**

	IV/SSRMS	EV1 (FF)	EV2 (FF)
	 <p>The diagram illustrates the cable connection process. A cable is shown with a wiretie securing it to a rectangular component labeled 'Fwd EVA Handhold'. The cable then loops around a circular component labeled 'Curved EVA Handhold'. Labels with arrows point to 'Wiretie', 'Fwd EVA Handhold', and 'Curved EVA Handhold'.</p>	<p><u>TUS CABLE TEMP STOW</u></p> <p>8. Coil cable maintaining a minimum bend radius of 2.5 inches (secure coil with wire ties as req'd)</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center;"><b>CAUTION</b></p> <p style="text-align: center;">Cable must be clear of MT translation path. Cable should not be fwd of EVA handle on TUS reel</p> </div> <p>9. At TUS reel, wire tie cable to fwd EVA handhold</p> <p>10. Temp stow coiled cable on TUS reel curved EVA handhold</p>	<p><u>TUS CABLE TEMP STOW</u></p> <p>5. Assist EV1</p>



## TUS DISCONNECT TASK DATA SHEET

### Tools:

EV1 (RMS)	EV2 (FF)
	PGT
	7/16 (wobble) Socket-6 ext

### EVA Fasteners:

Fastener Name	Label	Head Size	Qty	Install Torque (ft-lb)	Release Torque (ft-lb)	Failure Torque (ft-lb)	Turns	RPM
IUA Launch Lock	--	7/16	2	4.7	6.5	Release 17.9 Install 10.7	6.25- 6.75	30
Safing Bolt	BOLT 3	7/16	1	5.4	4.9	26.25	7 min	10

### EVA Connectors:

Harness	To	Clamps (#)	Conn Size	Function
TUS1-P52 (W8063)	IUA1-J1	None	15	MT Power, MT4B
TUS2-P52 (W8063)	IUA2-J1	None	15	MT Power, MT3A
TUS1-P53 (W8063)	MT-J027 (B0003)	None	17	Video/Synch
TUS2-P53 (W8063)	MT-J016 (B0004)	None	17	Video/Synch
TUS1-P54 (W8063)	MT-J023 (B0003)	None	15	1553-B
TUS2-P54 (W8063)	MT-J025 (B0002)	None	15	1553-B

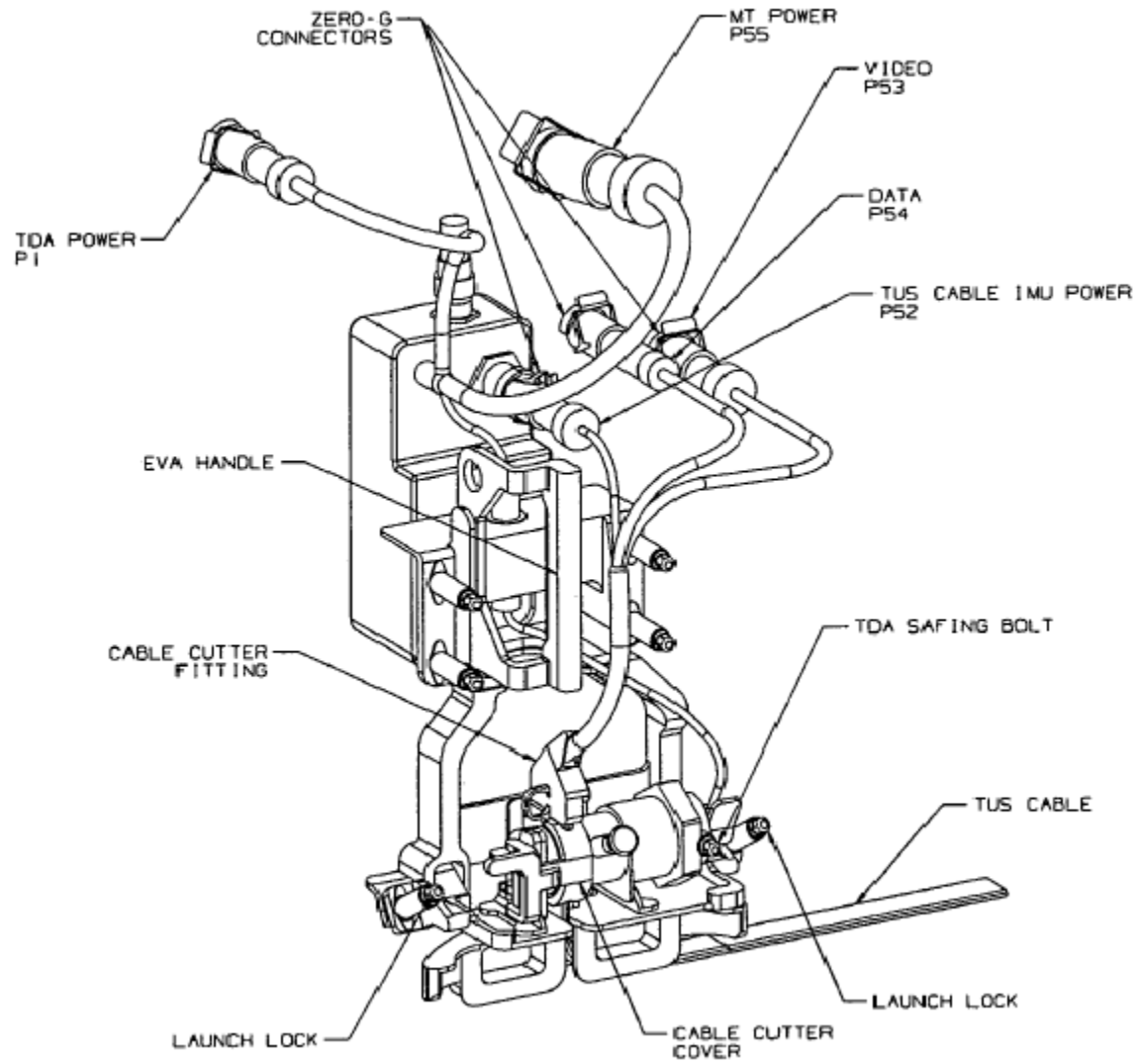
### Cautions:

- Avoid excessive tension on wire harnesses. Separation of wires from connector contacts may occur
- Avoid bend radii of less than 10X diameter of IUA wire harness
- Activation of the "Do not pull knob" on cable cutter will cause fitting to rotate. The fitting must be returned to initial position prior to operating if pulled inadvertently.

### Warnings:

- Failure to place electrical inhibits can result in inadvertent activation of the TDA, which can result in stored energy hazard.
- Failure to remove power can result in electrical shock hazard

IUA



# CONTINGENCY EVA INHIBIT PAD

## ORBITER

<b>RCS</b>	
	If EV crew < 27 ft from FRCS:
IV	1. √DAP: VERN
O14,15,16	2. √RJDF F1, F2, F3, F4 MANF DRIVER (four) – OFF
MCC-H	3. √RCS F – ITEM 1 EXEC (*)
	√JET DES F1U – ITEM 17 (*)
	F3U – ITEM 19 (*)
	F2U – ITEM 21 (*)

<b>Orbiter Antennas</b>	
S-BAND	
	<u>NOTE</u>
	Possible loss of comm when forced to 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
Ku-BAND	
MCC-H	5. √Ku-BAND EVA Protect Box - active

<b>TCS</b>	
L12	1. √TCS POWER - OFF

## RSOS

<b>MCS</b>	
MCC-M	1. √FGB Manifold valves (eighteen) – closed
	2. √FGB MCS unpowered
	3. √SM MCS – INDICATOR MODE
	4. √SM Manifold valves (six) - closed
	5. √SOYUZ manifolds (ten) closed
	6. √SOYUZ MCS unpowered

<b>FGB Antennas</b>	
MCC-M	1. TV System [КЛ - 108A] - Deactivate
	2. Radiotelemetry [БР-9ЦУ-8] - Deactivate
	3. Kurs P [КУРС P] - Deactivate
	4. Kurs A [КУРС A] - Deactivate
	5. √Sirius (HAM) [Sirius] - Deactivate
	6. √КОМПАРУС [КИС] - Deactivate
	7. CNPMS [СИТНП] - Deactivate
	8. TORU [ТОРУ] - Deactivate

<b>SM Antennas (MCC-M)</b>	
MCC-M	1. Global Timing Sys1(400.1MHz) [GTS] – Deactivate
	2. VHF-1, VHF-2[CTTC] – Deactivate
	3. BITS [БИТС2-12] – Deactivate
	4. √TV System [ТВС] – Deactivate
	5. REGUL [Регул] – Deactivate
	6. √LIRA [ОИА] – Deactivate
	7. Orbit Radio Tracking System [PKO] – Deactivate
	8. Kurs P [КУРС P] – Deactivate

## USOS

<b>USOS ISS Antennas</b>	
Ku-BAND (SGANT)	
	<u>NOTE</u>
	Ku-Band keepout zone of 1 meter maintained to preclude possibility of EMU or equipment contact with antenna
	1. Ku-Band – 1 meter
S-BAND (SASA)	
	<u>NOTE</u>
	EV crew should not go more zenith than IEA bulkhead to avoid S-band antenna keep-out zones (3.6 ft in high gain, 1.3 ft in low gain)
	2. S-Band – None required

<b>LAB Window</b>	
IV	If EV crew near window, close window shutter

Cont next page

## CONTINGENCY EVA INHIBIT PAD (Cont)

### USOS (Cont)

PCU	<u>NOTE</u>
MCC-H	<p>PCUs may require up to 1 hr warm-up period before they are operational</p> <ol style="list-style-type: none"><li>1. √PCUs (two) operational, in discharge mode</li></ol> <p>If only one PCU operational:</p> <ol style="list-style-type: none"><li>2. √SSU is shunted for the first 10 min of each insolation period</li></ol> <p>If no PCUs operational:</p> <ol style="list-style-type: none"><li>3. One array will be oriented at least 105 deg from the velocity vector and the other array will be shunted for the first 10 min of each insolation period</li></ol>

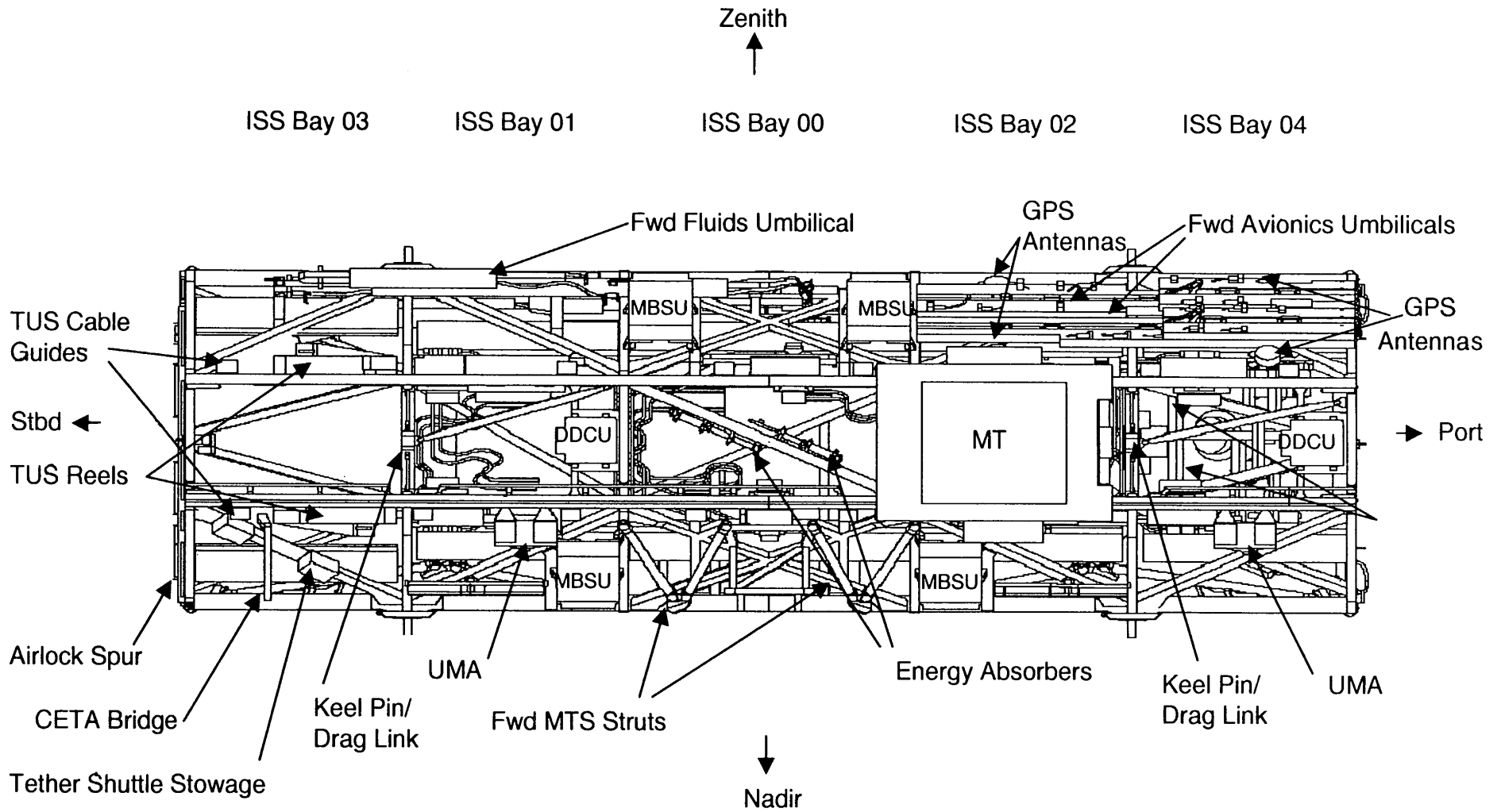
GENERIC EVA REFERENCE

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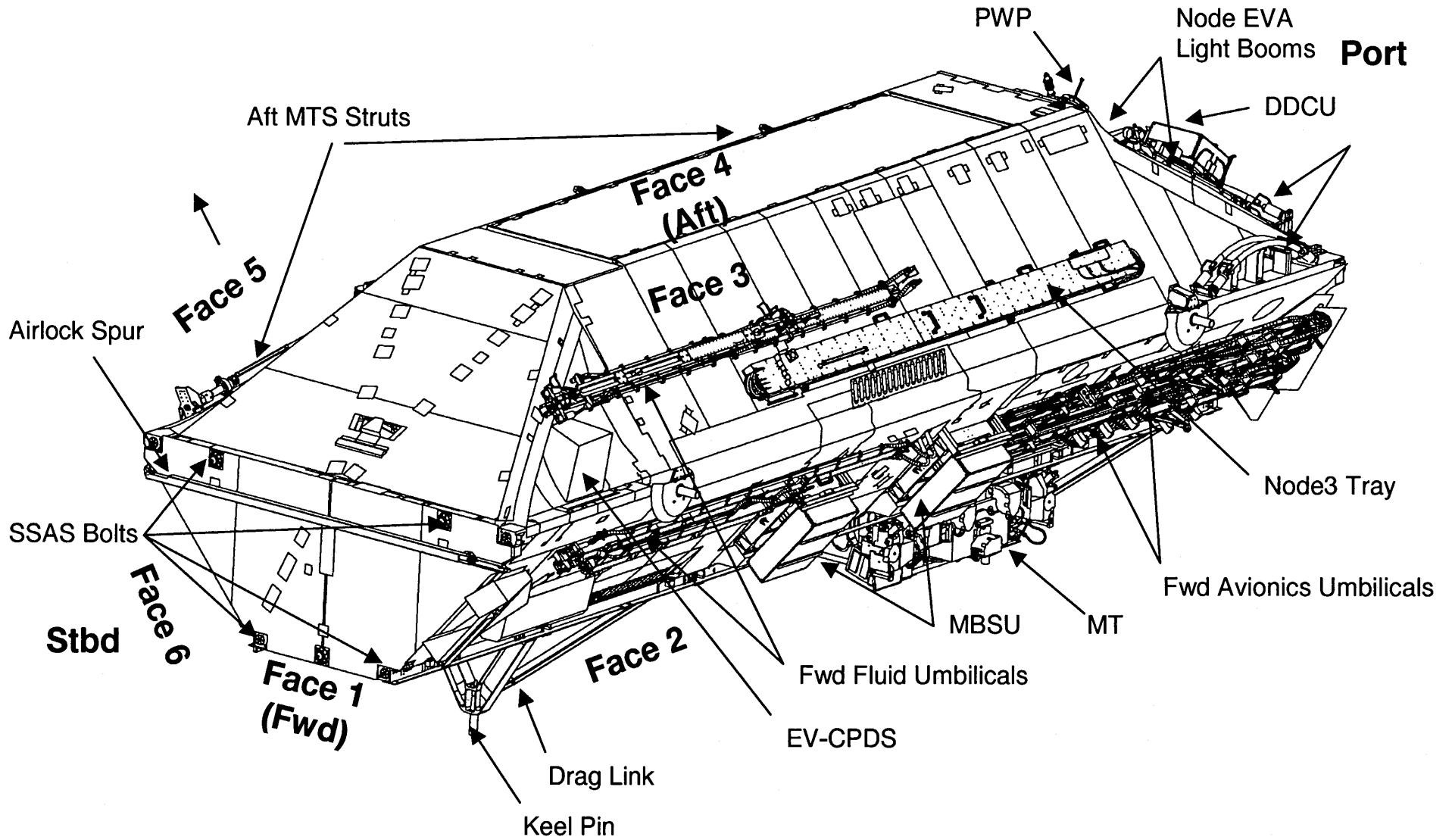
GENERIC  
EVA REF

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# S0 LAUNCH CONFIG

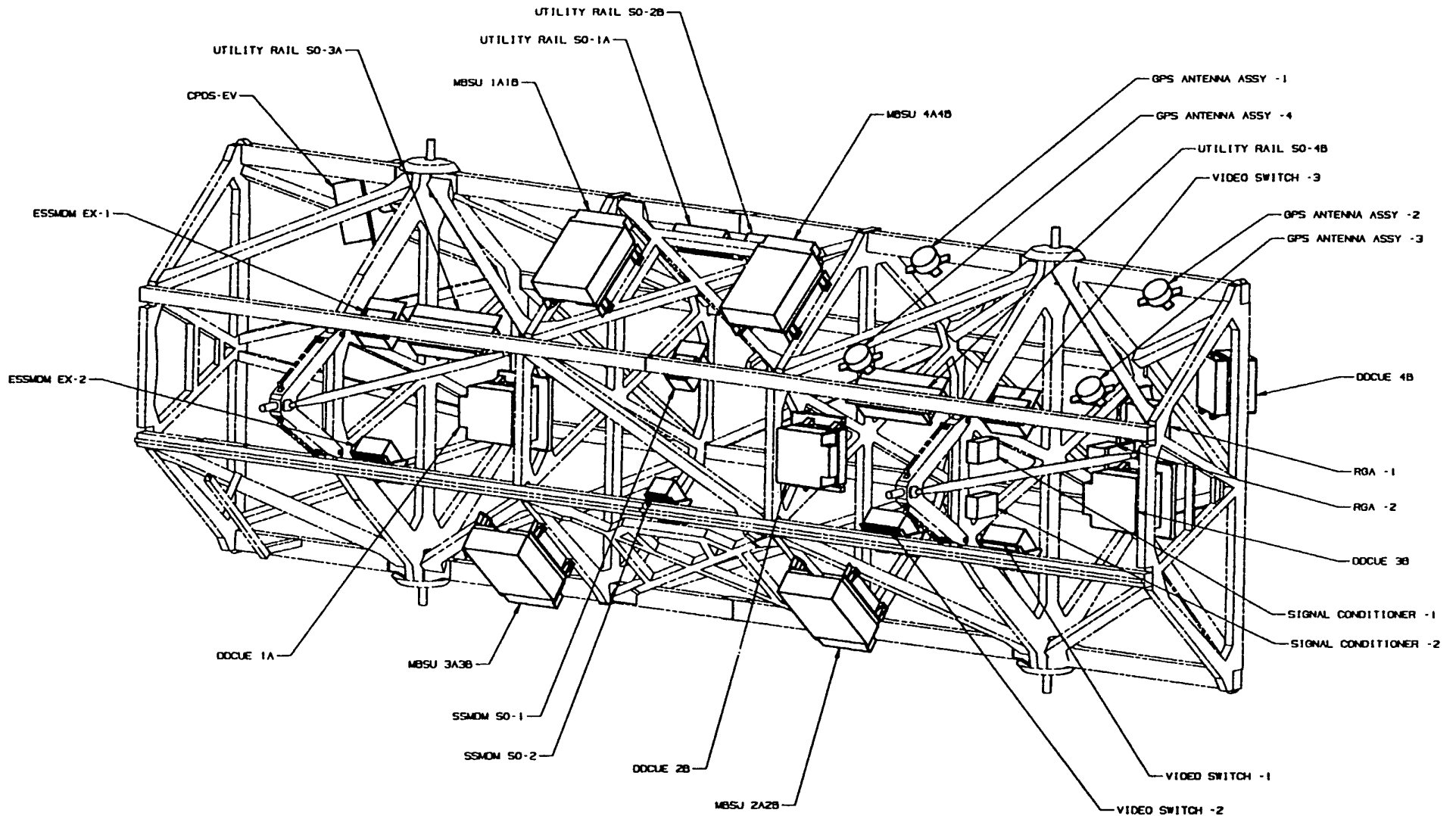


S0 LAUNCH CONFIG (Cont)

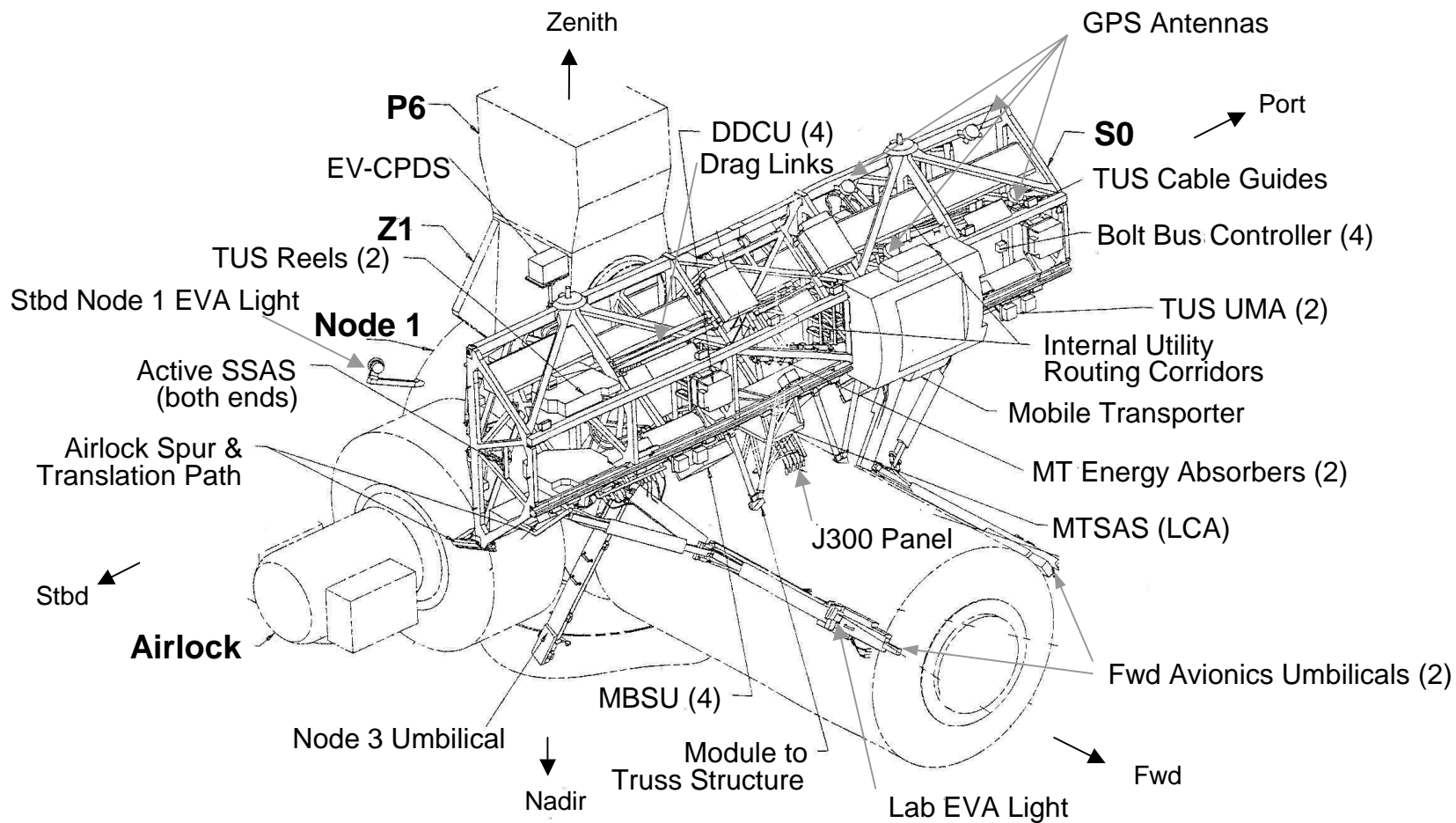




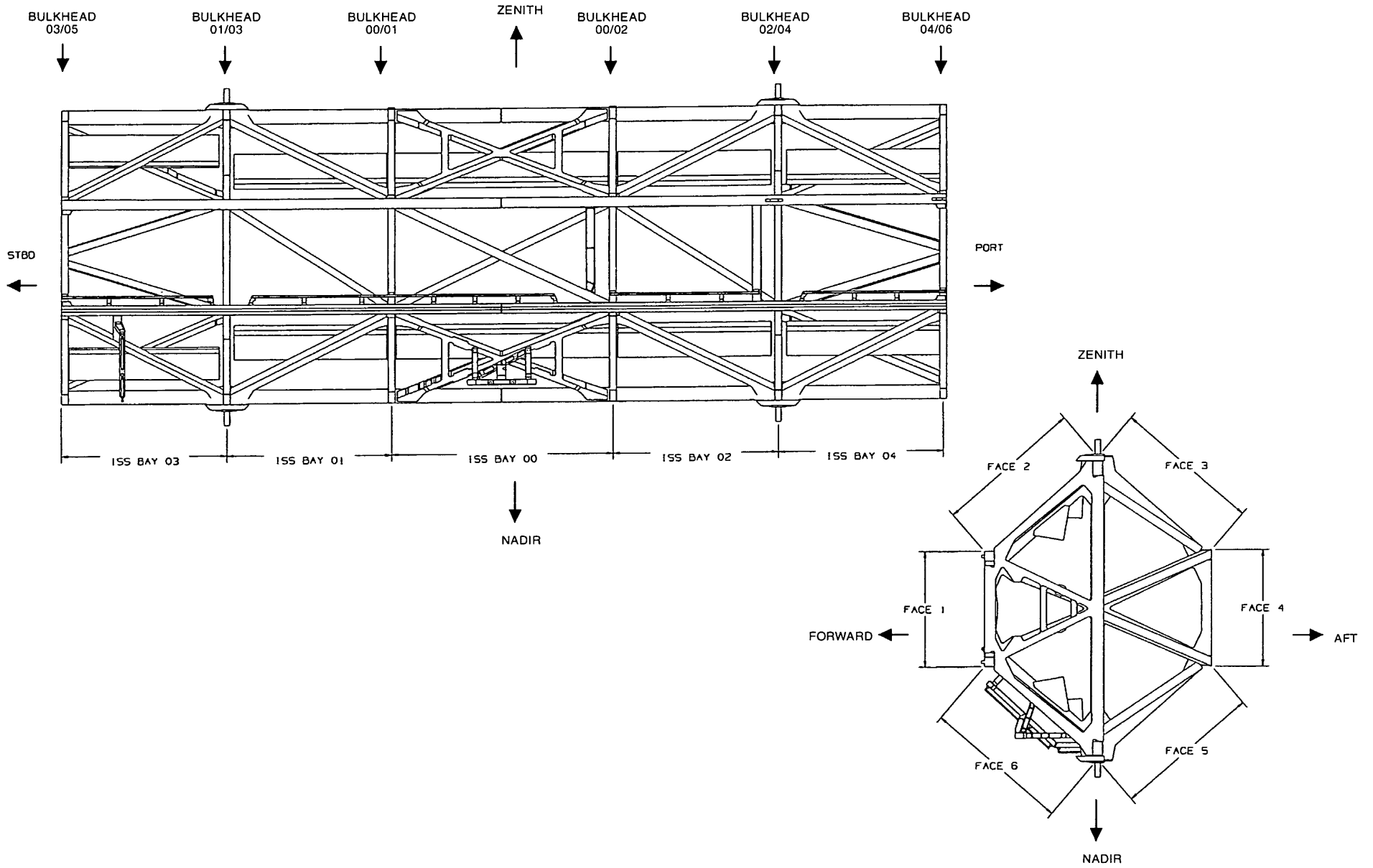
# S0 ORU LOCATIONS



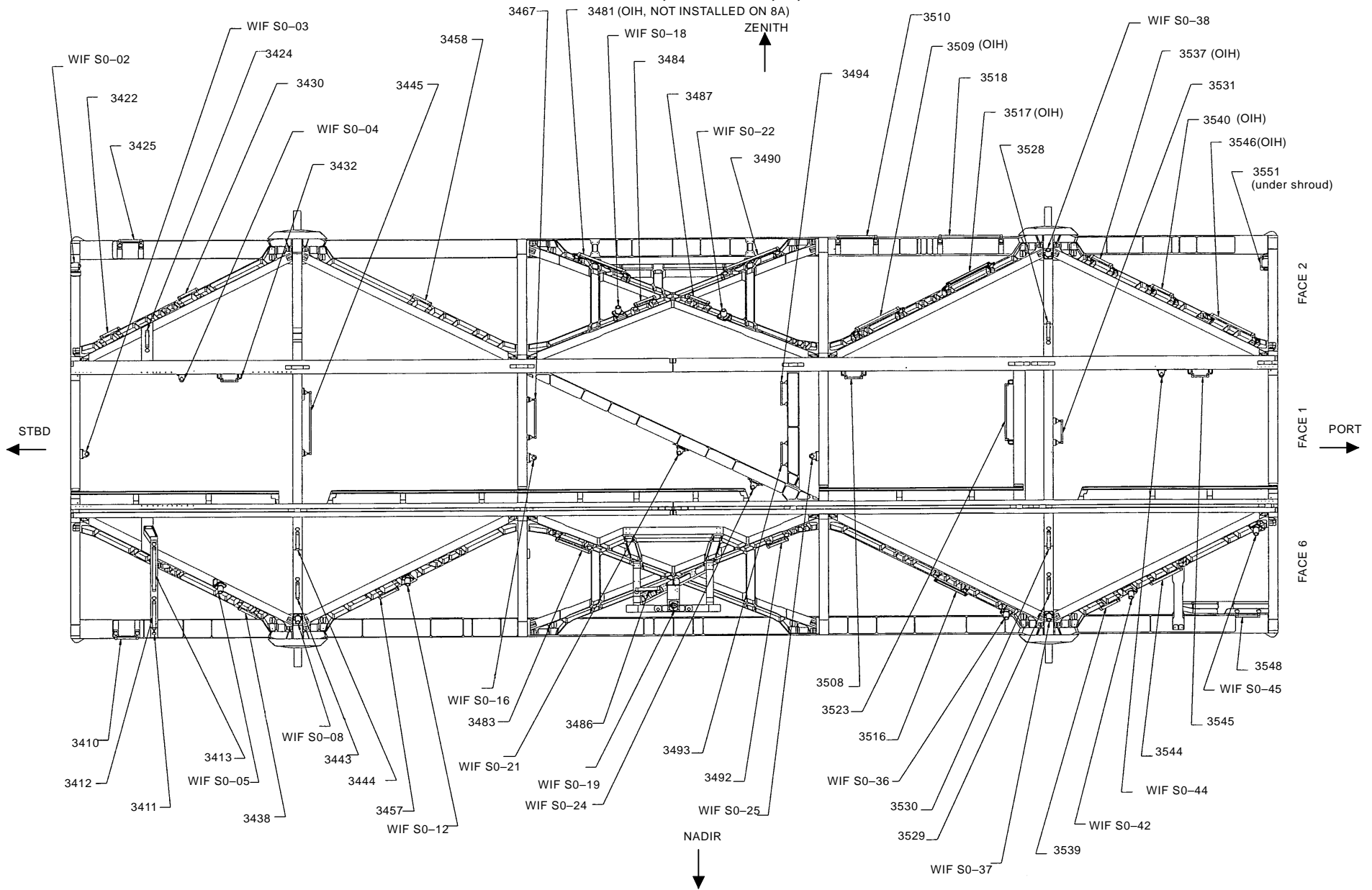
### S0 FINAL ON-ORBIT CONFIG



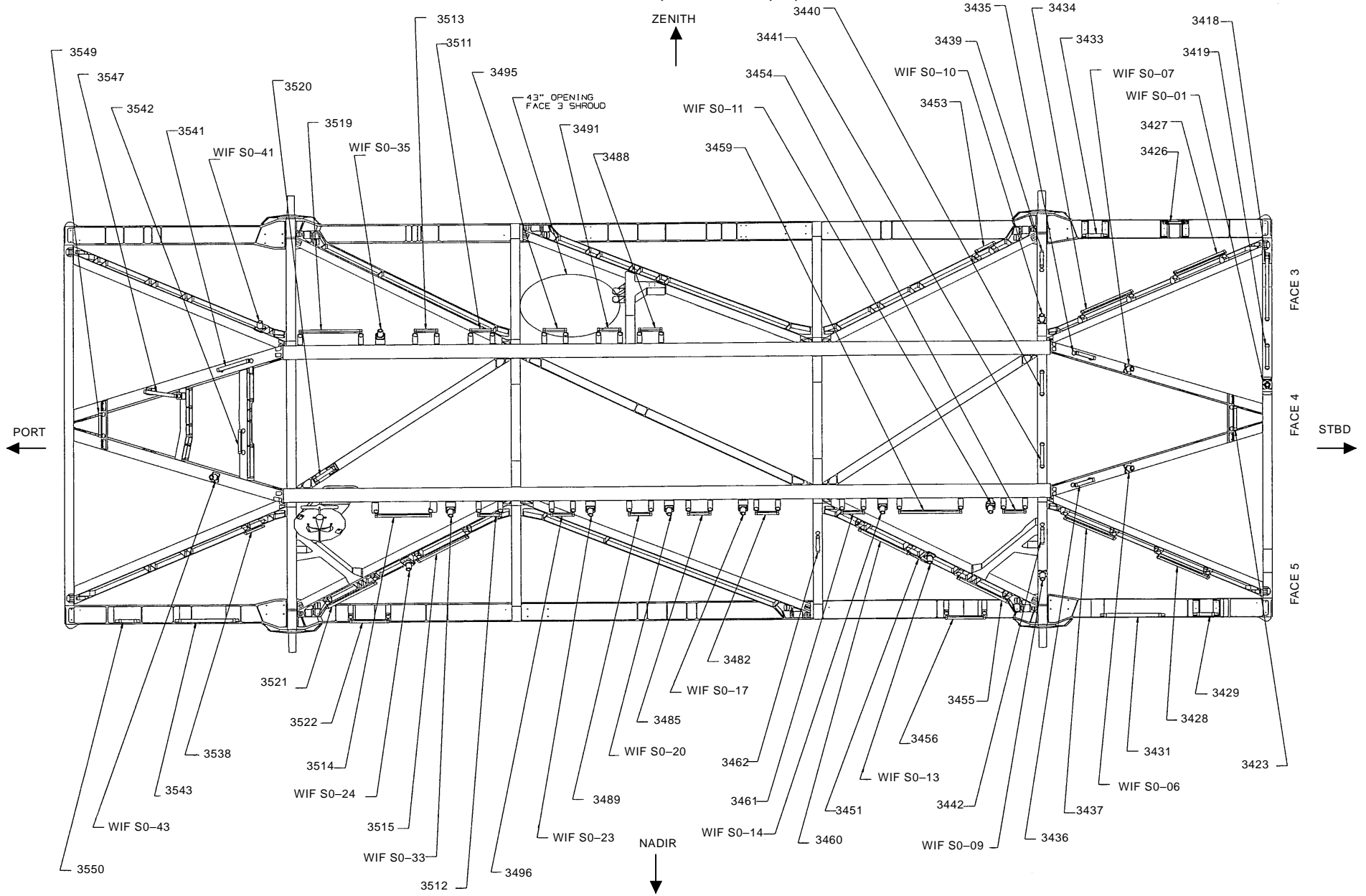
# S0 TRUSS BAY AND FACE NOMENCLATURE



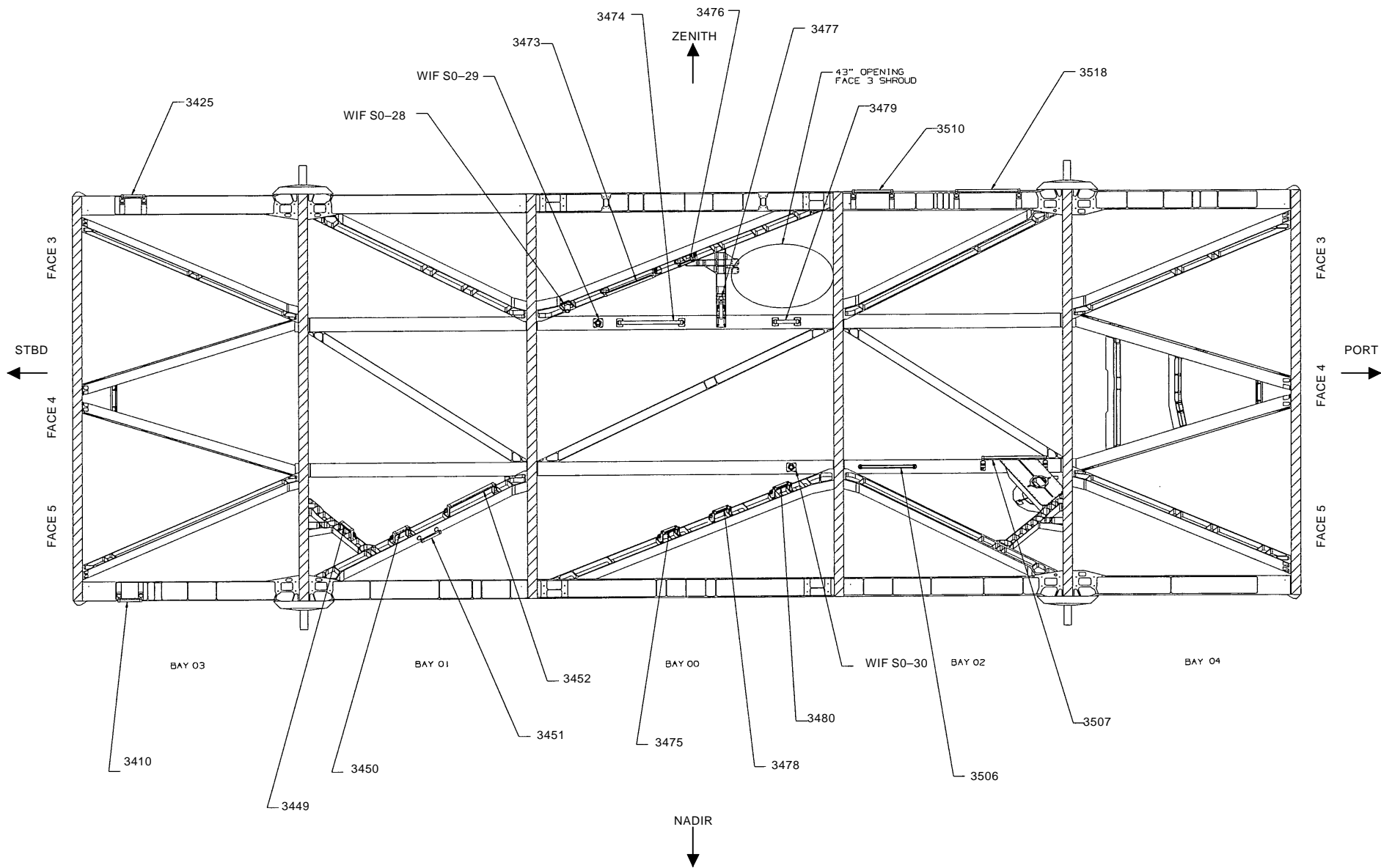
# S0 HANDRAILS AND WIFs EXTERNAL VIEW, FACES 1, 2, AND 6



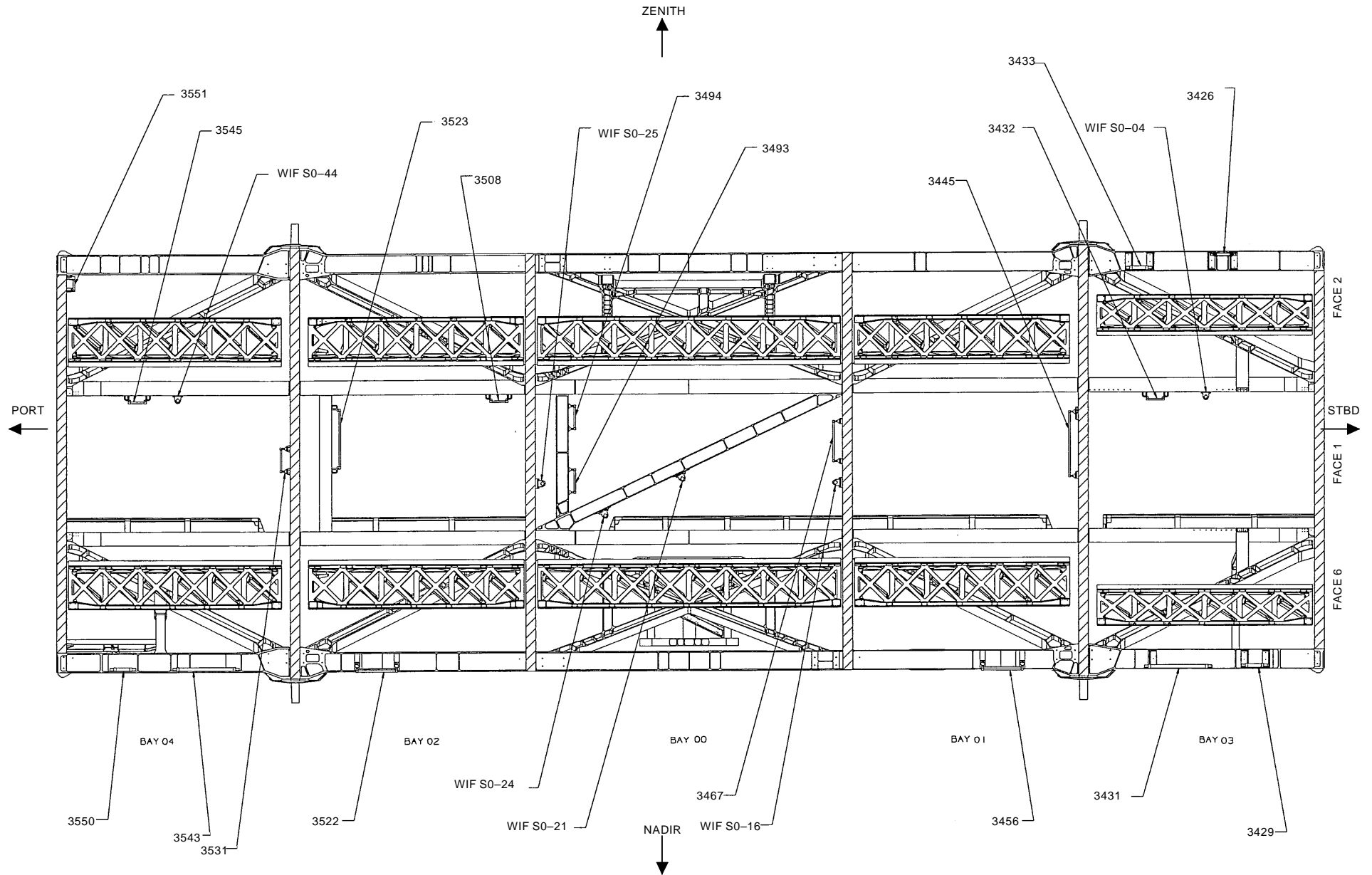
# S0 HANDRAILS AND WIFs EXTERNAL VIEW, FACES 3, 4, AND 5



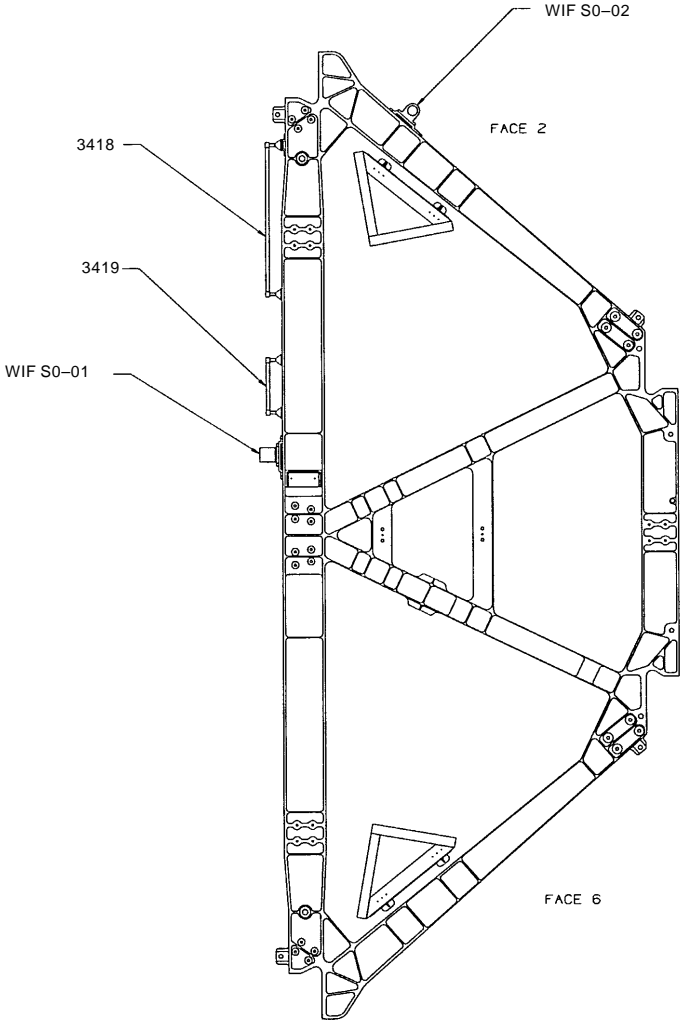
**S0 HANDRAILS AND WIFs  
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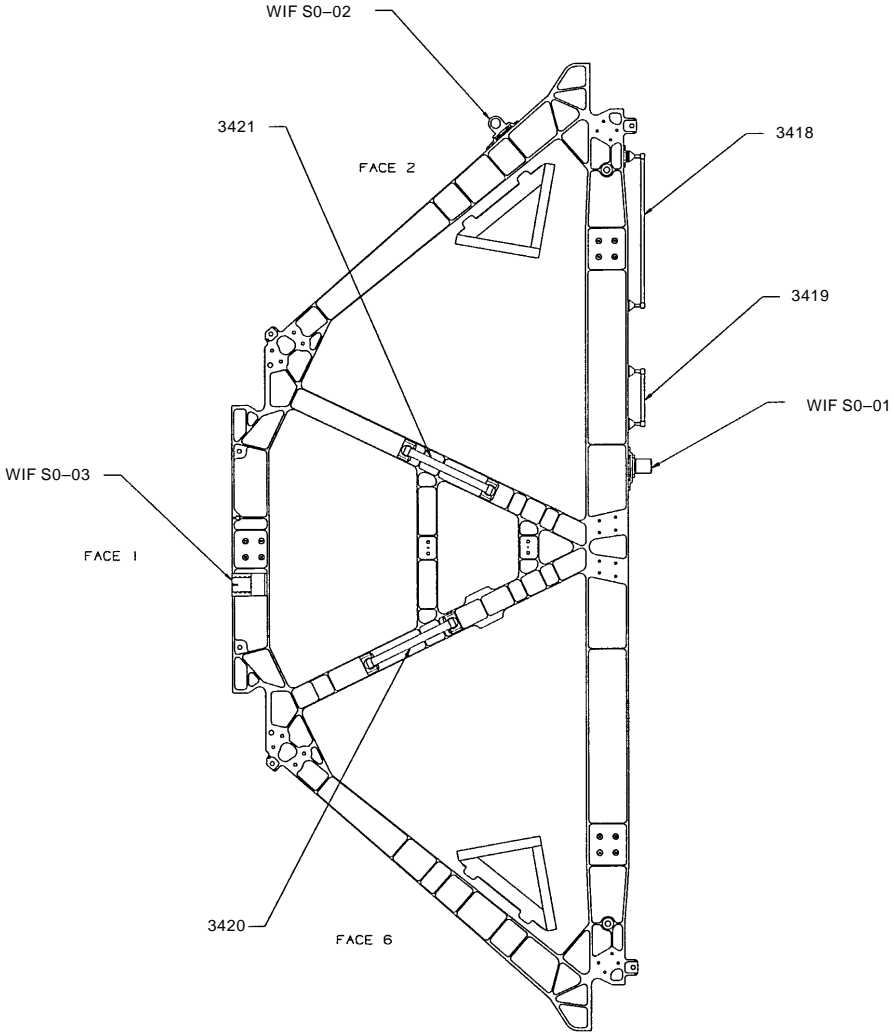
**S0 HANDRAILS AND WIFs  
VIEW LOOKING FROM INSIDE TRUSS TO FACES 1, 2, AND 6**



**S0 HANDRAILS AND WIFs  
BULKHEAD 03/05**



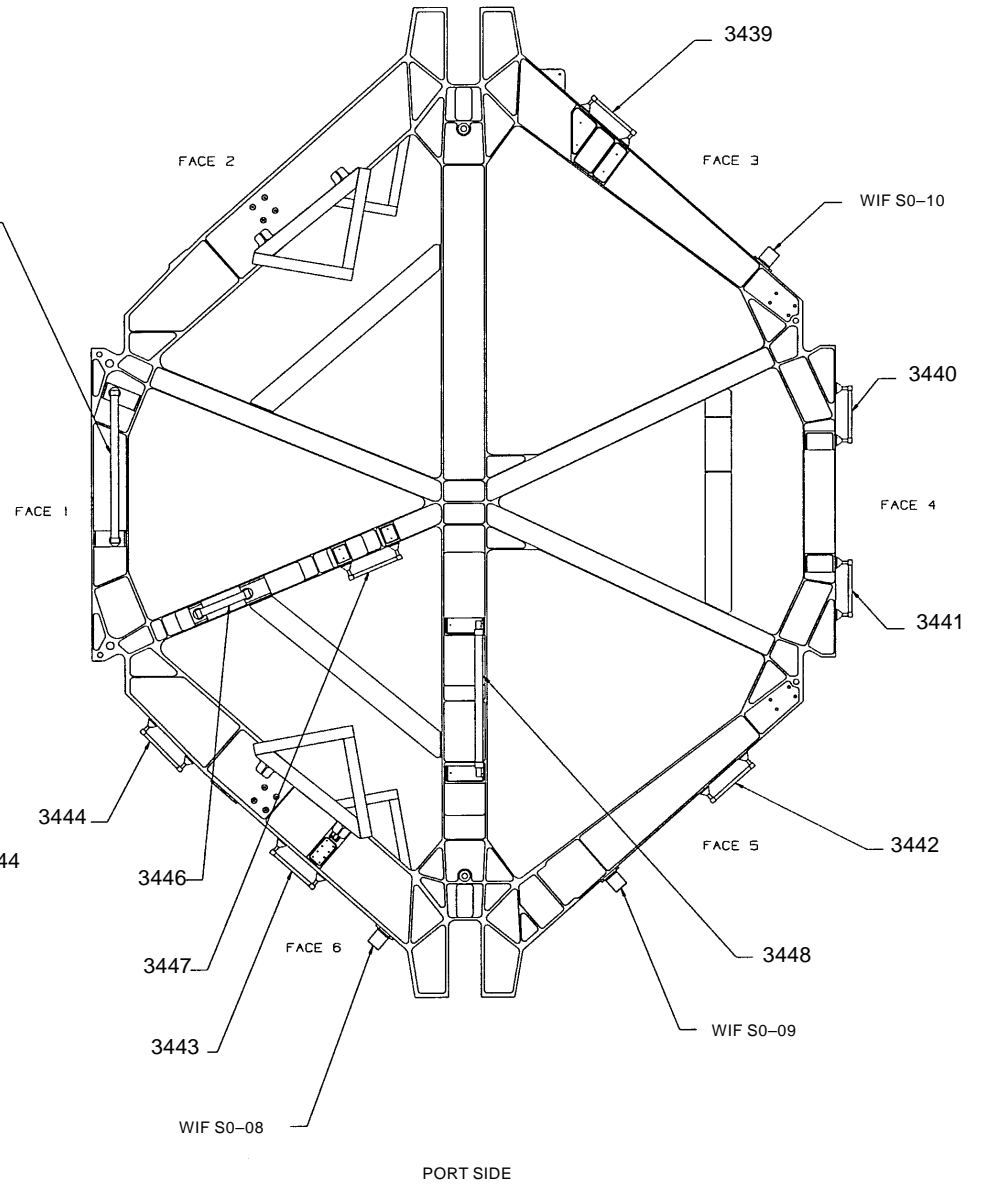
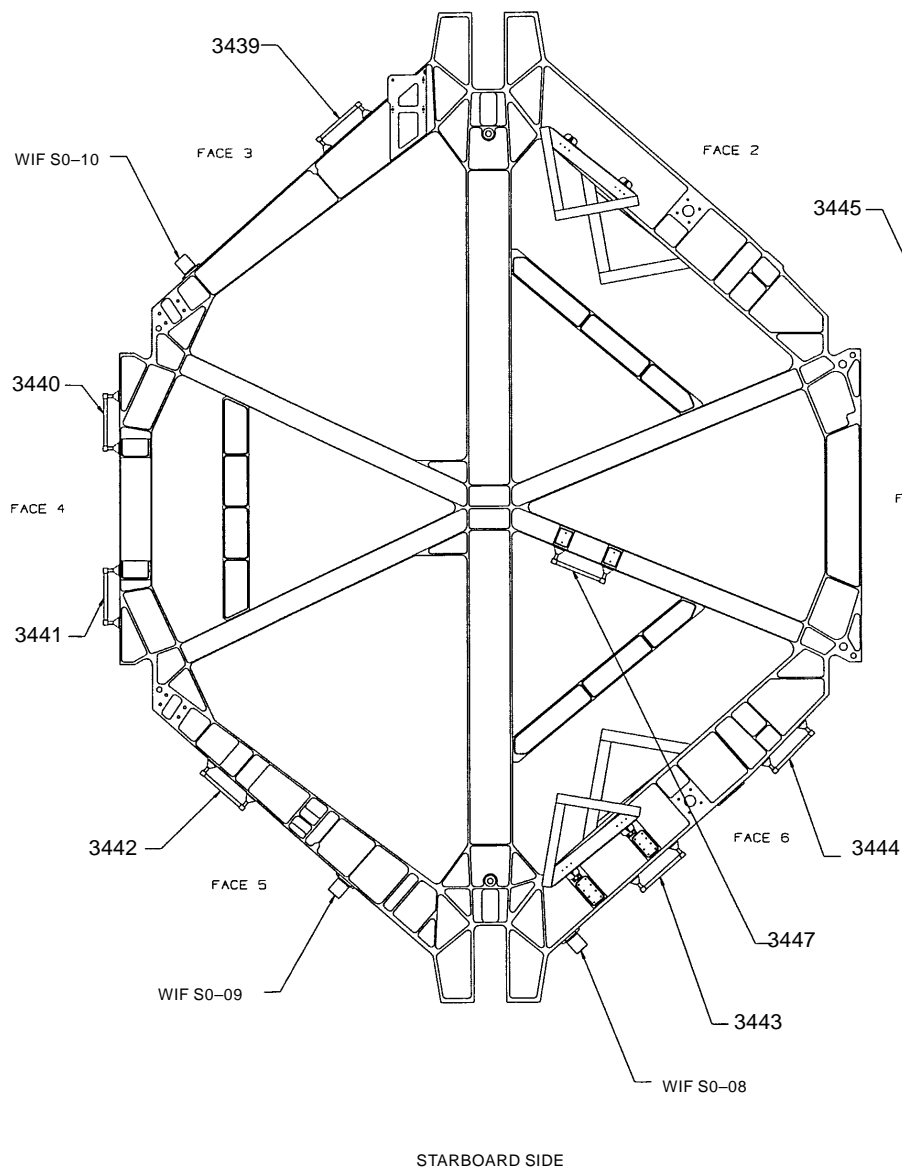
STARBOARD SIDE



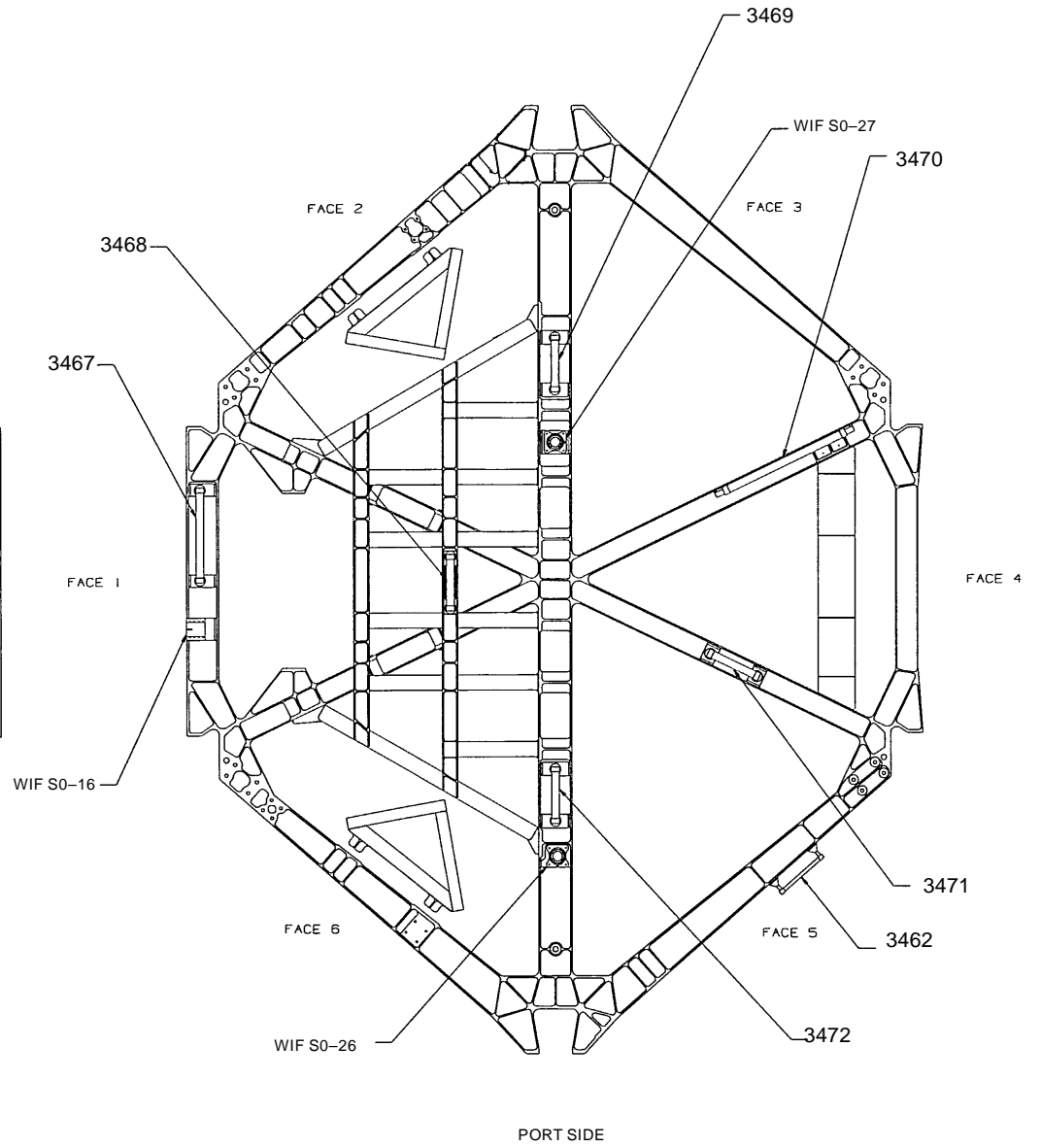
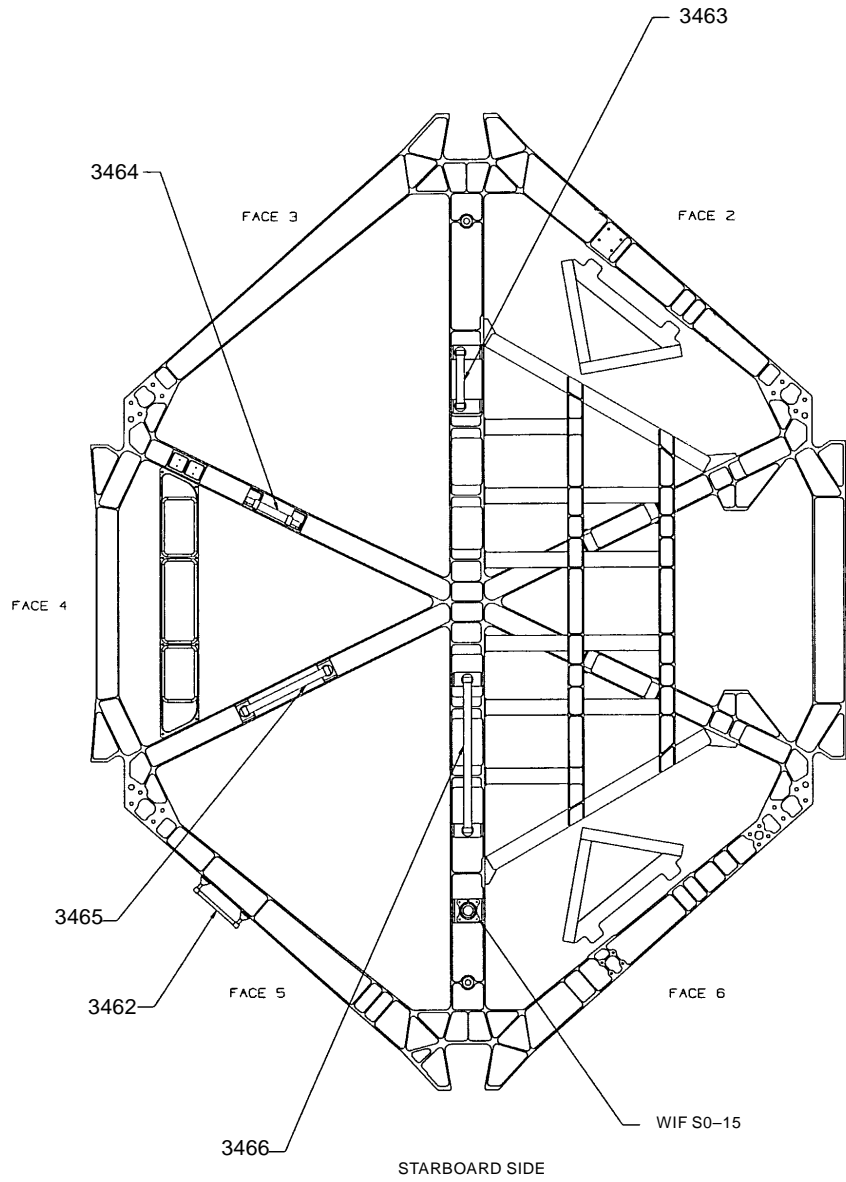
PORT SIDE



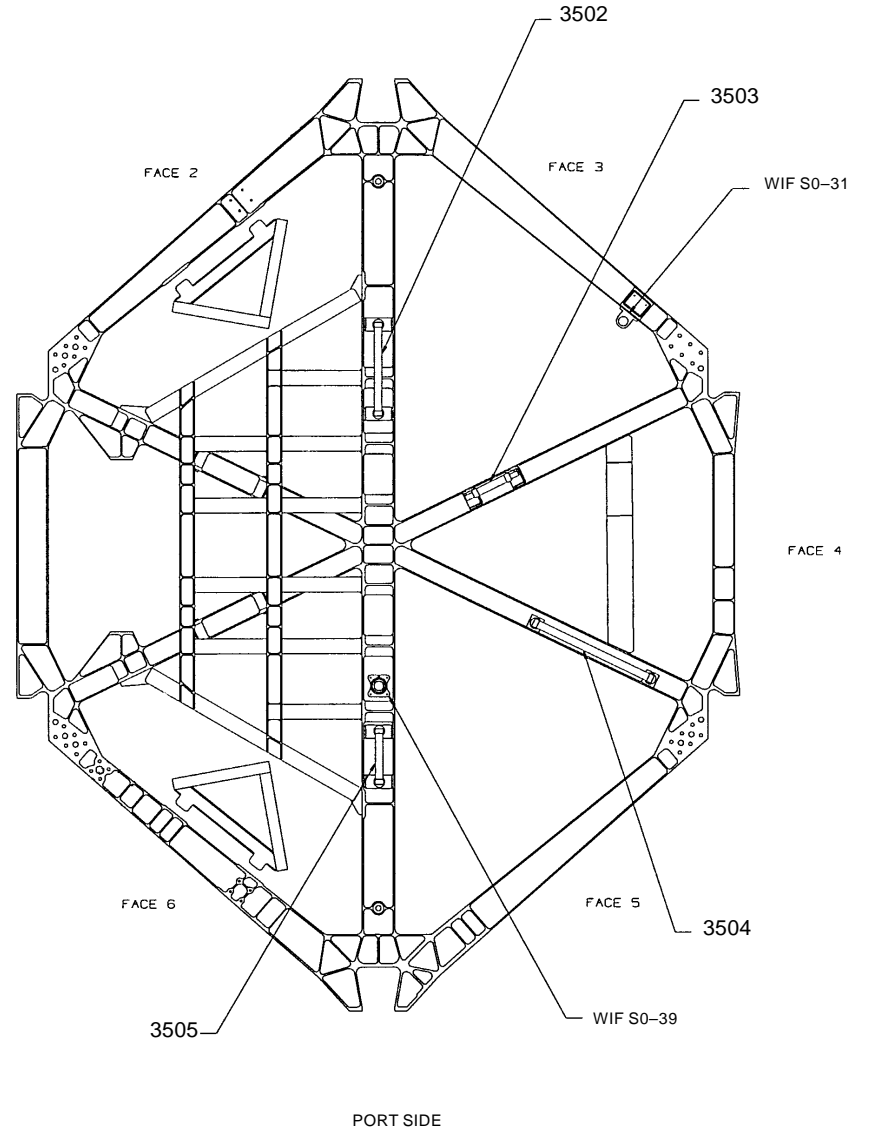
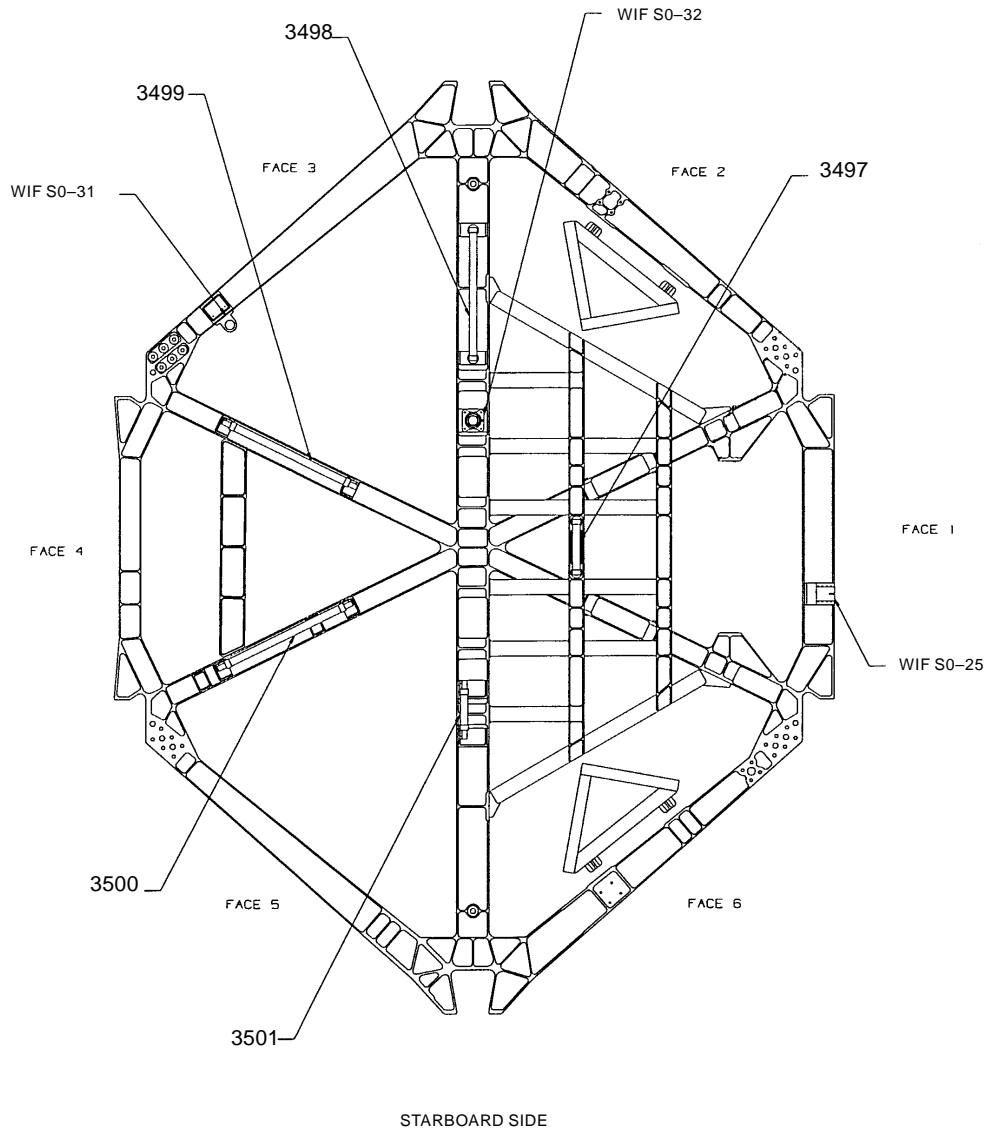
# S0 HANDRAILS AND WIFs BULKHEAD 01/03



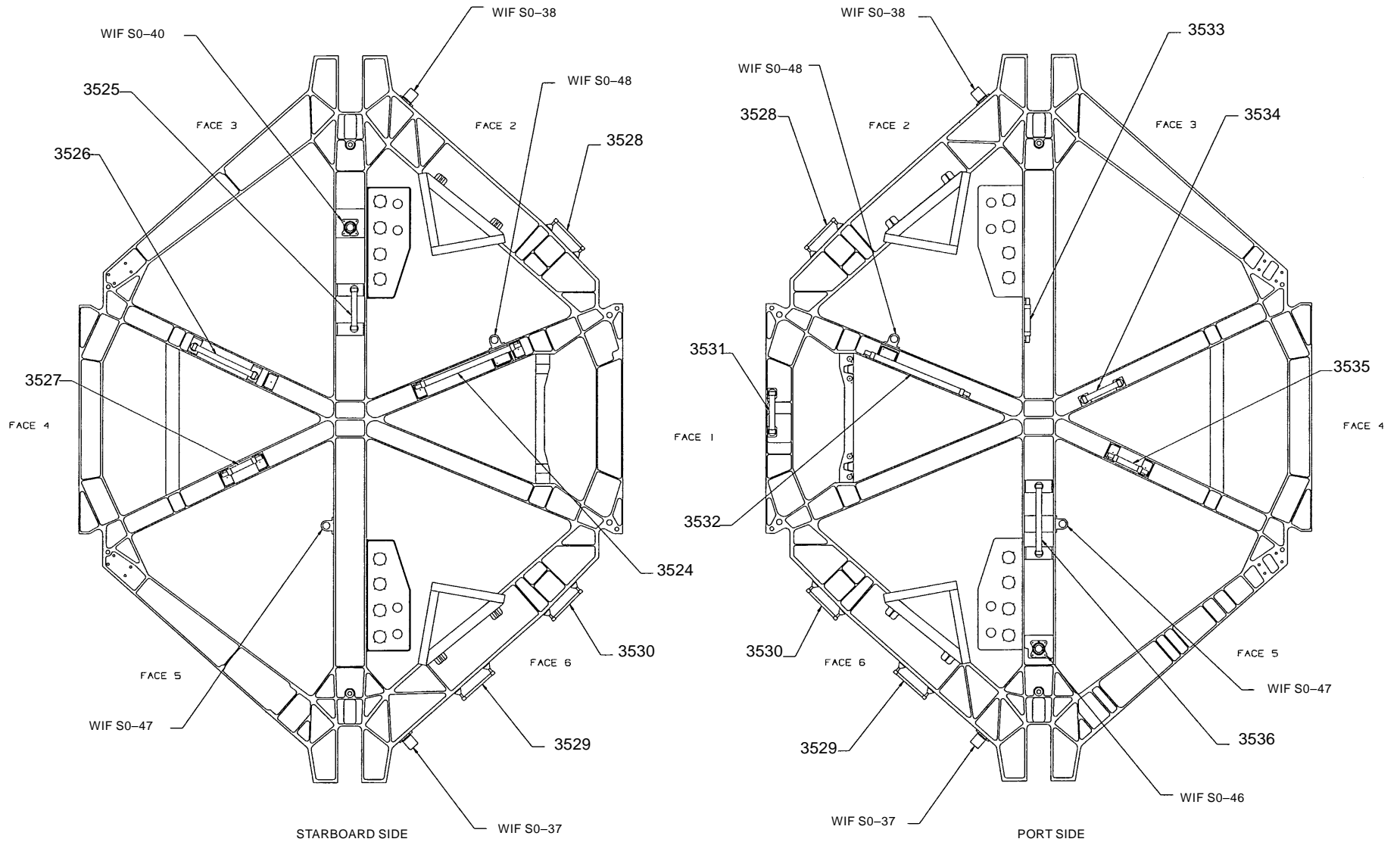
# S0 HANDRAILS AND WIFs BULKHEAD 00/01



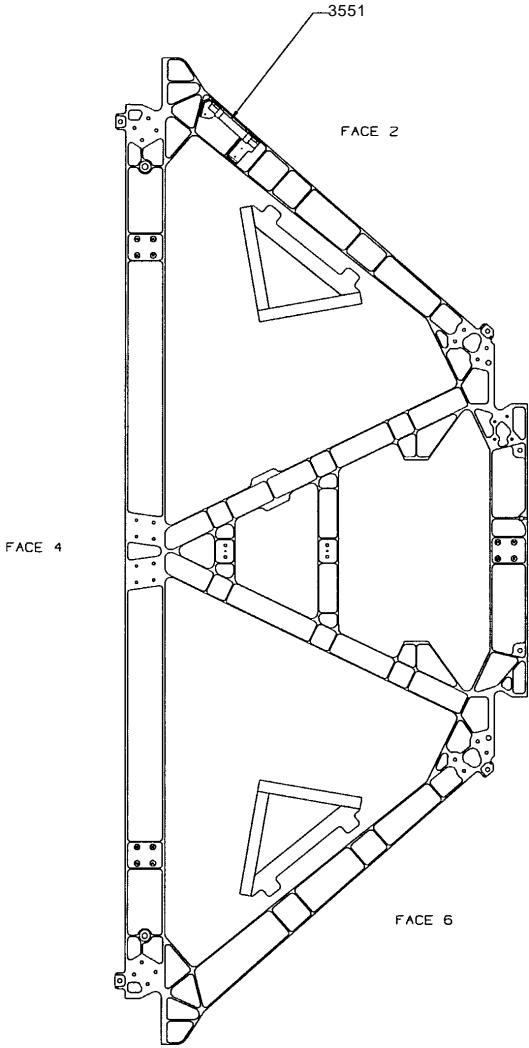
# S0 HANDRAILS AND WIFs BULKHEAD 00/02



## S0 HANDRAILS AND WIFs BULKHEAD 02/04

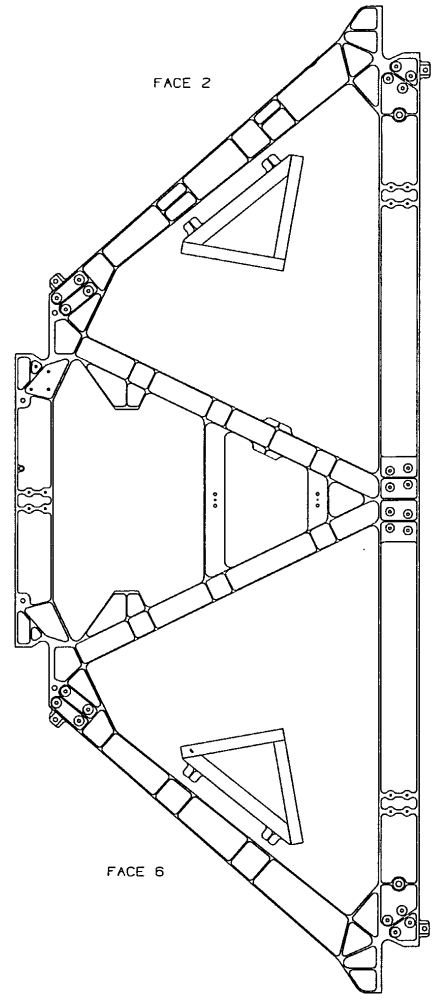


**S0 HANDRAILS AND WIFs  
BULKHEAD 04/06**



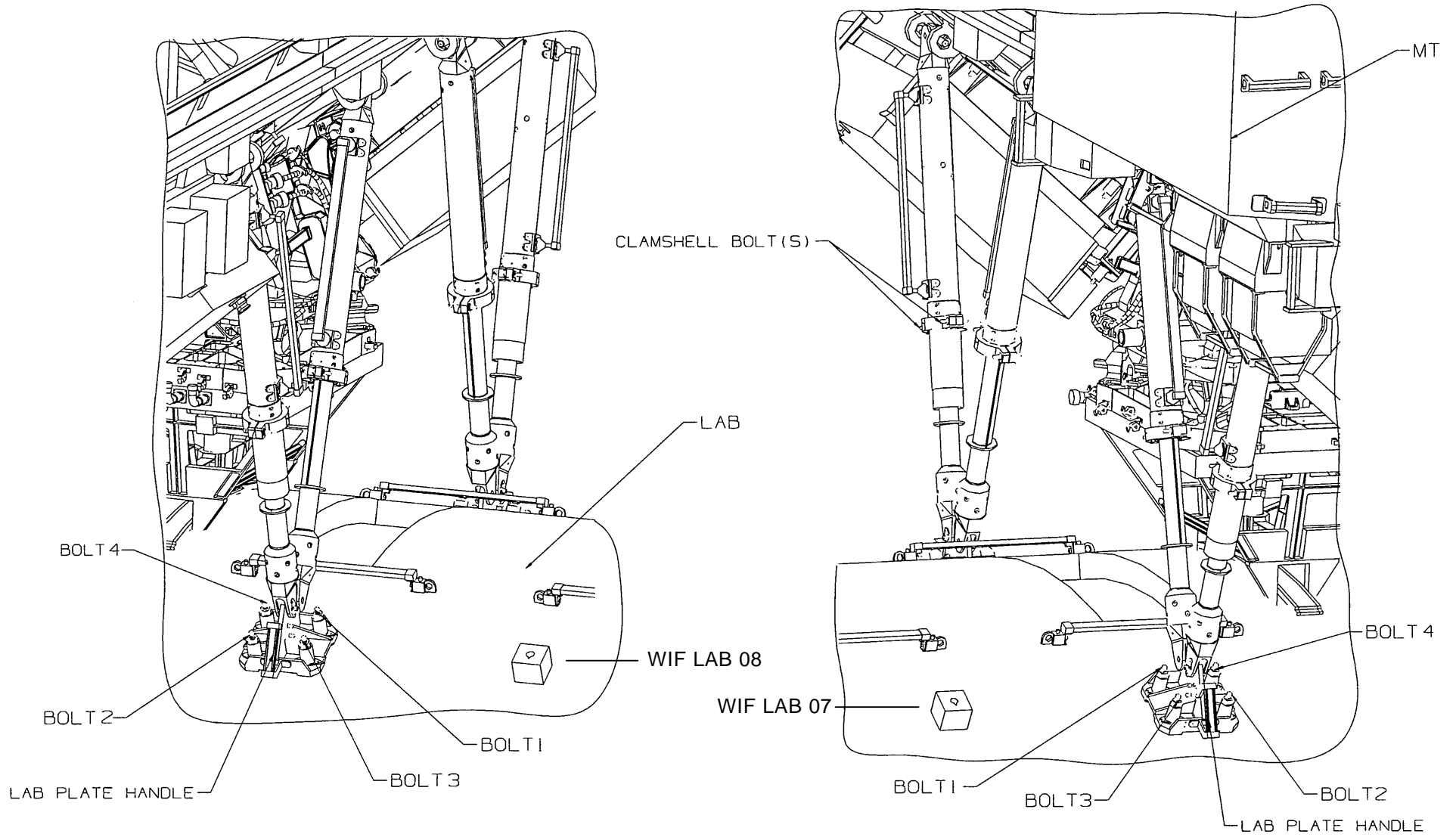
STARBOARD SIDE

FACE 1

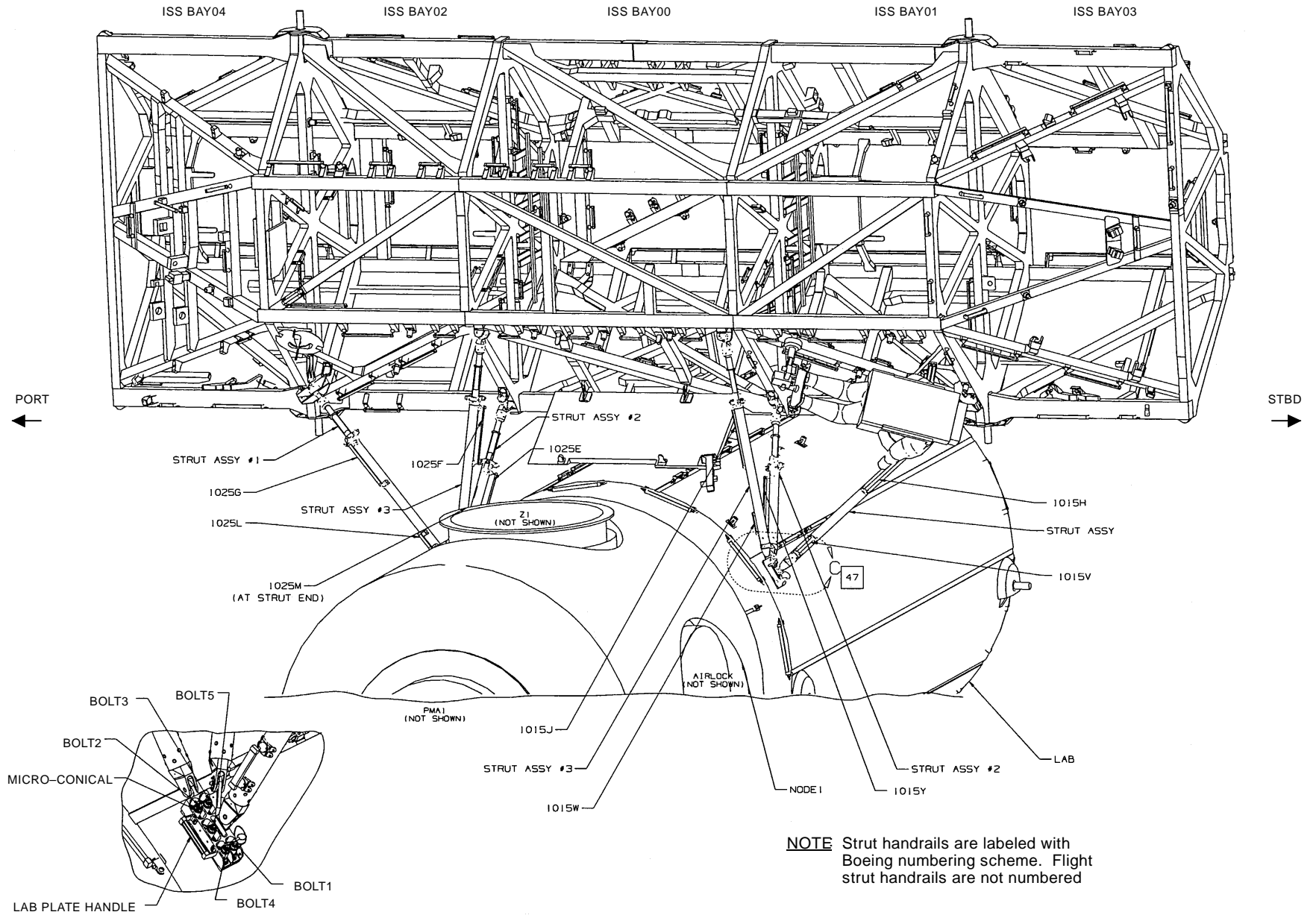


PORT SIDE

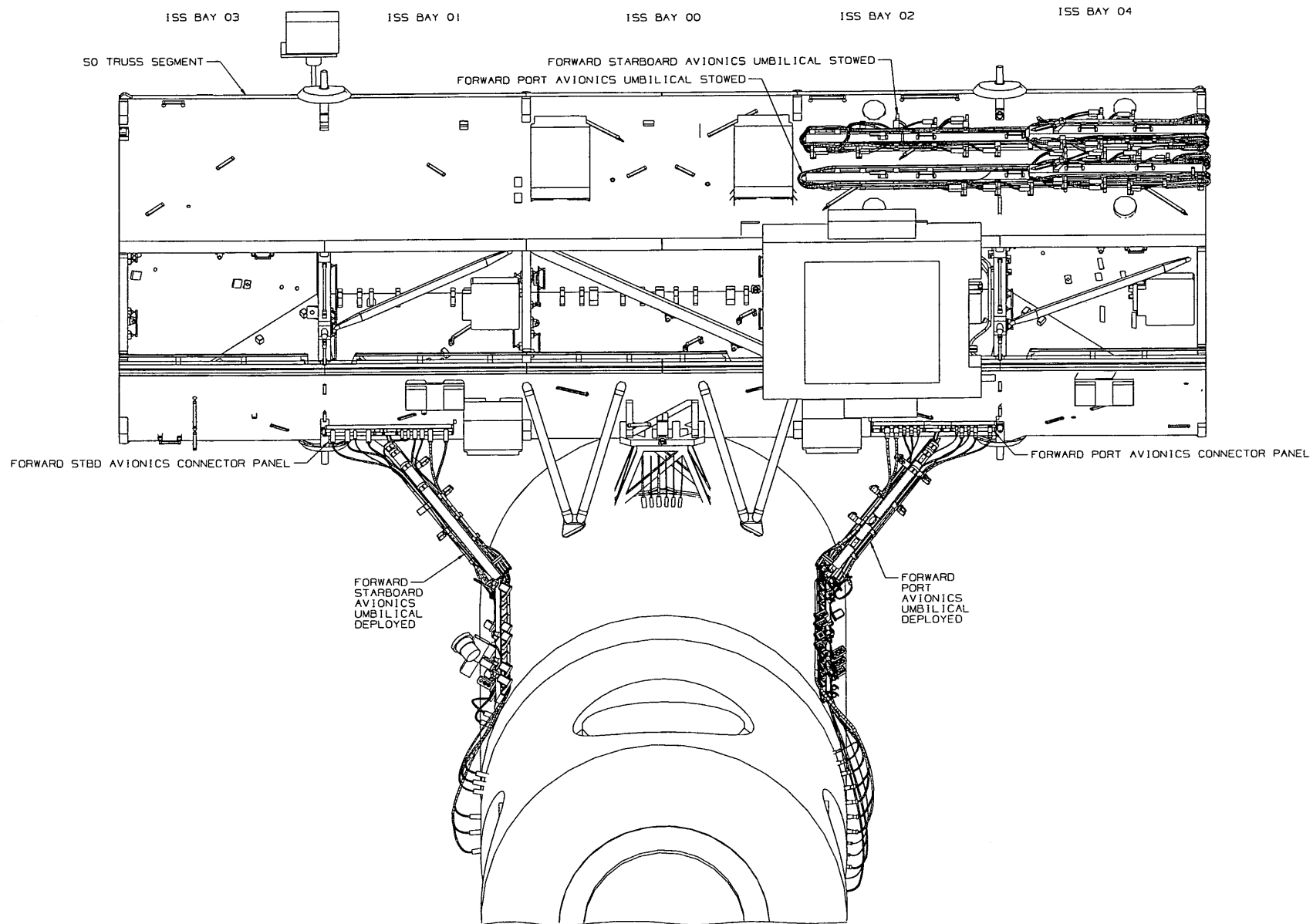
# FWD MTS STRUTS – DEPLOYED CONFIG



# AFT MTS STRUTS – DEPLOYED CONFIG

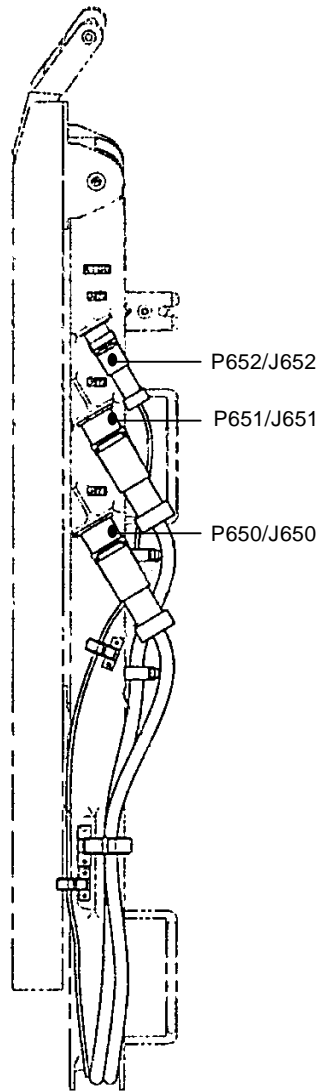


# S0 FORWARD AVIONICS UMBILICALS

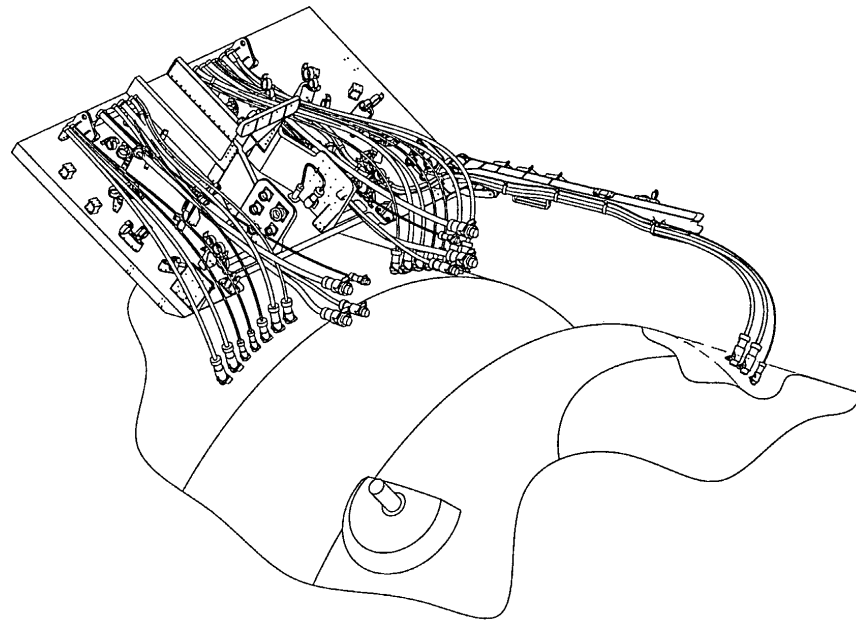




# AFT AVIONICS TRAY/NODE 1 SWINGARM DEPLOYED – FINAL ON-ORBIT CONFIG

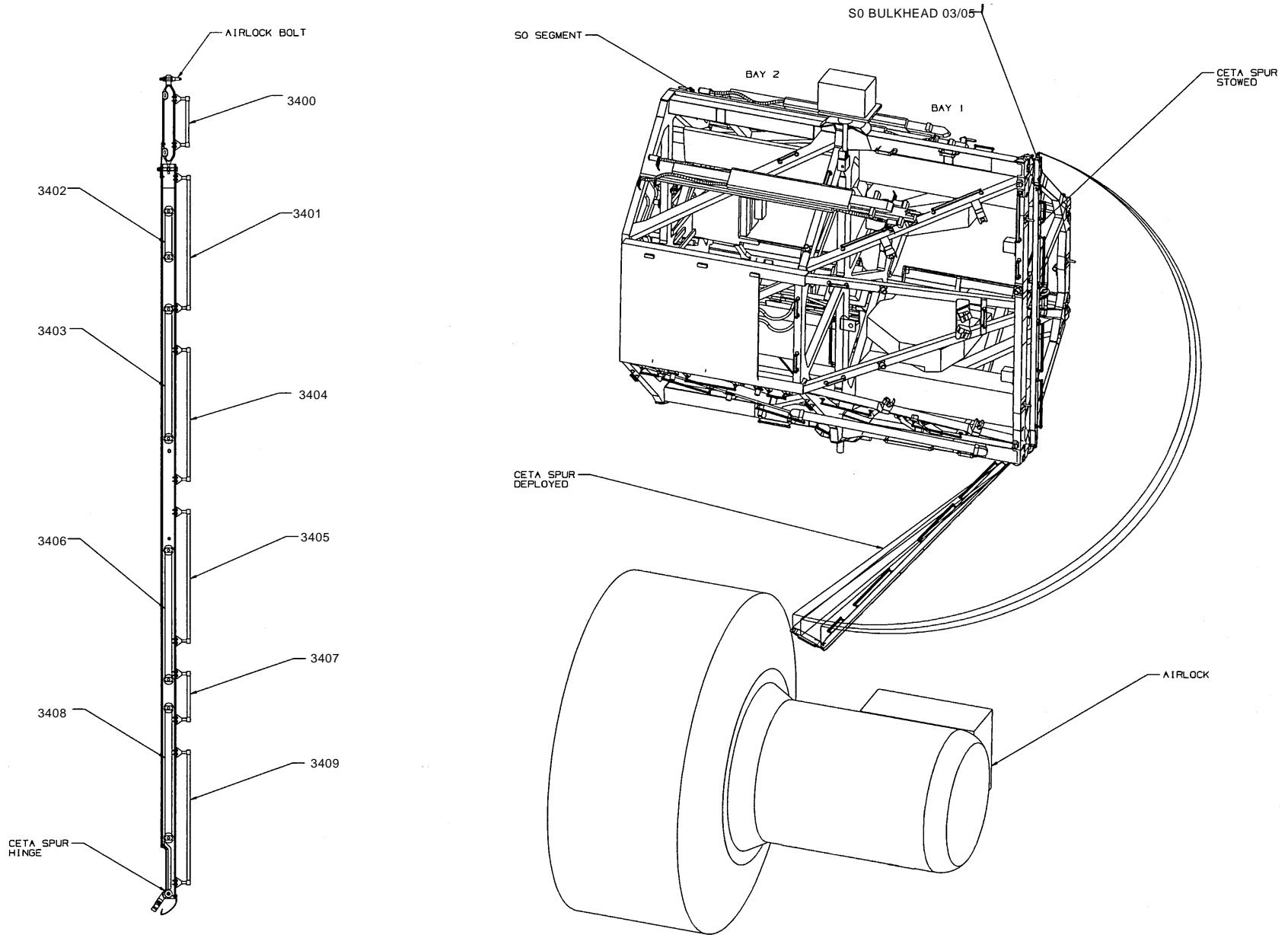


NODE 1 SWINGARM

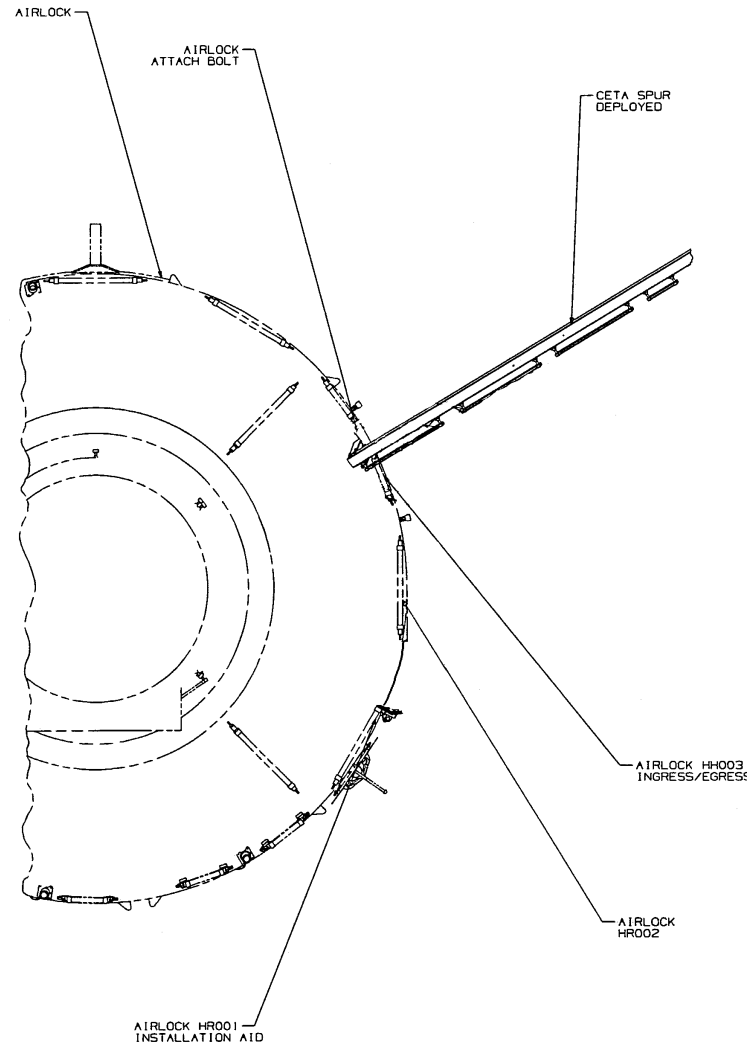


NODE 1 SWINGARM DEPLOYED

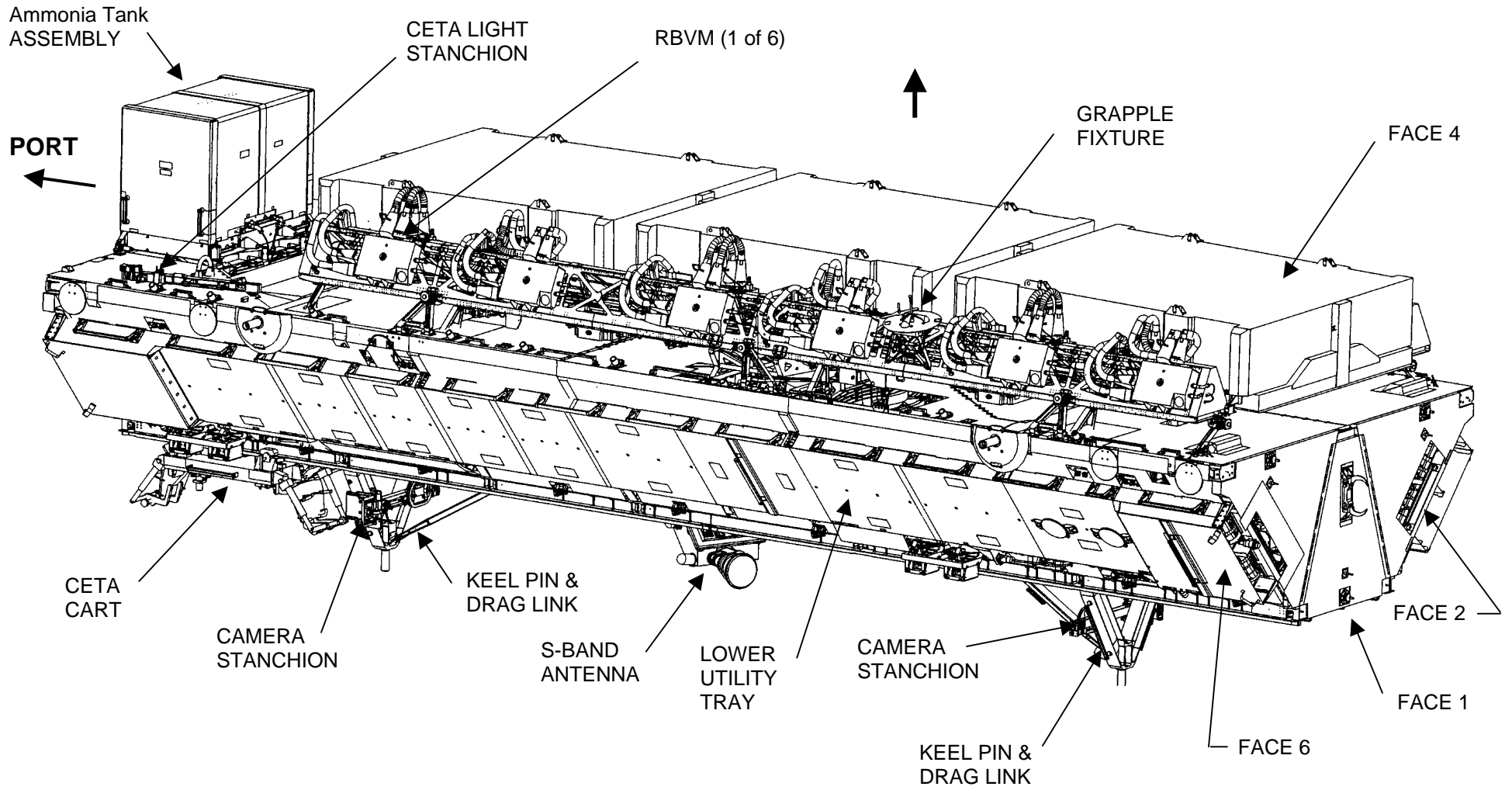
# AIRLOCK SPUR INSTALLATION



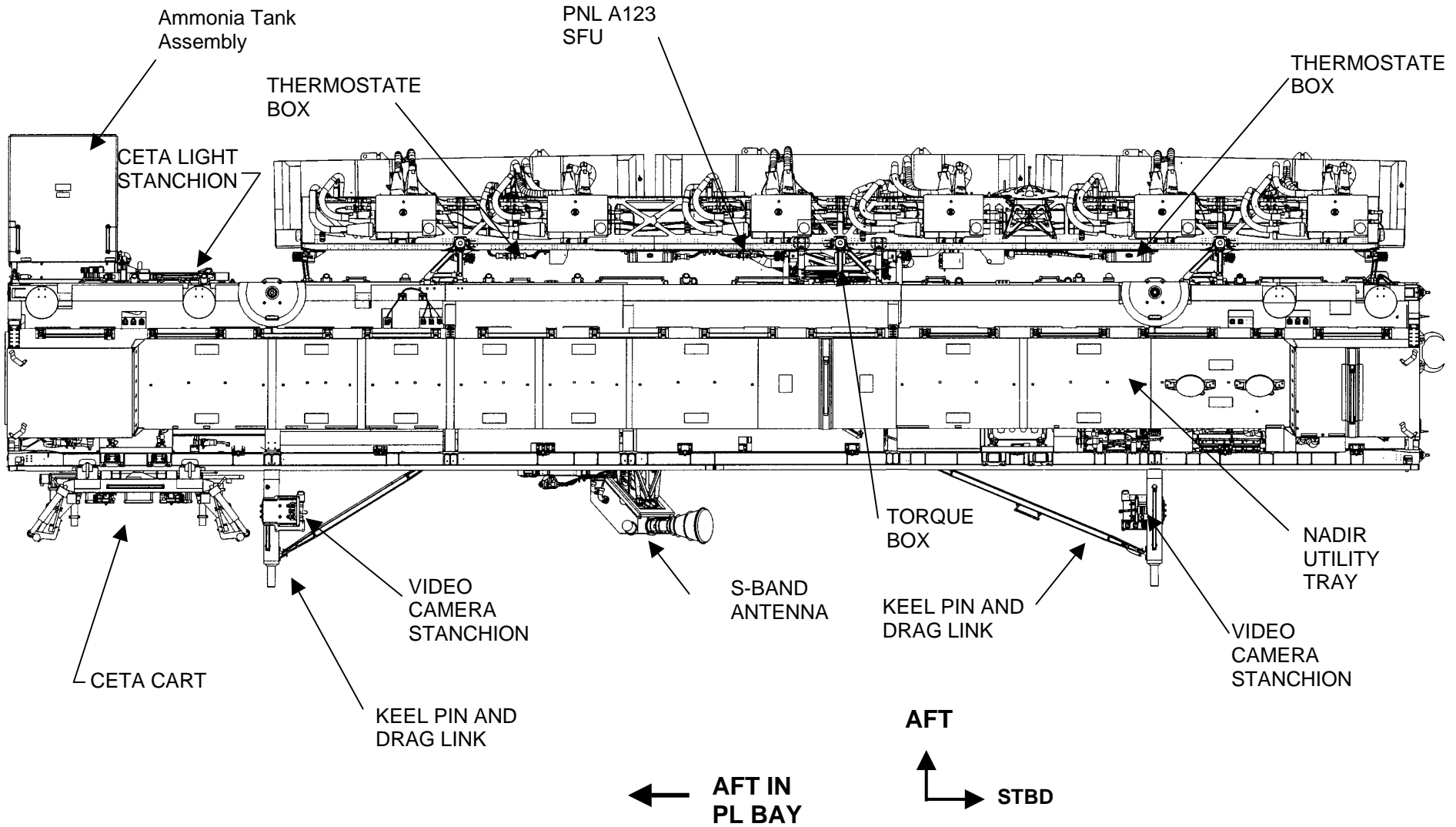
# AIRLOCK SPUR INSTALLATION (Cont)



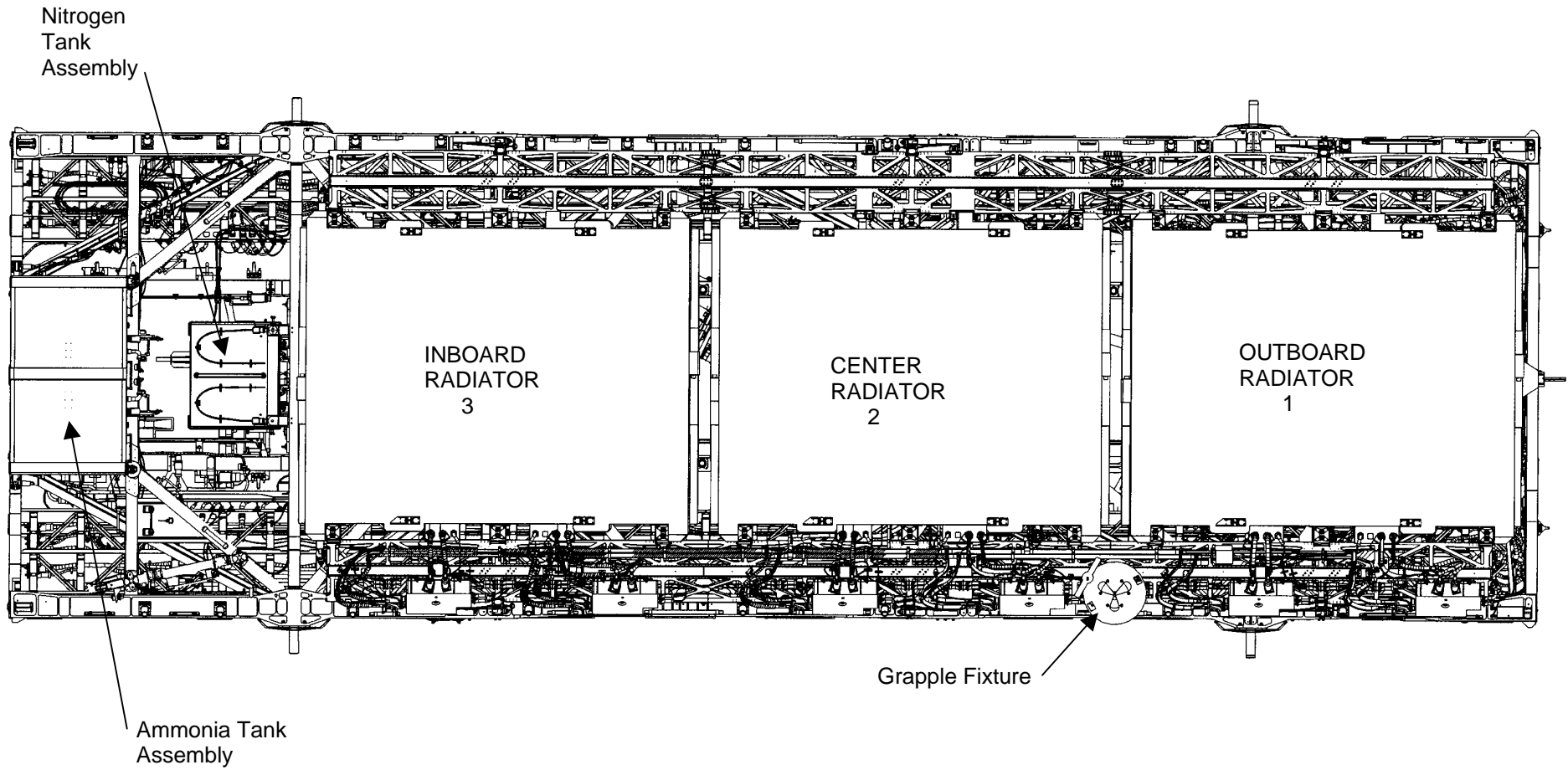
# S1 OVERVIEW



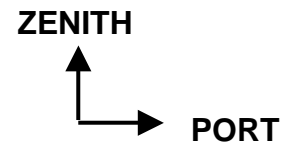
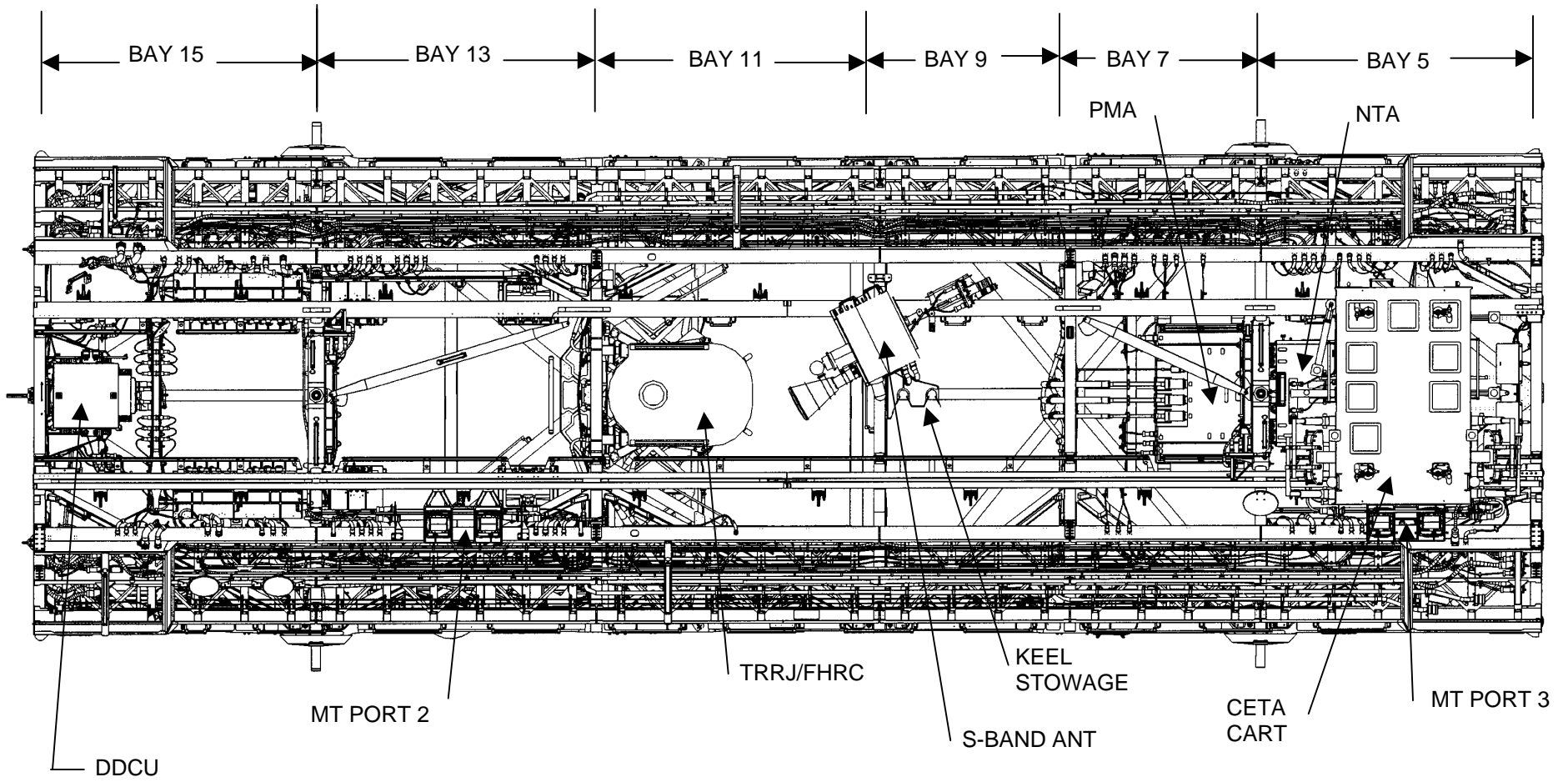
**S1 NADIR SIDE (FACE 6)**



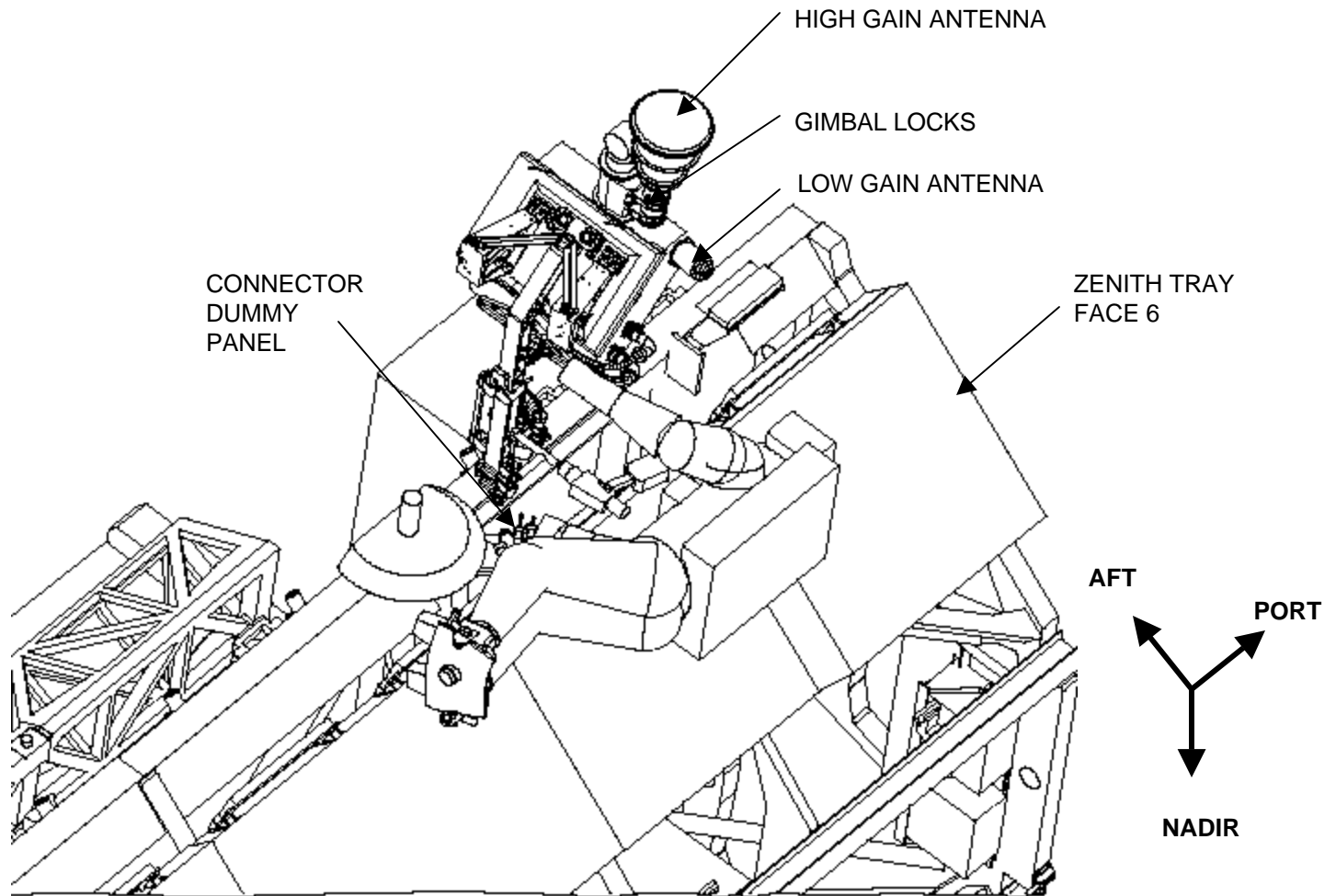
S1 AFT FACE (FACE 4)



# S1 FORWARD FACE (FACE 1)



# SASA INSTALL

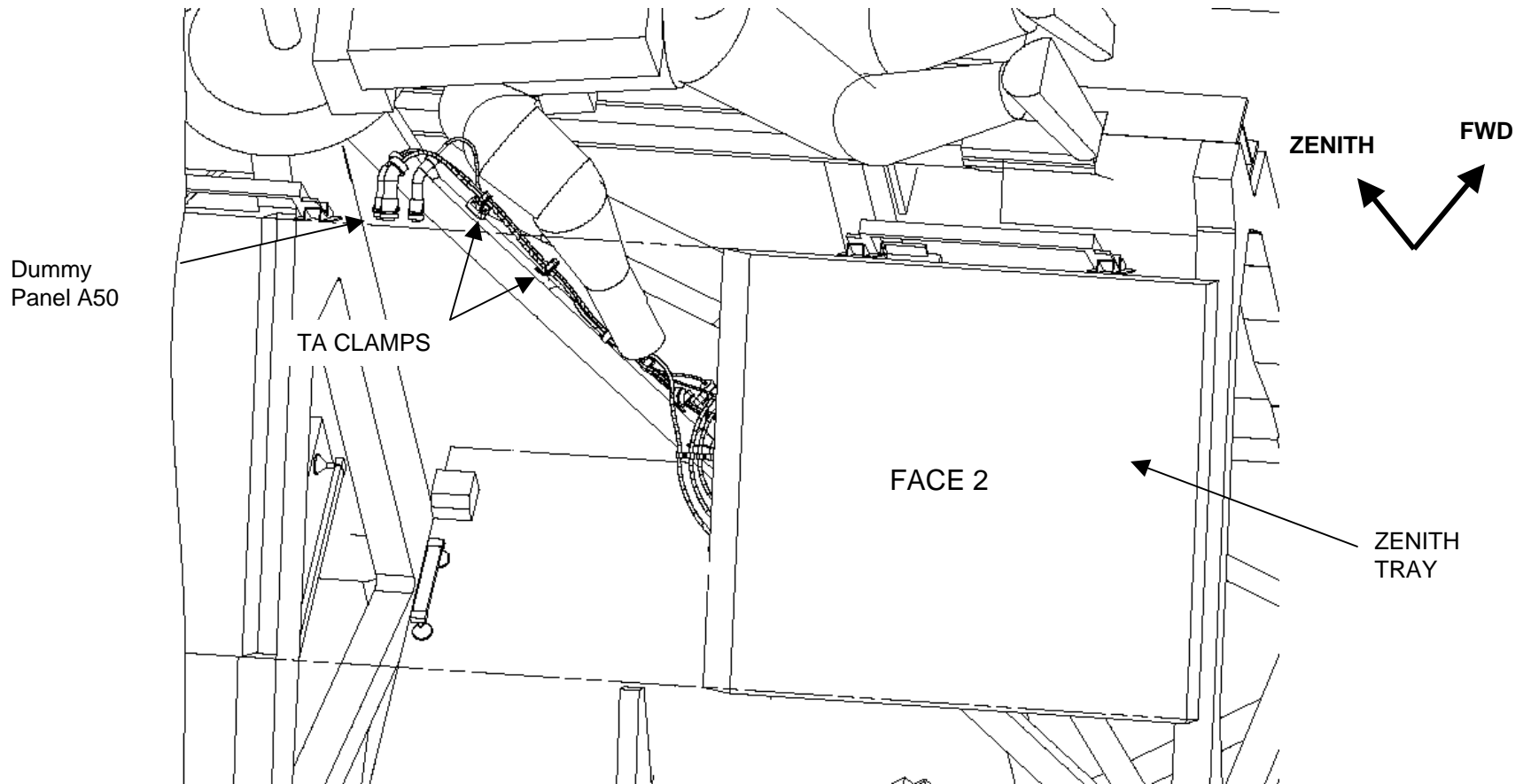


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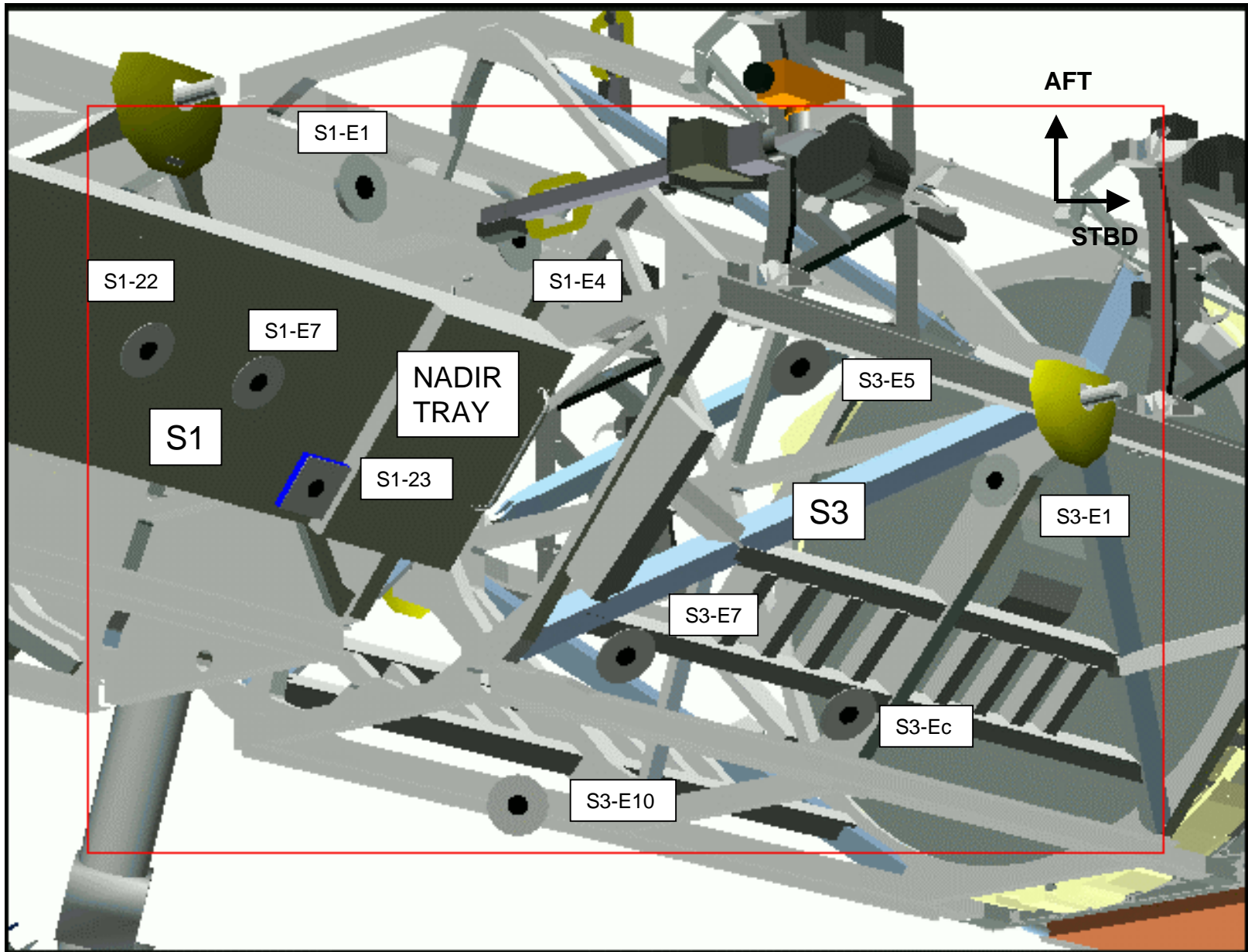
EVA/113/FIN



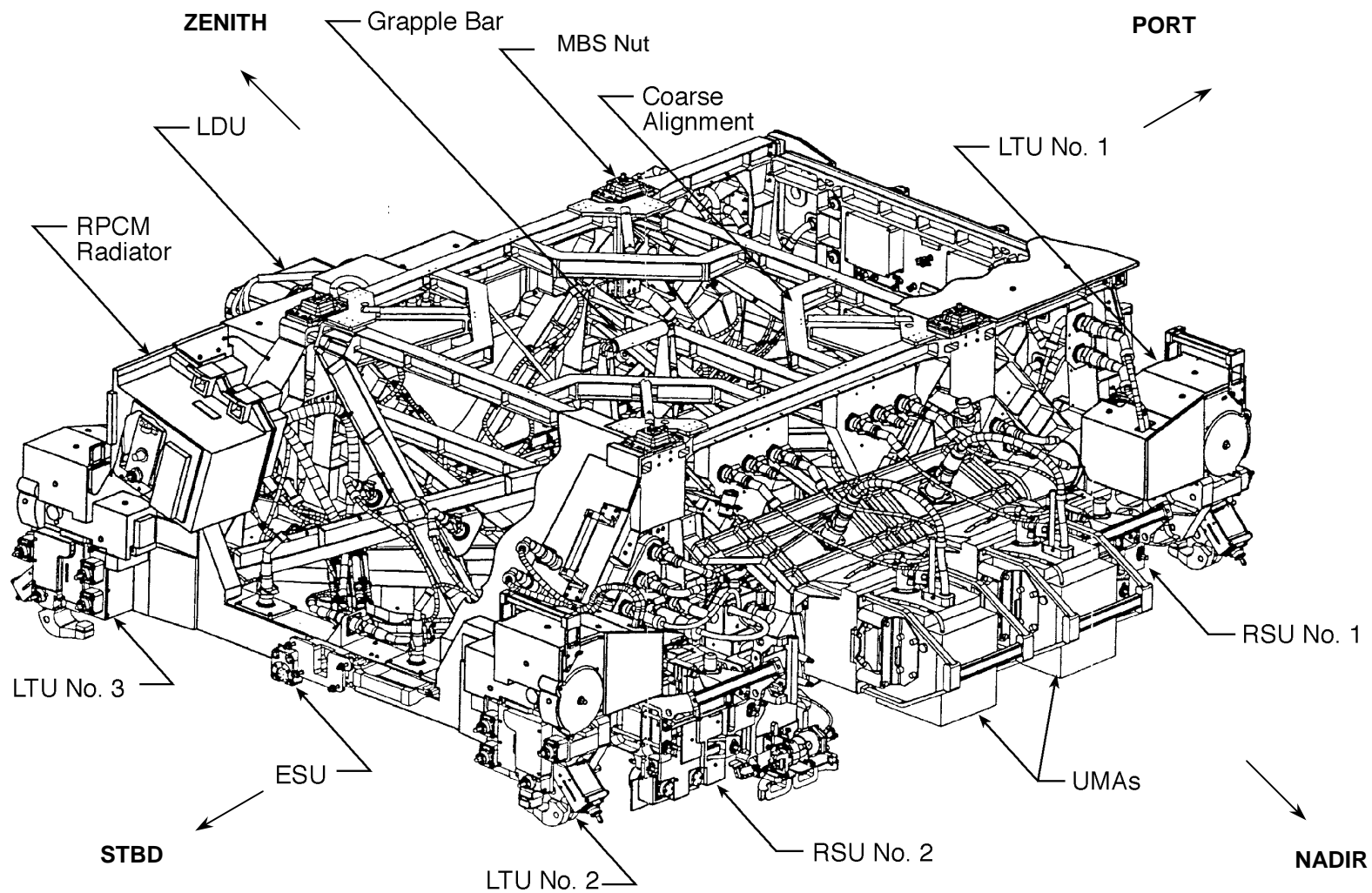
# SASA TA CLAMPS



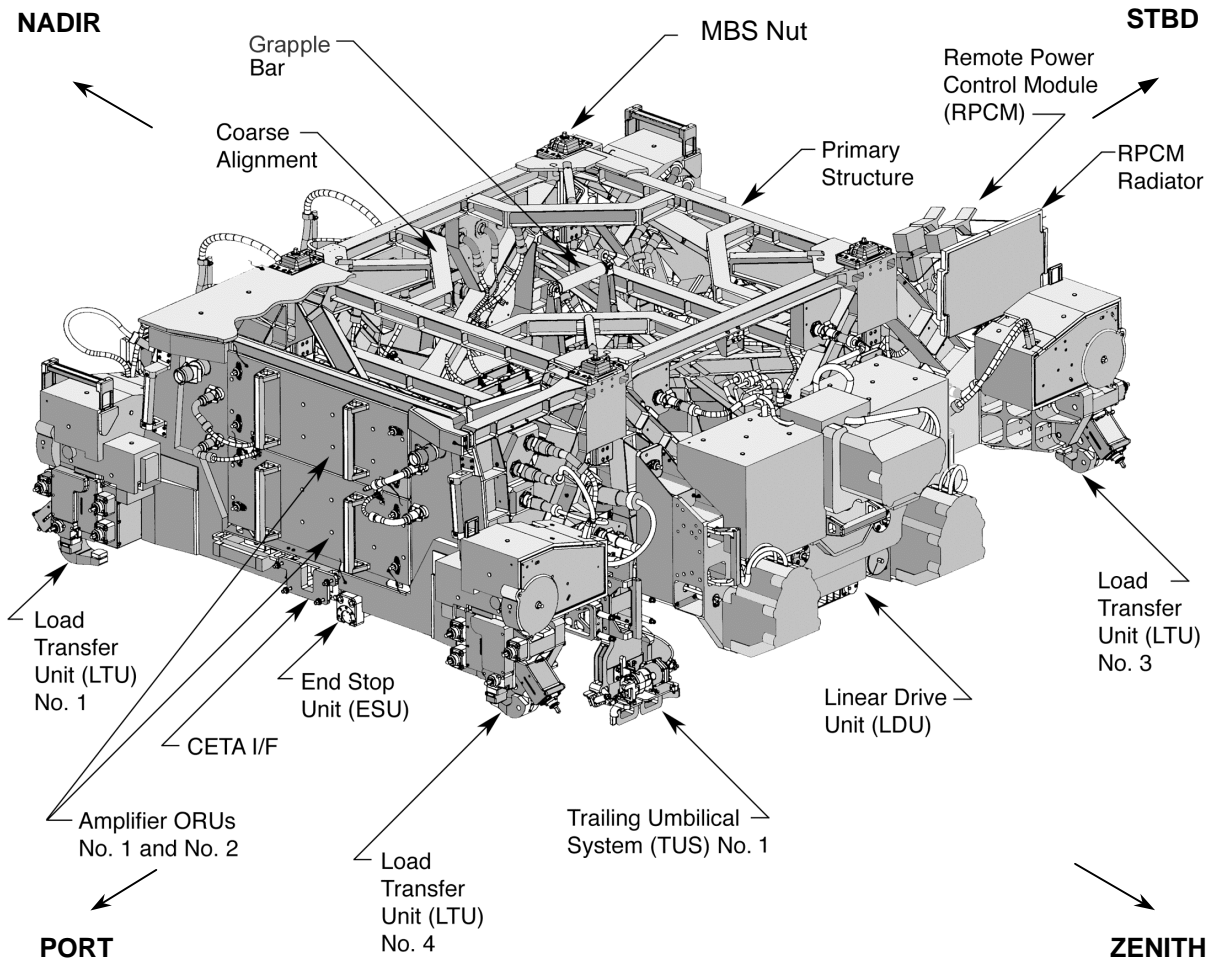
# SVS TARGETS REQUIRED FOR S3 BERTHING



# MOBILE TRANSPORTER

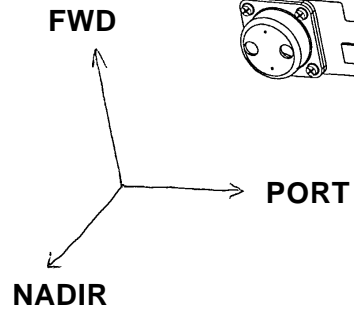
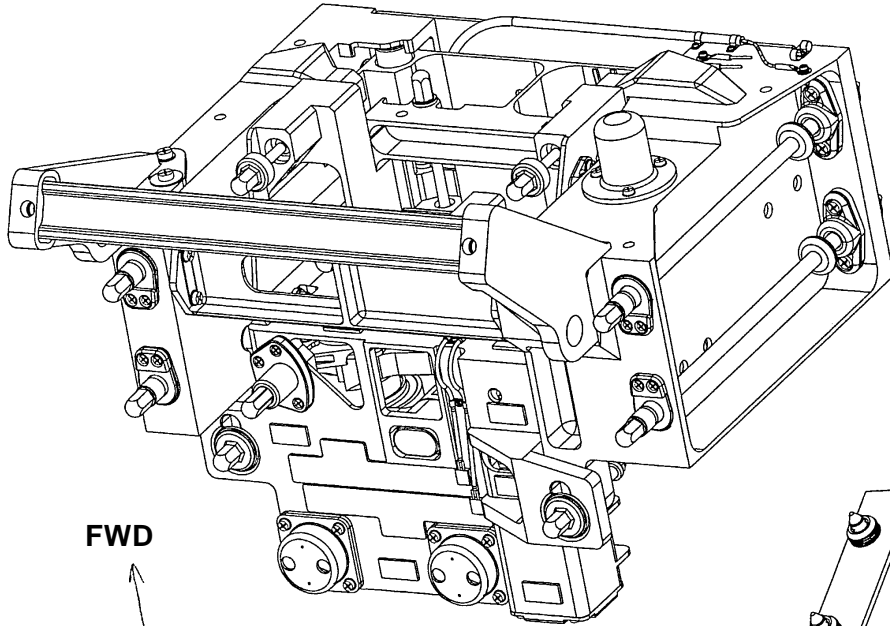


# MOBILE TRANSPORTER (Cont)

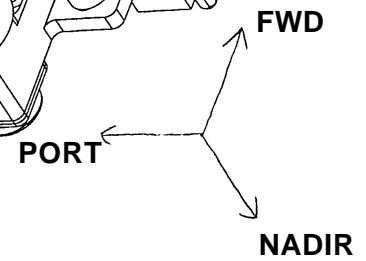
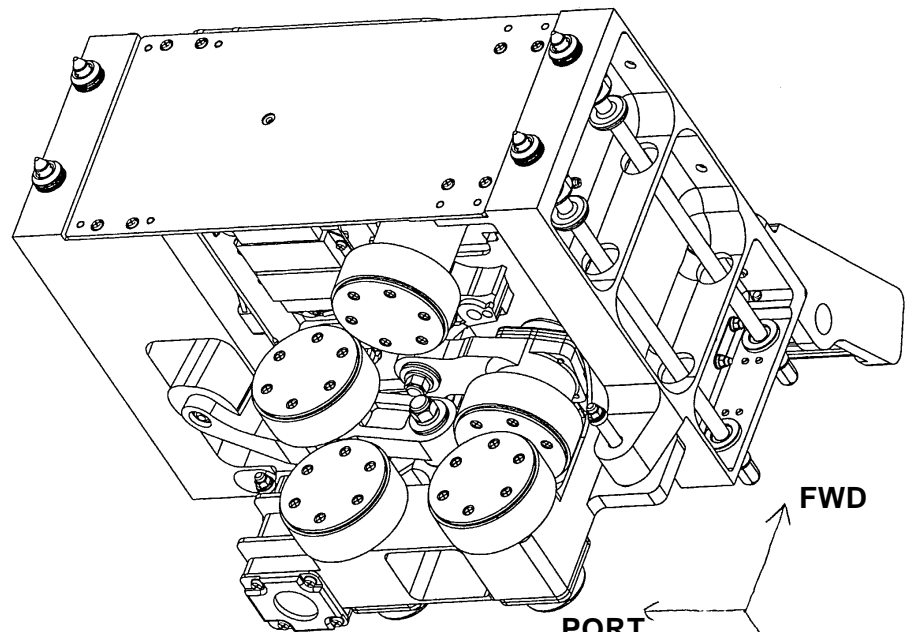


# RSU ASSEMBLY

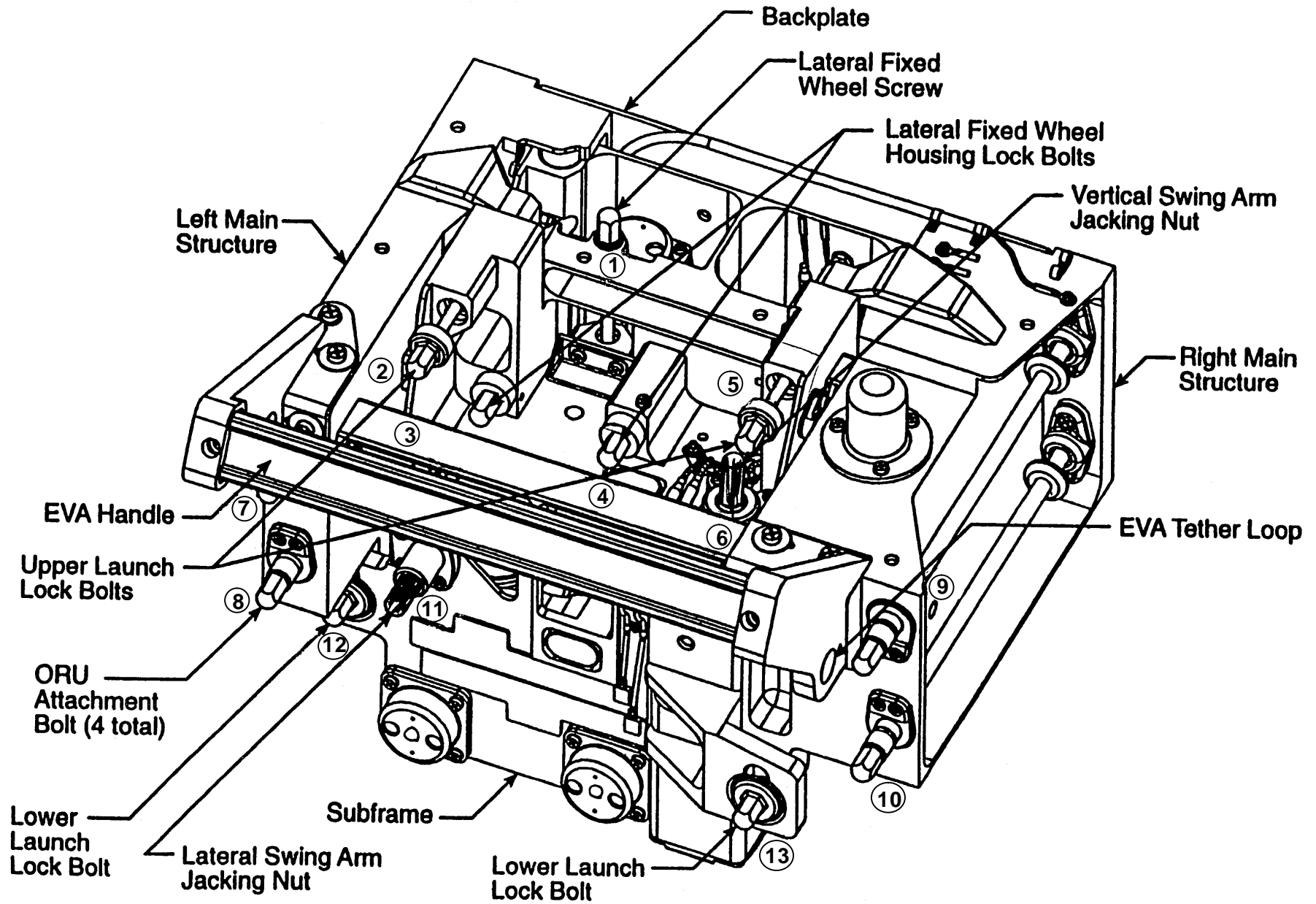
## FRONT VIEW



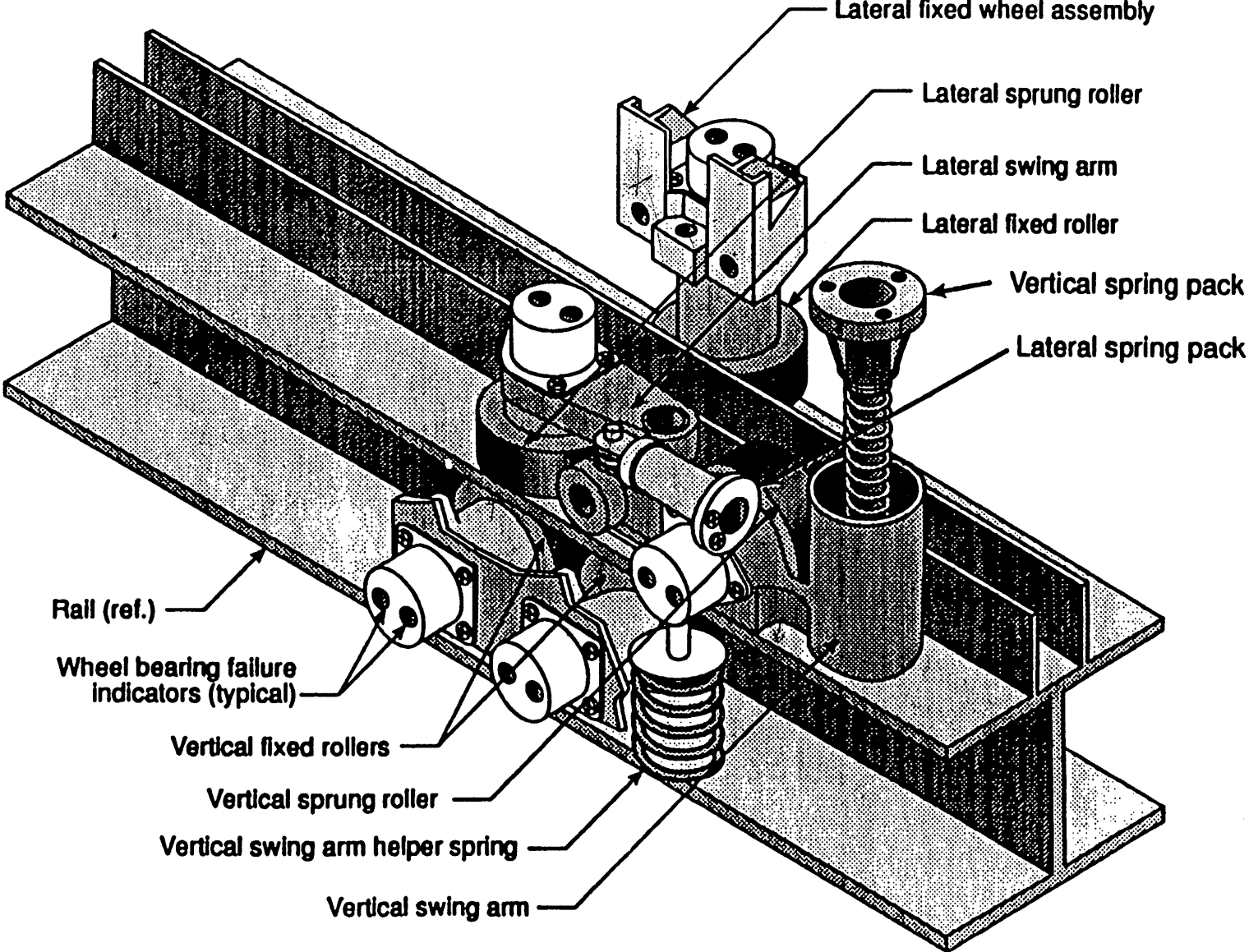
## REAR VIEW



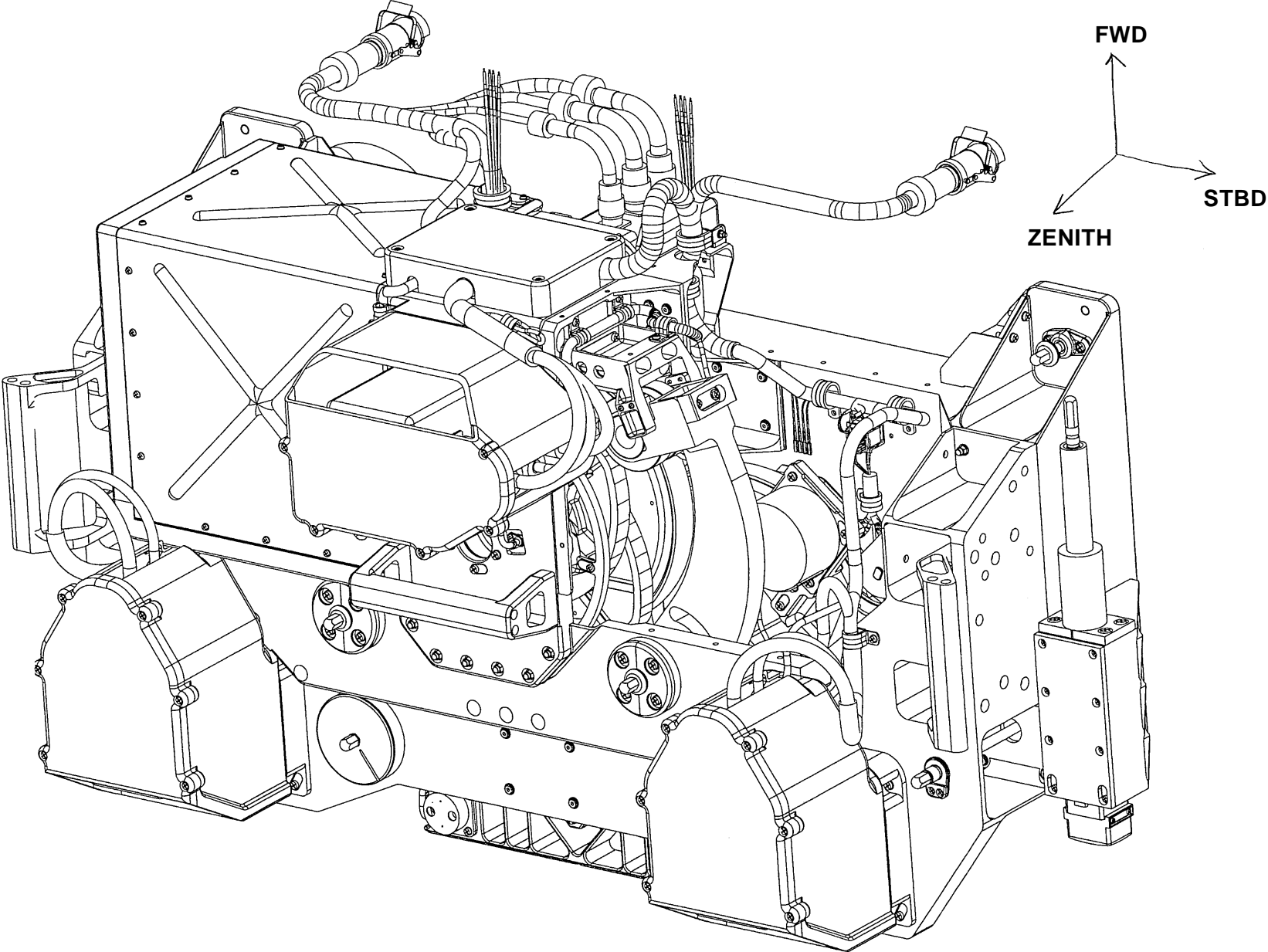
# RSU BOLT NUMBERING REFERENCE



**RSU LATERAL AND VERTICAL WHEELS**

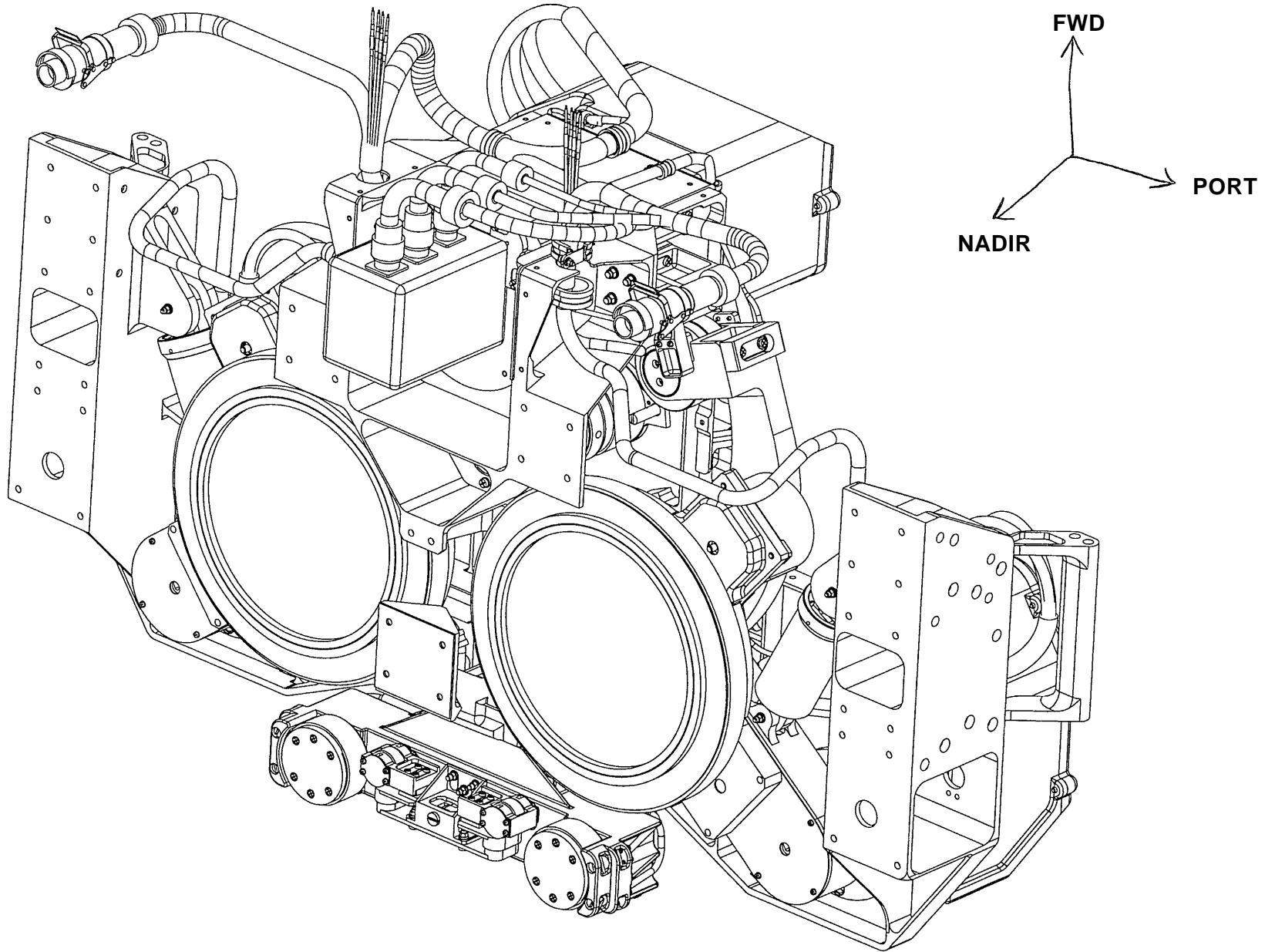


**LDU FRONT VIEW**





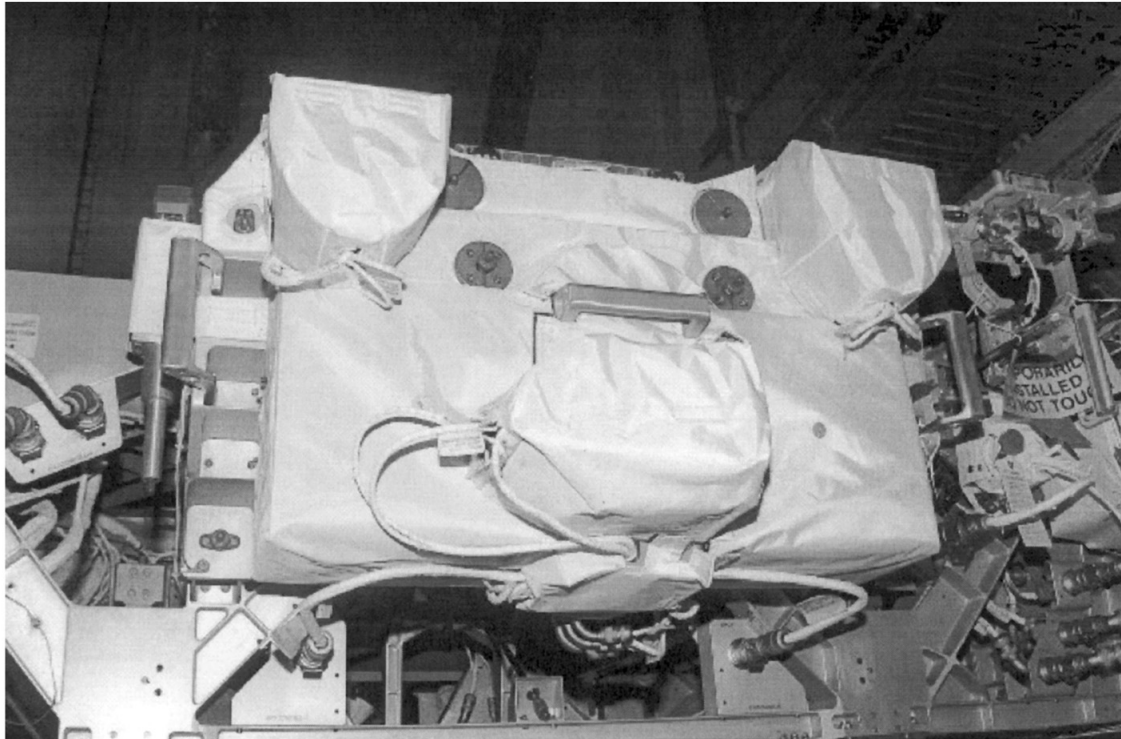
**LDU REAR VIEW**



FS 17-37

EVA/113/FIN

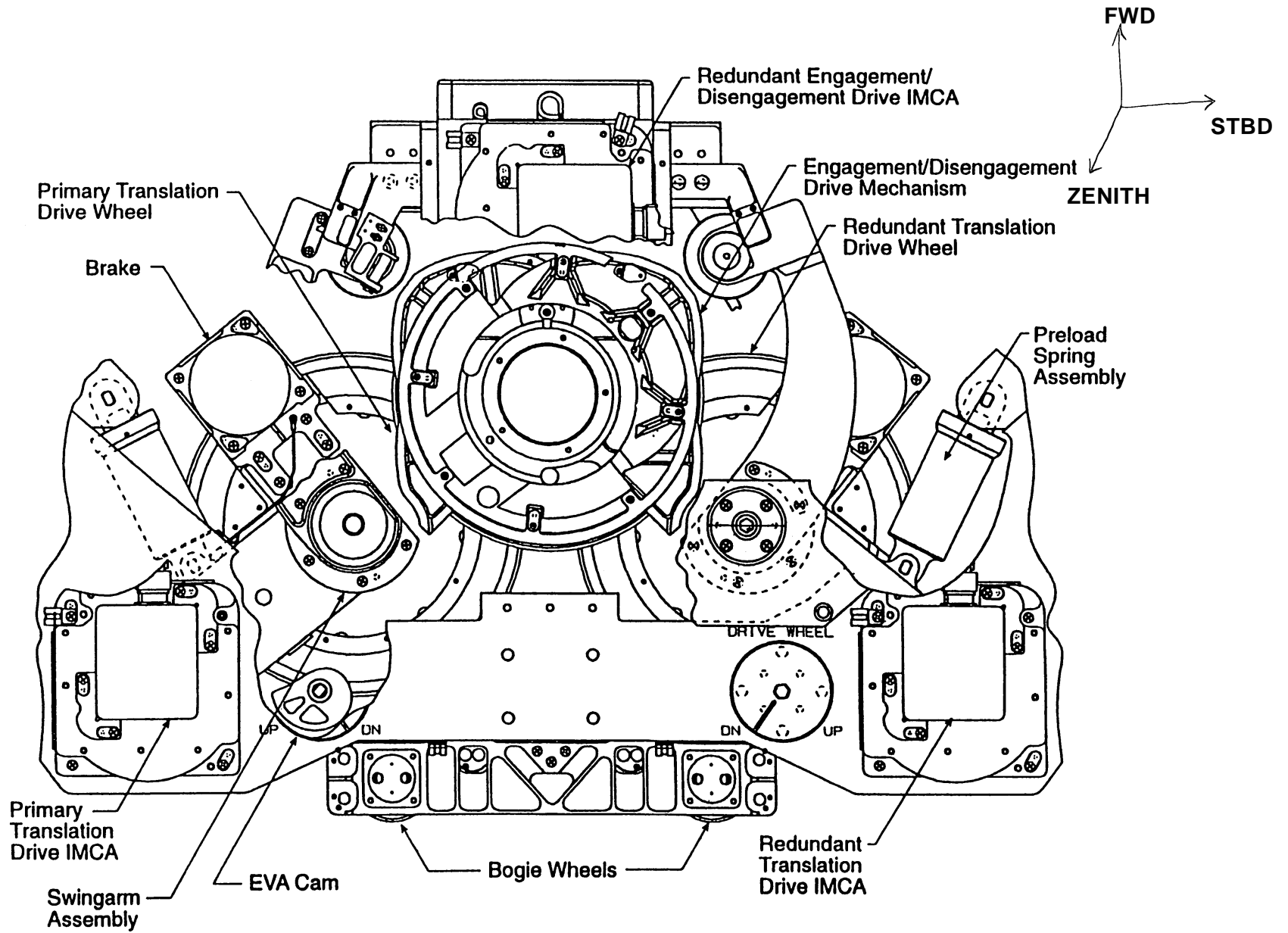
**LDU PHOTO**



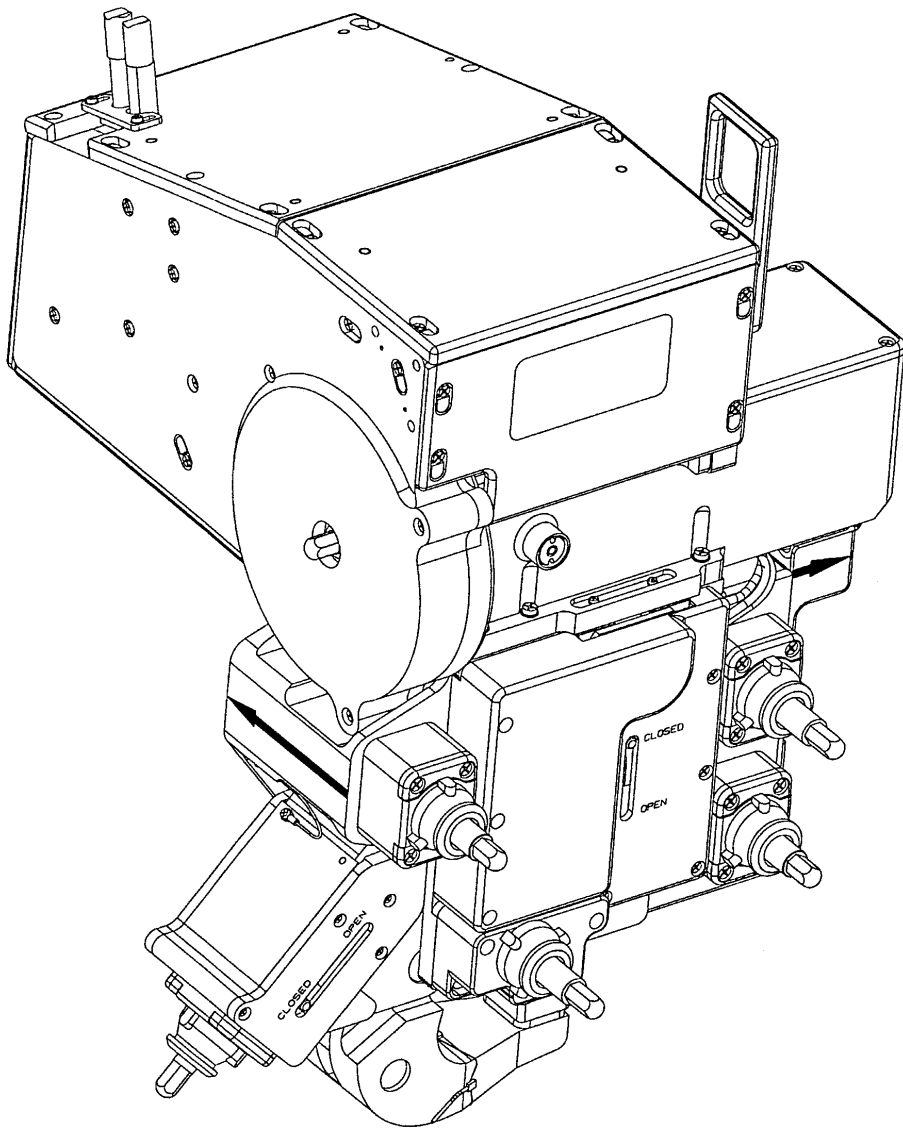
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EVA/110/FIN

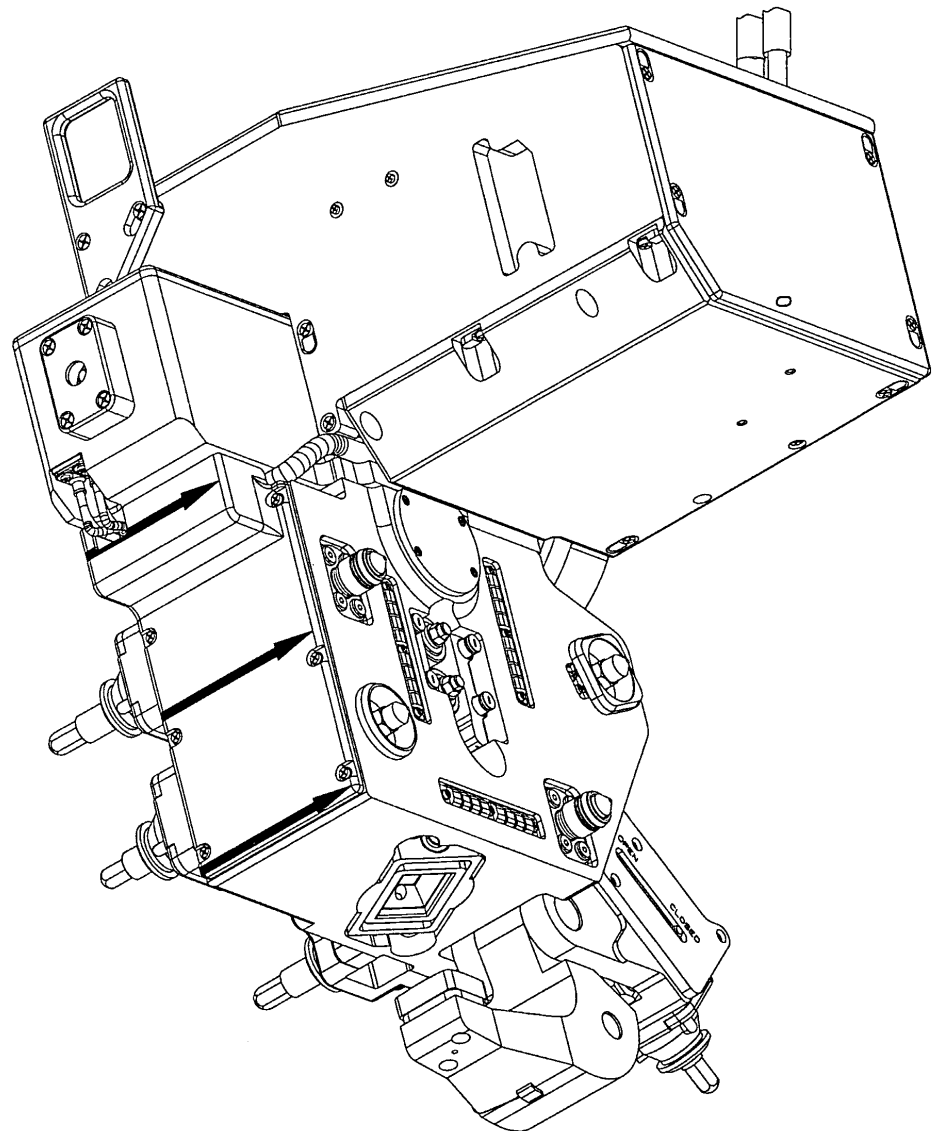
# LDU DRIVE MECHANISM



# LTU ASSEMBLY

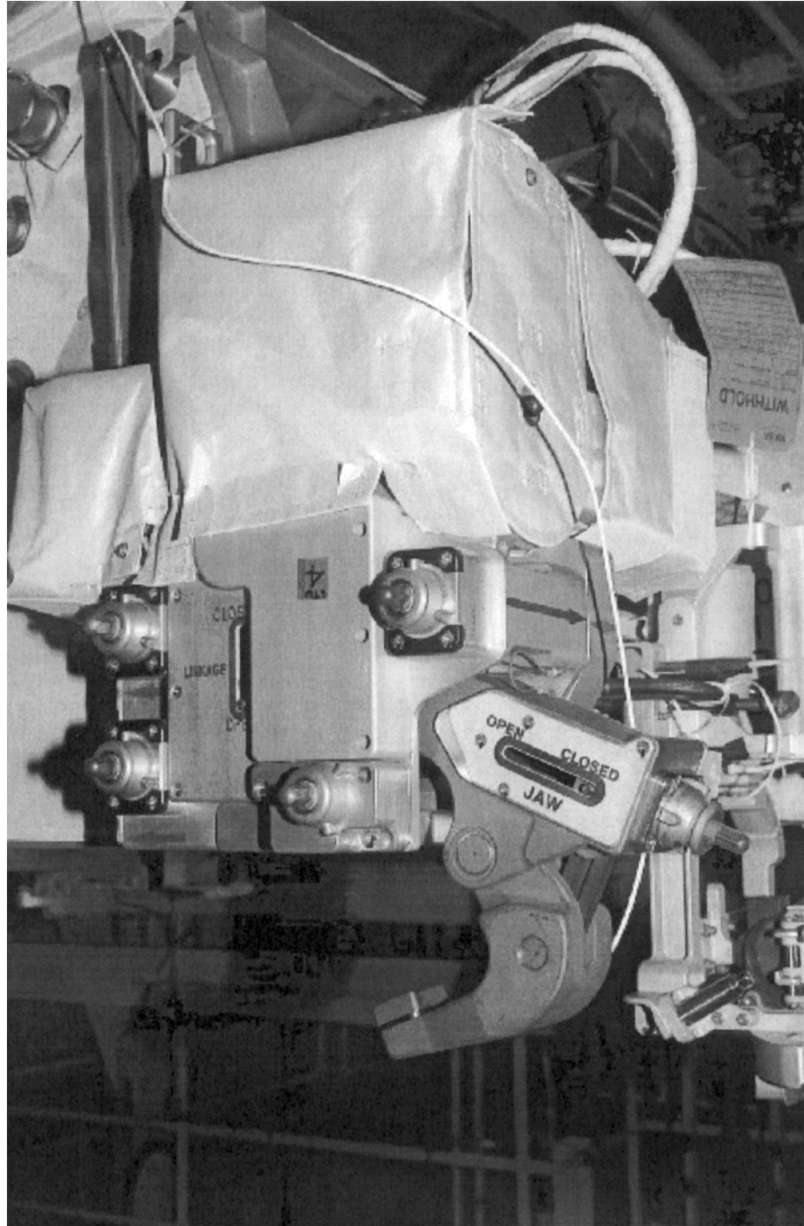


**FRONT VIEW**



**REAR VIEW**

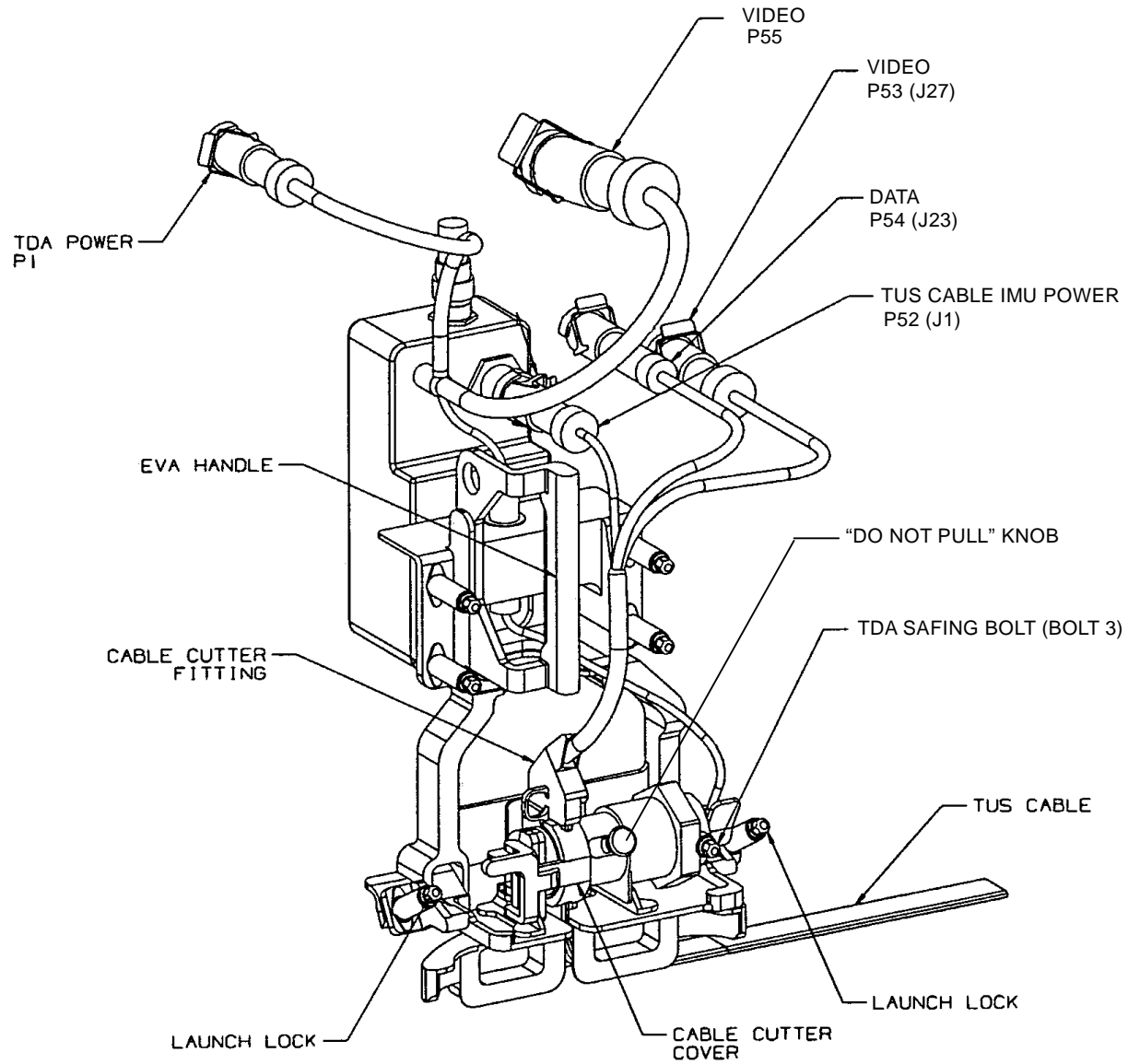
**LTU PHOTO**



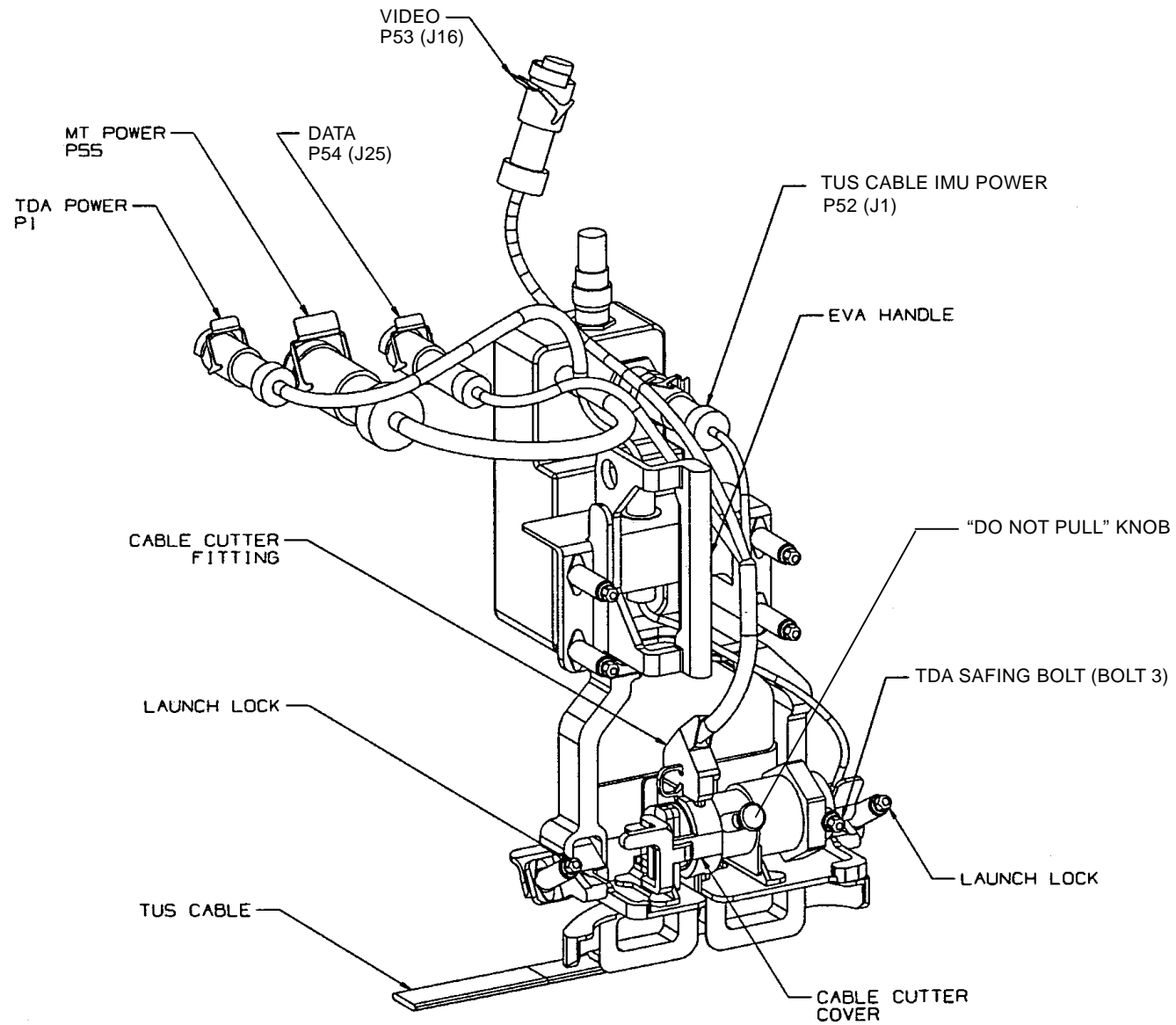
**Example of LTU Assembly**



# ZENITH TUS INTERFACE UMBILICAL ASSEMBLY #1

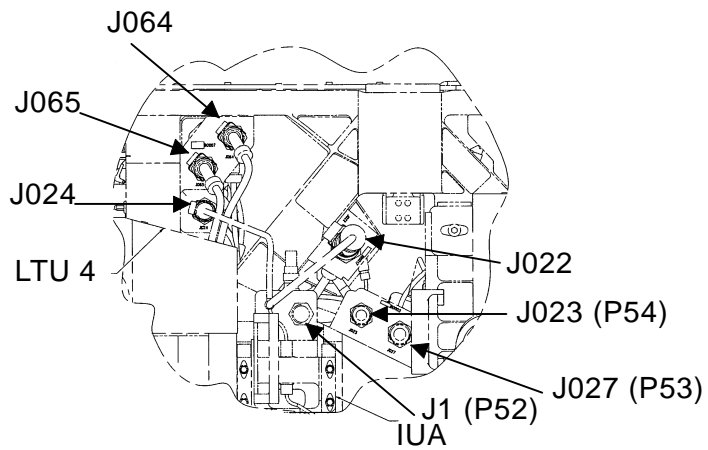
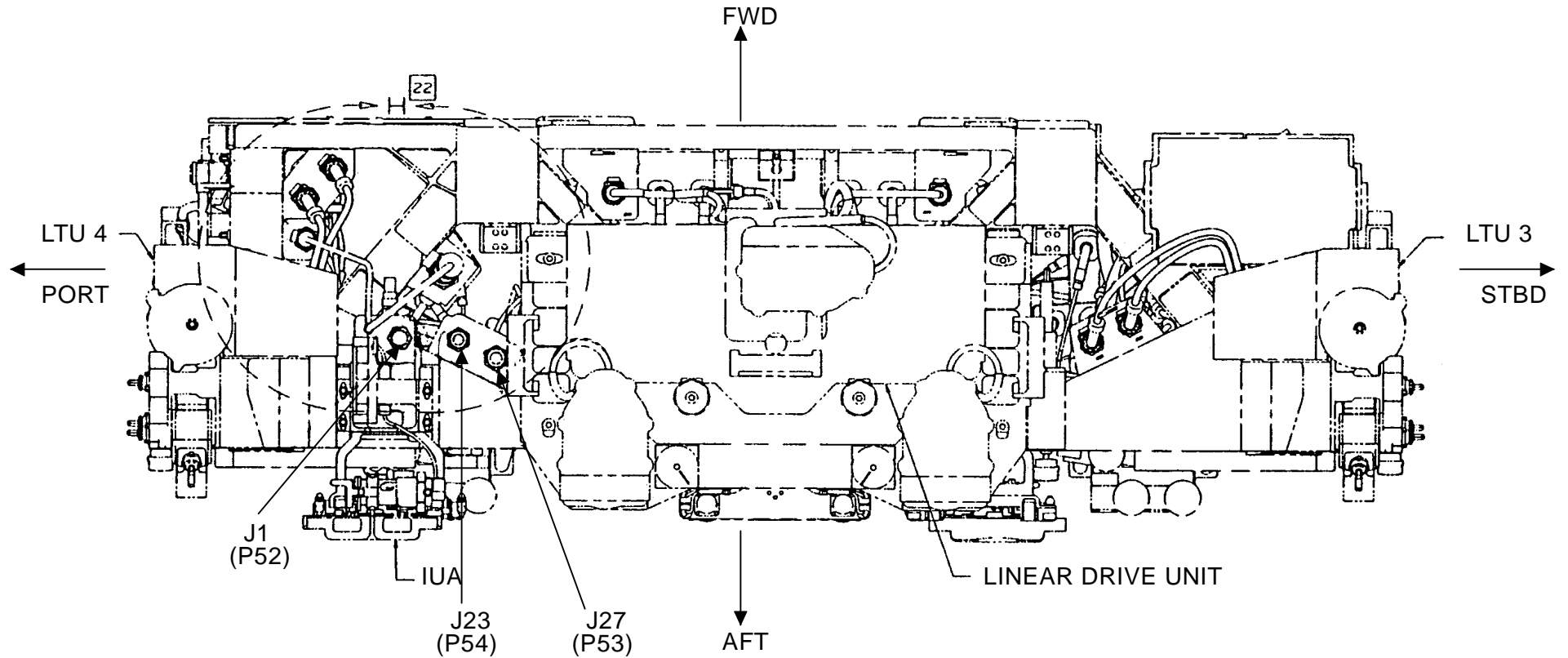


## NADIR TUS INTERFACE UMBILICAL ASSEMBLY #2

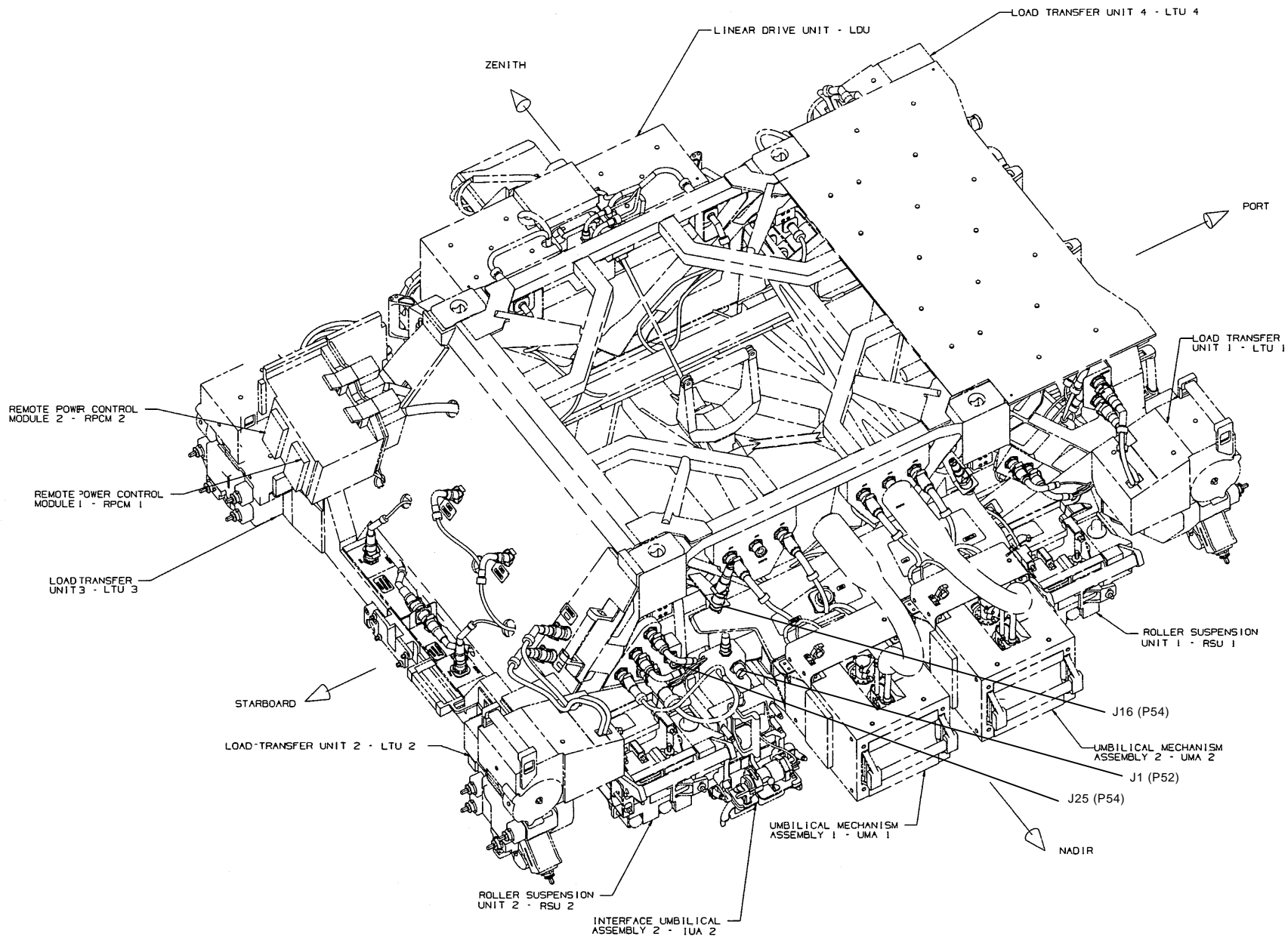




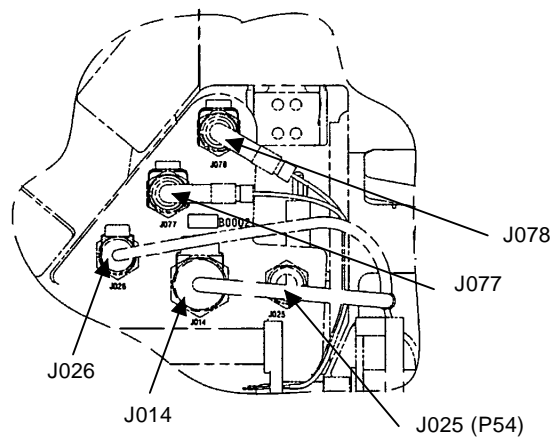
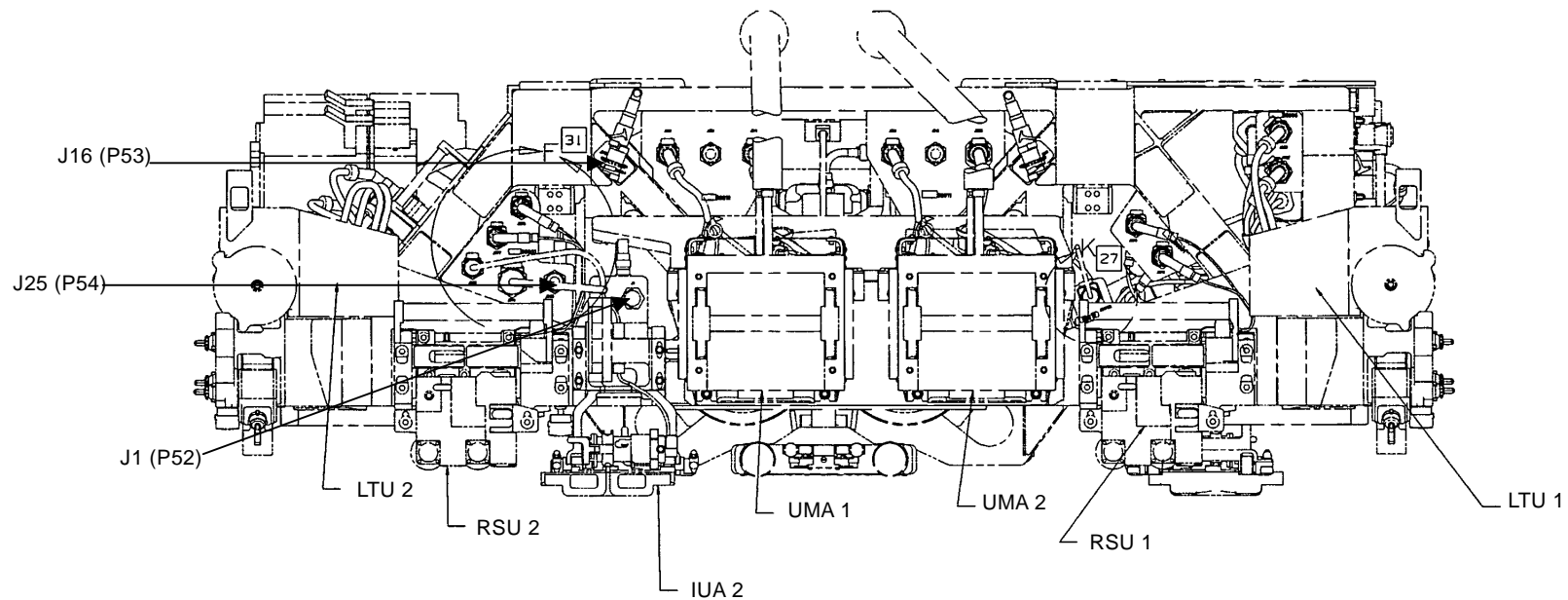
# ZENITH TUS CABLE MATING LOCATIONS



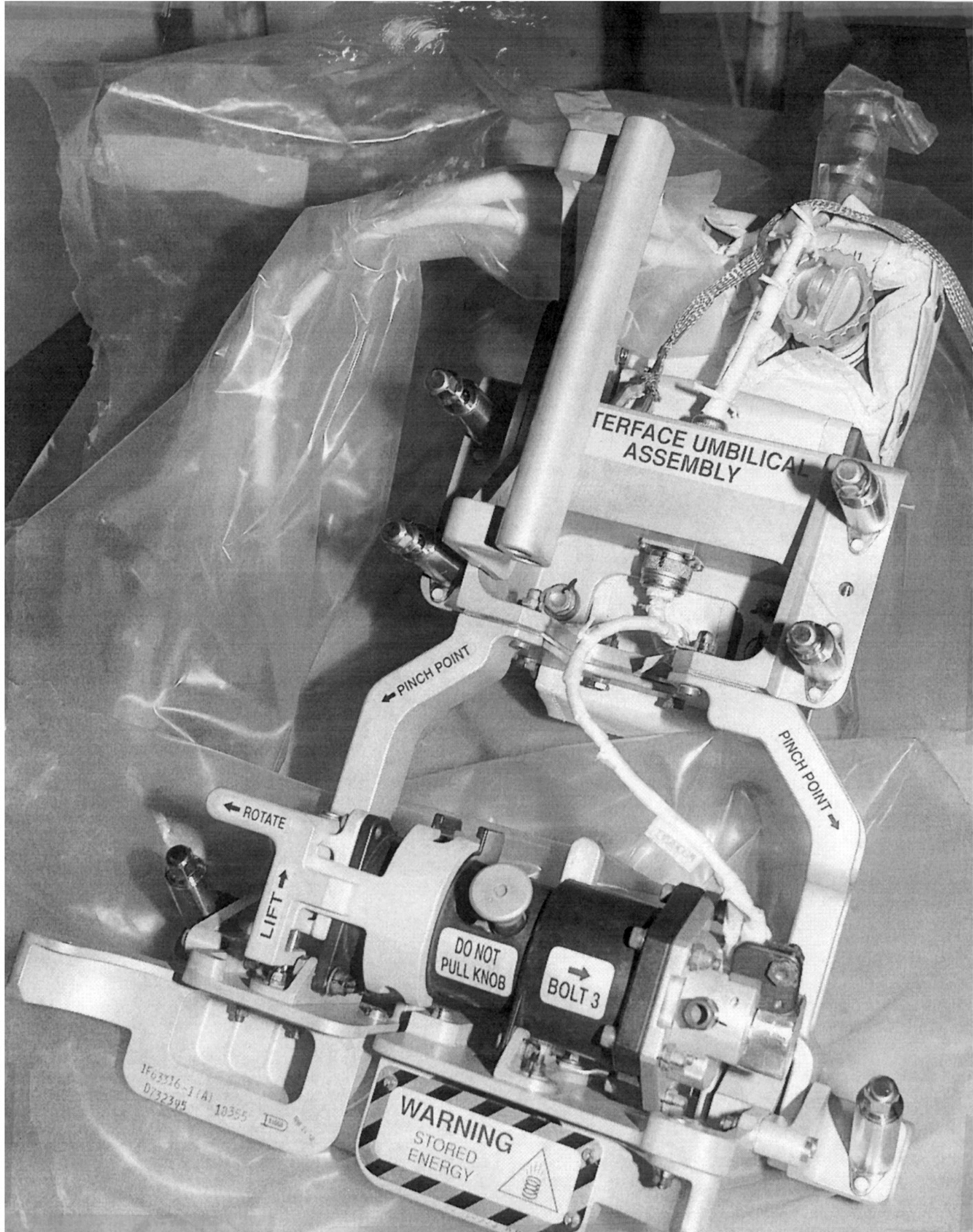
# NADIR TUS CABLE MATING LOCATIONS (3-D)



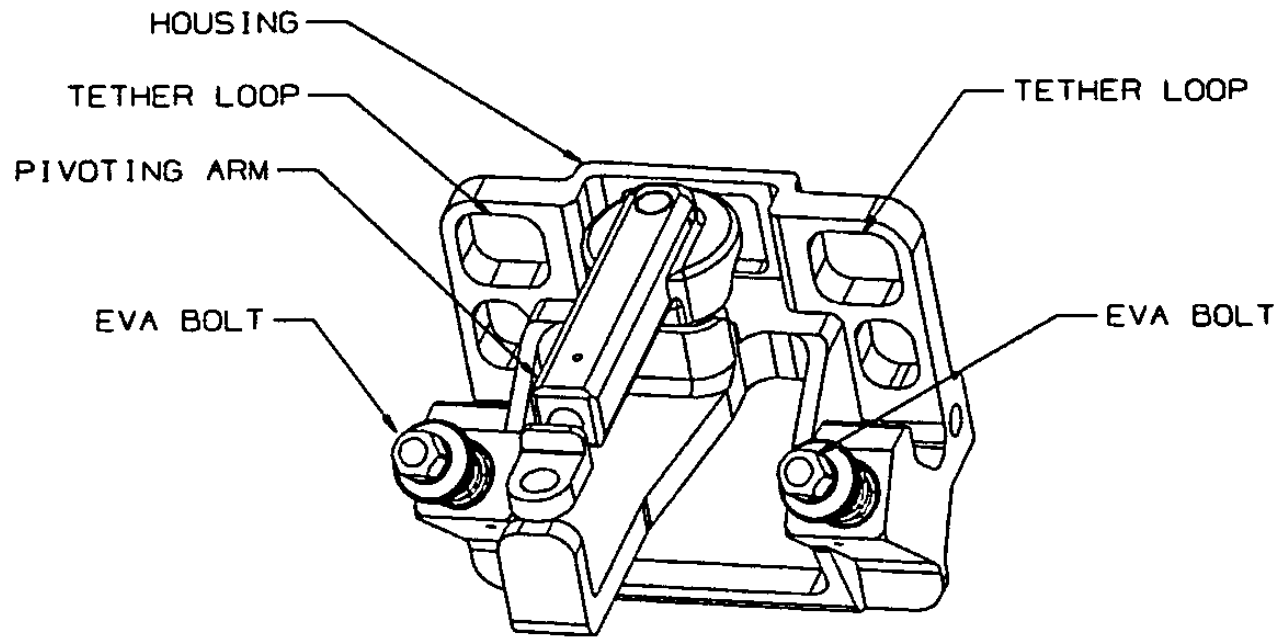
# NADIR TUS CABLE MATING LOCATIONS



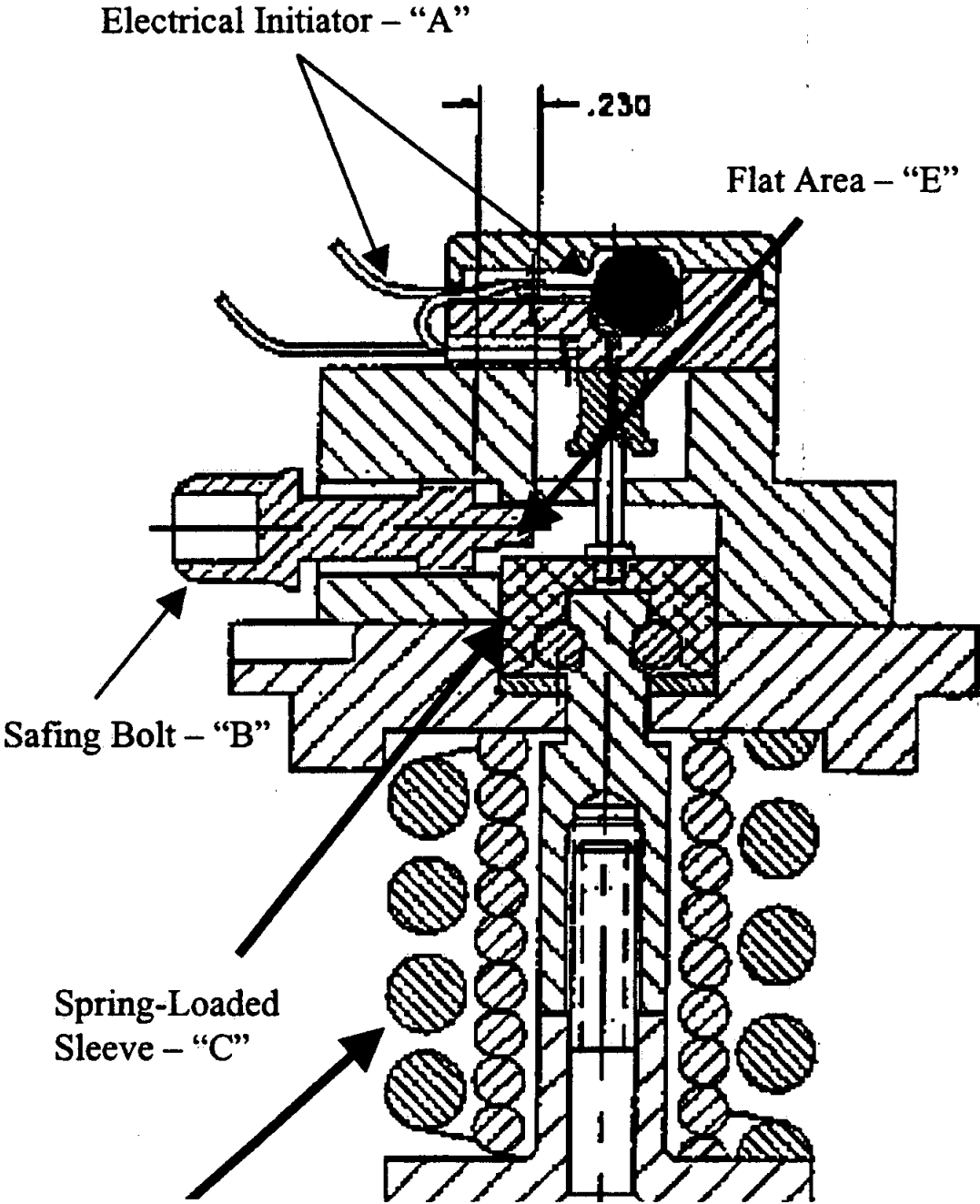
# INTERFACE UMBILICAL ASSEMBLY



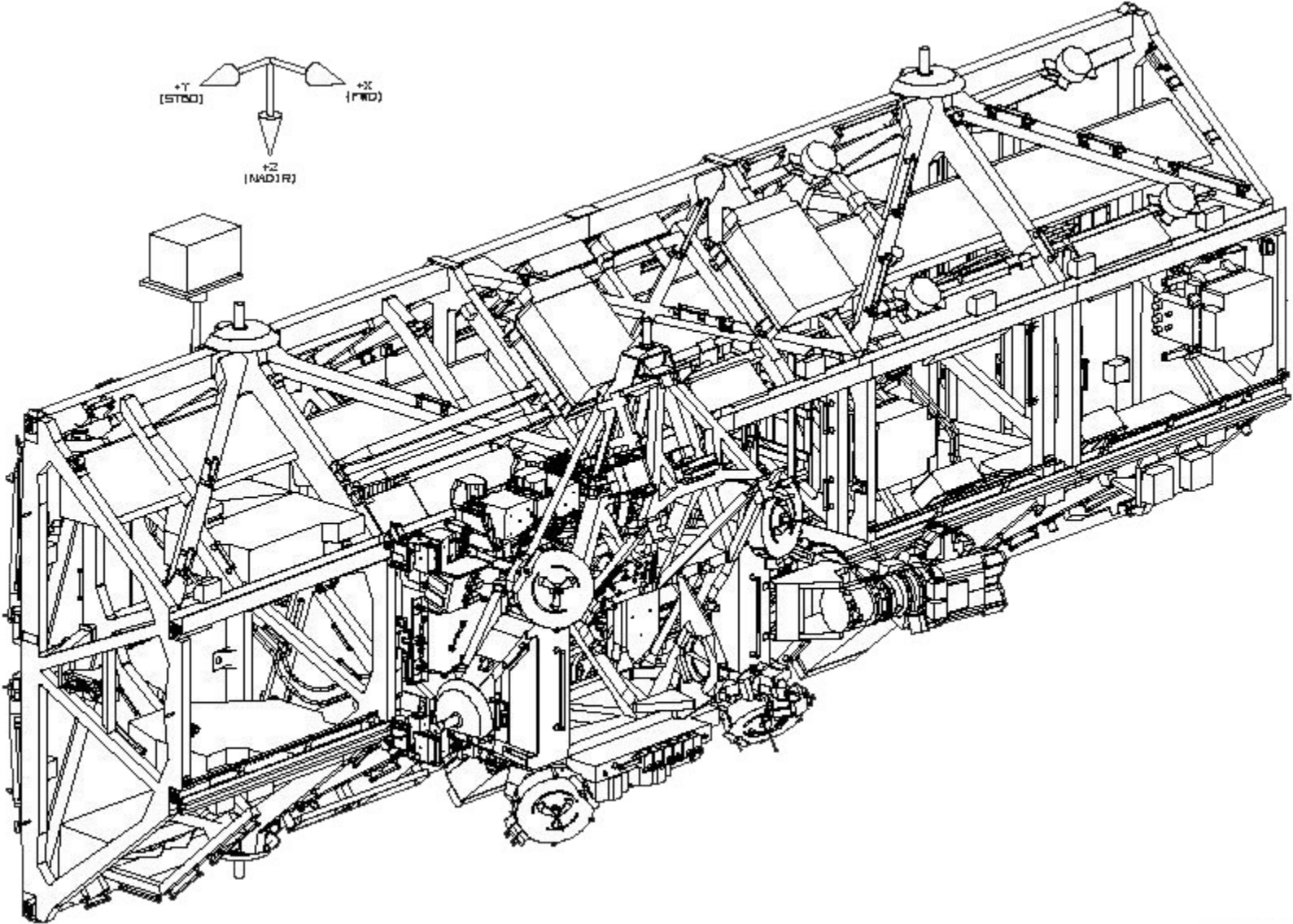
# CABLE GUIDE ASSEMBLY



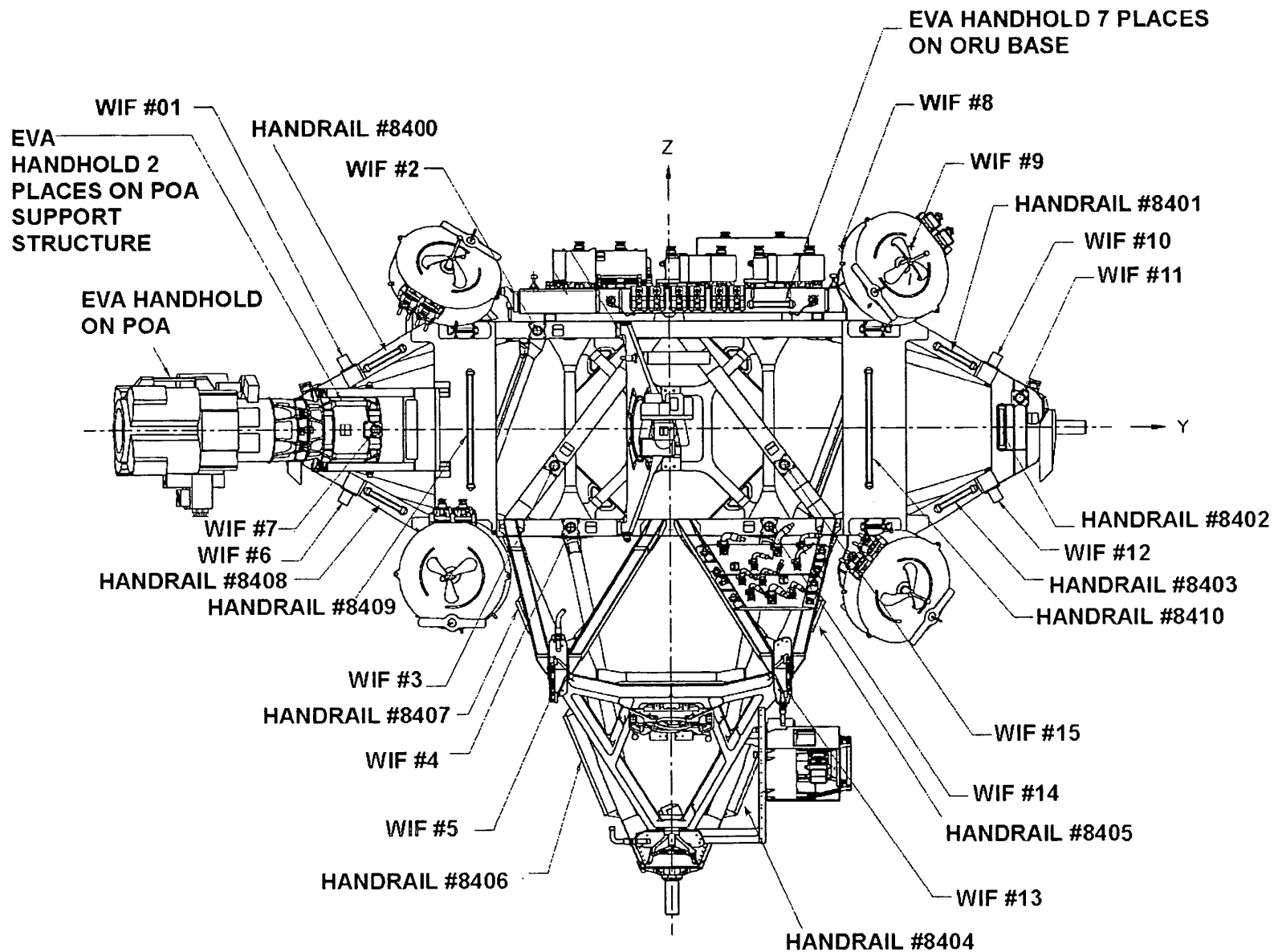
INTERFACE UMBILICAL ASSEMBLY CROSS-SECTION



MBS/MT/S0 OVERVIEW

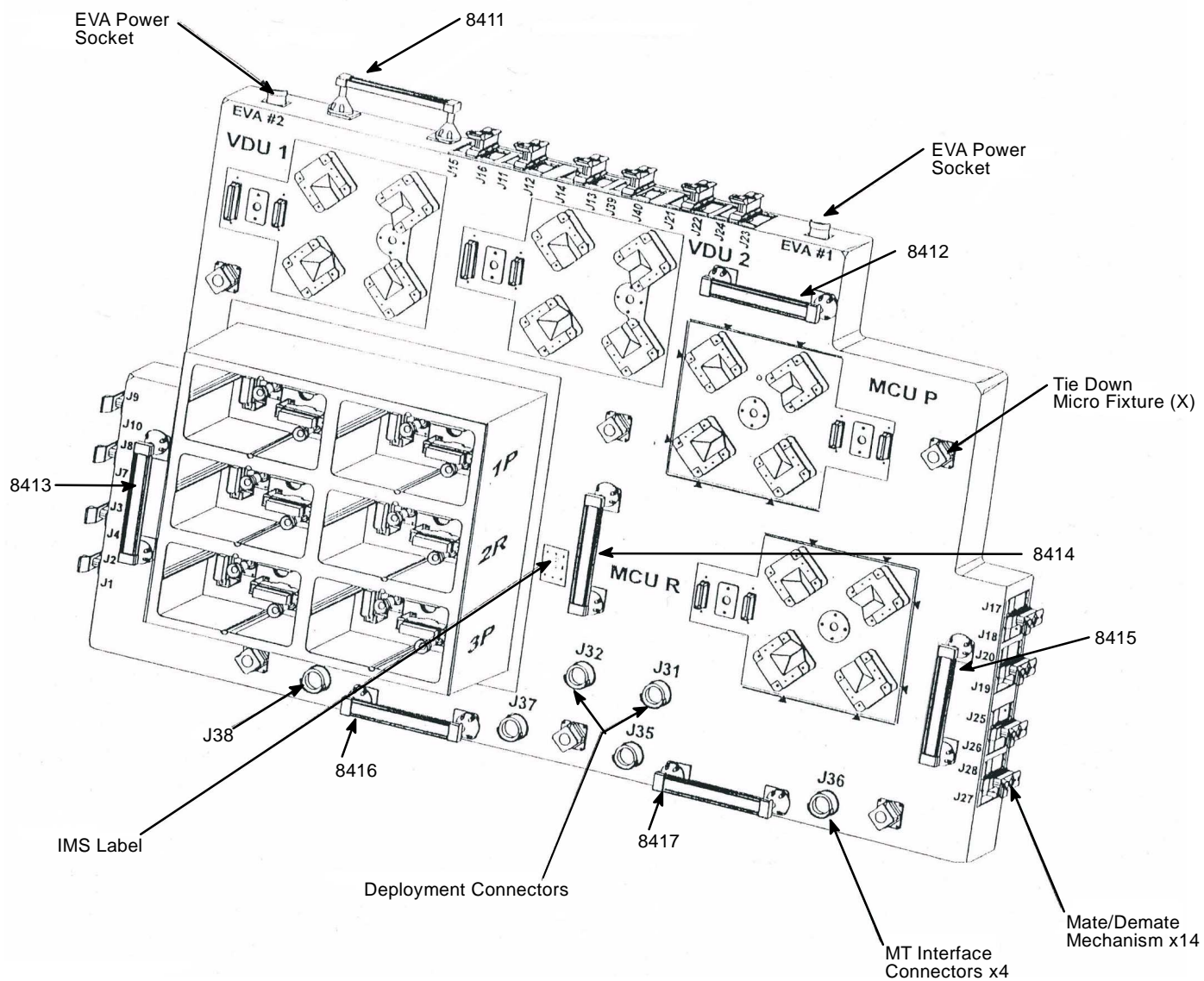


# MBS HANDRAILS

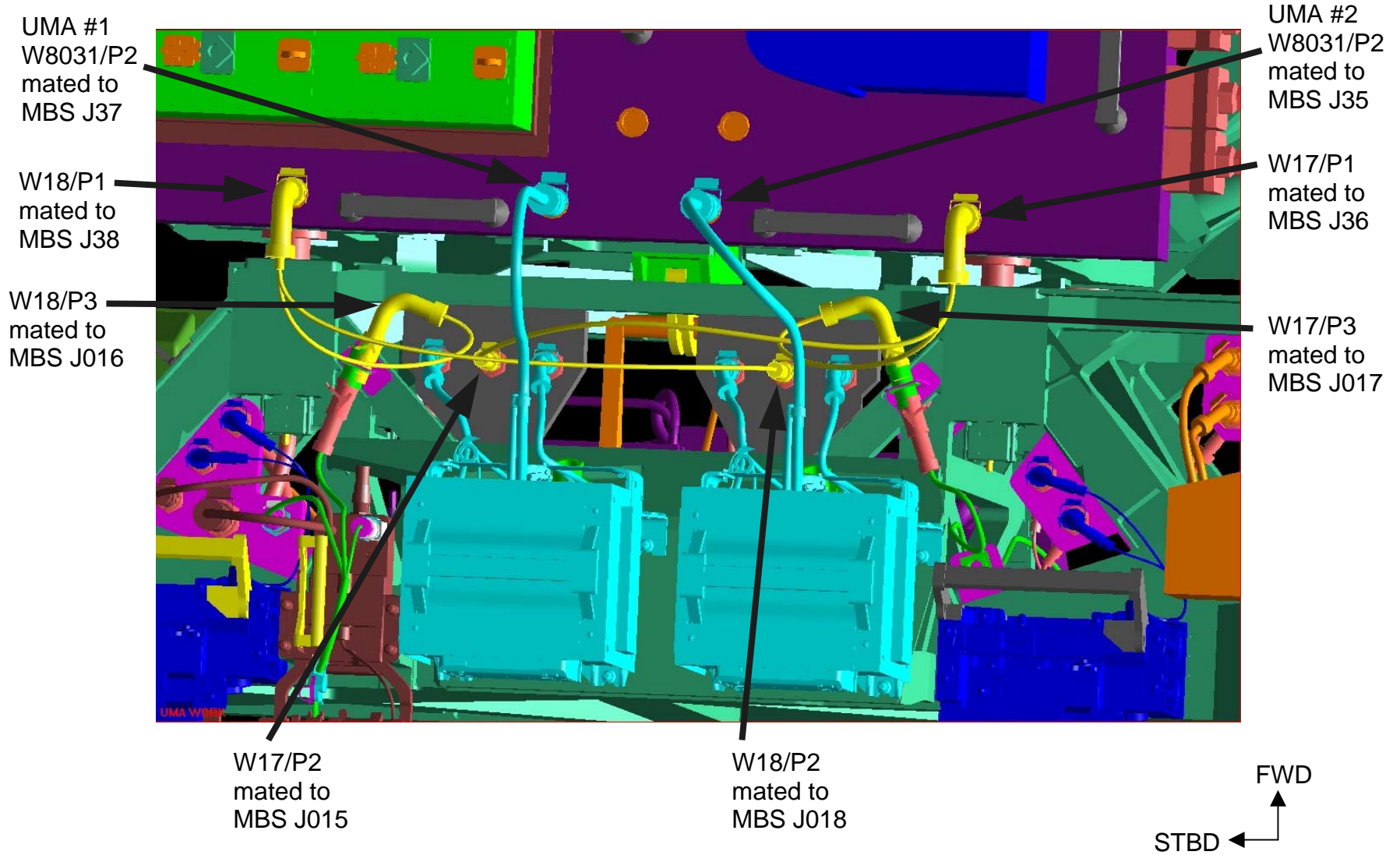




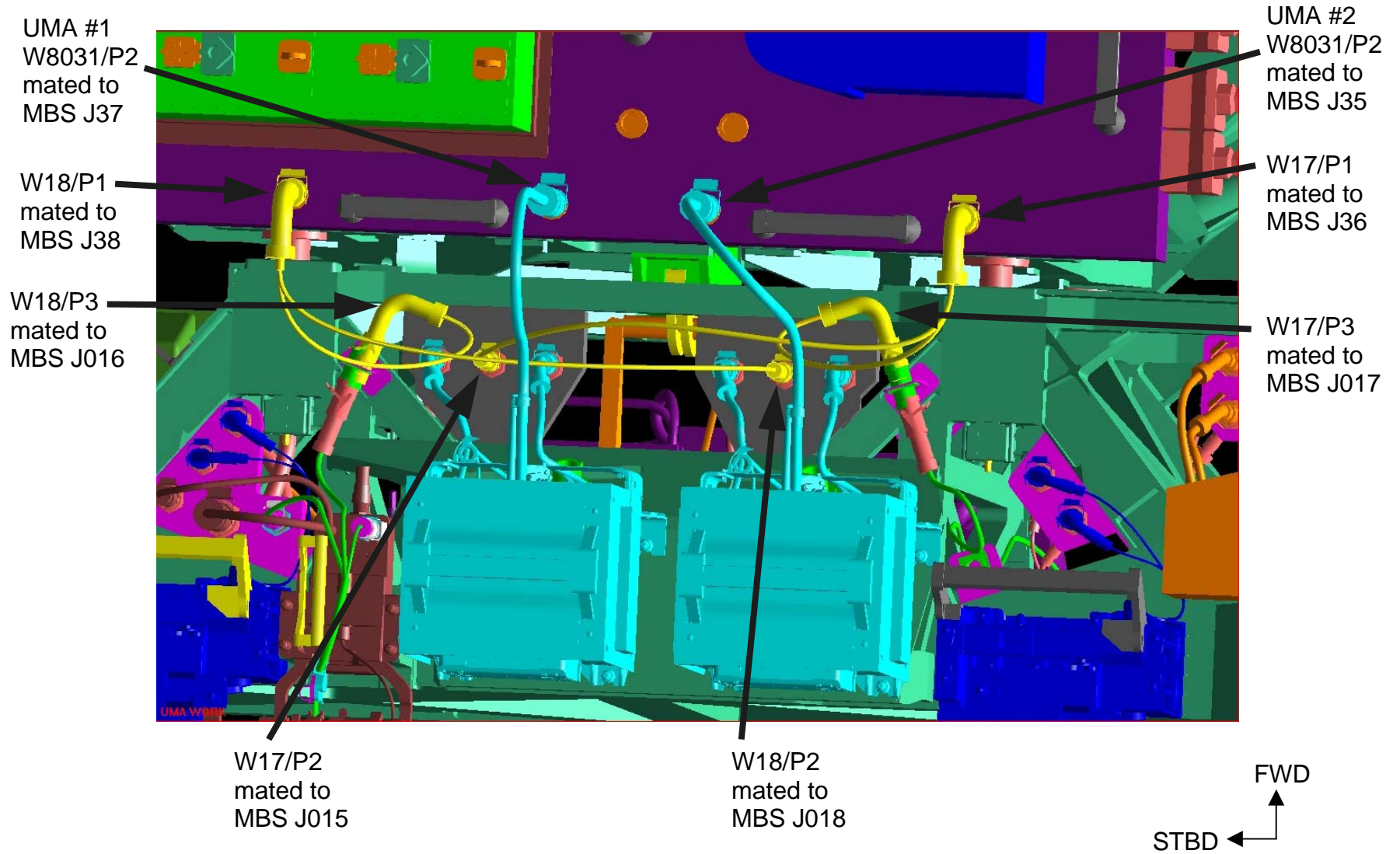
# MBS ORU BASE HANDRAILS



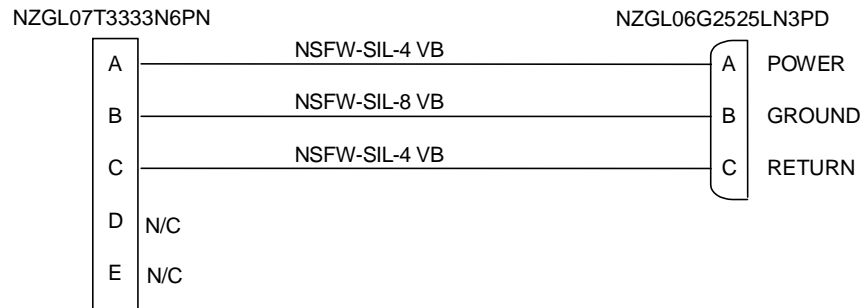
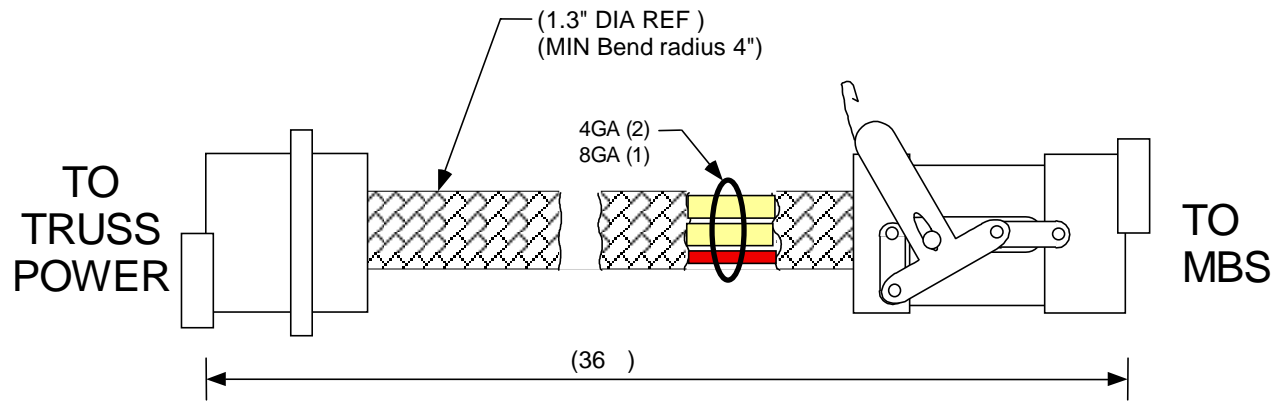
# MT TO MBS CABLE ROUTING



# MT TO MBS CABLE ROUTING (Cont)



### MSS EXTENSION CABLE



FLIGHT SPECIFIC EVA REFERENCE

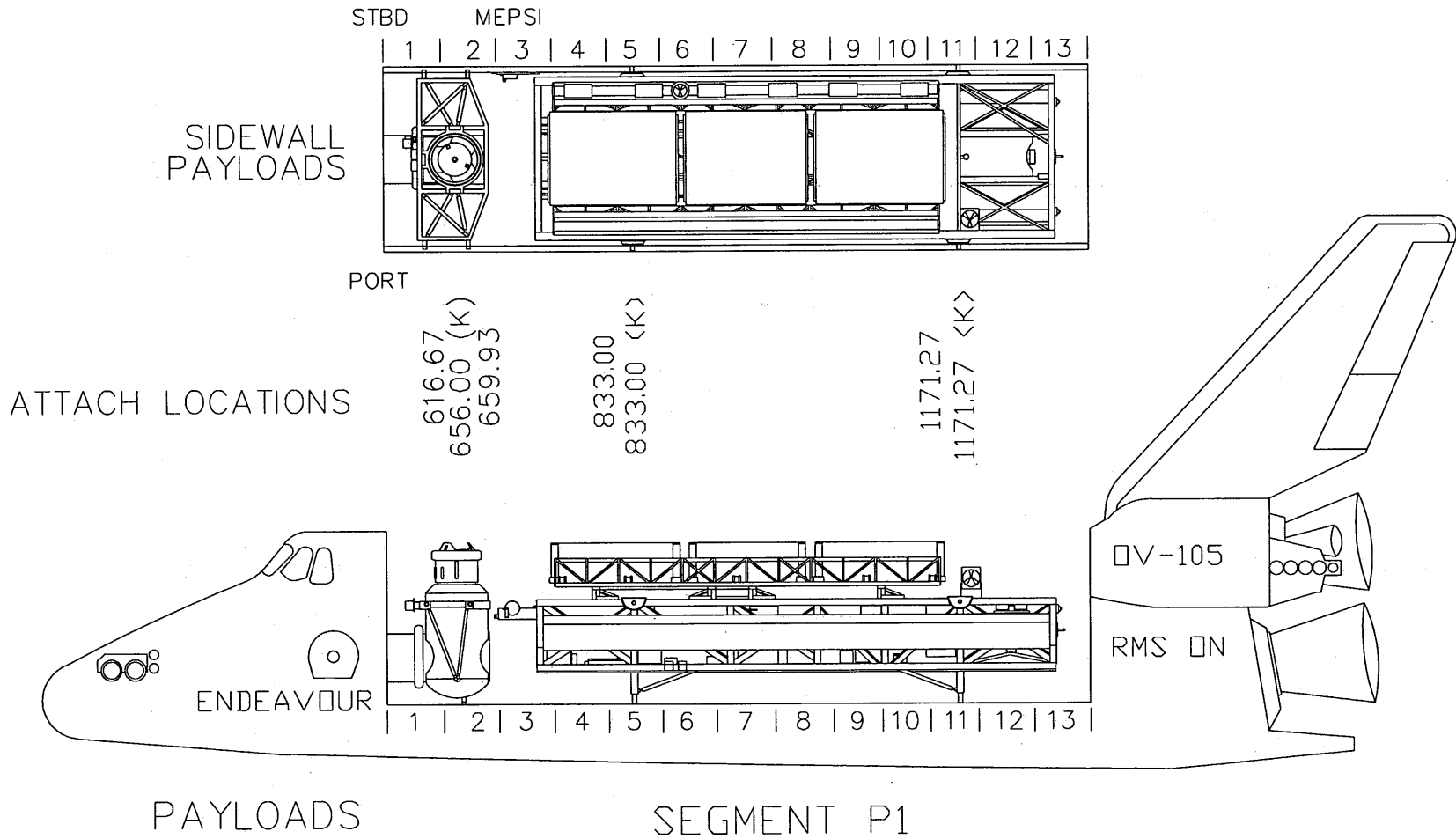
I

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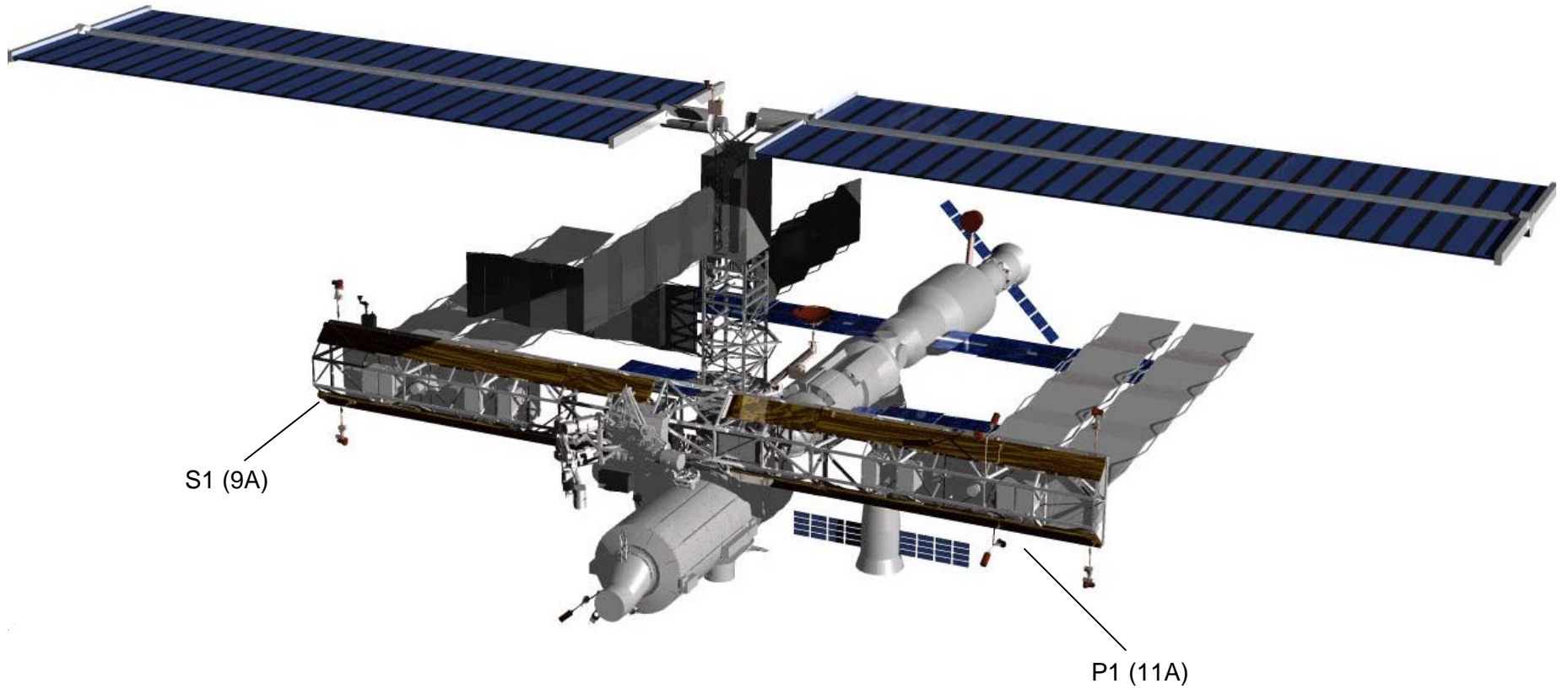
**FLIGHT SPECIFIC  
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# PAYLOAD BAY OVERVIEW



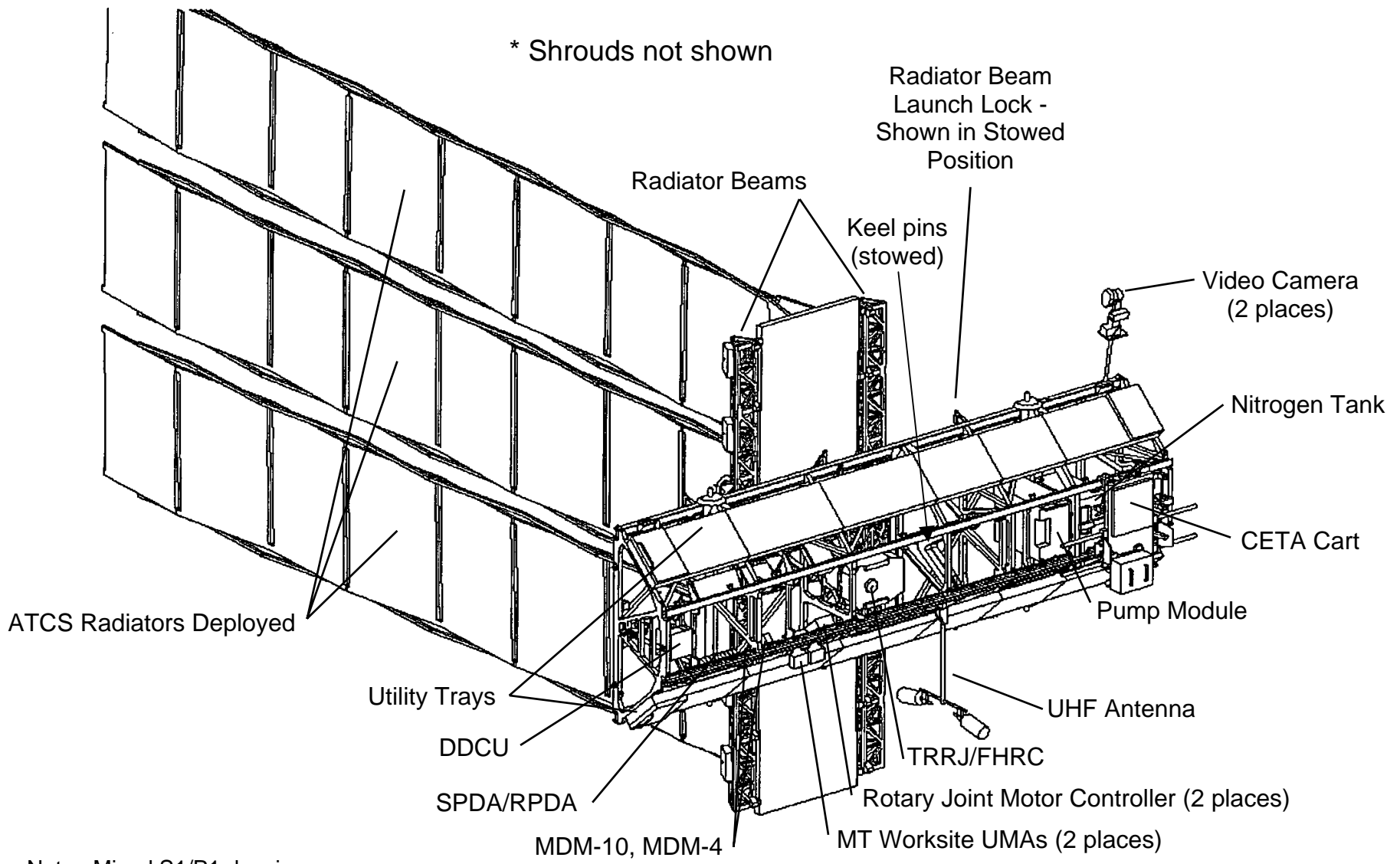
# POST-11A ISS CONFIG



NOTE: S1 center radiator deployed only  
P1 center radiator deployed on  
11A stage

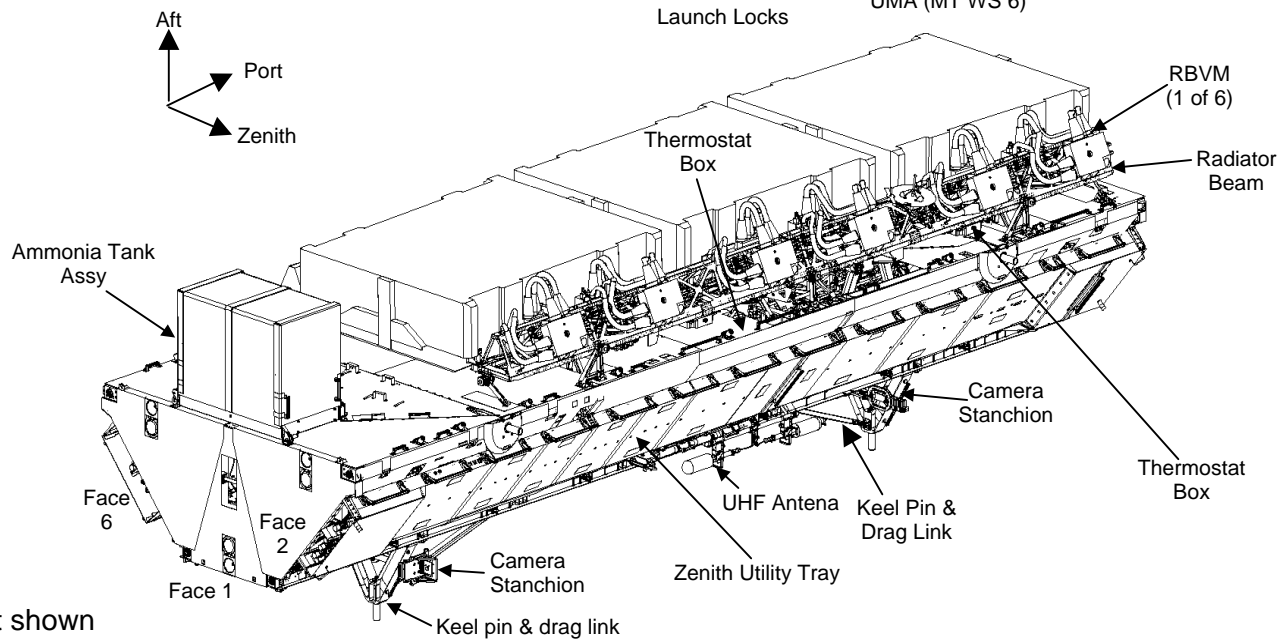
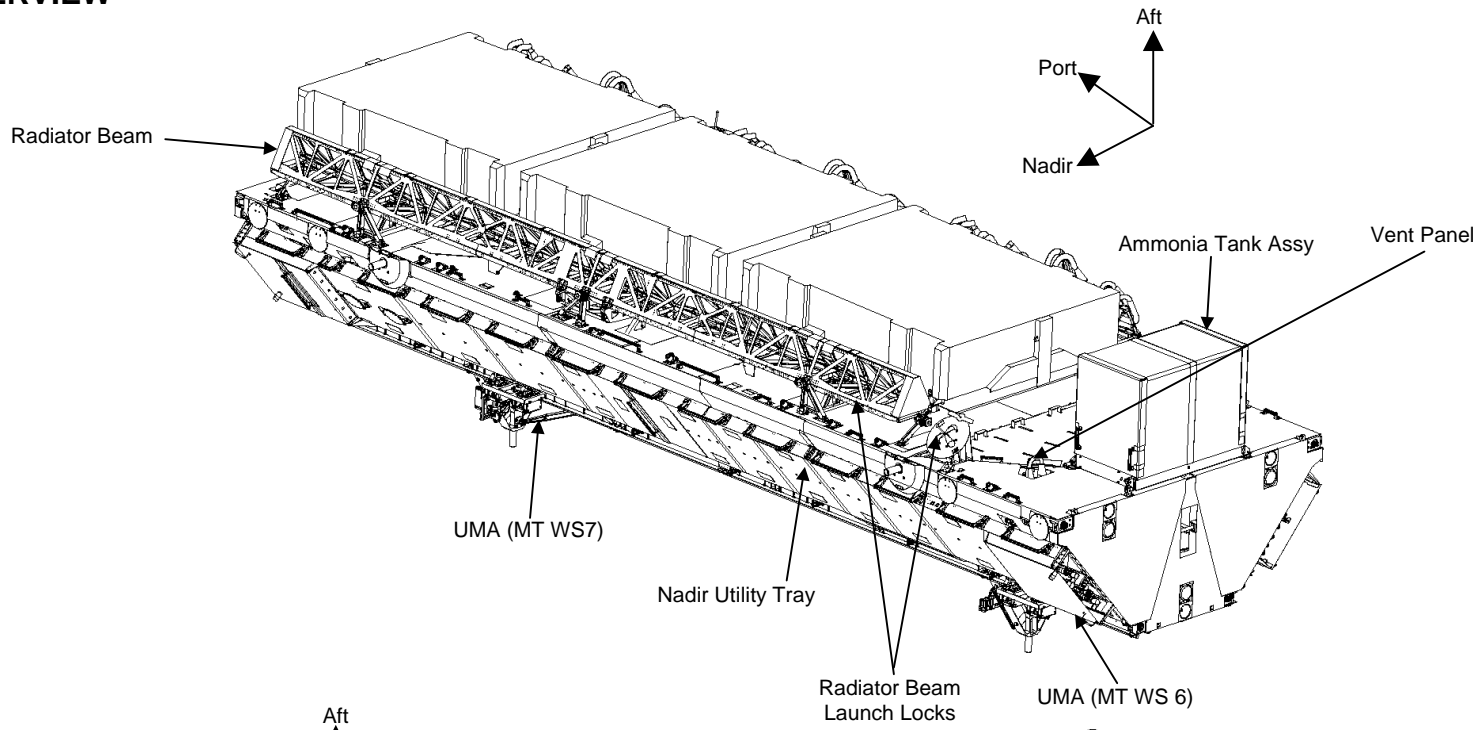


# P1 ELEMENT



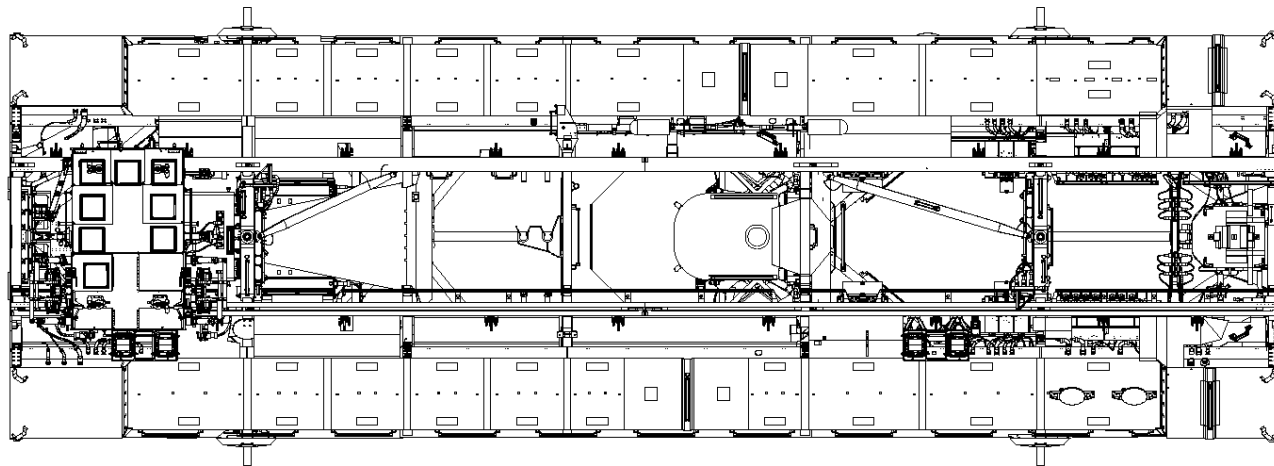
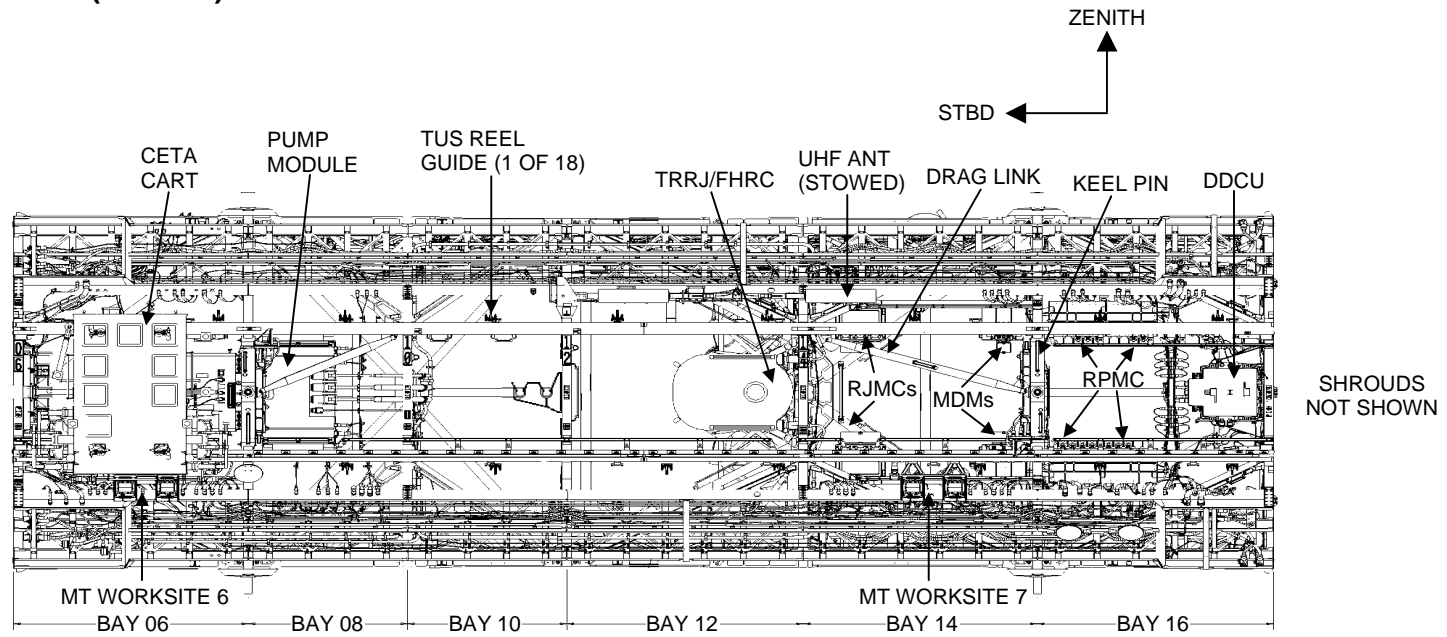
# P1 OVERVIEW

## P1 OVERVIEW

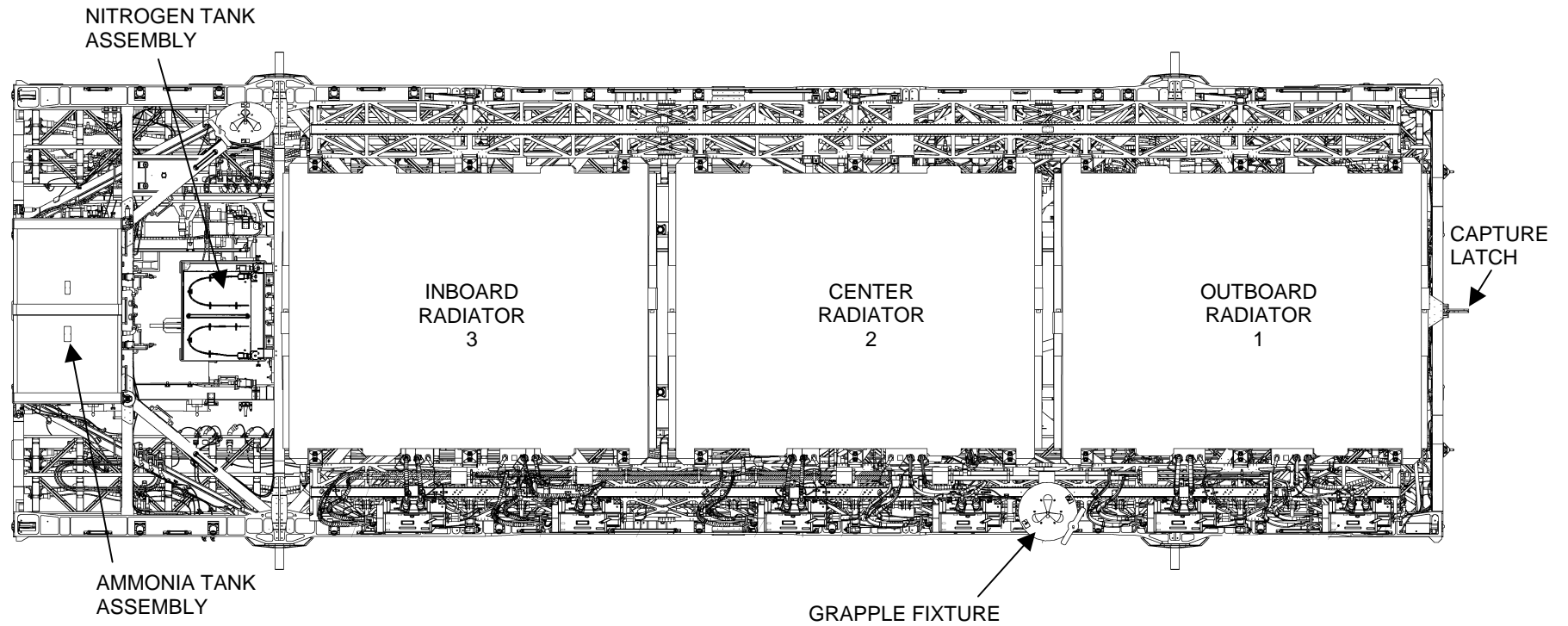


Note: CETA cart not shown

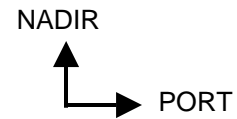
# P1 FORWARD FACE (FACE 1)



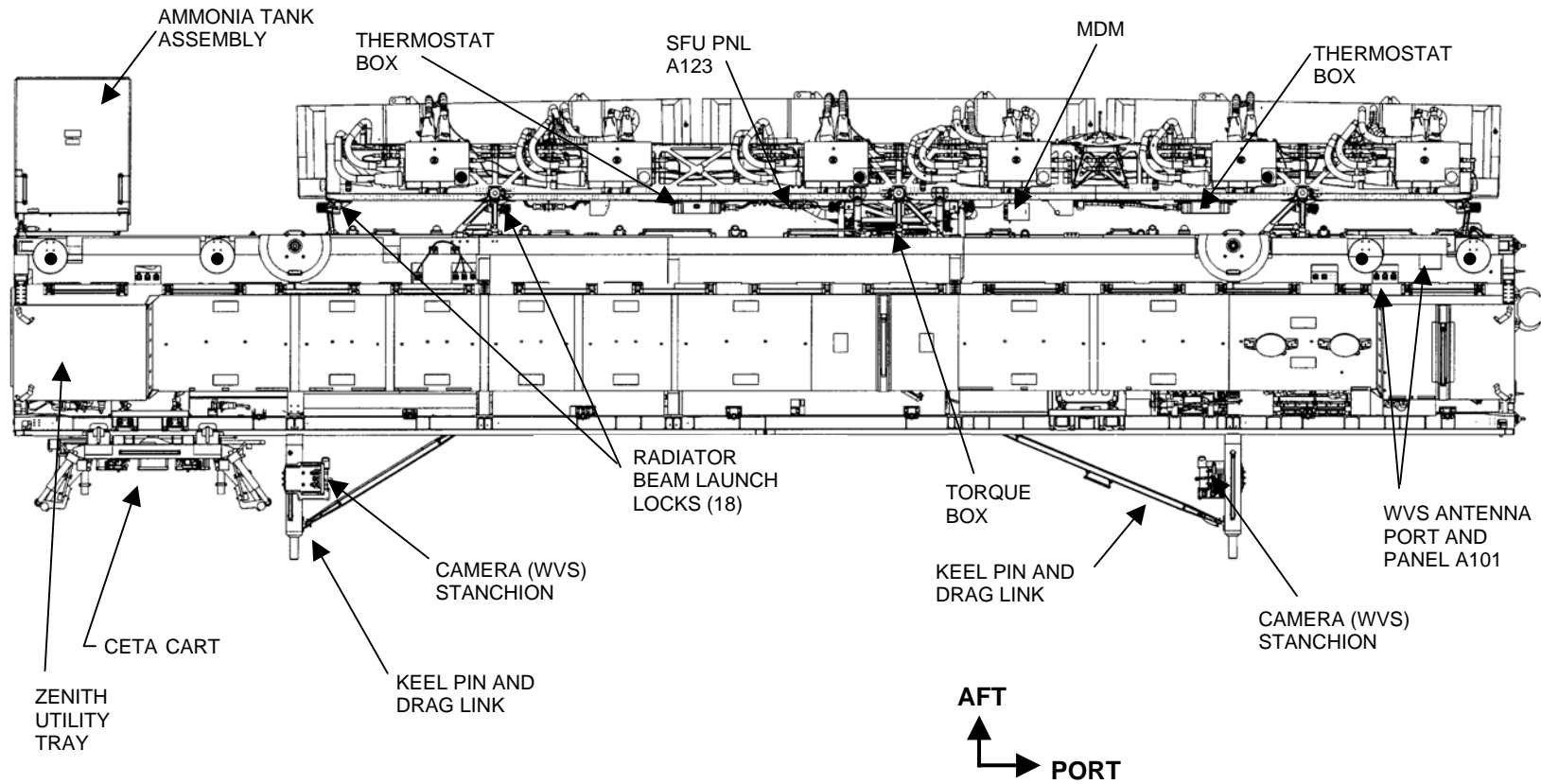
# P1 AFT FACE (FACE 4)



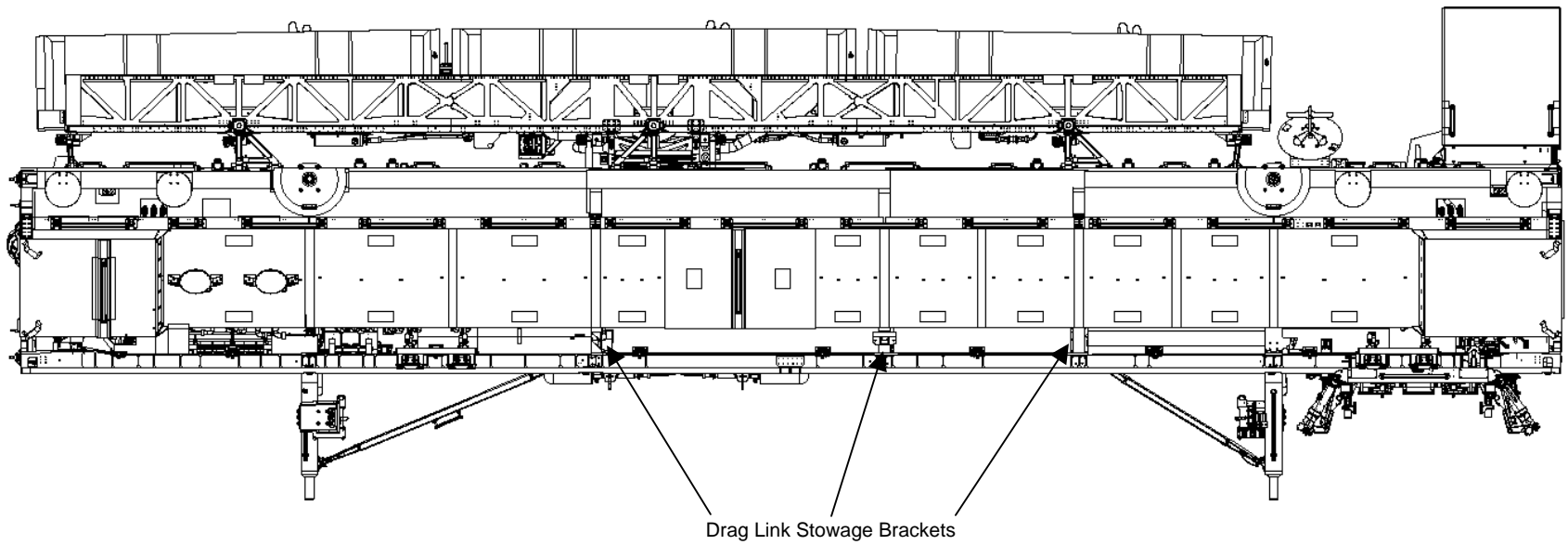
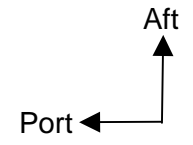
Note: Shrouds not shown on radiator beams and aft face



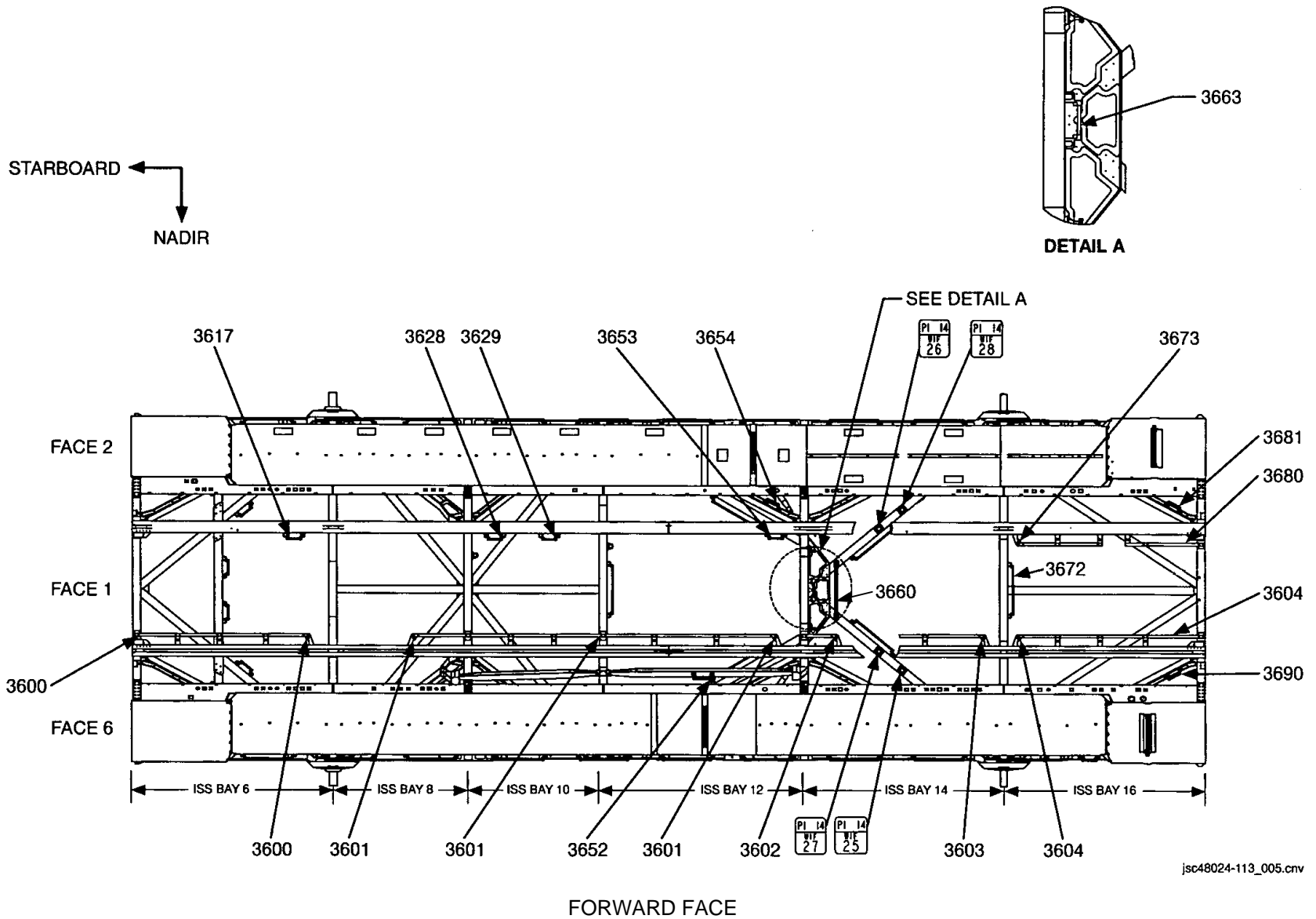
# P1 ZENITH SIDE (FACE 2)



P1 NADIR SIDE (FACE 6)

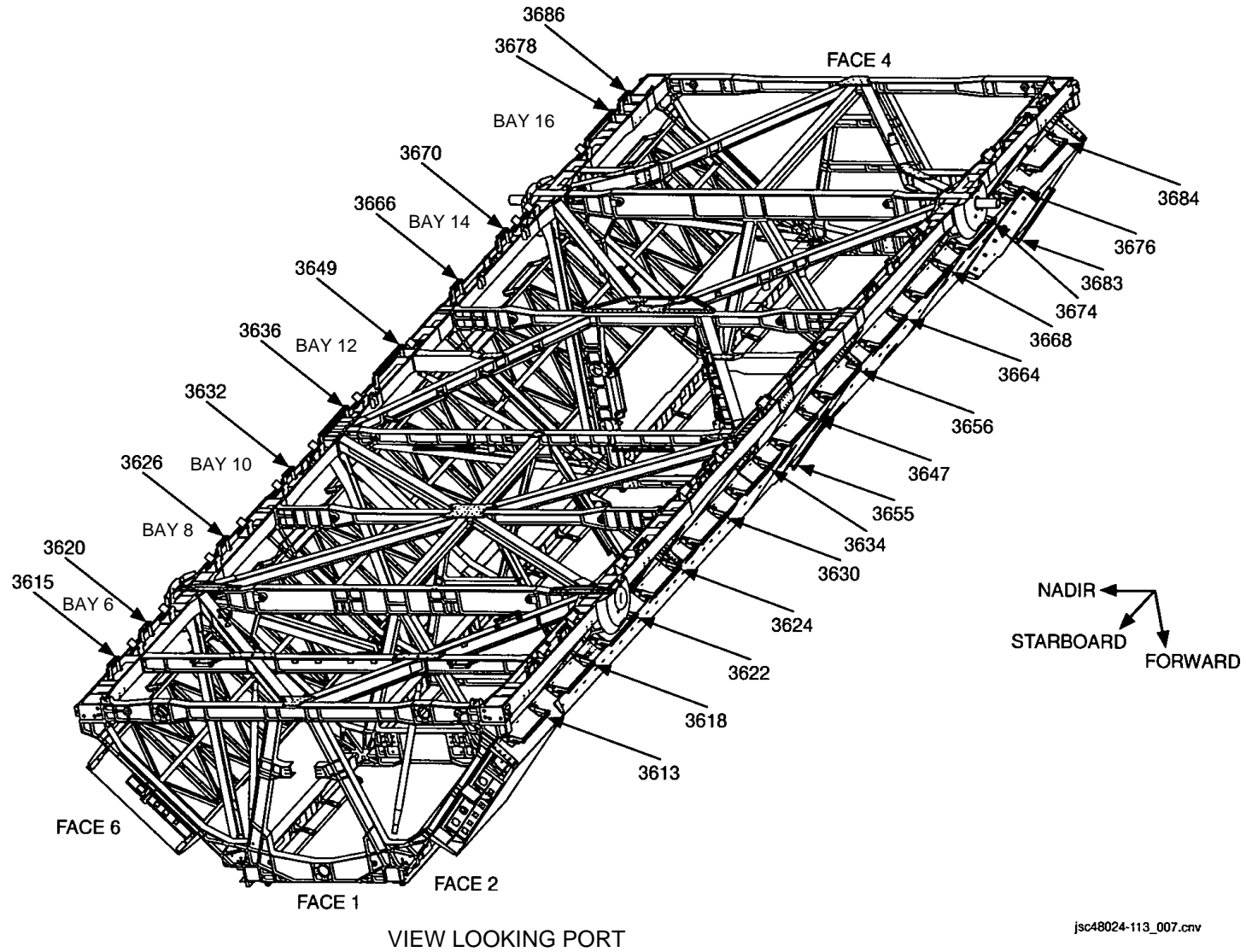


# P1 HANDRAILS AND WIFs, FACES 1, 2, AND 6



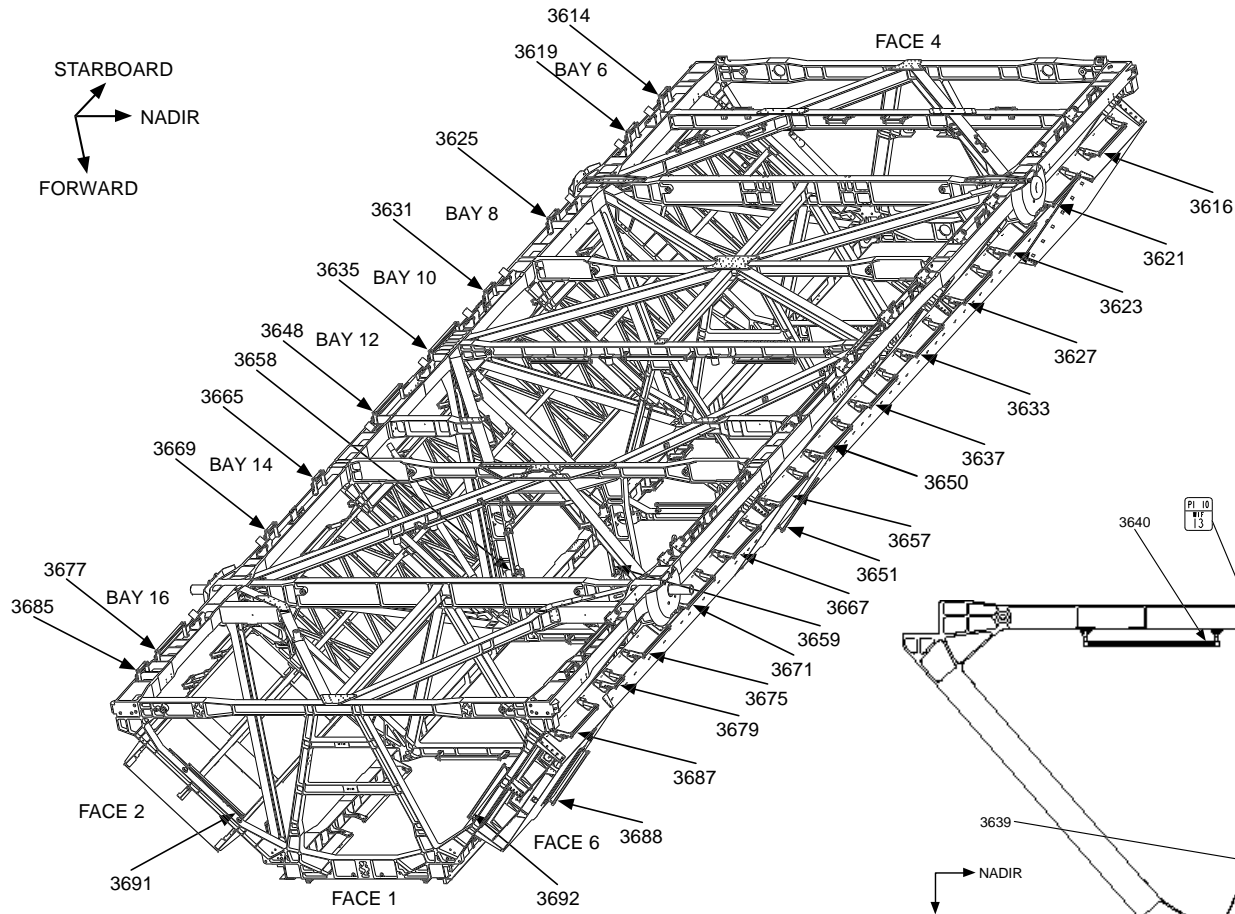
# P1 HANDRAILS

## P1 HANDRAILS AND WIFs, FACE 4

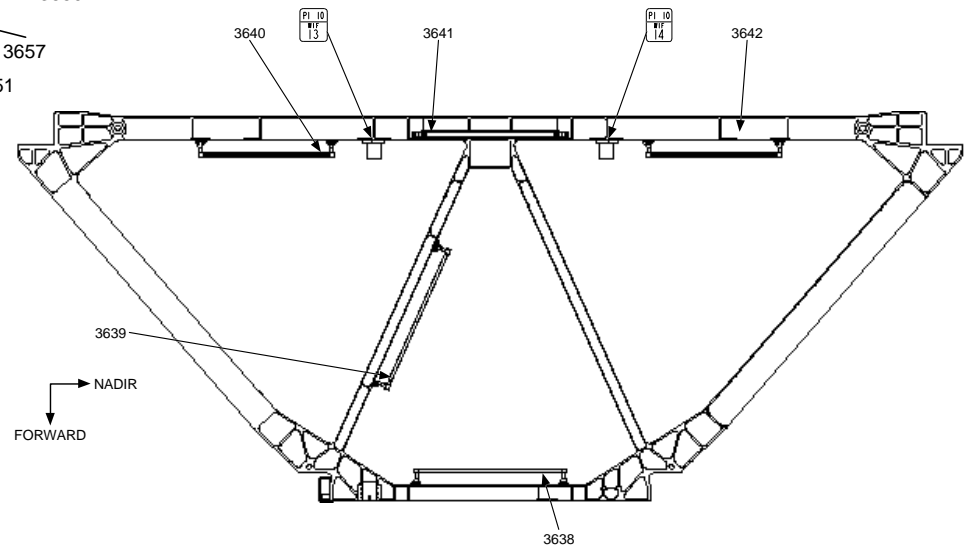




# P1 HANDRAILS AND WIFs, FACE 4 (Cont)



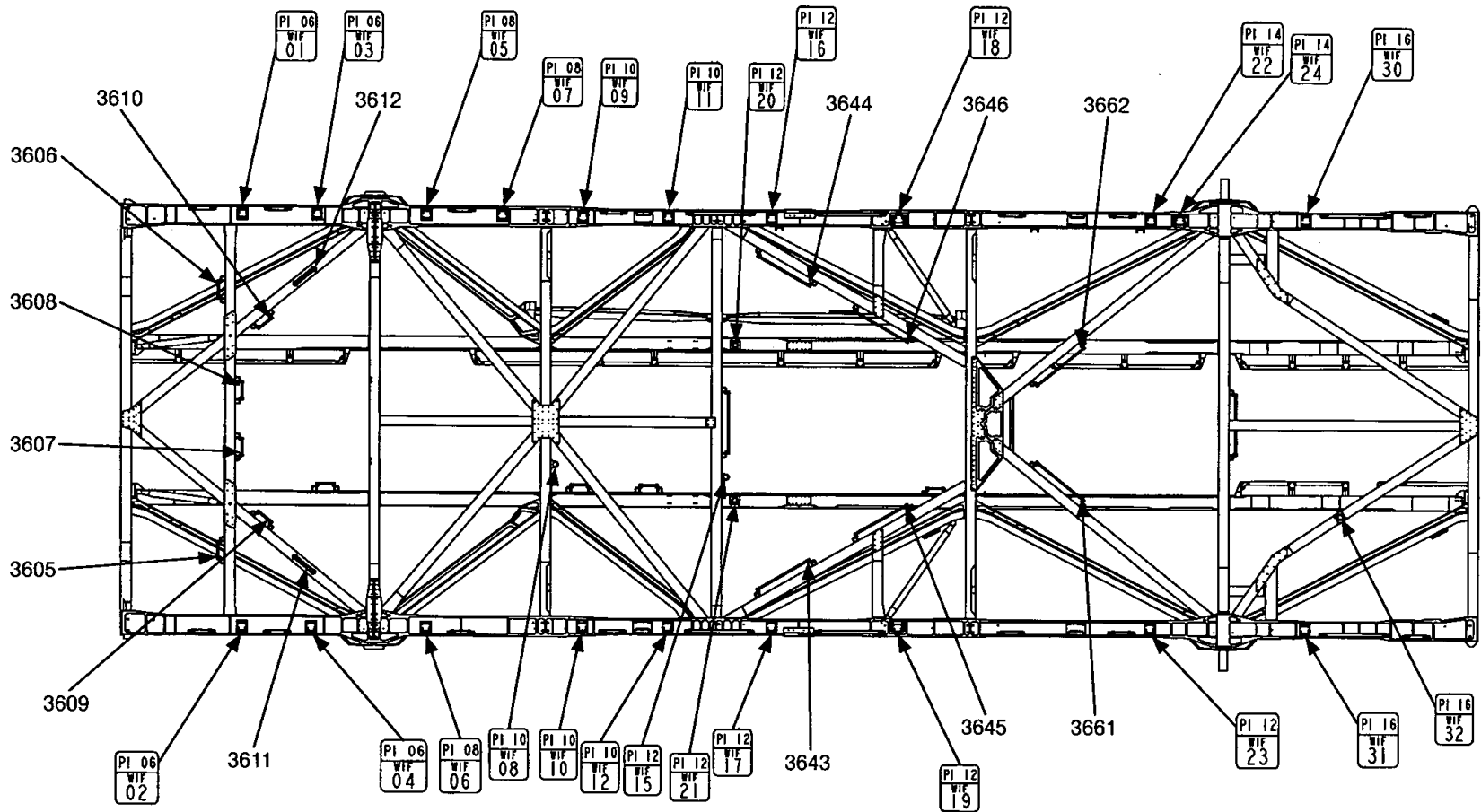
VIEW LOOKING STBD



VIEW OF BULKHEAD BETWEEN ISS BAY 10 AND BAY 12

jsc48024-113\_009

P1 HANDRAILS AND WIFs, FACE 4 (Cont)

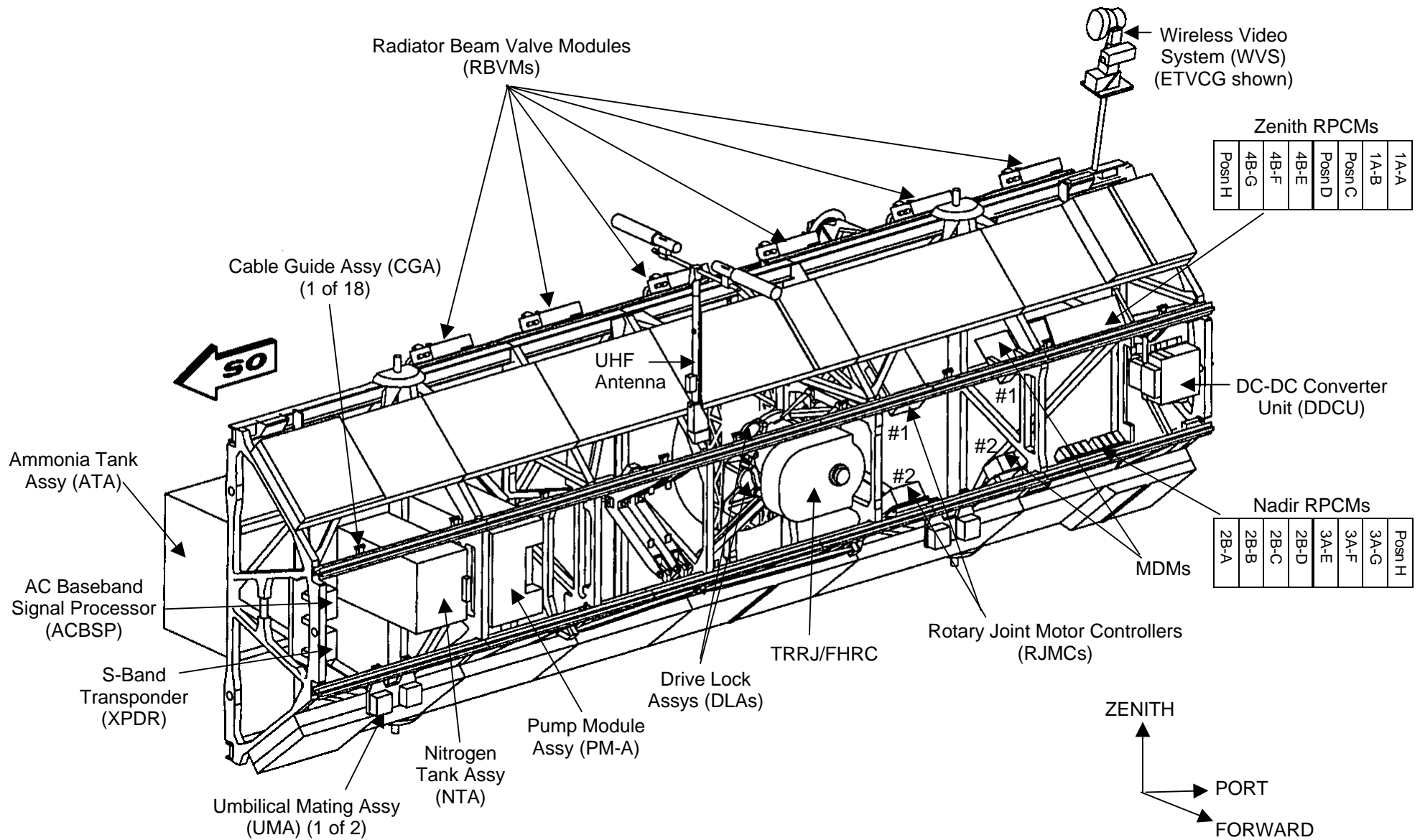


NADIR  
 STARBOARD

AFT FACE

jsc48024-113\_008

# P1 ORUs

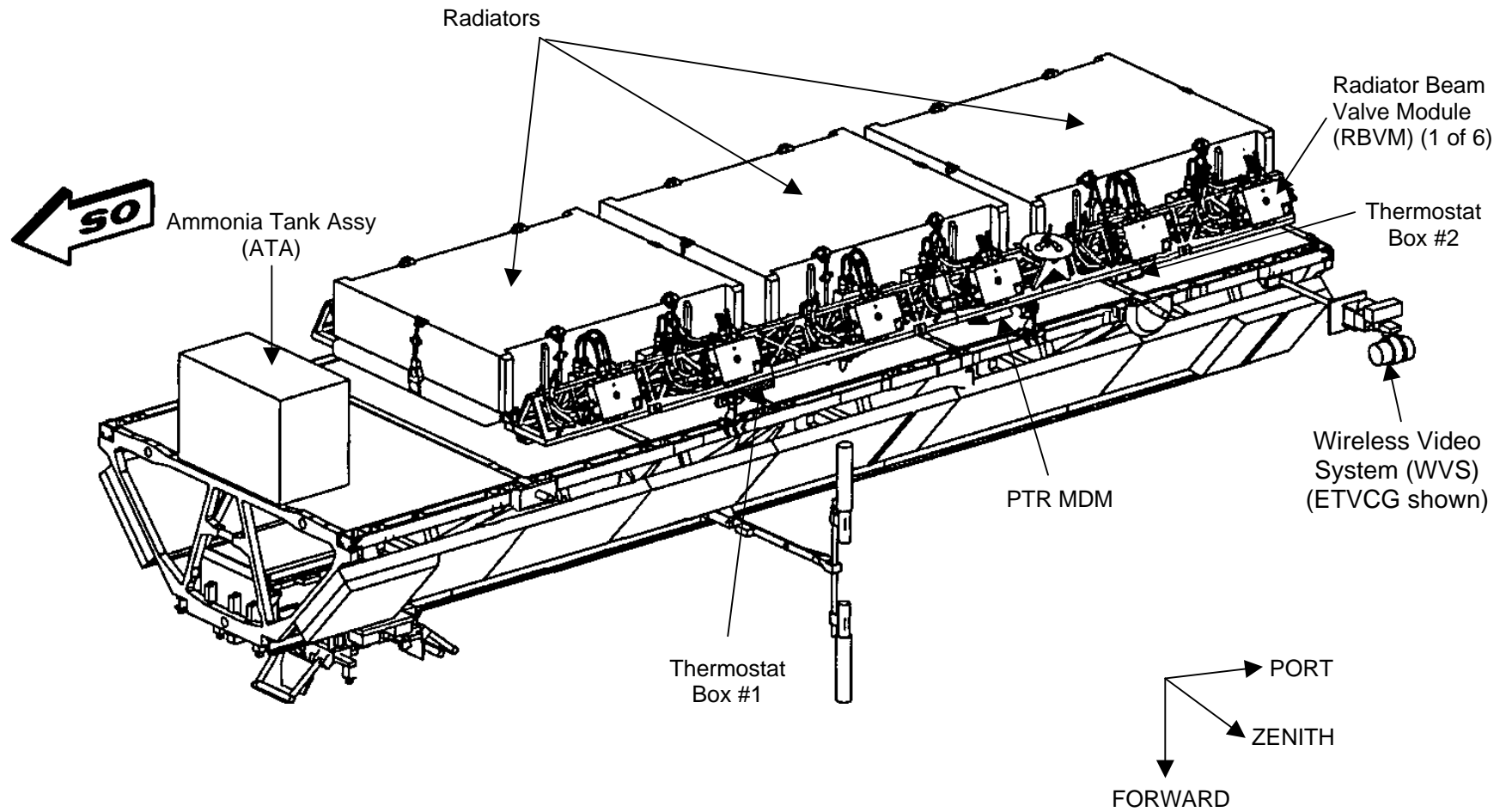


FS 18-15

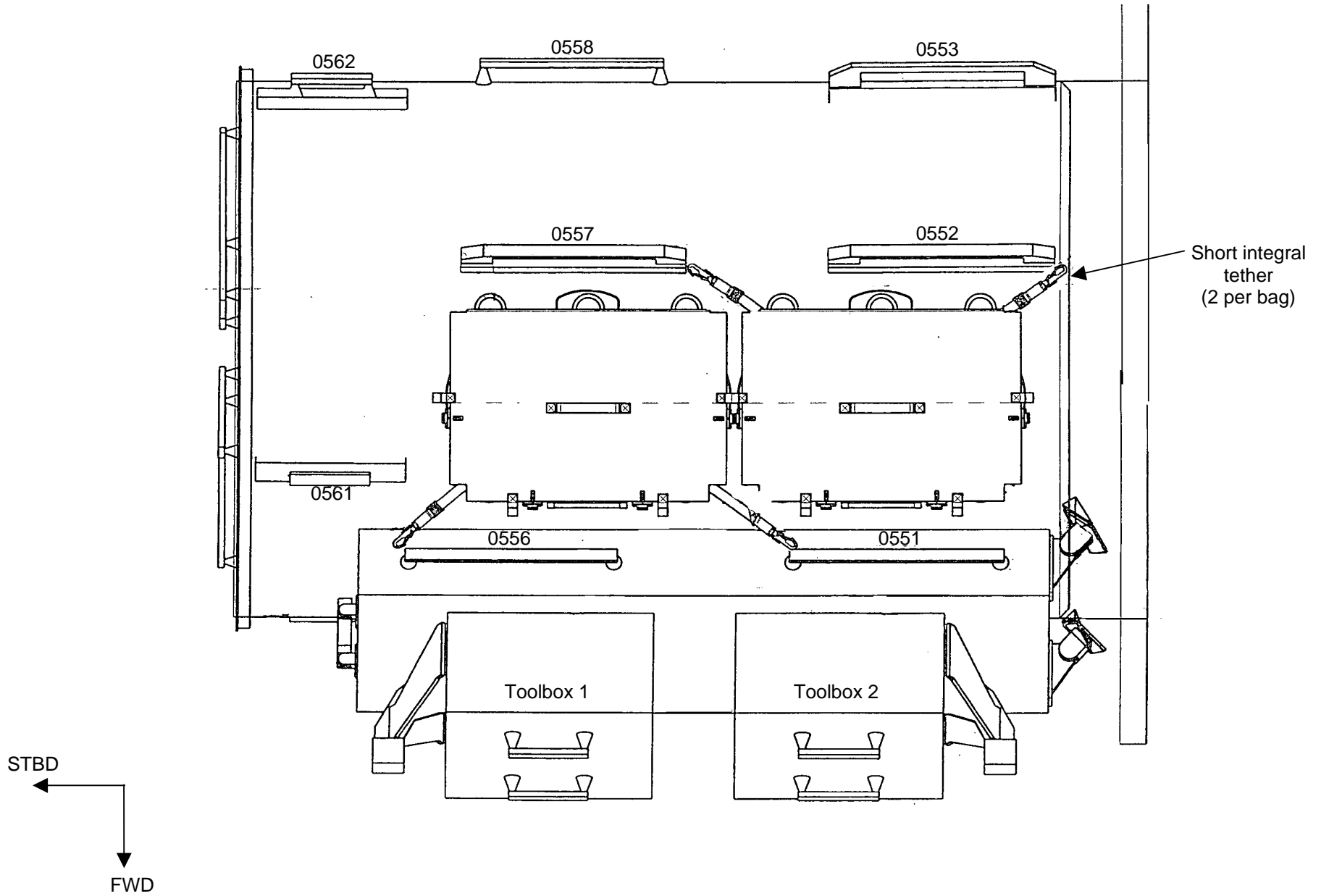
EVA/113/FIN

**P1 ORUs**

P1 ORUs (Cont)



# QD TOOLBAGS INSTALLED ON CREWLOCK ZENITH

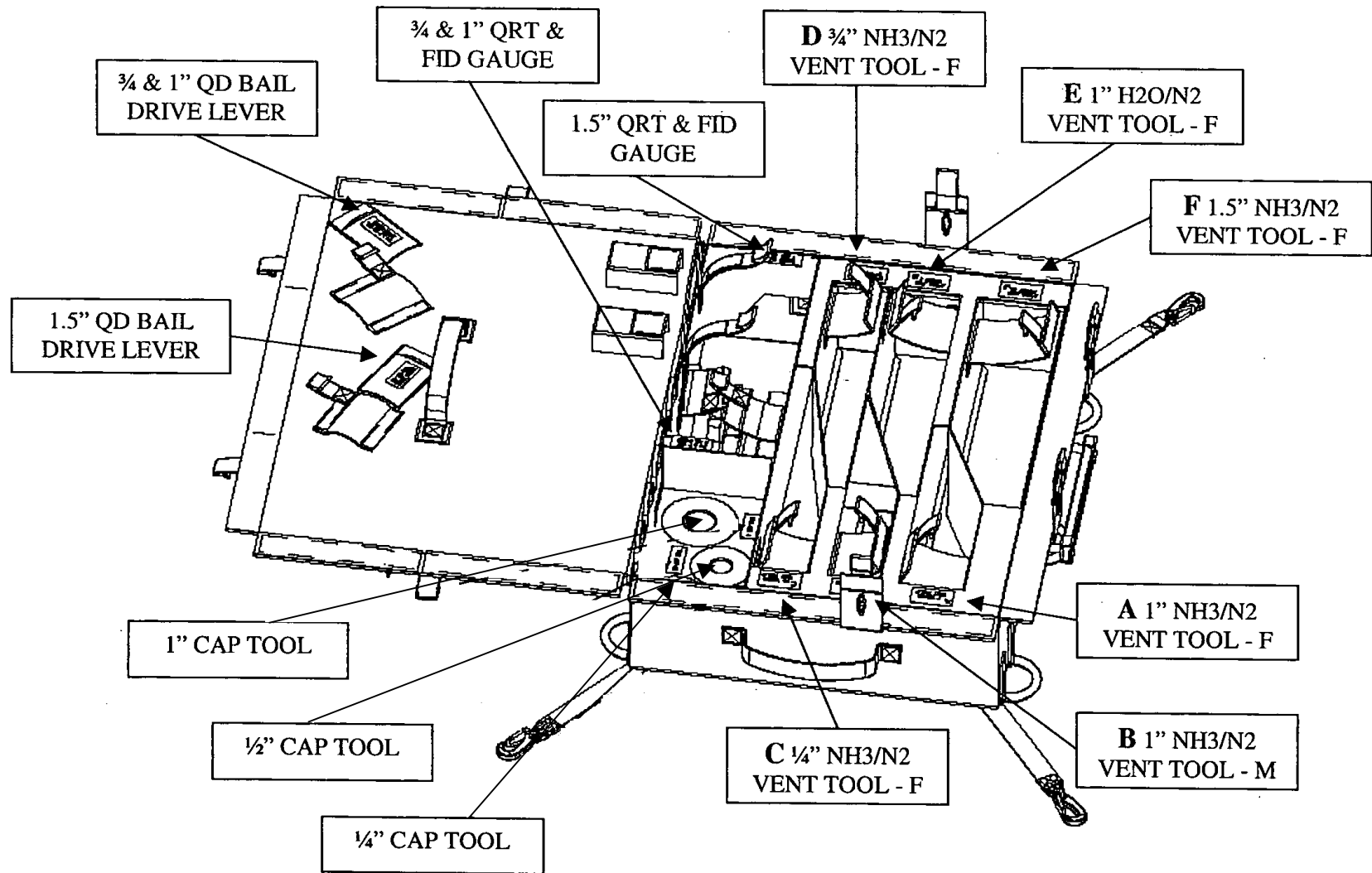


FS 18-17

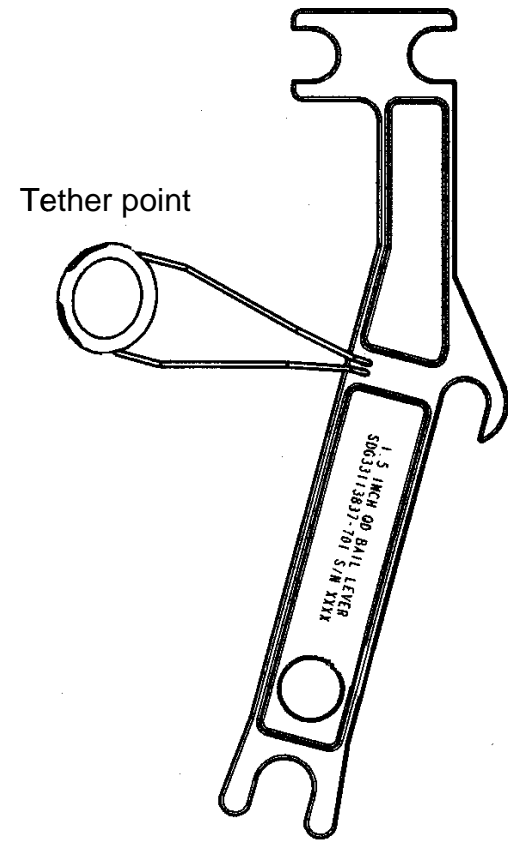
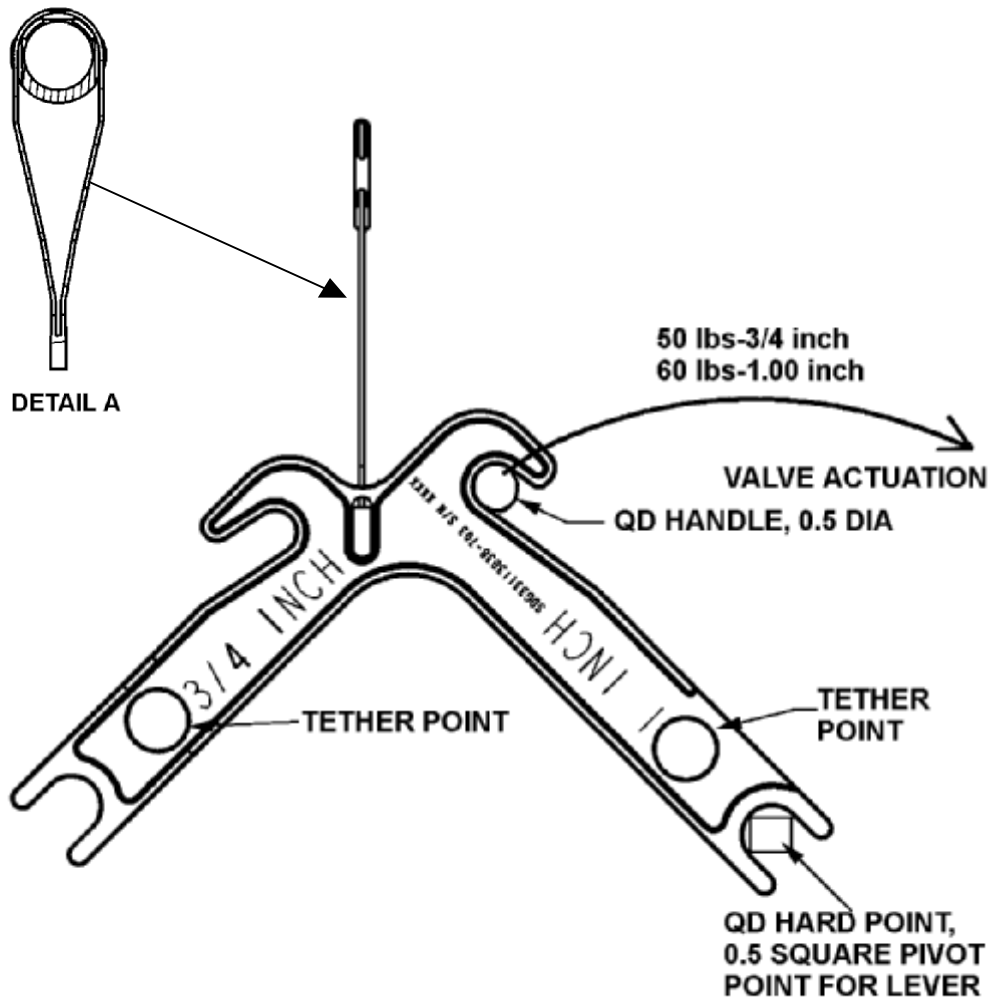
FS TOOLS

EVA/113/FIN

QD TOOLBAG CONTENTS

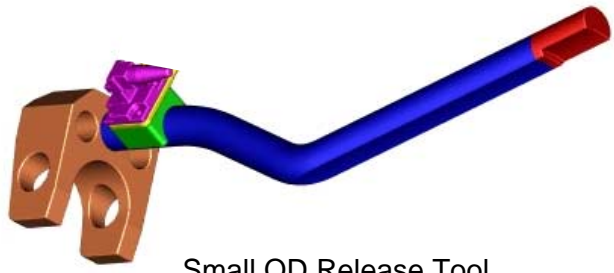


# FLUID QD BAIL LEVERS

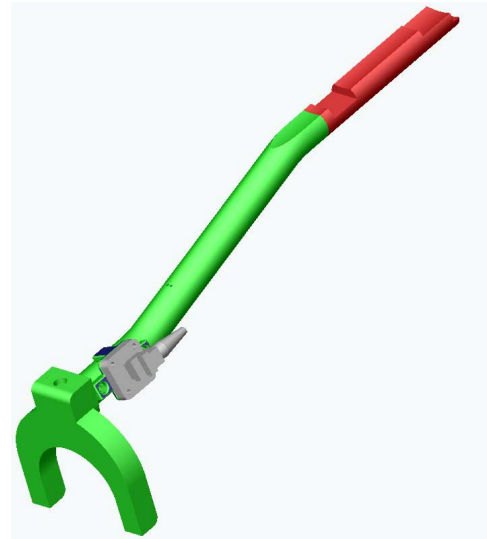


1.5-in QD Bail Lever

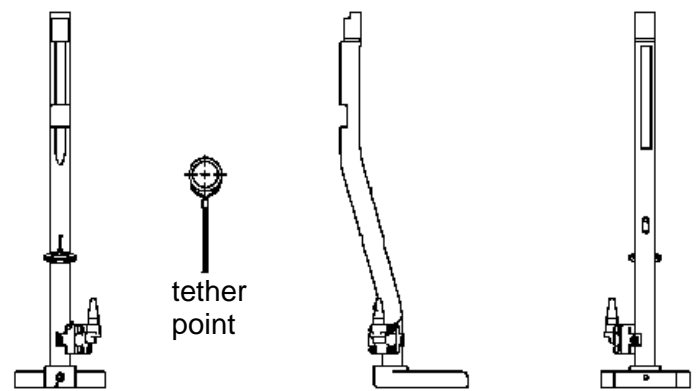
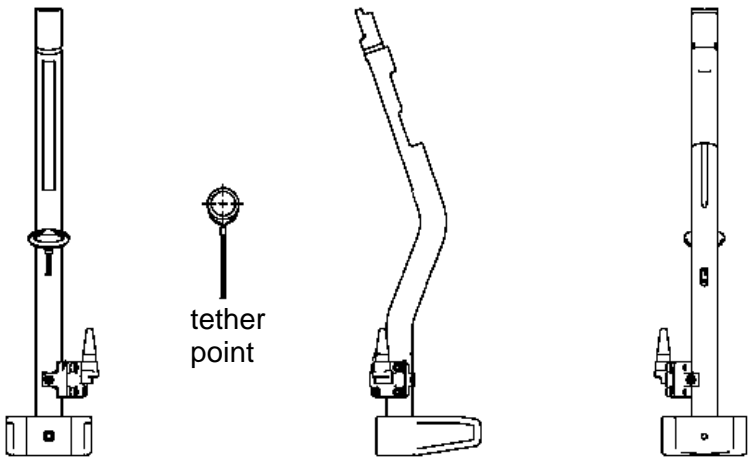
# FLUID QD RELEASE TOOLS



Small QD Release Tool  
w/ FID Gauge

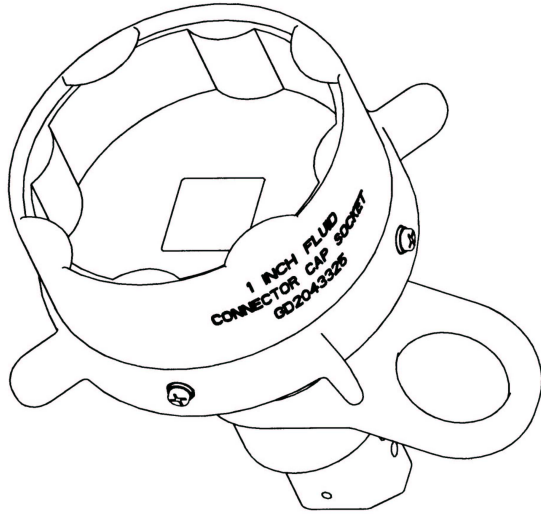


1.5-in QD Release Tool  
w/ FID Gauge

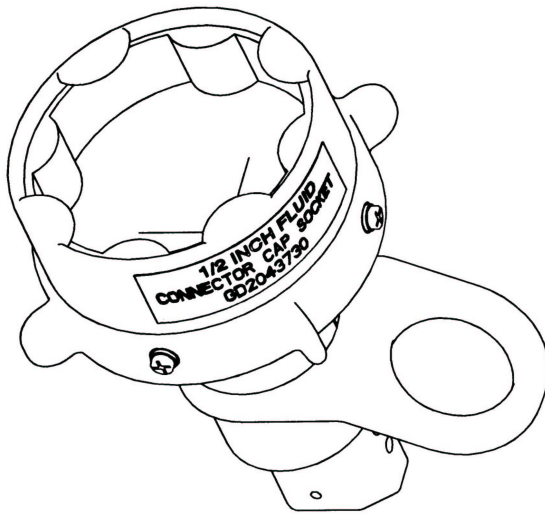
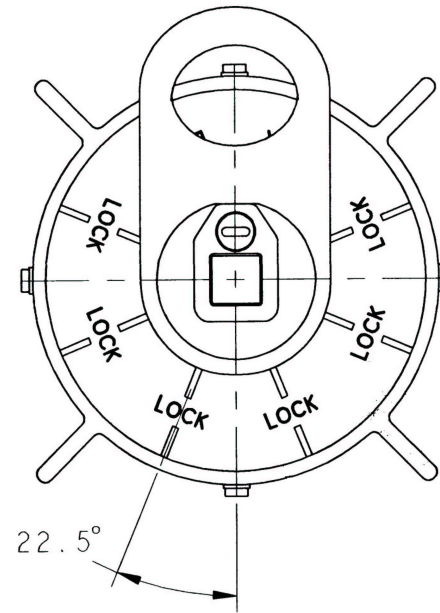




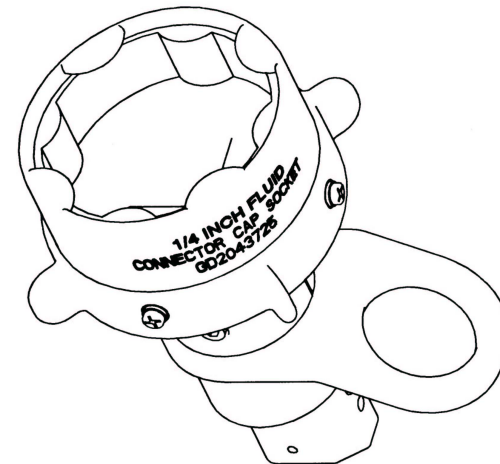
# FLUID QD CAP TOOLS



1-in QD Cap Tool

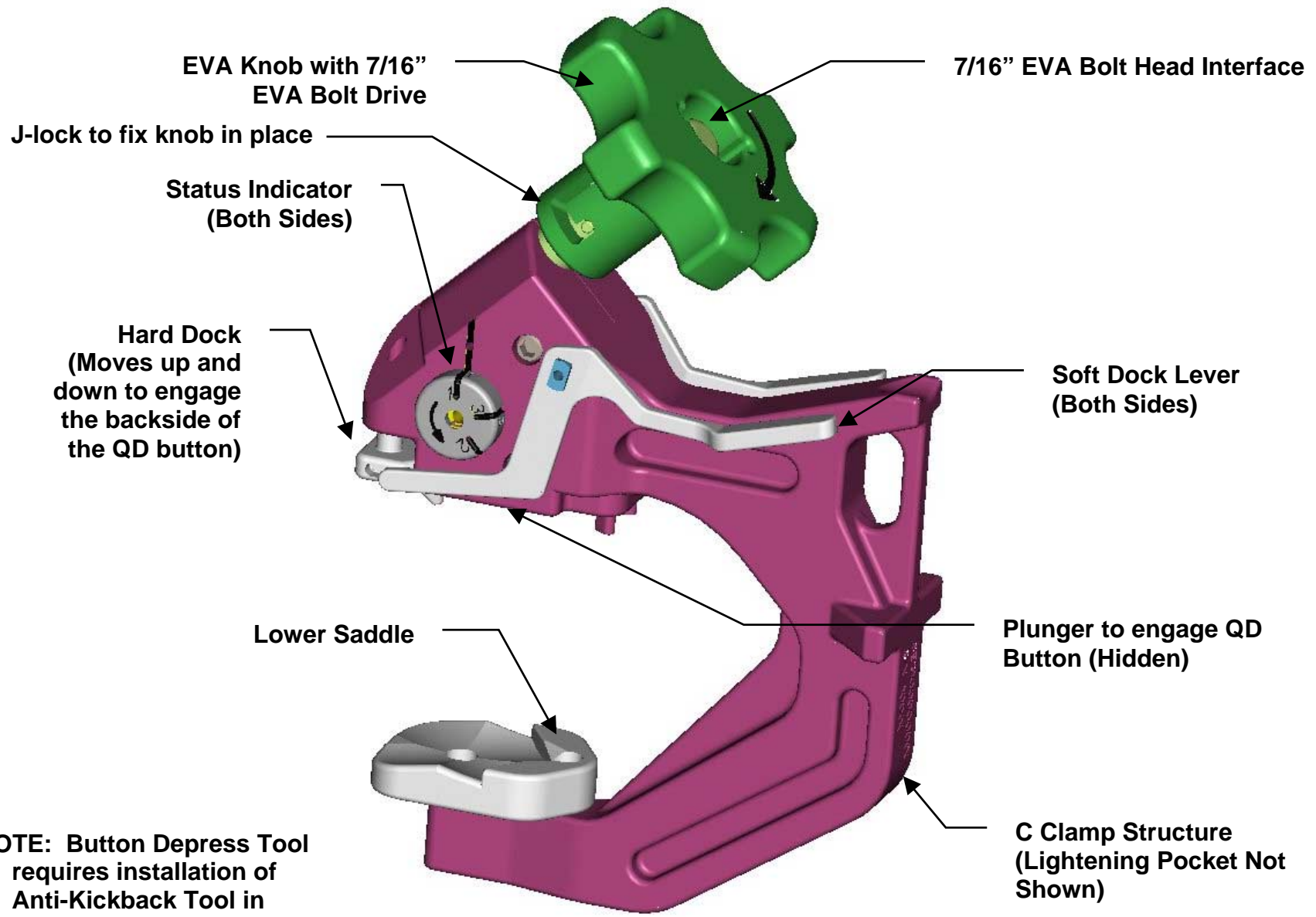


1/2-in QD Cap Tool



1/4-in QD Cap Tool

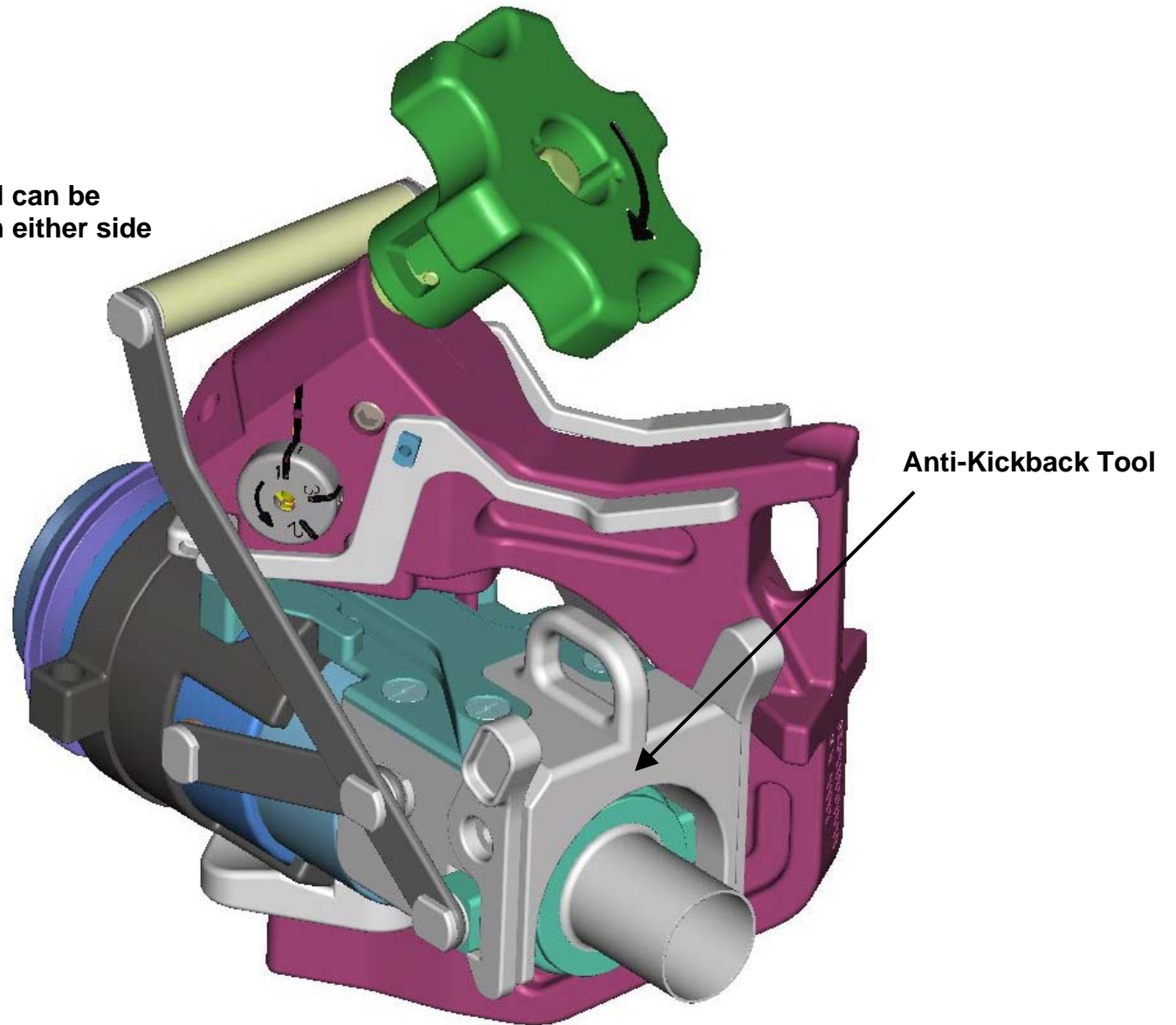
# 1.0-IN BUTTON DEPRESS TOOL



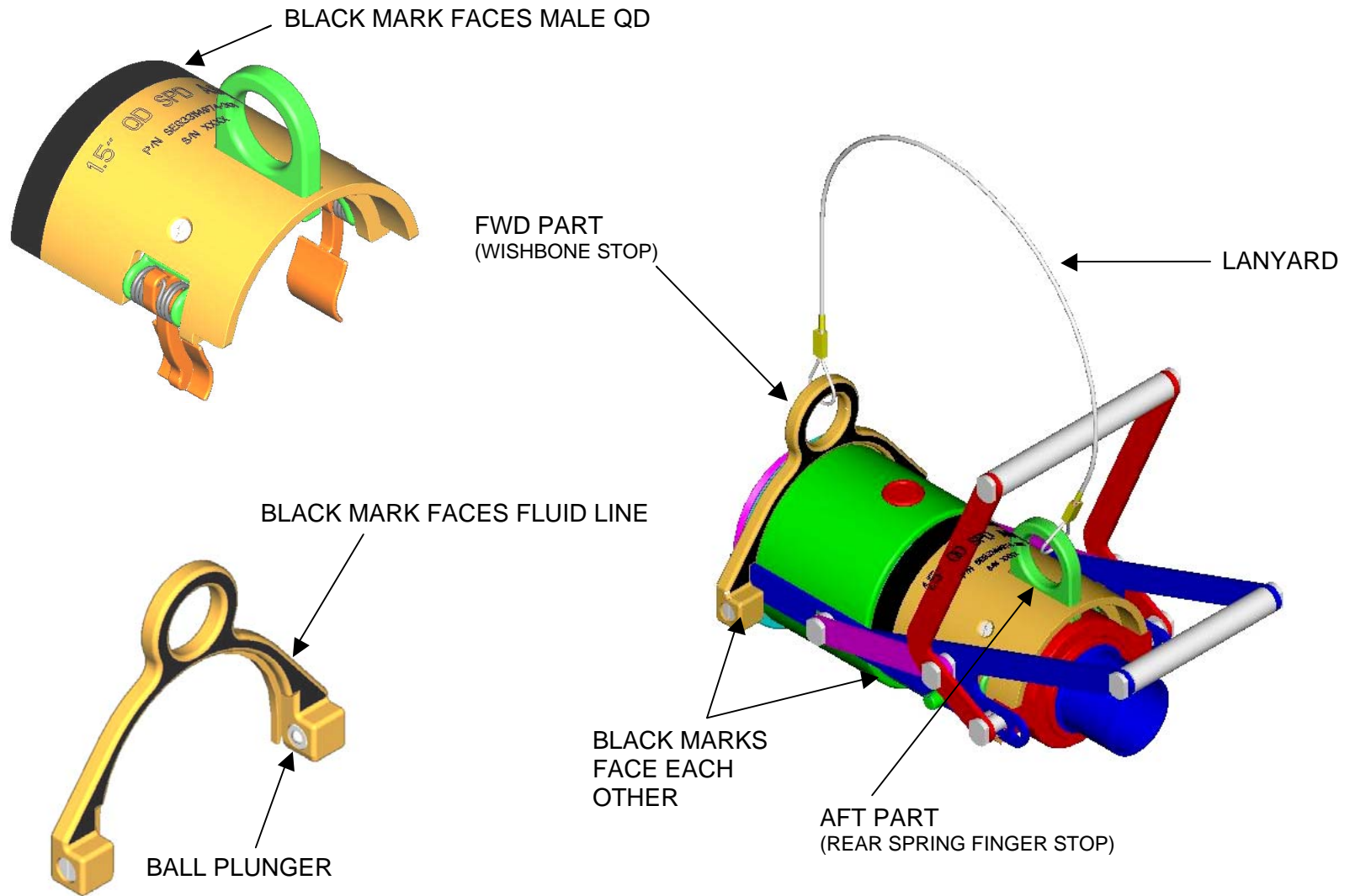
**NOTE: Button Depress Tool requires installation of Anti-Kickback Tool in order to engage QD**

# 1.0-IN BUTTON DEPRESS TOOL - INSTALLED

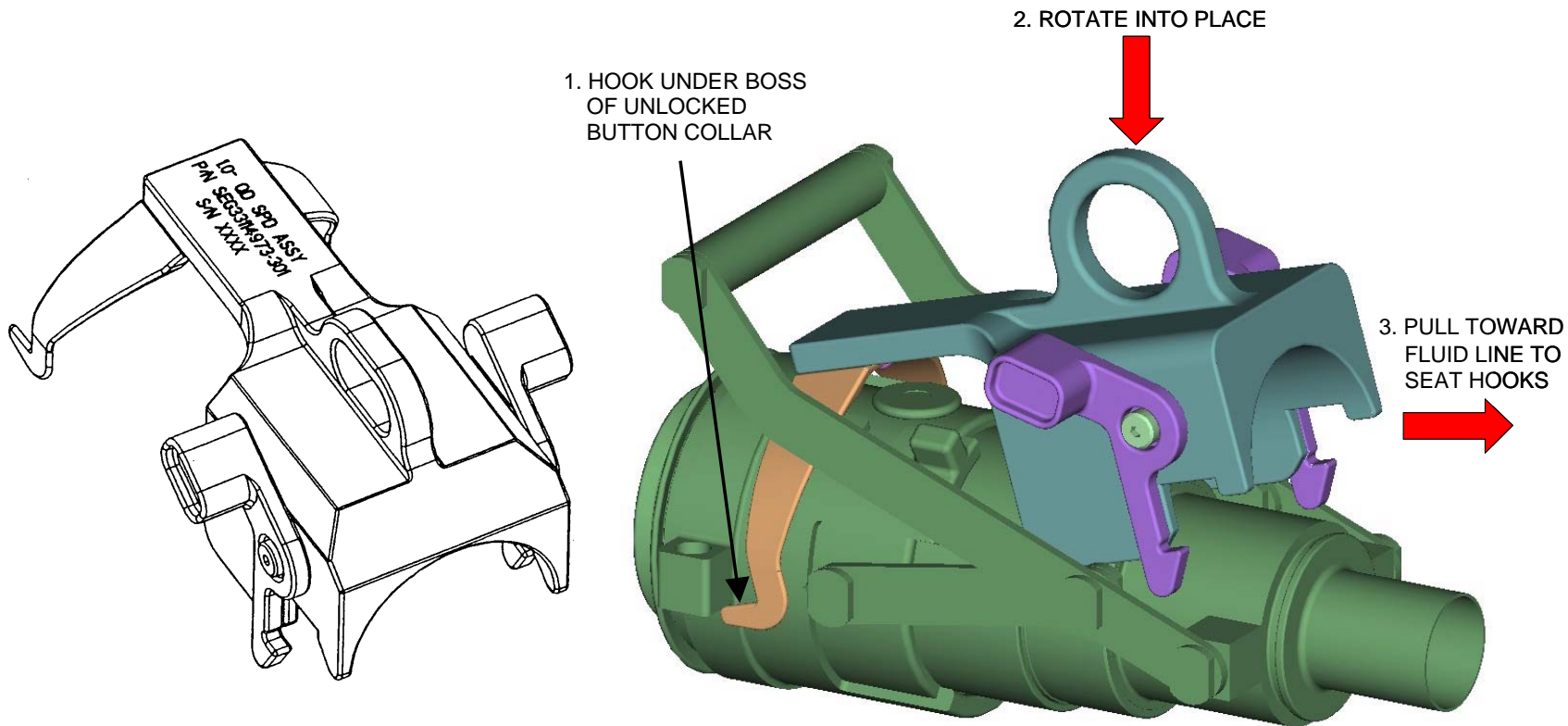
Button Depress Tool can be installed on QD from either side



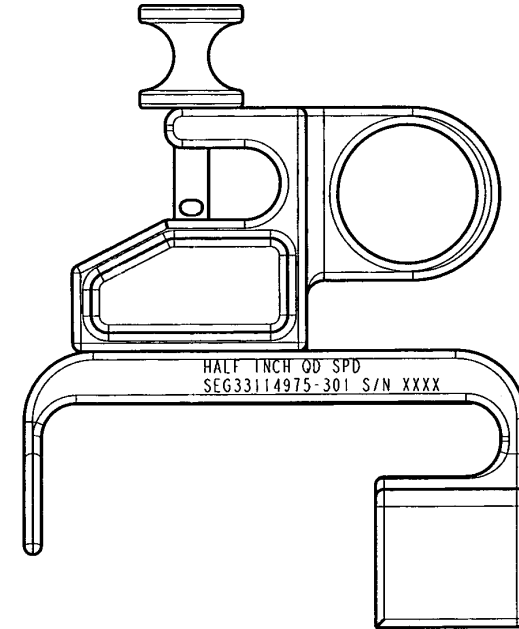
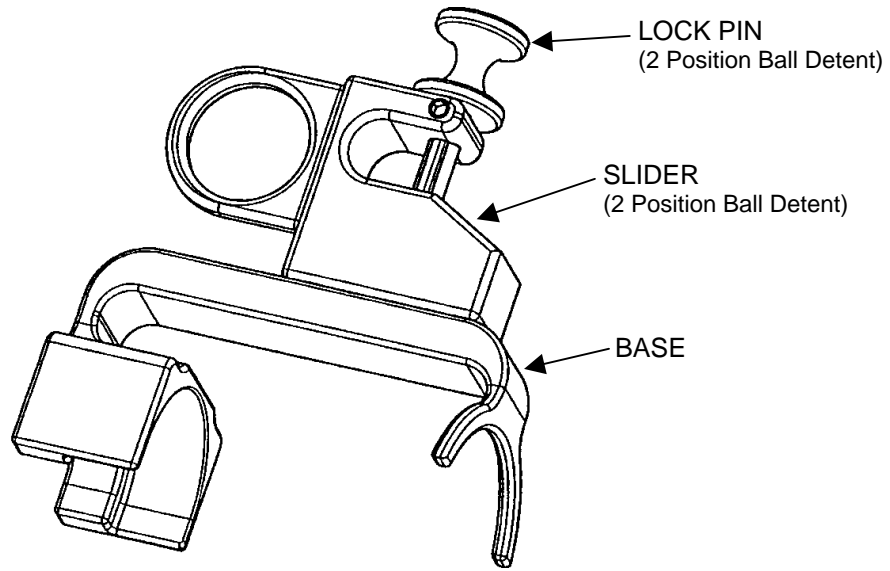
# 1.5-IN FLUID QD SPOOL POSITIONING DEVICE



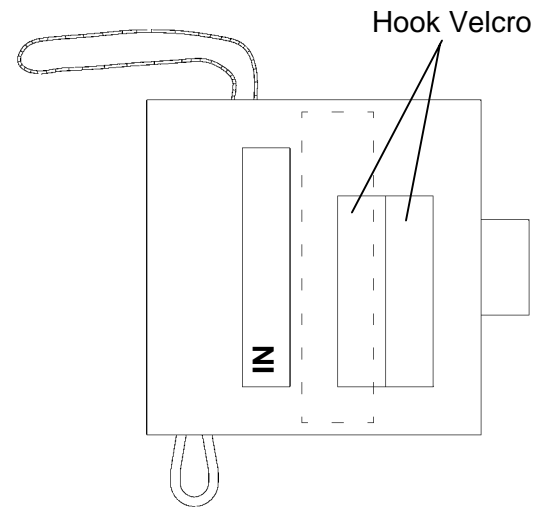
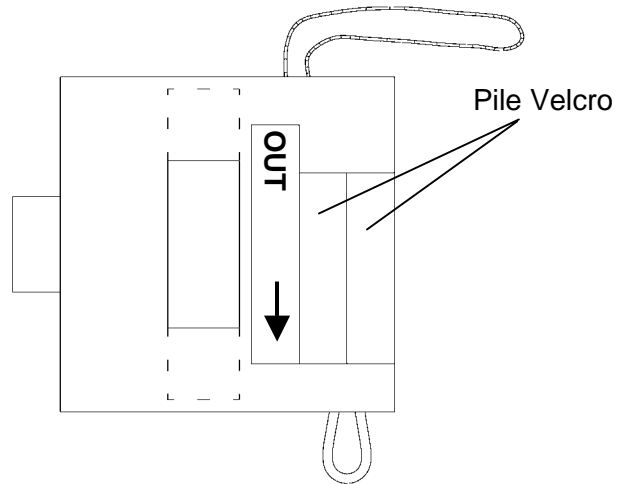
# 1.0 IN FLUID QD SPOOL POSITIONING DEVICE



### 0.5-IN FLUID QD SPOOL POSITIONING DEVICE

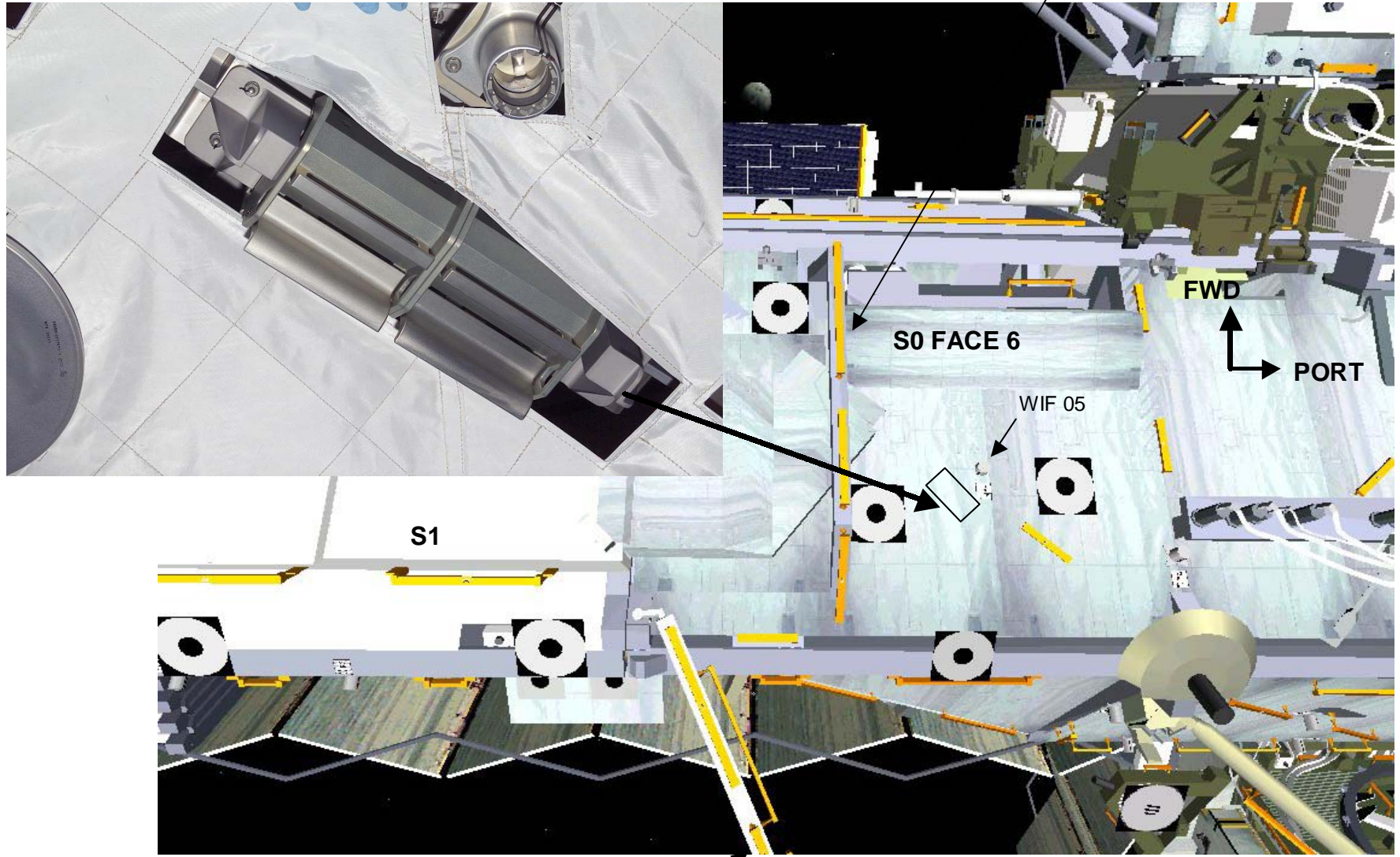


### 0.5 IN SPD BOOTIE EXTENSION



# TETHER SHUTTLE STOWAGE

S0 Handrail Bridge



FWD

PORT

S0 FACE 6

WIF 05

S1

Airlock Spur

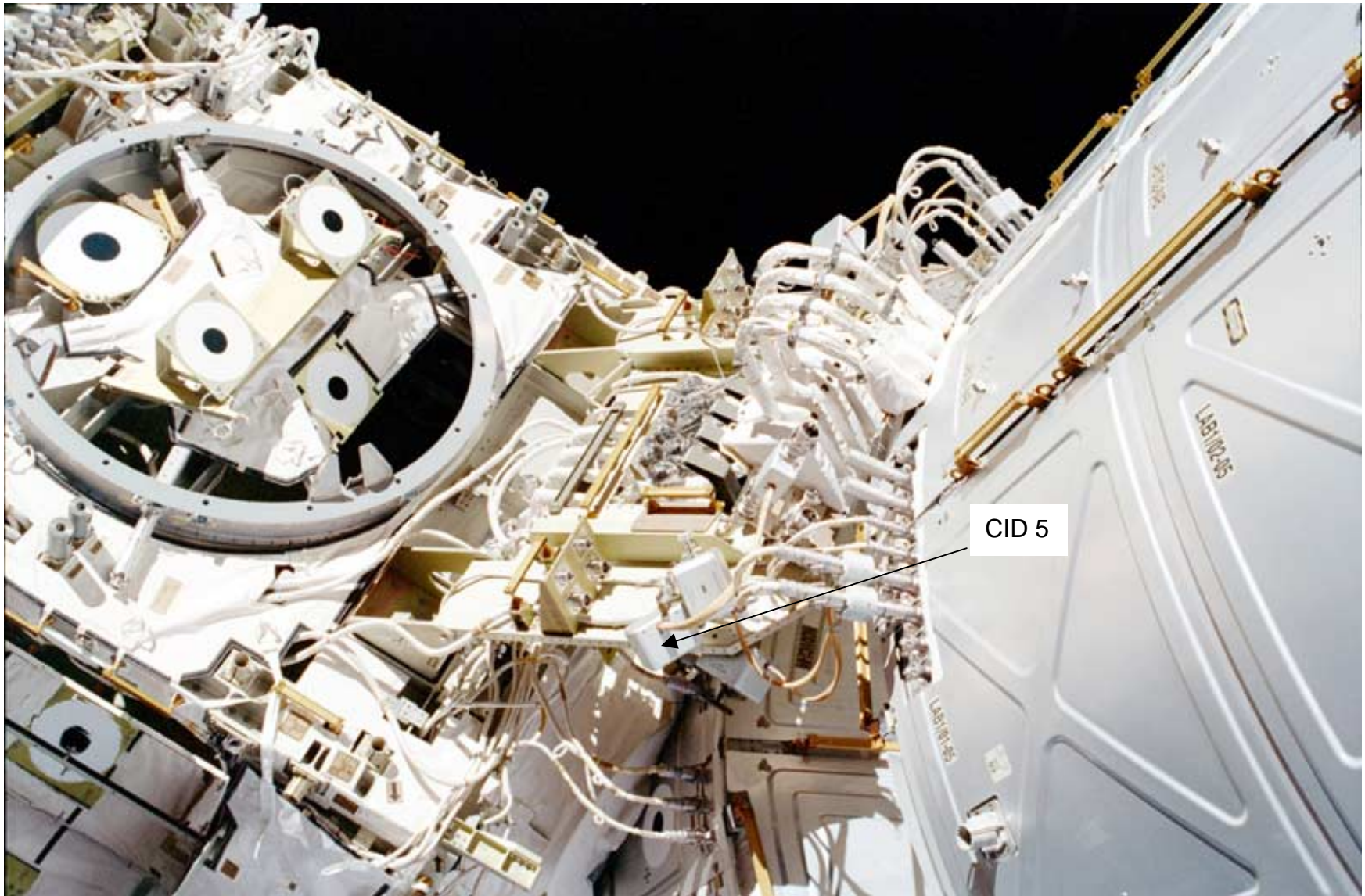
FS 18-27

EVA/113/FIN

CIDs

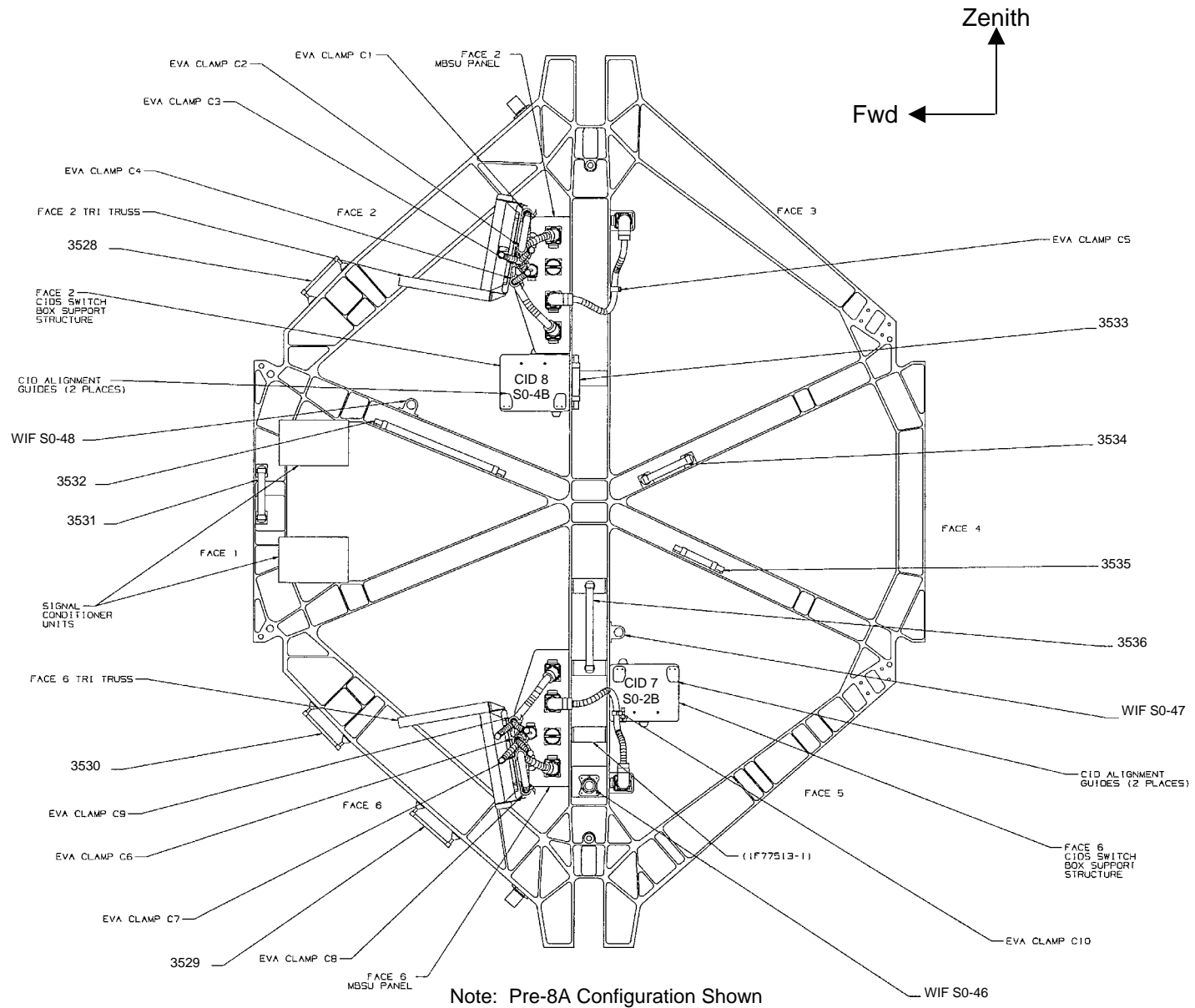
# CIDs

## CID 5 AND 6 LOCATION

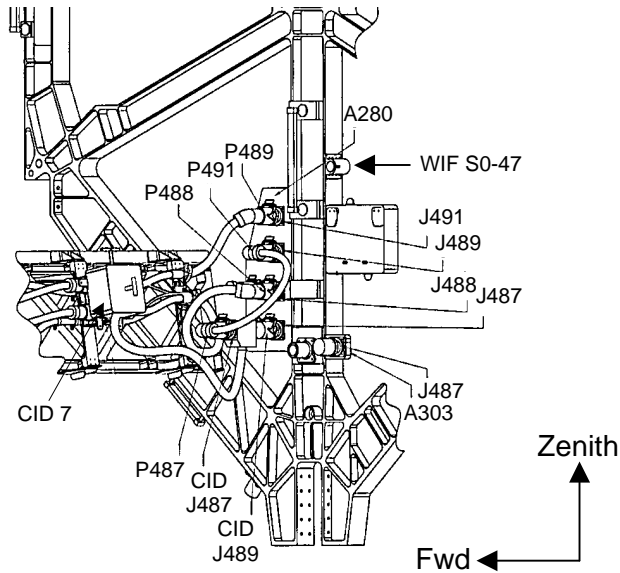




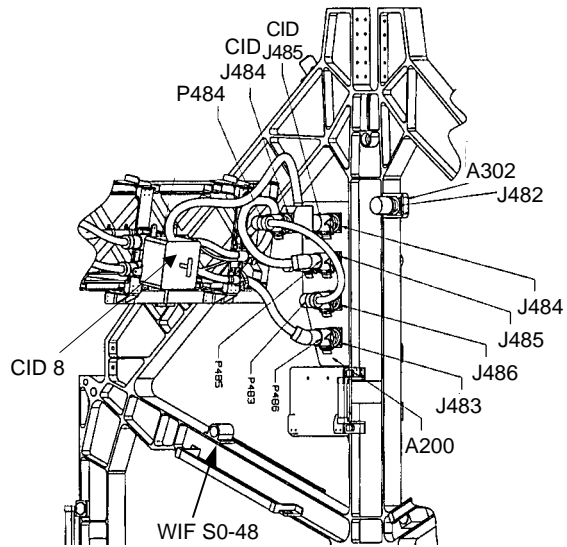
# CID 7 AND 8 INSTALLATION WORKSITE BEFORE CID INSTALLATION



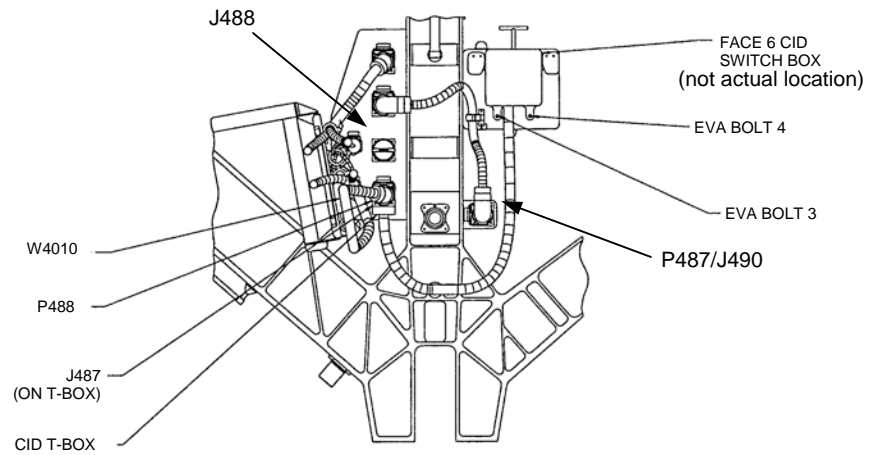
# CID 7 AND 8 RECONFIGURATION



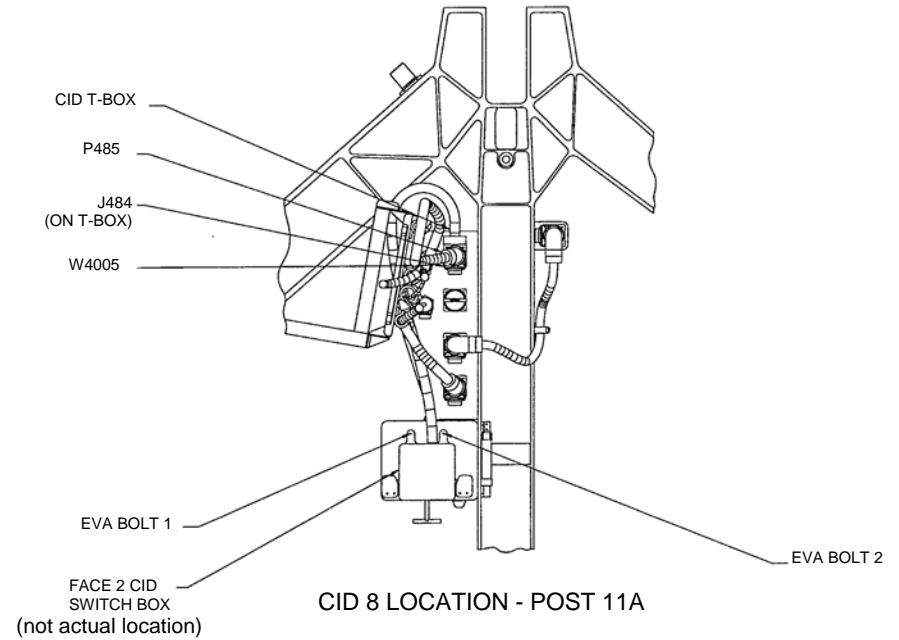
CID 7 LOCATION - PRE 11A



CID 8 LOCATION - PRE 11A

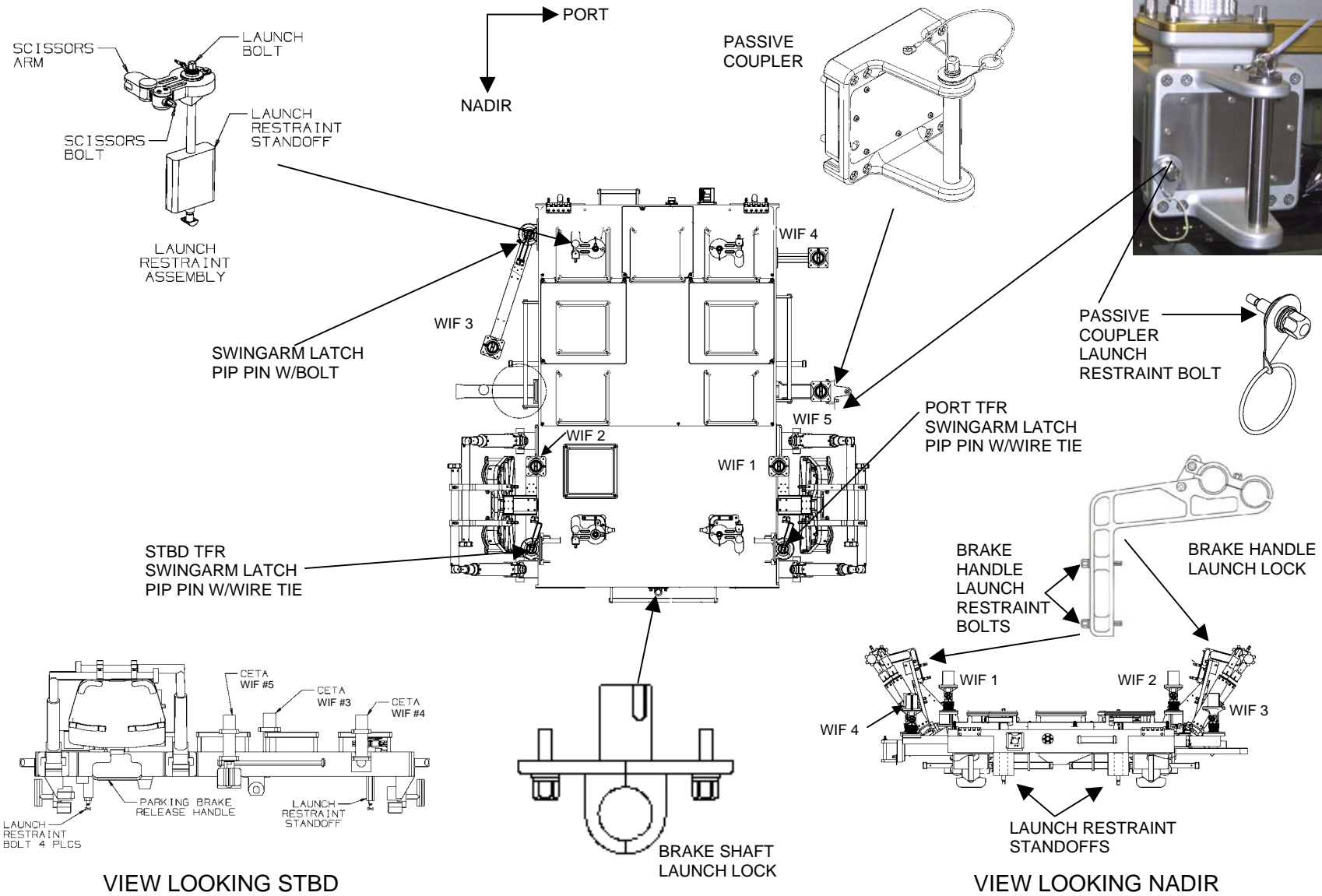


CID 7 LOCATION - POST 11A



CID 8 LOCATION - POST 11A

# CETA CART LAUNCH LOCKS



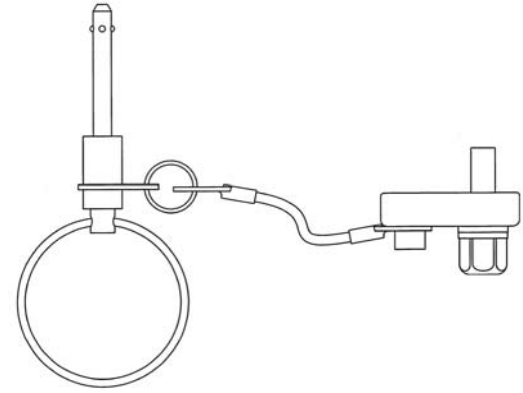
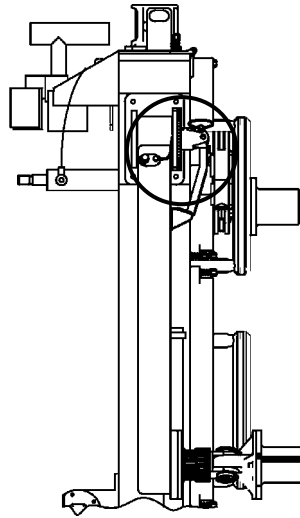
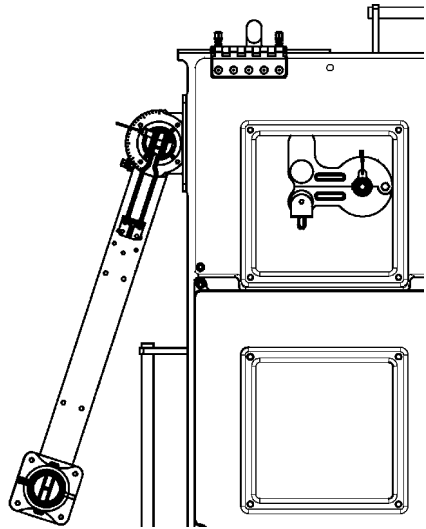
FS 18-31

EVA/113/FIN

**CETA CART/  
MT STOP**

CETA CART/  
MT STOP

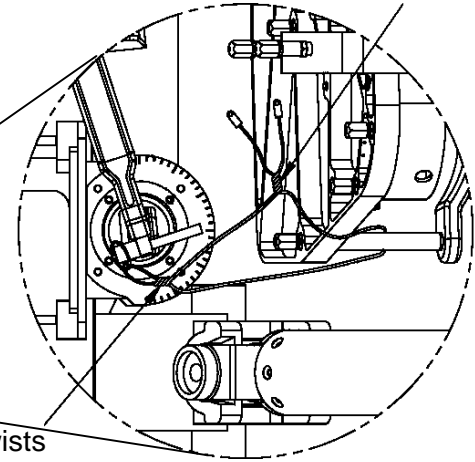
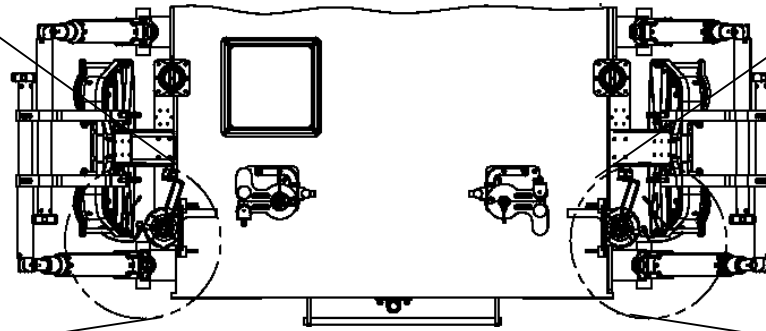
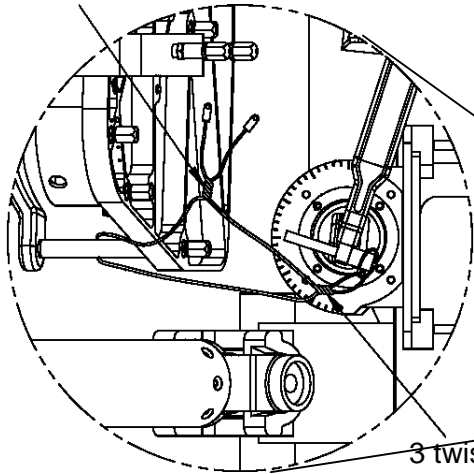
CETA SWINGARM LAUNCH LOCKS



ZENITH SWINGARM PIP PIN AND BOLT

3 twists

3 twists

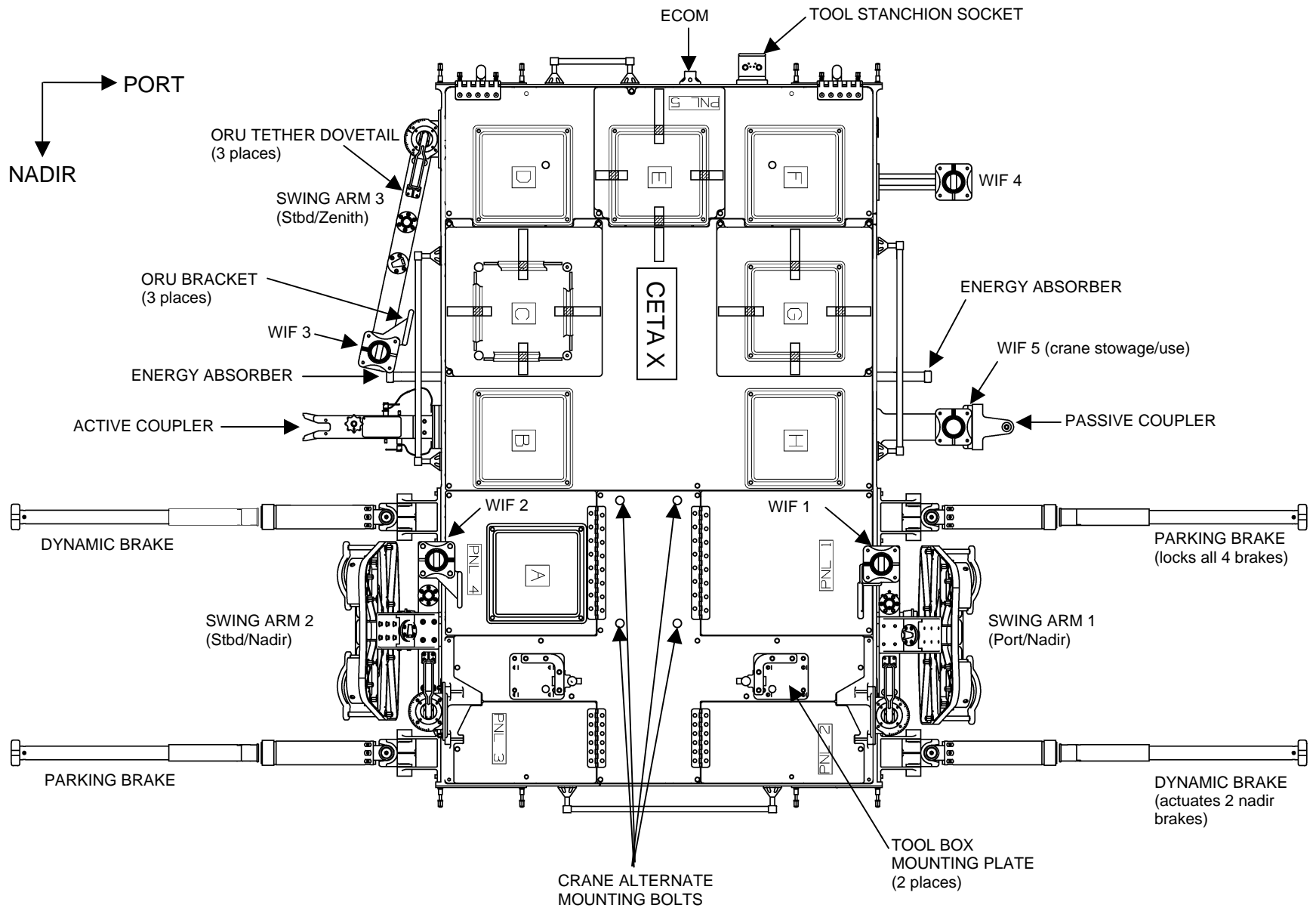


STBD TFR

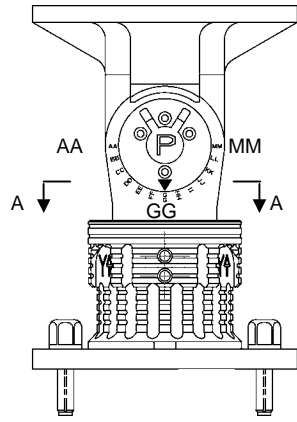
NADIR SWINGARM PIP PINS w/WIRE TIES

PORT TFR

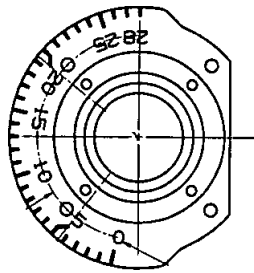
# CETA CART – FACE 1



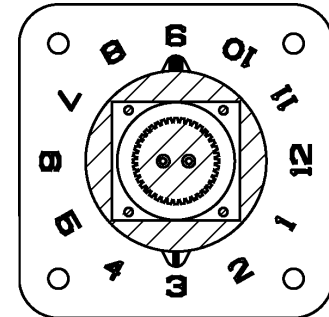
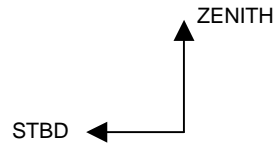
# CETA SWINGARM AND WIF MARKINGS



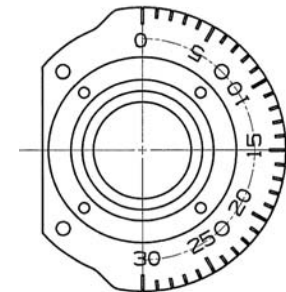
PITCH YAW FITTING  
WIF SINGLE - LINE SIDE  
SHOWN  
(AA always on left on this side)



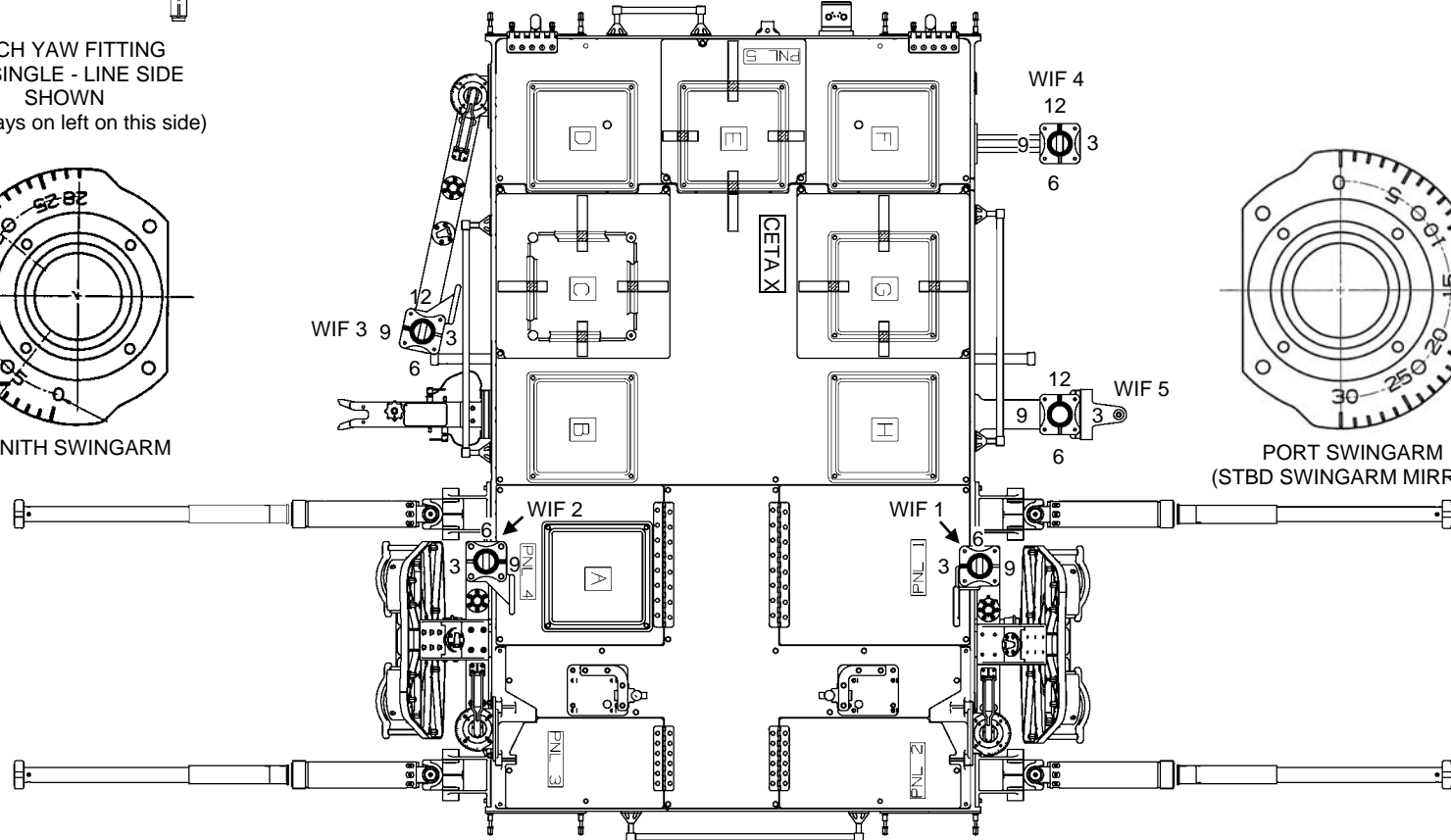
ZENITH SWINGARM



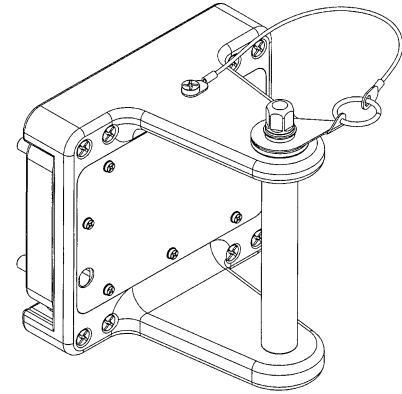
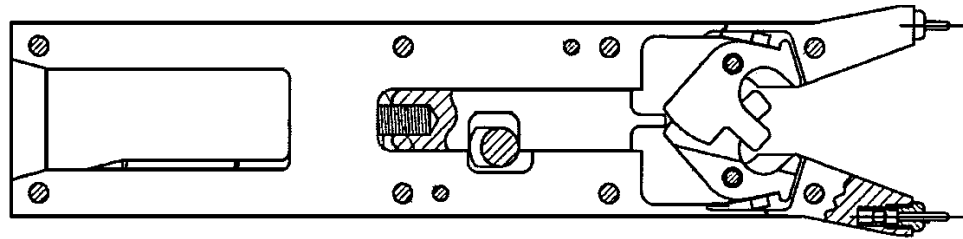
SECTION A - A



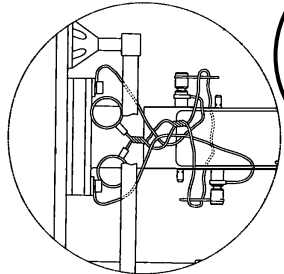
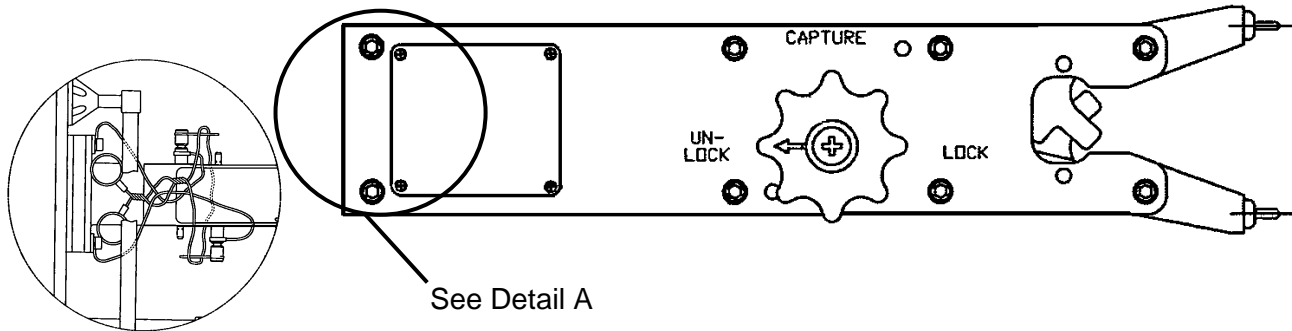
PORT SWINGARM  
(STBD SWINGARM MIRROR)



# CETA CART COUPLERS

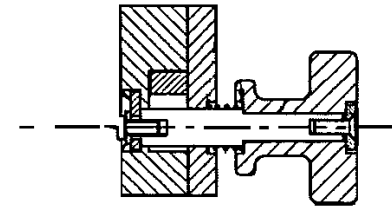
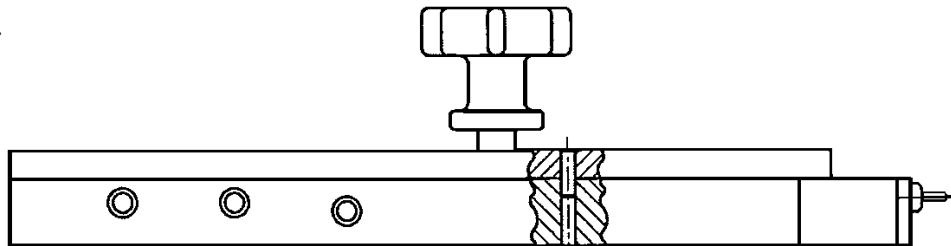


PASSIVE COUPLER

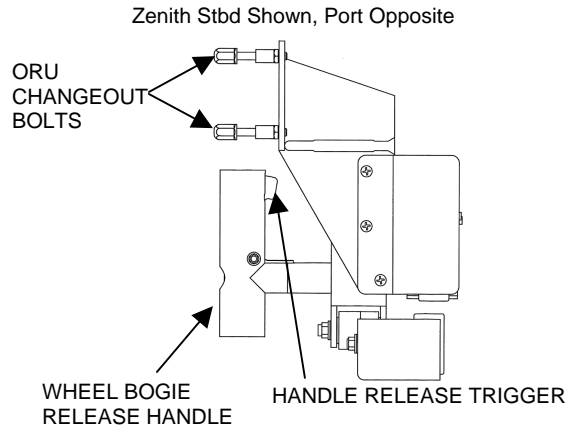


DETAIL A

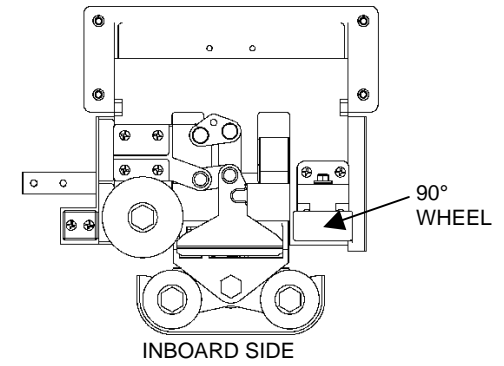
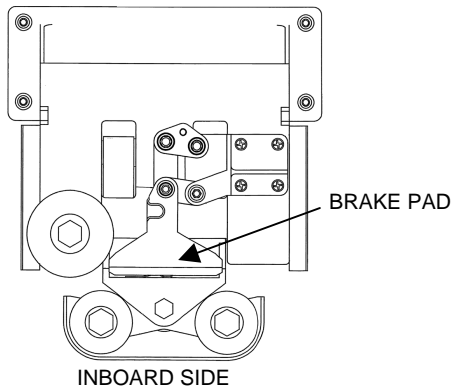
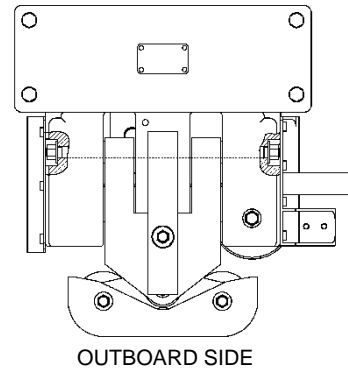
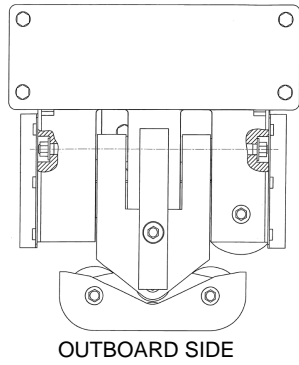
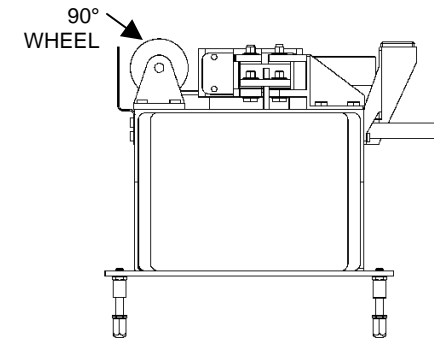
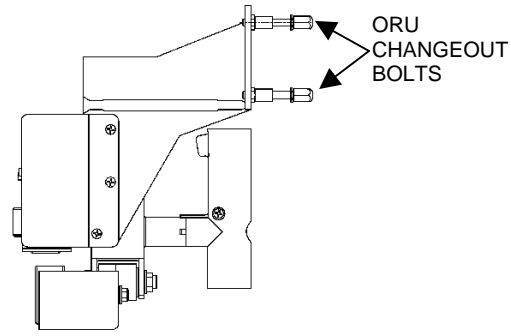
Wire ties removed only for coupler ORU changeout



# CETA CART WHEEL BOGIES

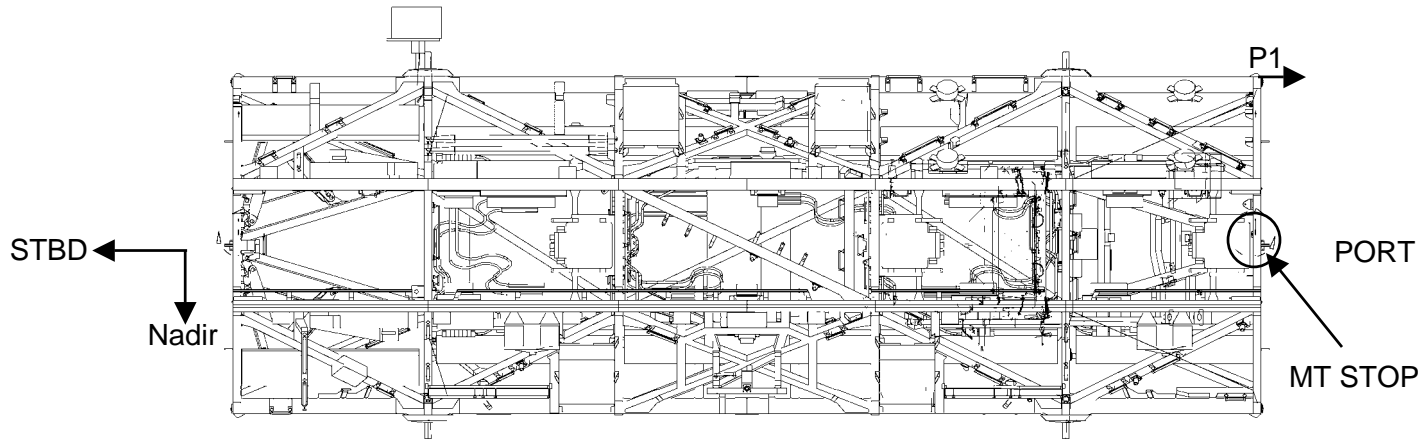


Nadir Port Shown, Stbd Opposite

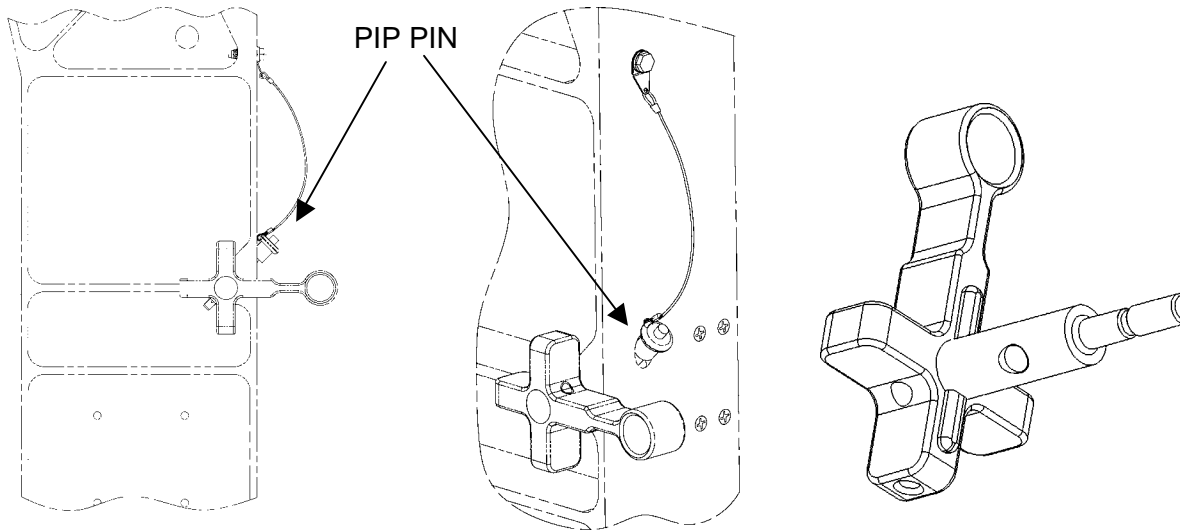




# MT STOP



MT STOP STOWED



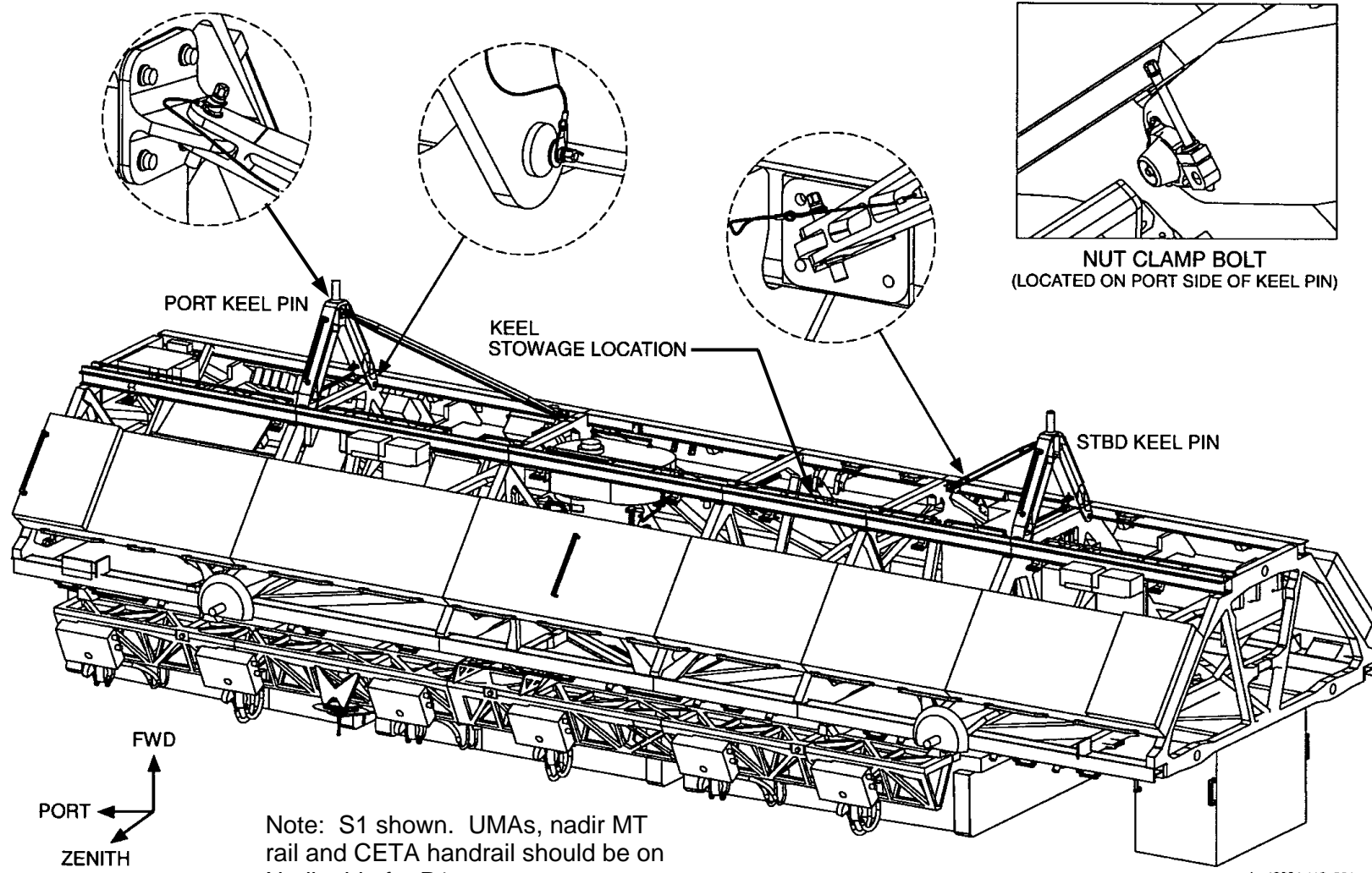
MT STOP DEPLOYED



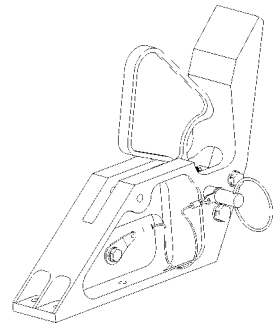
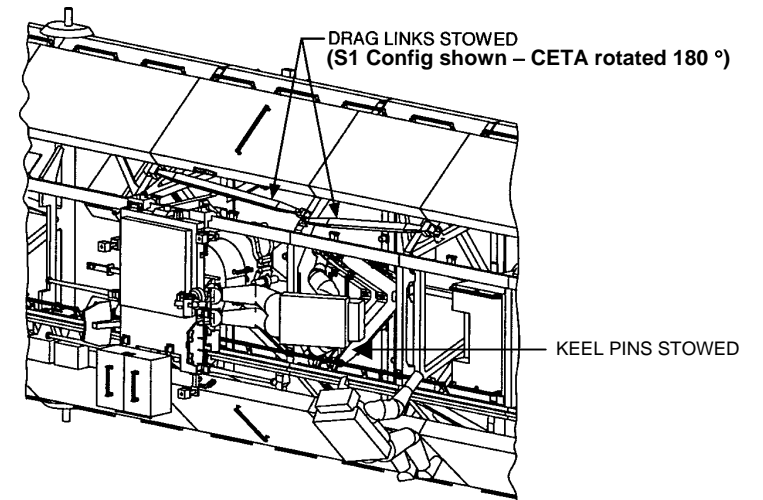
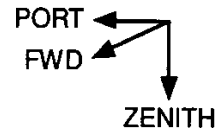
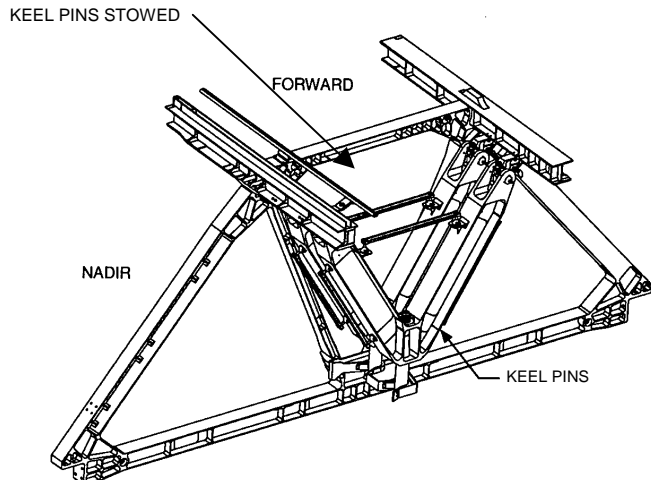
MT STOP DEPLOYED

# DRAG LINKS/ KEEL PINS

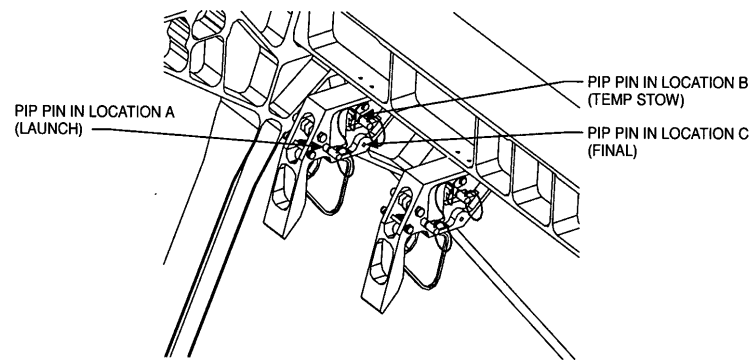
## DRAG LINK/KEEL PIN LAUNCH CONFIG



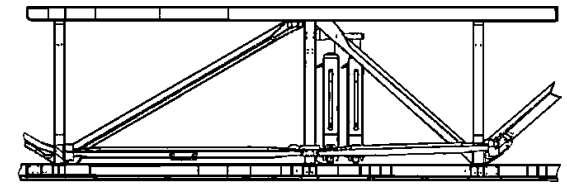
# DRAG LINK/KEEL PIN STOW LOCATION



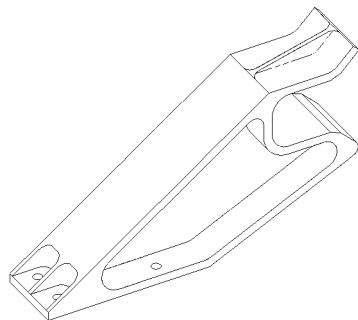
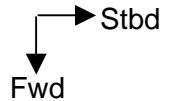
STORAGE LATCH



KEEL PIN STORAGE LATCH  
PIP PIN POSITIONS



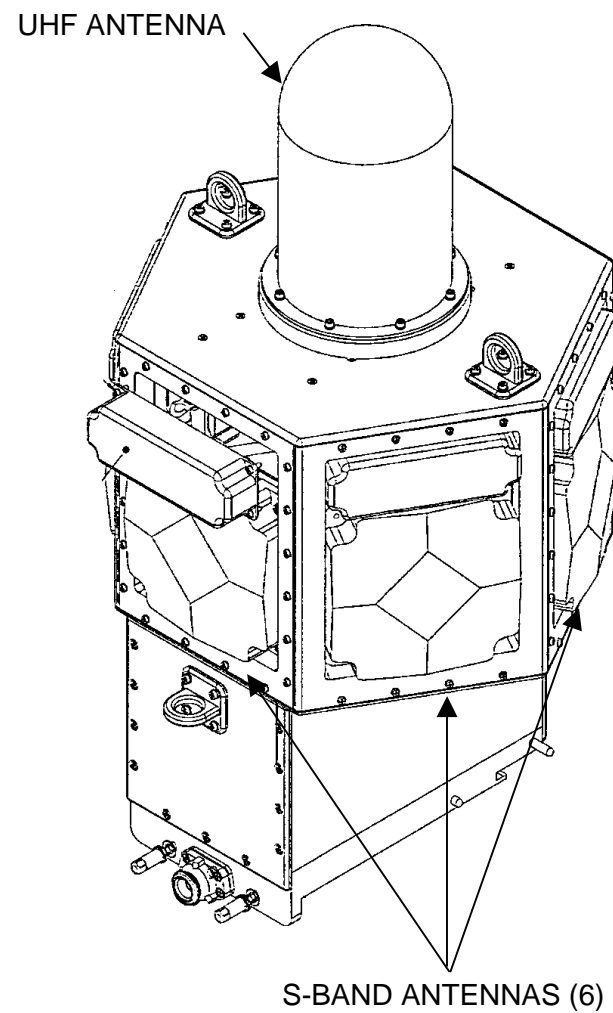
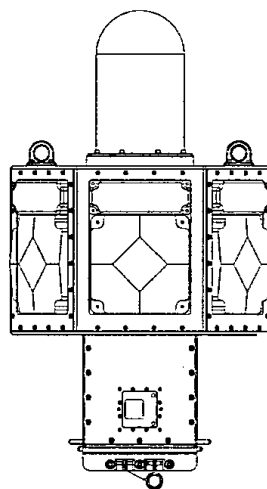
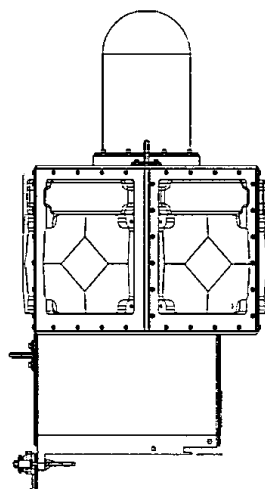
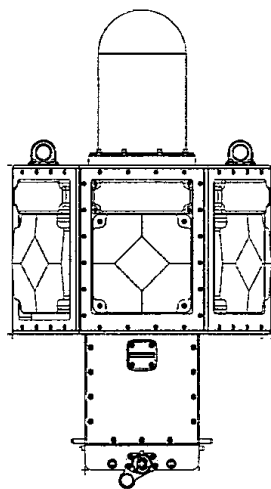
VIEW LOOKING ZENITH



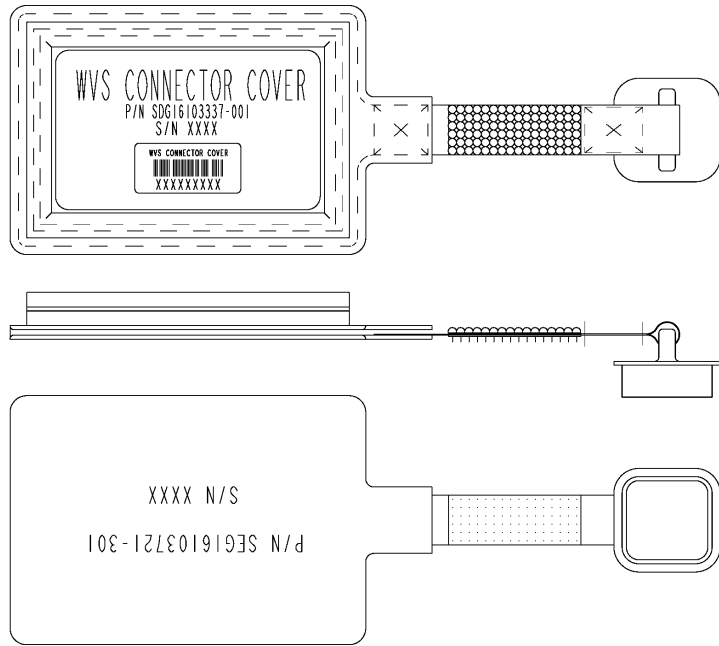
PASSIVE BRACKET

Note - drawings are of S1. P1 drag link stowage is nadir, Active keel latch is nadir, trunnion bracket opens to Zenith

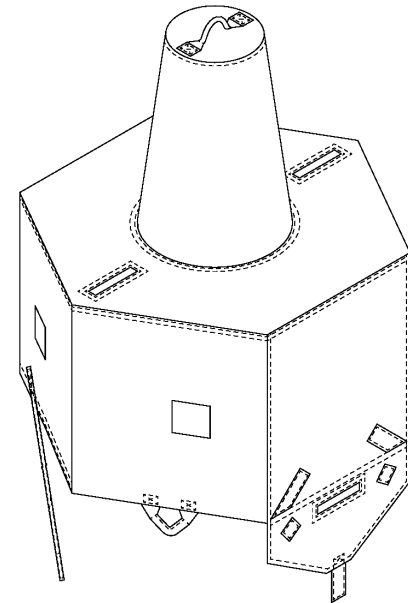
WVS EXTERNAL TRANSCEIVER ASSY (WETA)



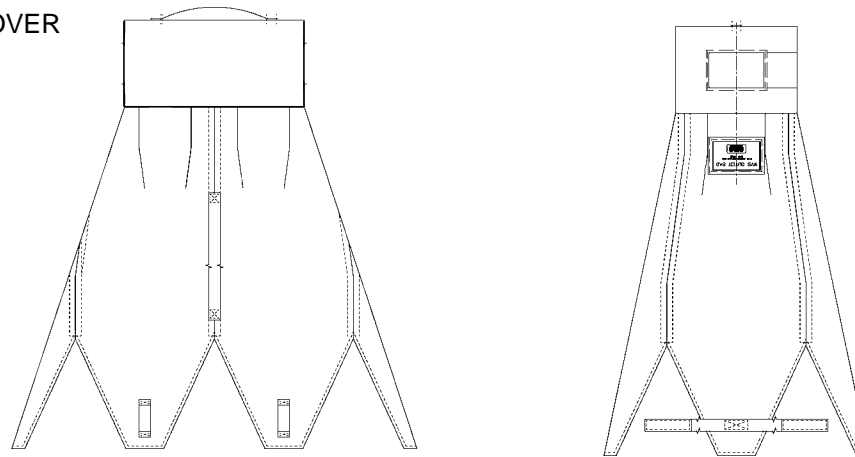
# WETA ACCESSORIES



WETA IVA CONNECTOR COVER

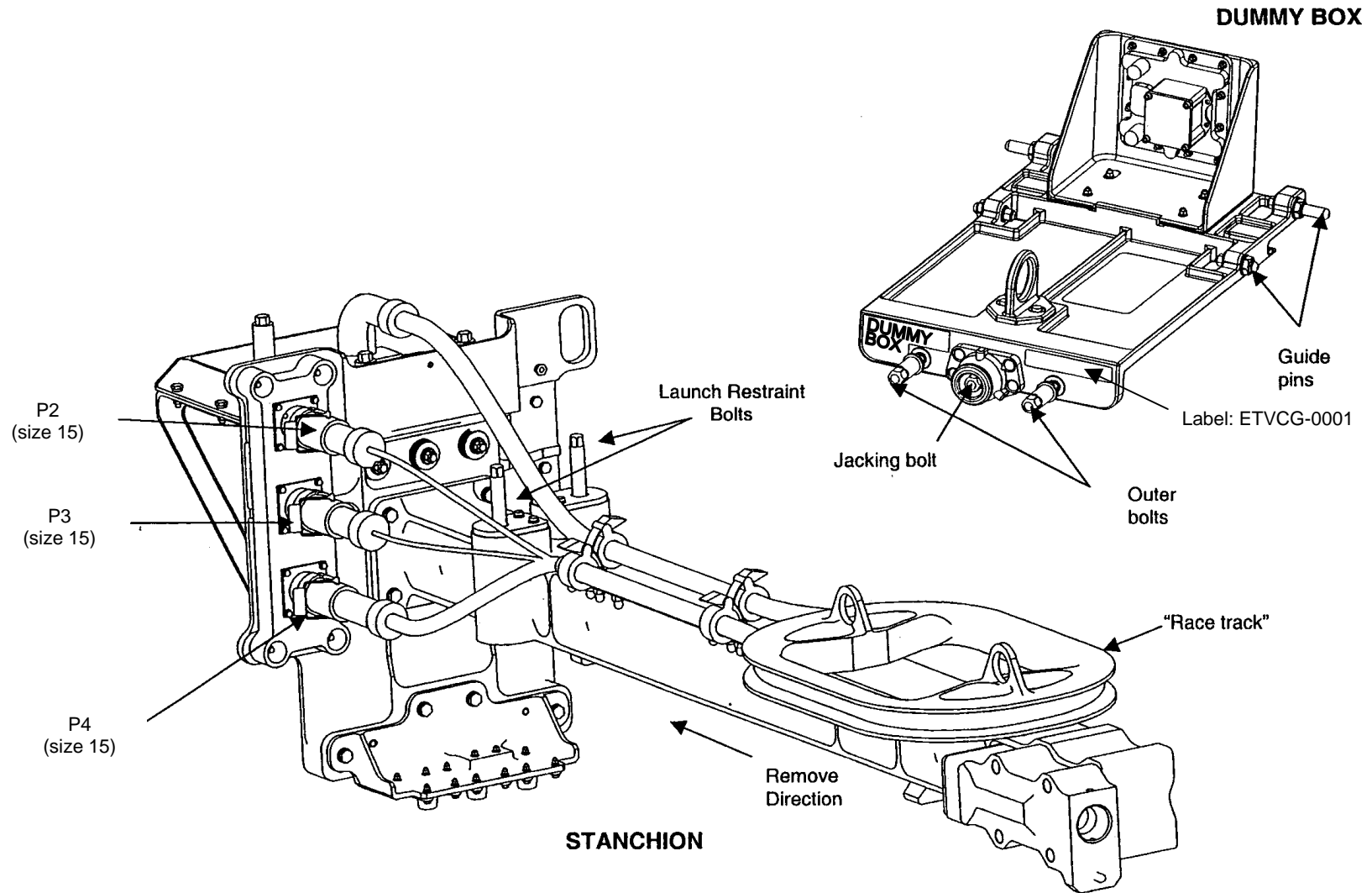


WETA EVA THERMAL COVER

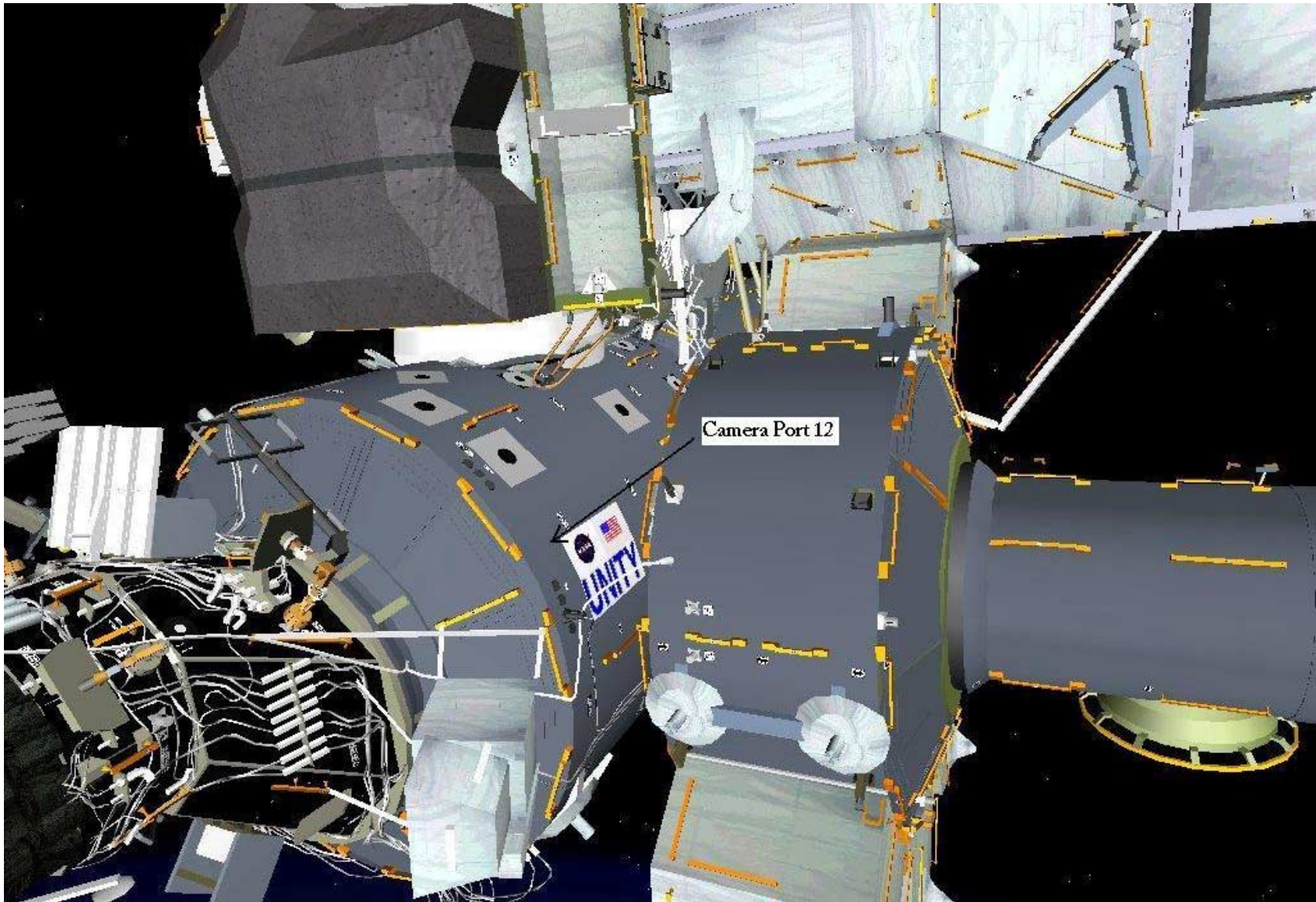


WETA OUTER BAG (IVA Only)

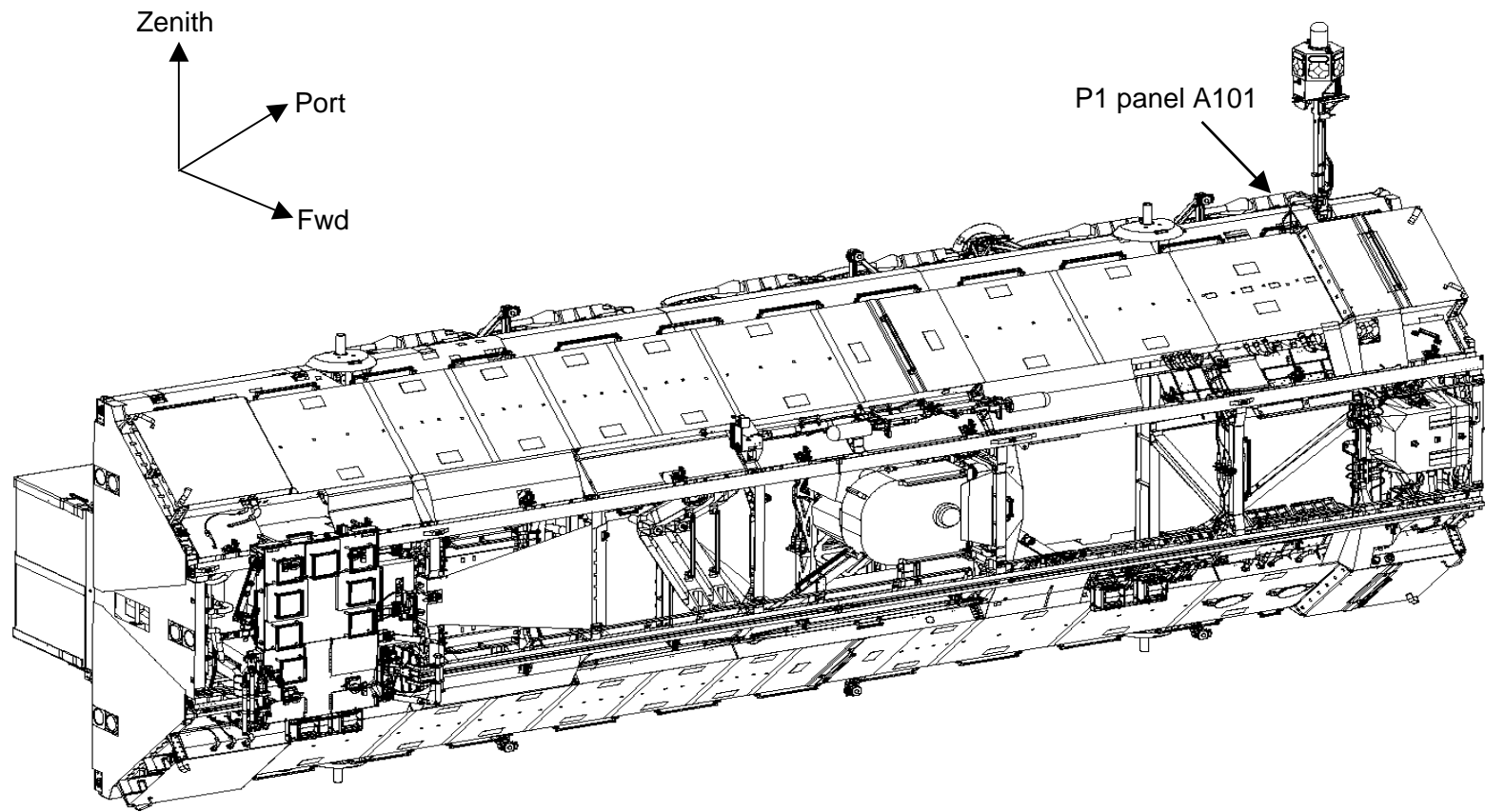
# WETA STANCHION



NODE WETA INSTALL – CP12

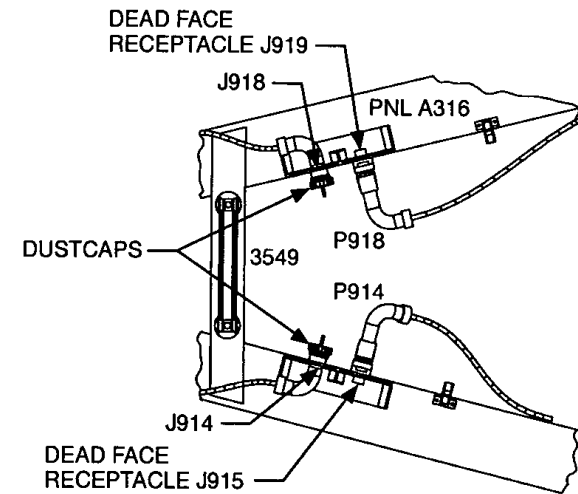
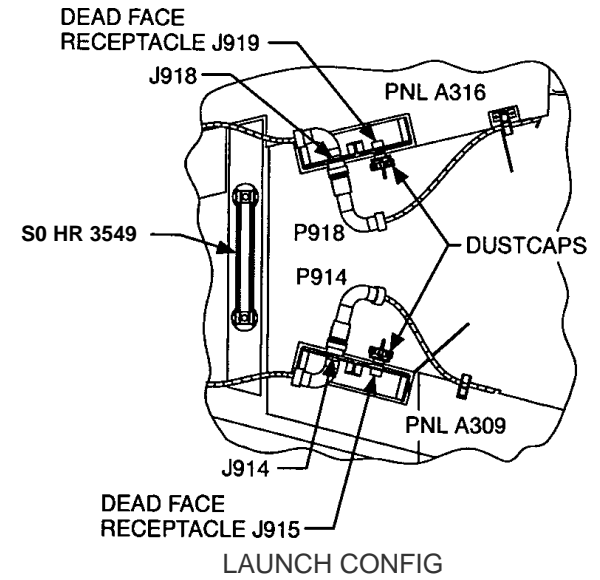
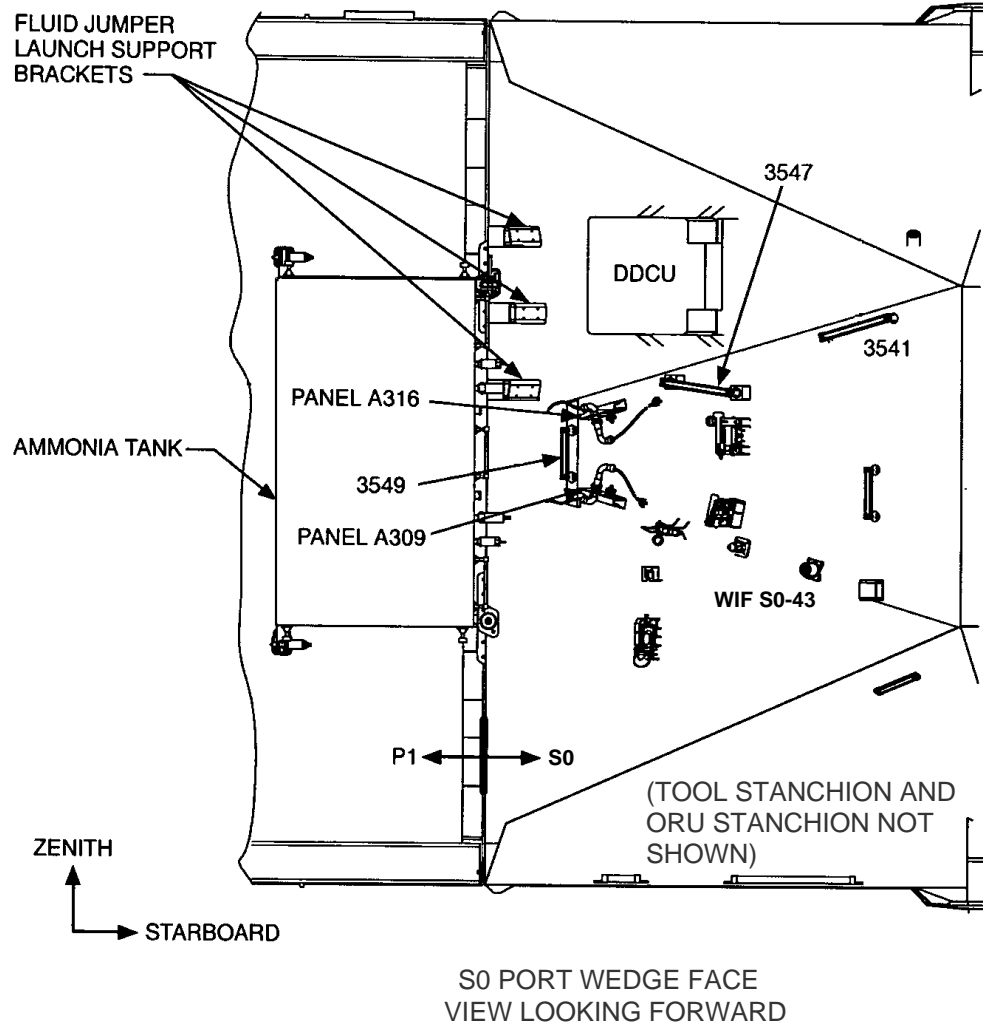


# P1 WETA INSTALL – CP08





# BBC DISCONNECT



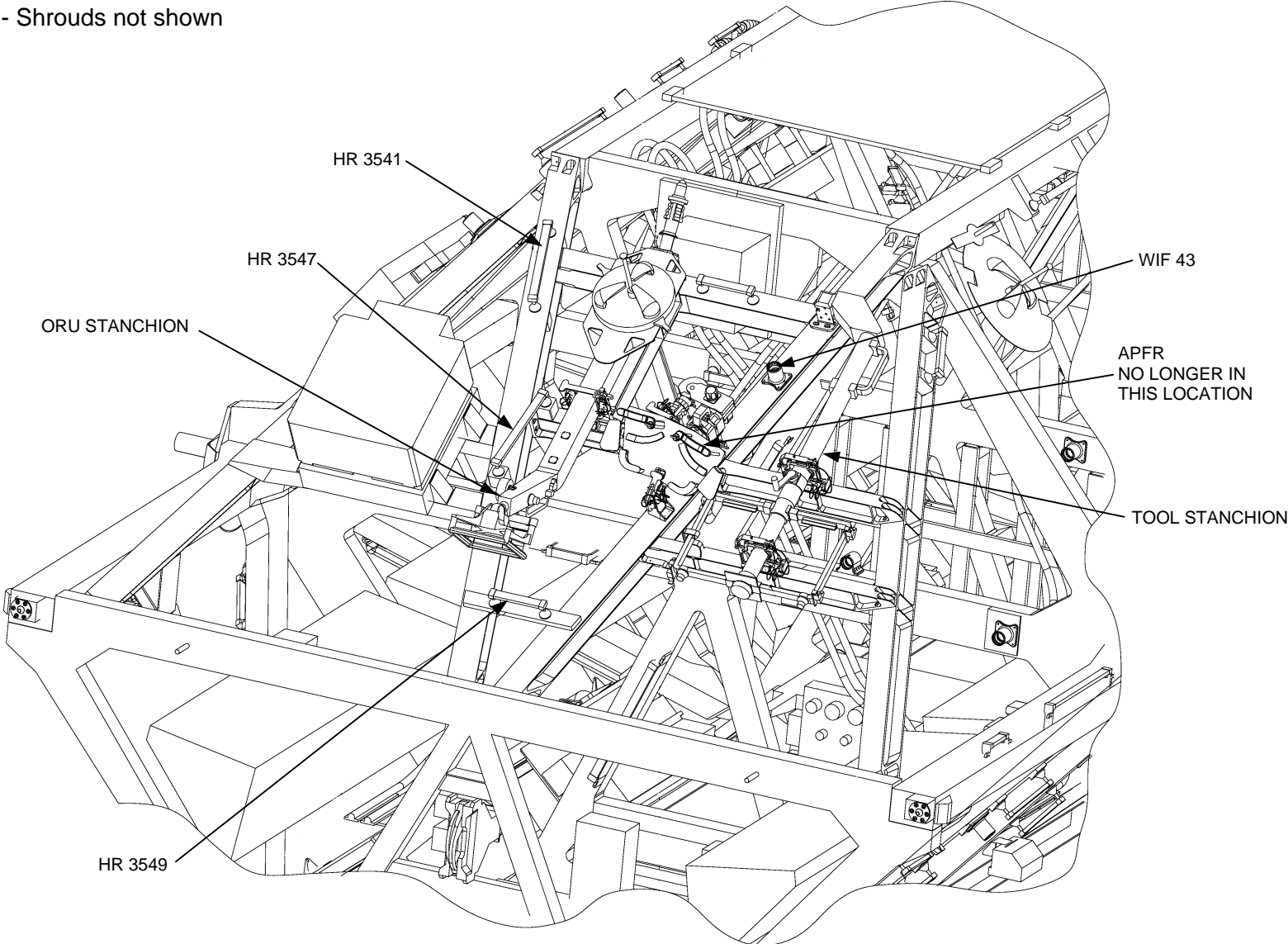
jsc48024-113\_004.crv

BBC DISCONNECTED

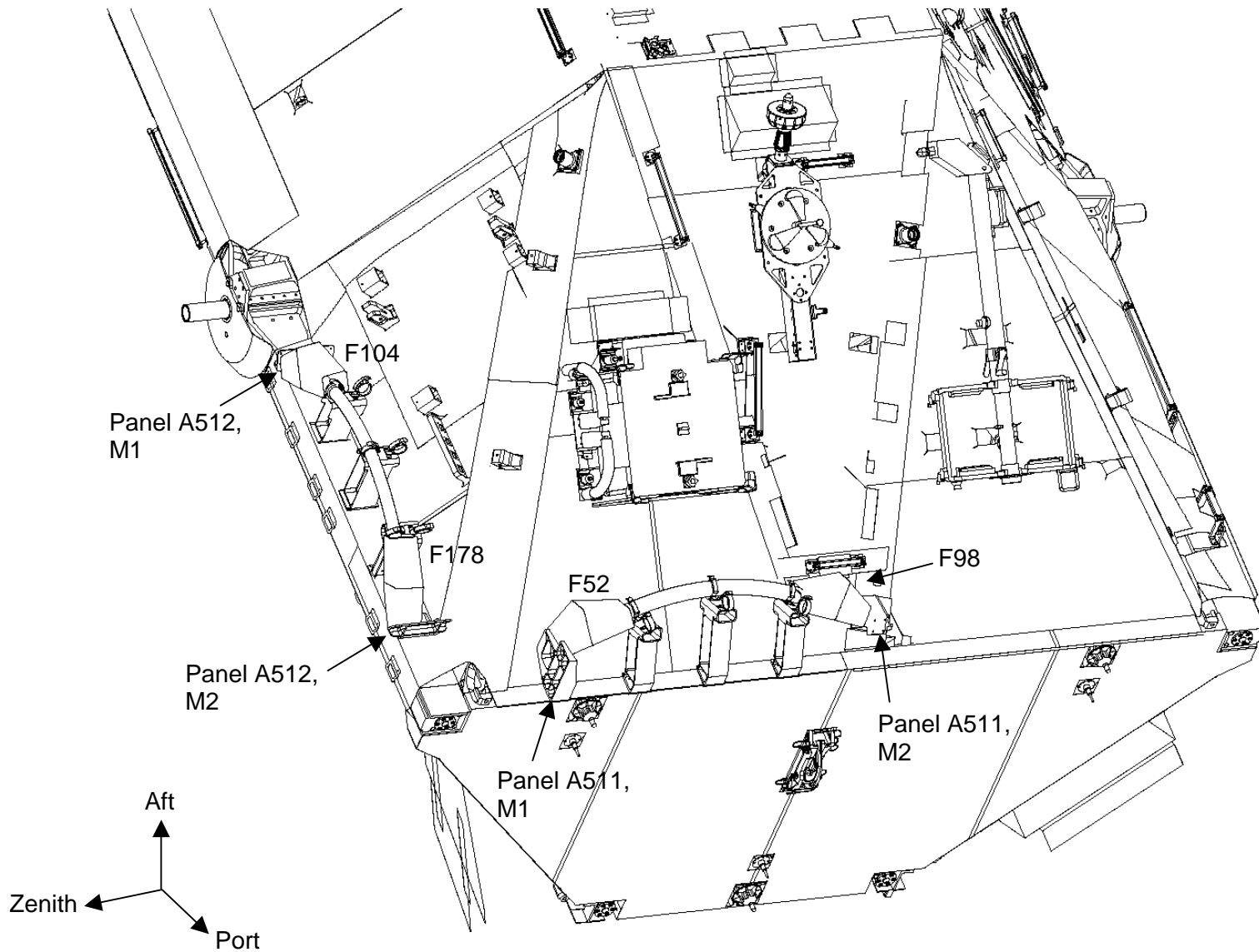
# FLUID JUMPERS

## S0 PORT WEDGE FACE

Note - Shrouds not shown



# SEGMENT-TO-SEGMENT JUMPERS



S0 Port Wedge Face

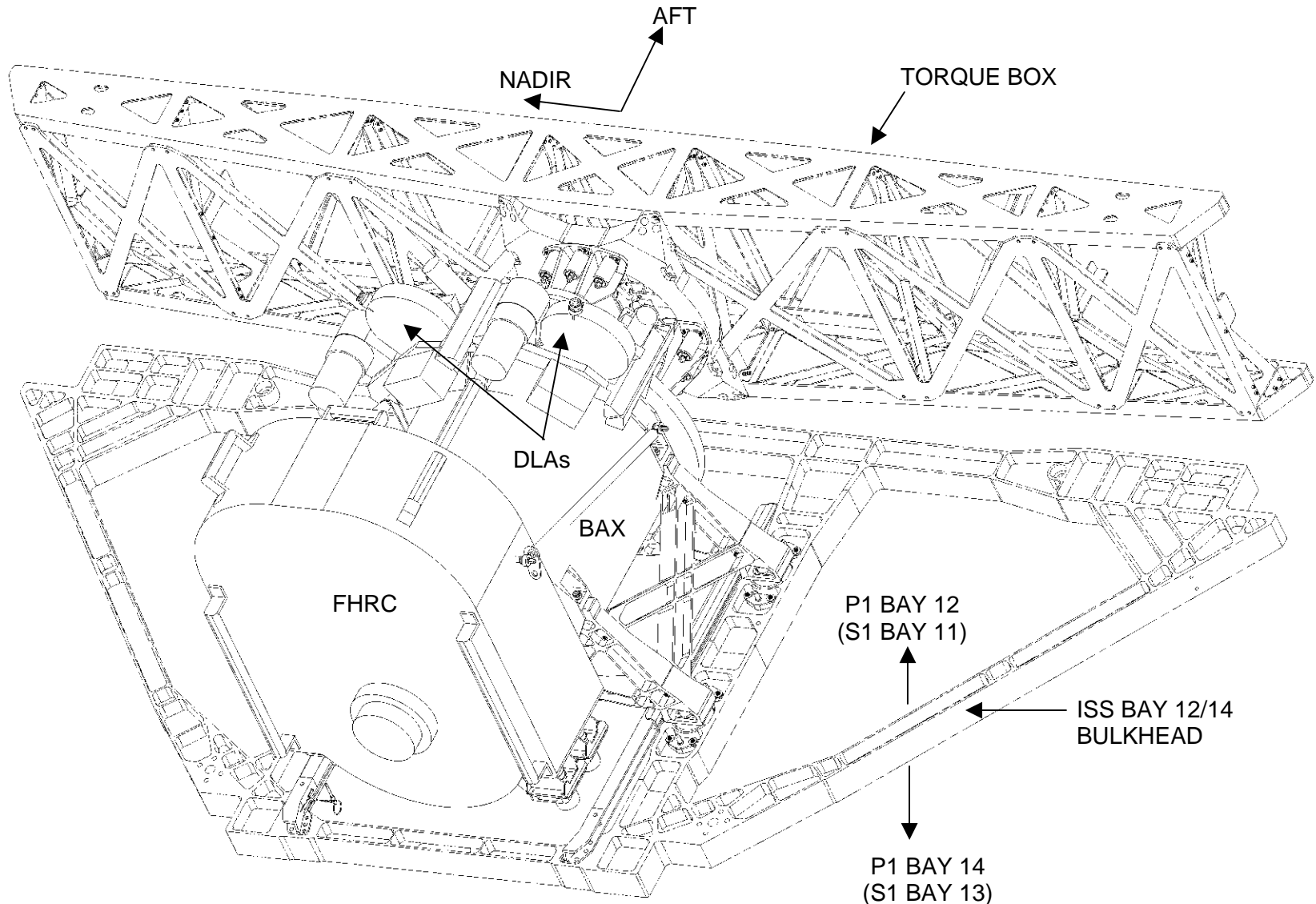
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EVA/113/FIN

TRRJ

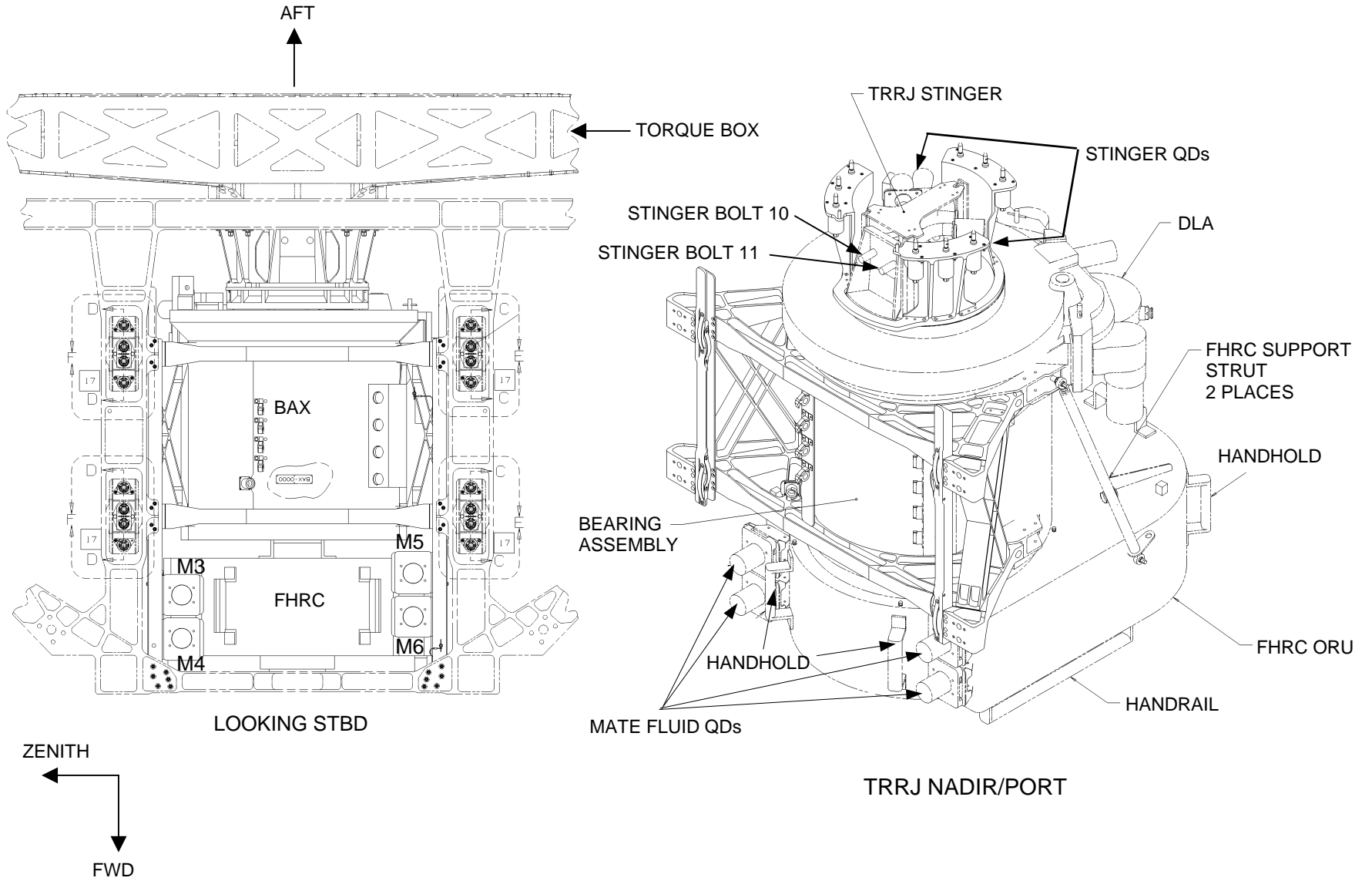
TRRJ

TRRJ OVERVIEW – STBD

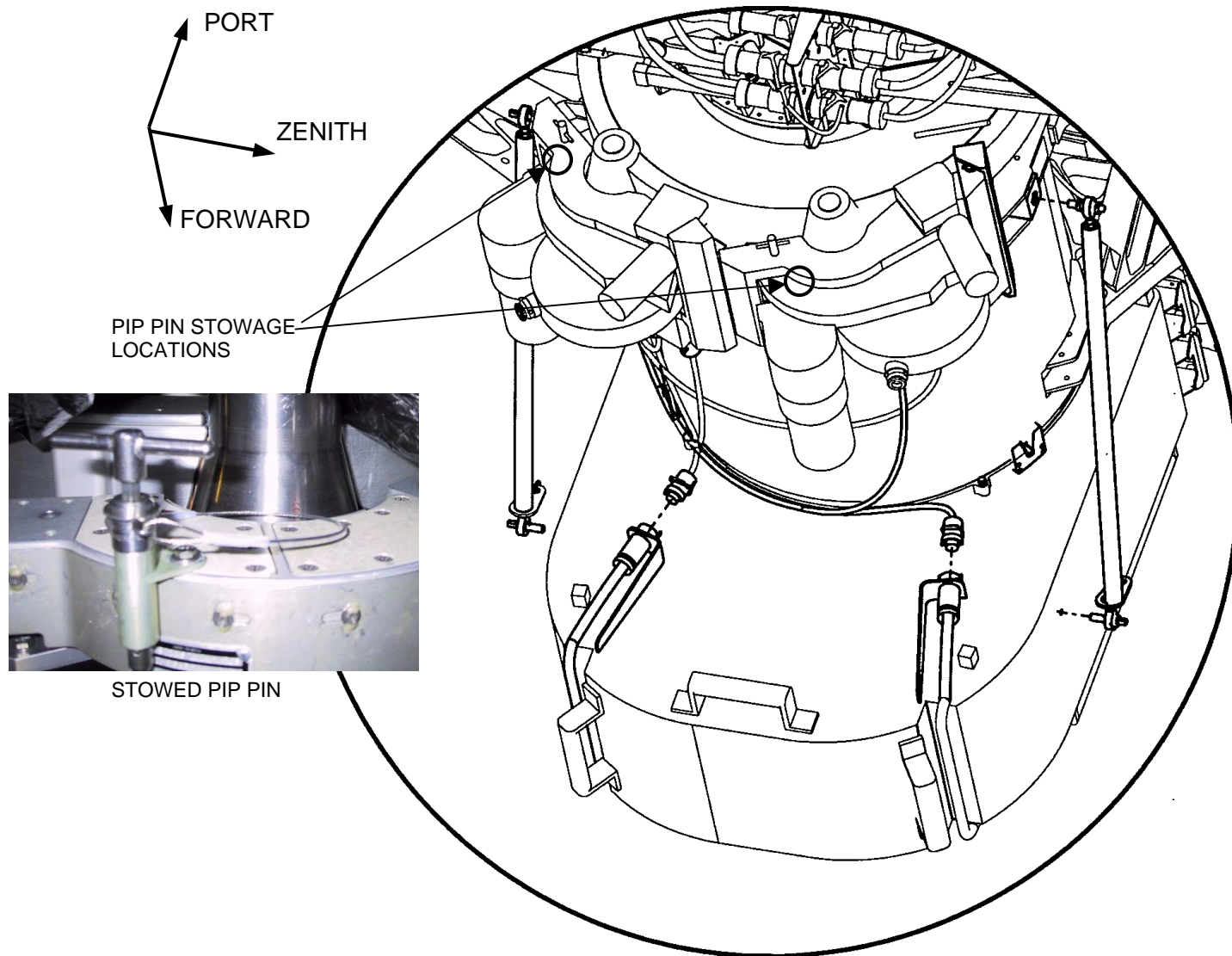


P1: ISS BAY 12, LOOKING PORT/AFT  
S1: ISS BAY 11, LOOKING STBD/AFT

# TRRJ OVERVIEW – P1 PORT/S1 STBD

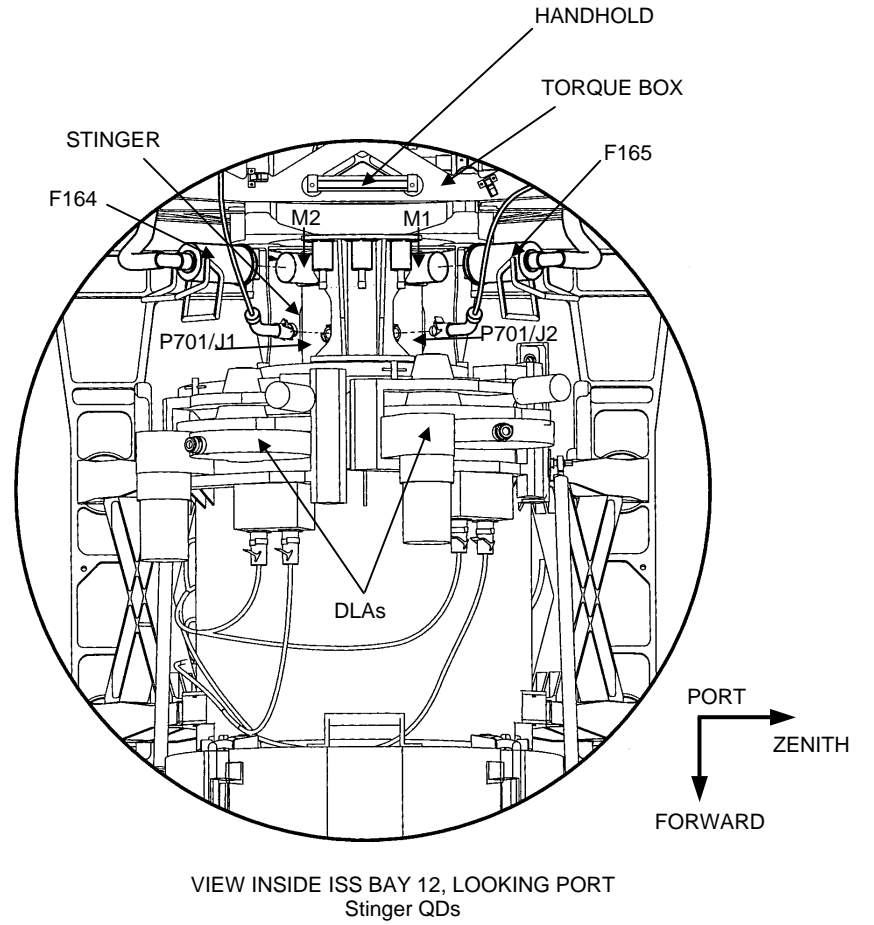
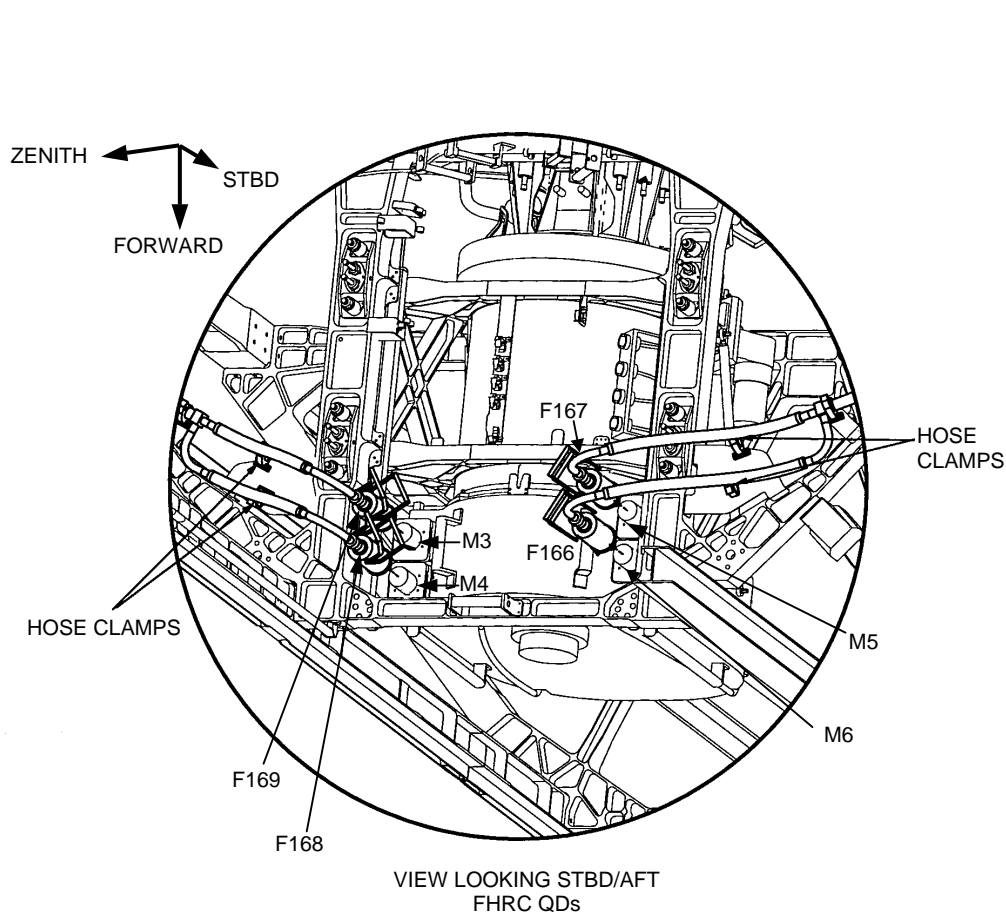


# TRRJ DRIVE LOCK ASSEMBLIES

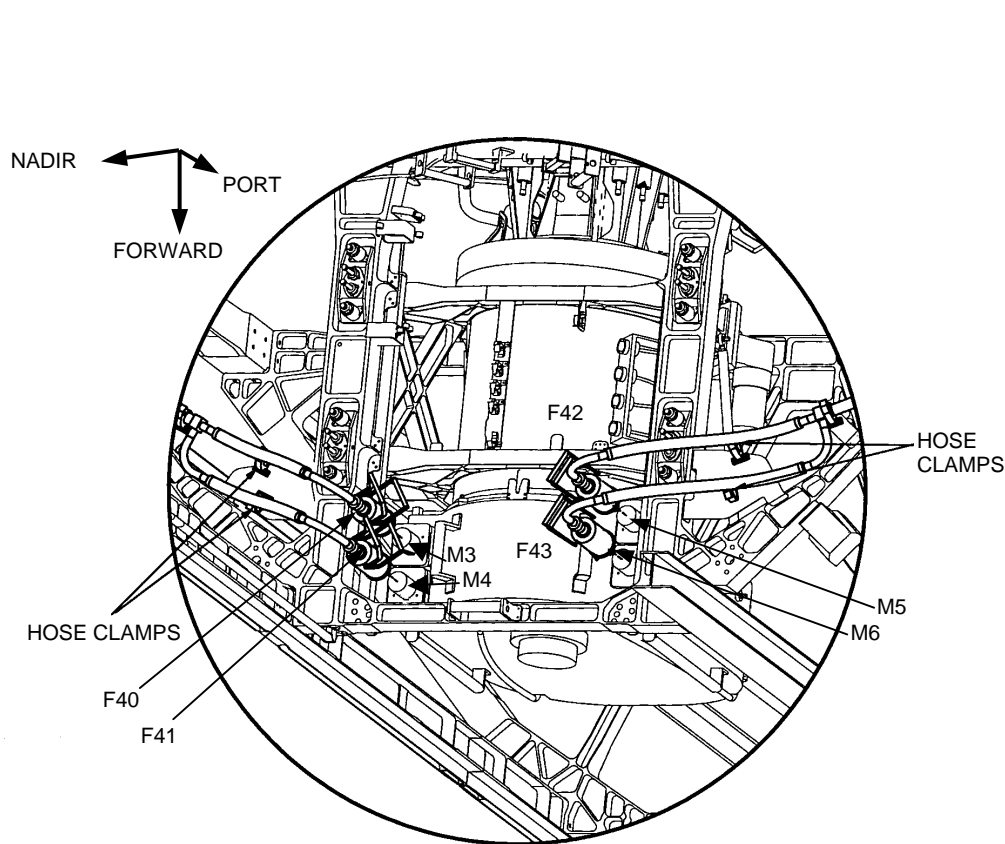


**NOTE:** Pip pins shown in launch locations  
Struts not shown as attached for launch

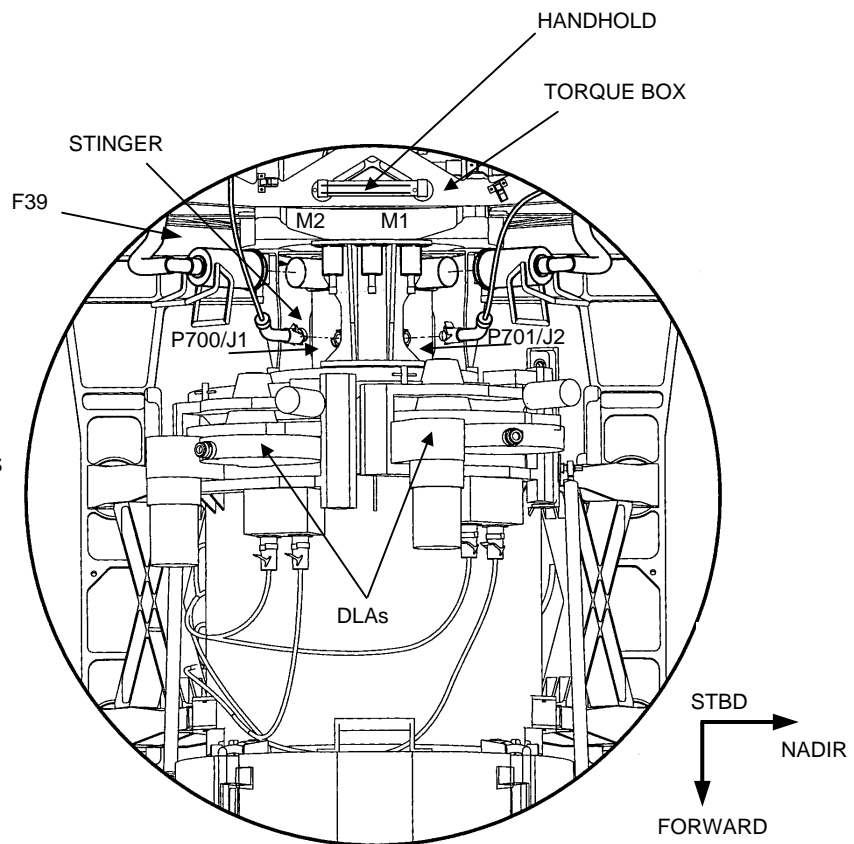
**P1 TRRJ FHRC/STINGER FLUID QDs (1.5-IN)**



# S1 TRRJ FHRC/STINGER FLUID QDs (1.5-IN)



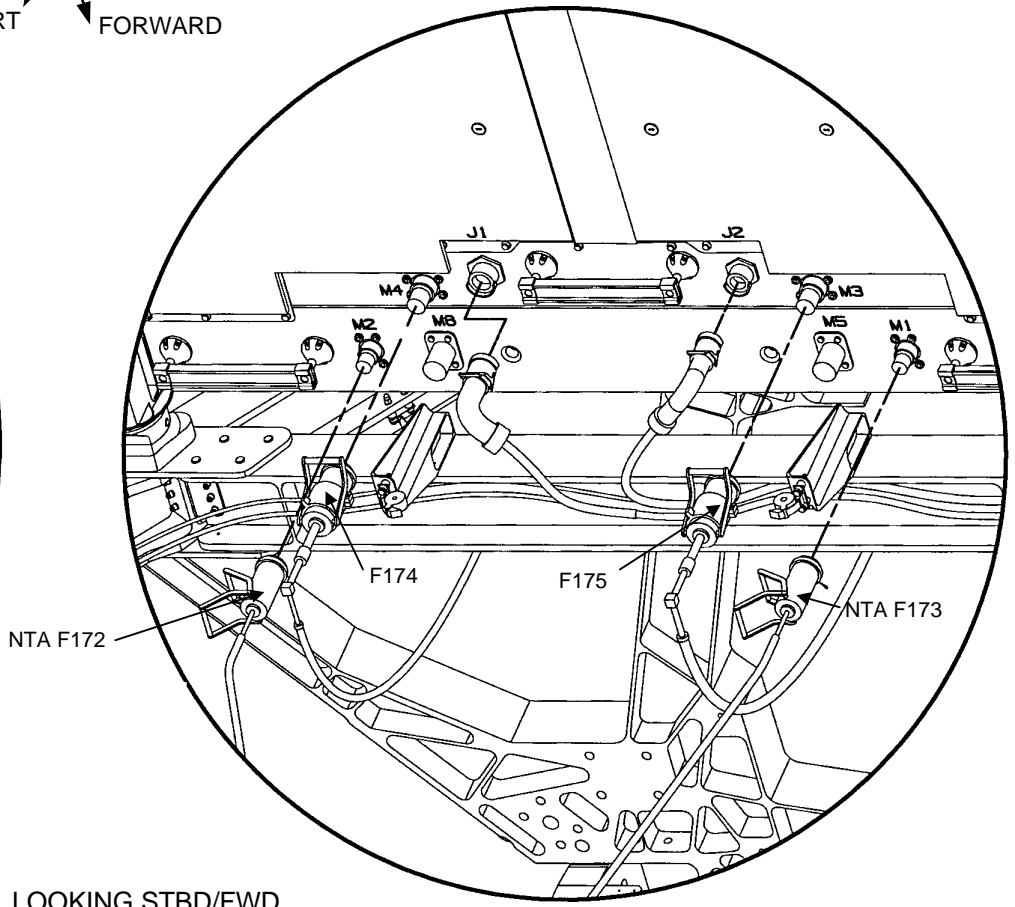
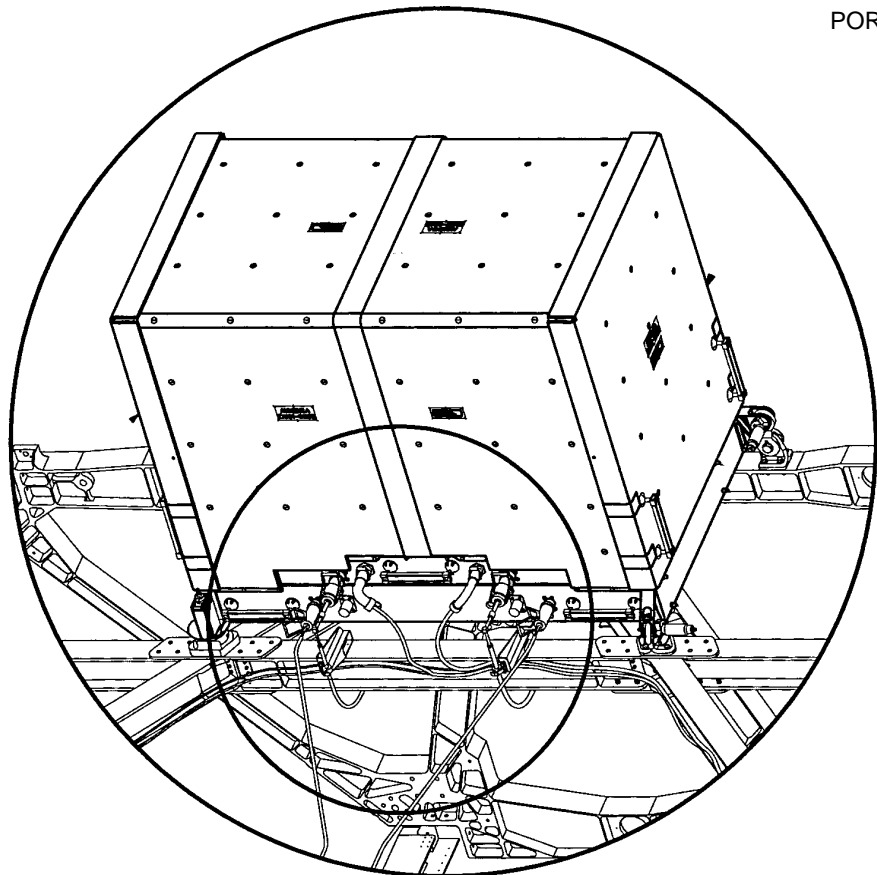
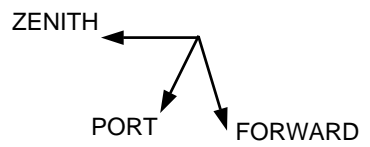
VIEW LOOKING PORT/AFT  
FHRC QDs



VIEW INSIDE ISS BAY 11, LOOKING STBD  
Stinger QDs



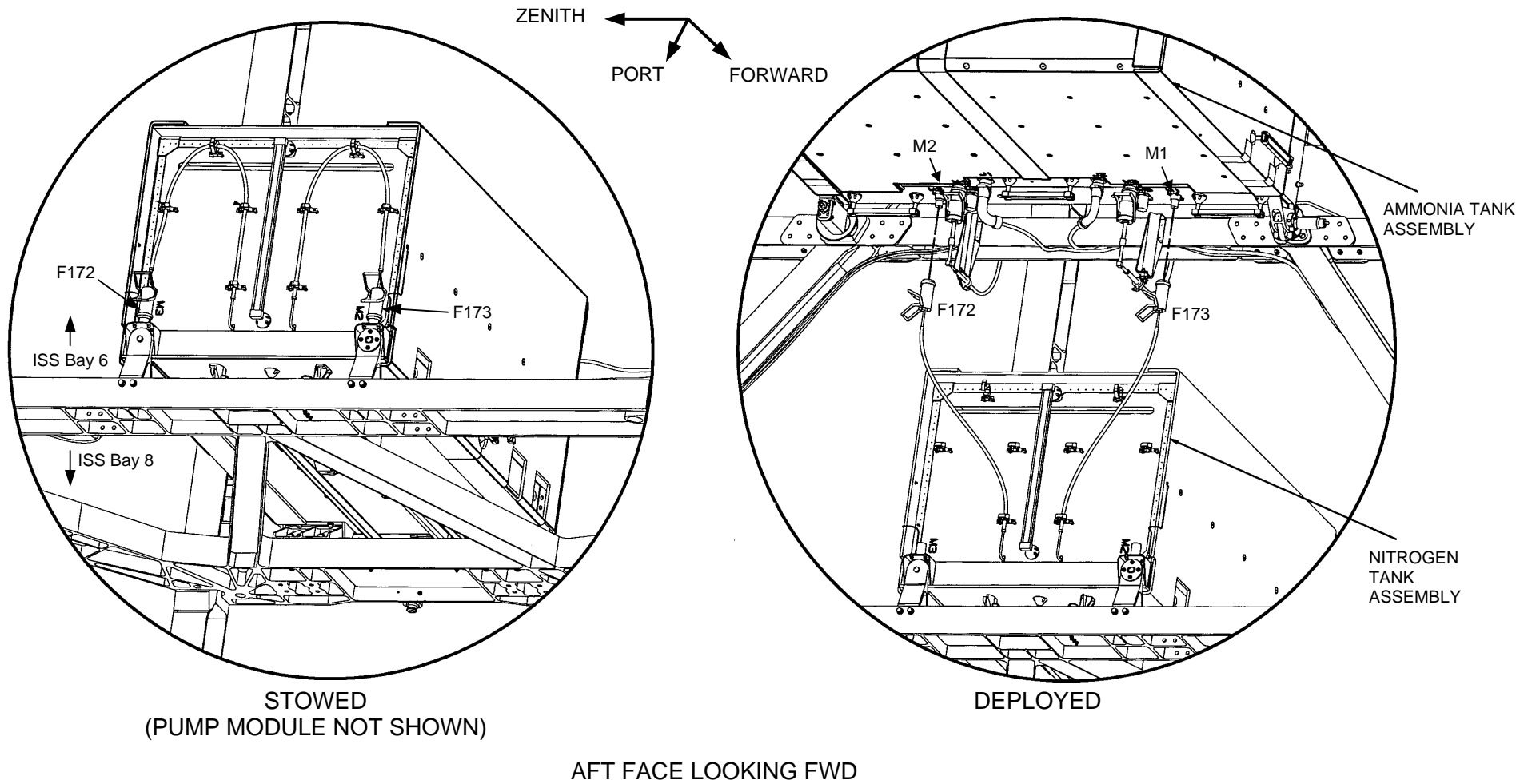
# P1 AMMONIA TANK FLUID CONNECTIONS



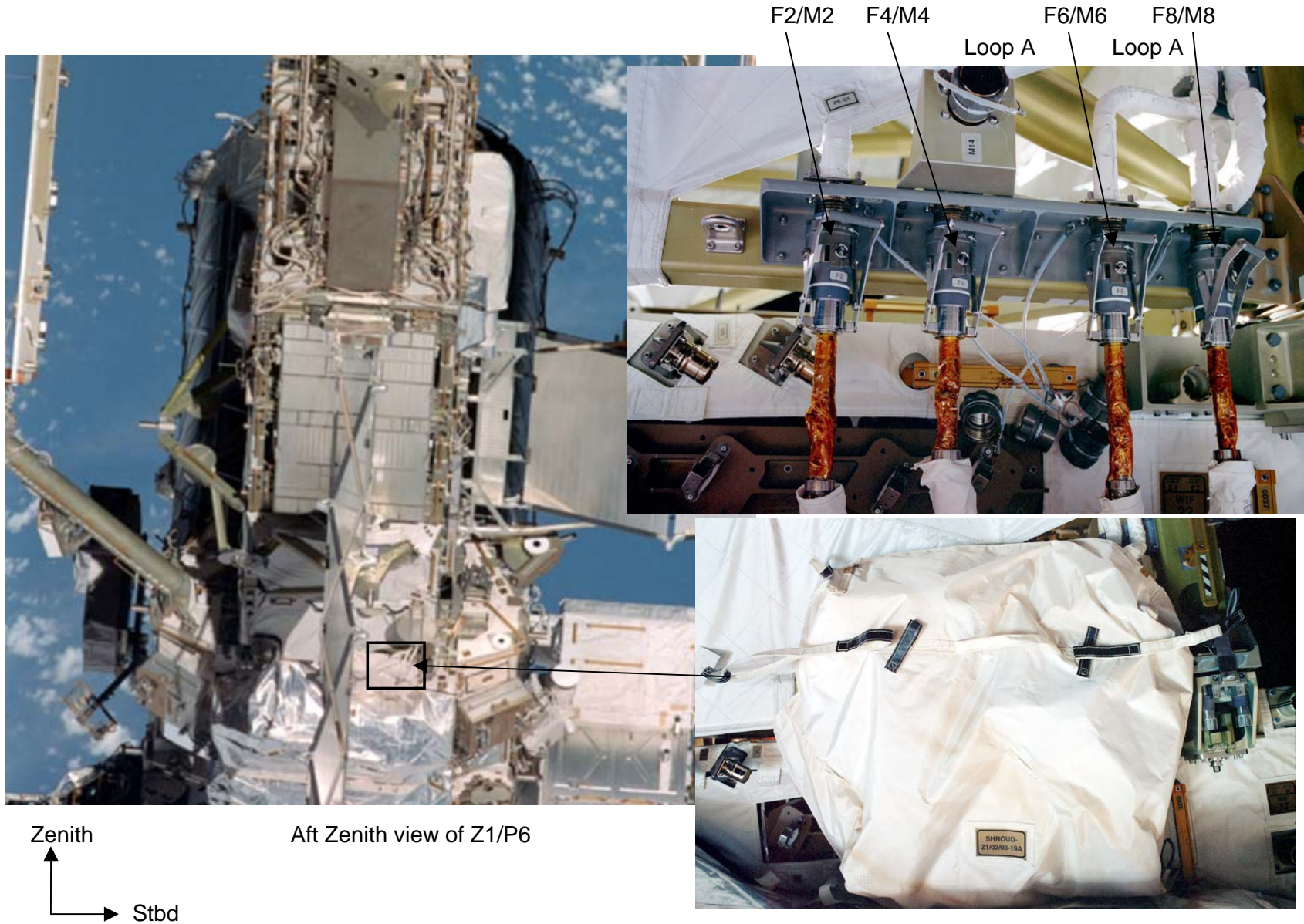
AFT FACE, LOOKING STBD/FWD

ATA/NTA

P1 NITROGEN TANK FLUID CONNECTIONS

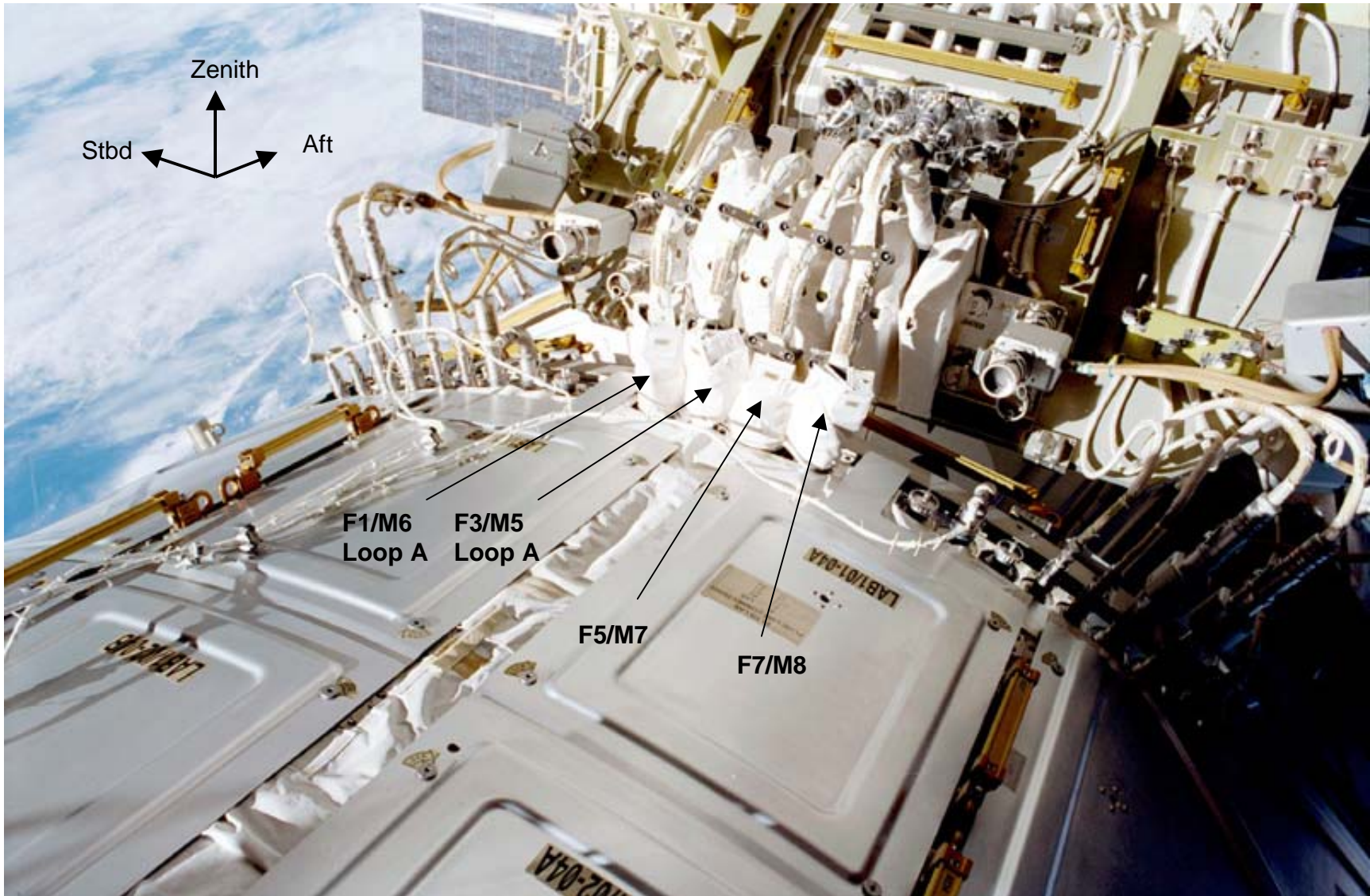


# Z1 TO P6 QDs (1-IN)

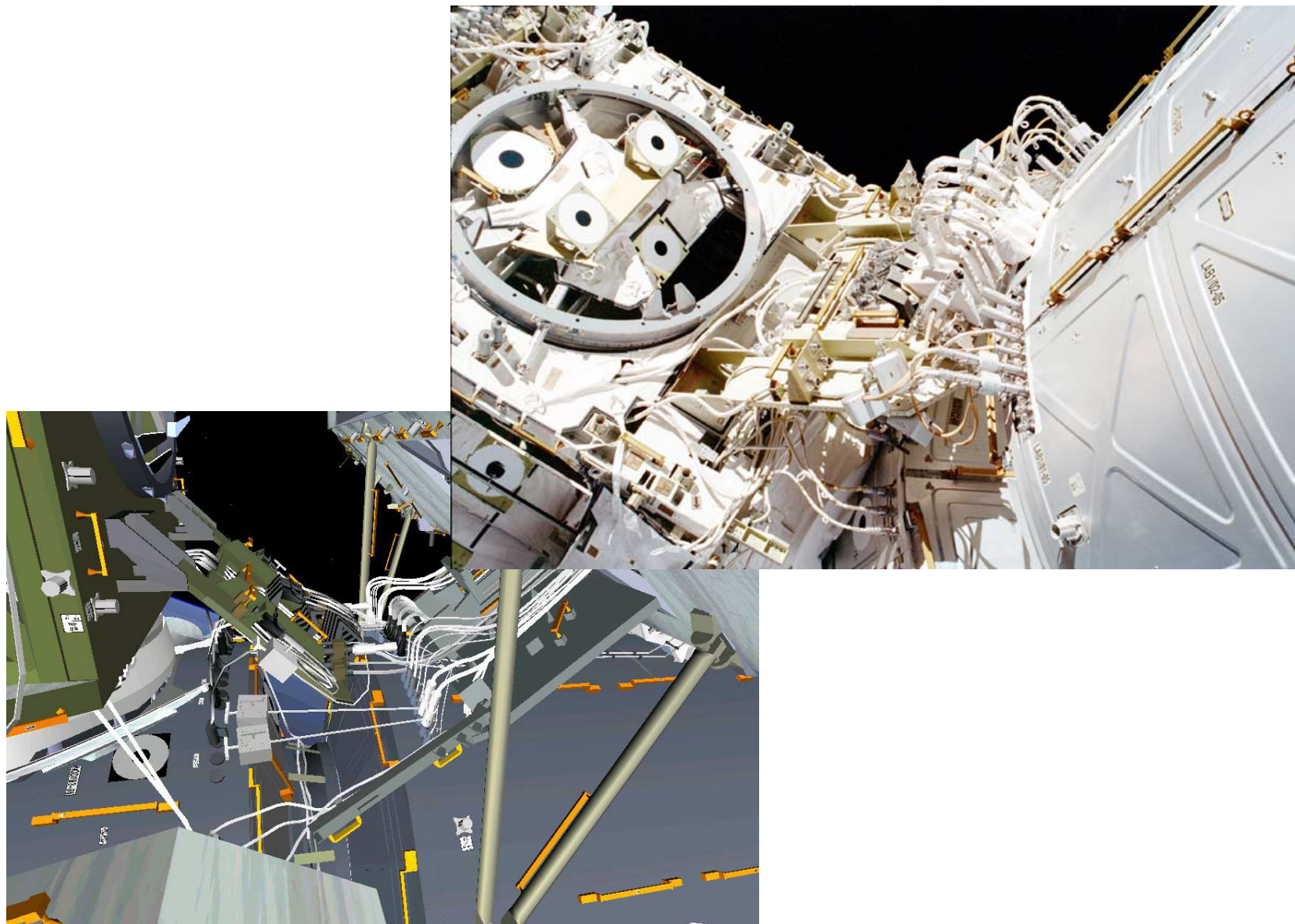


# SPD INSTALL

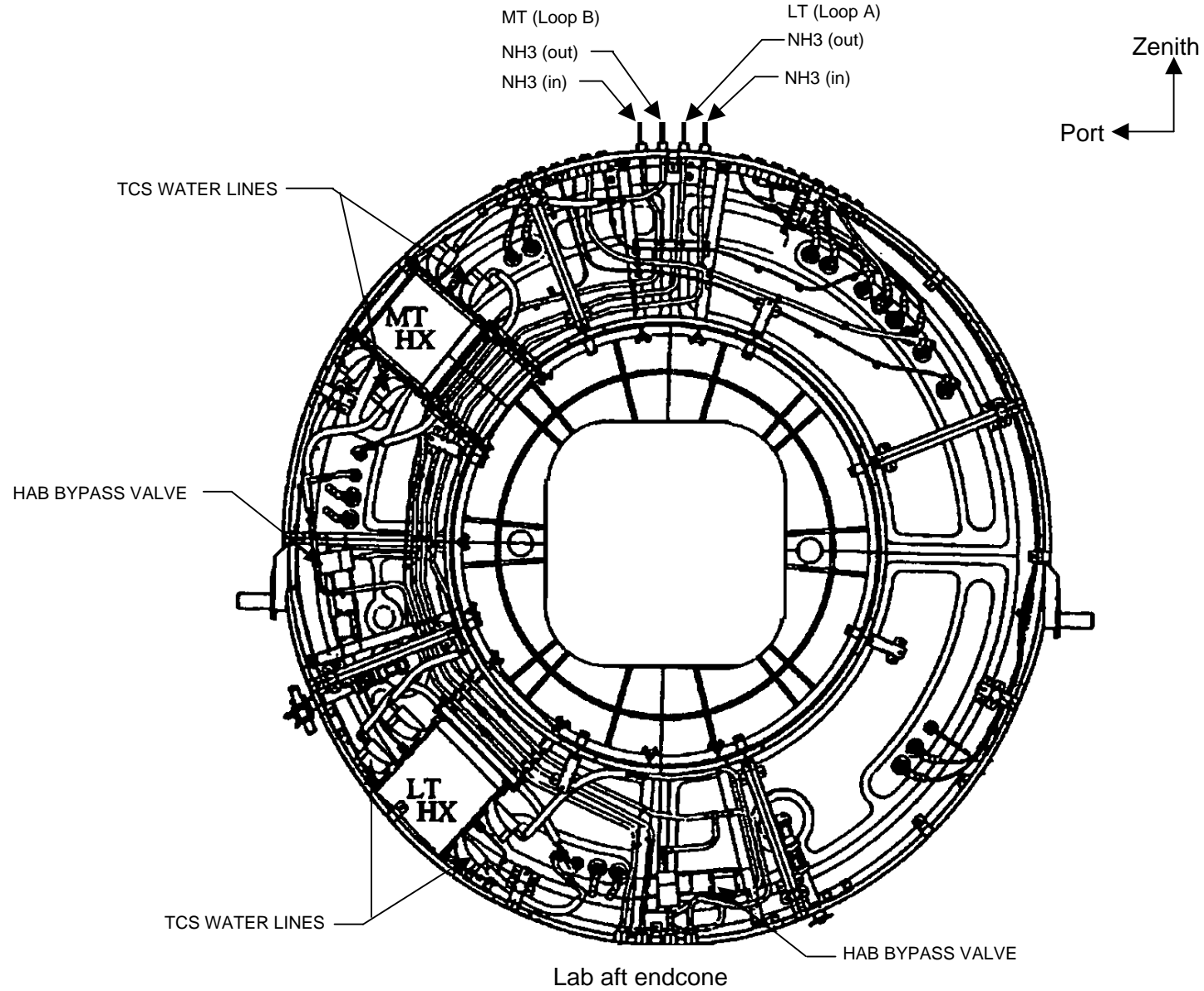
## Z1 TO LAB QDs (1-IN)



# Z1 TO LAB QDs (1-IN) (Cont)



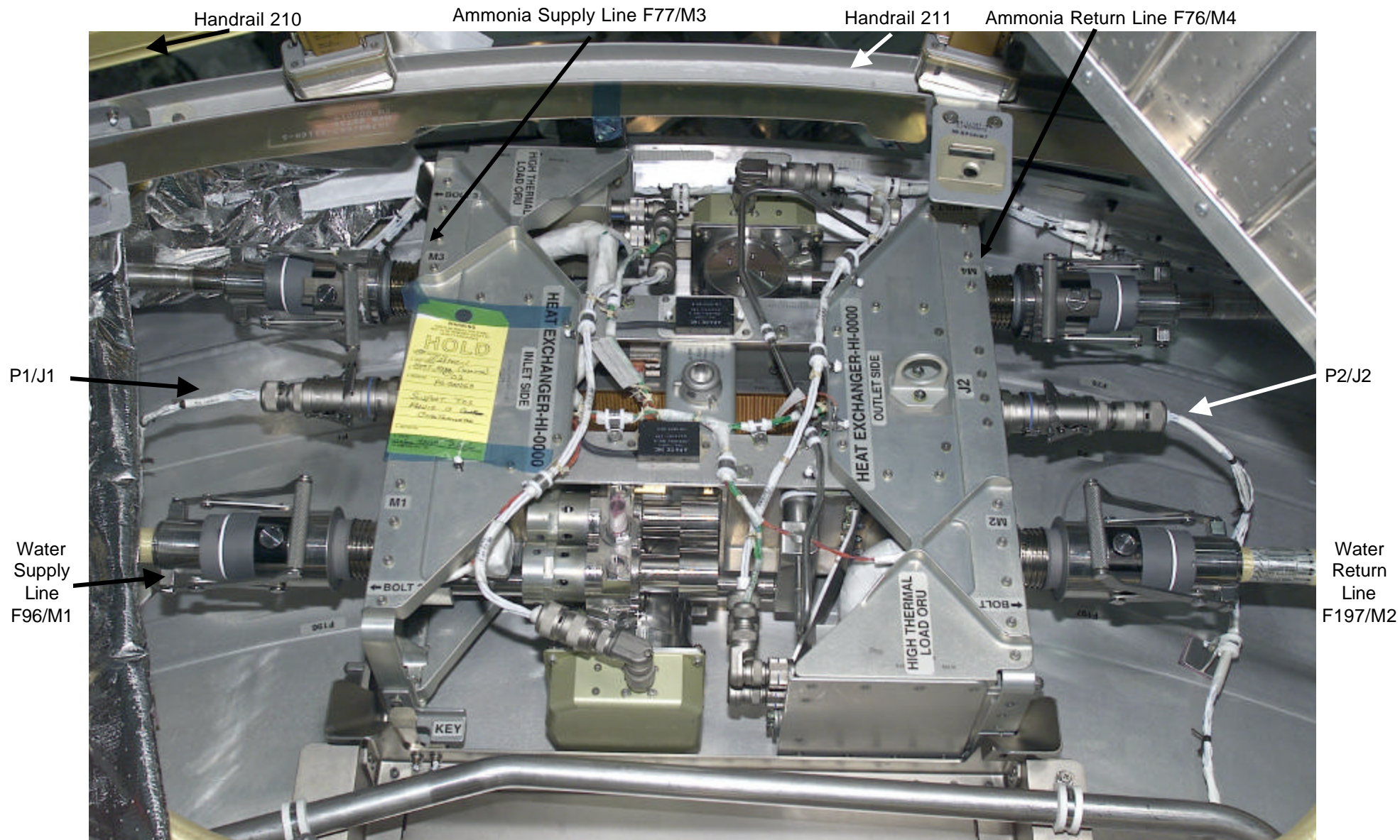
# LAB MT AND LT HEAT EXCHANGERS



# LAB MT HEAT EXCHANGER

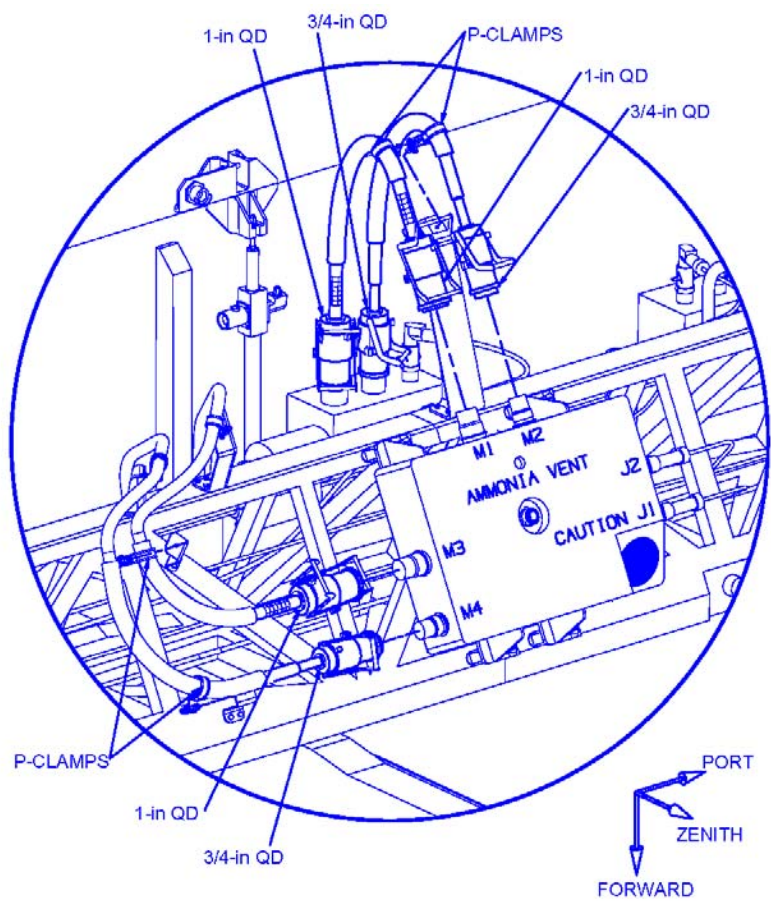


# LAB MT HEAT EXCHANGER (Cont)

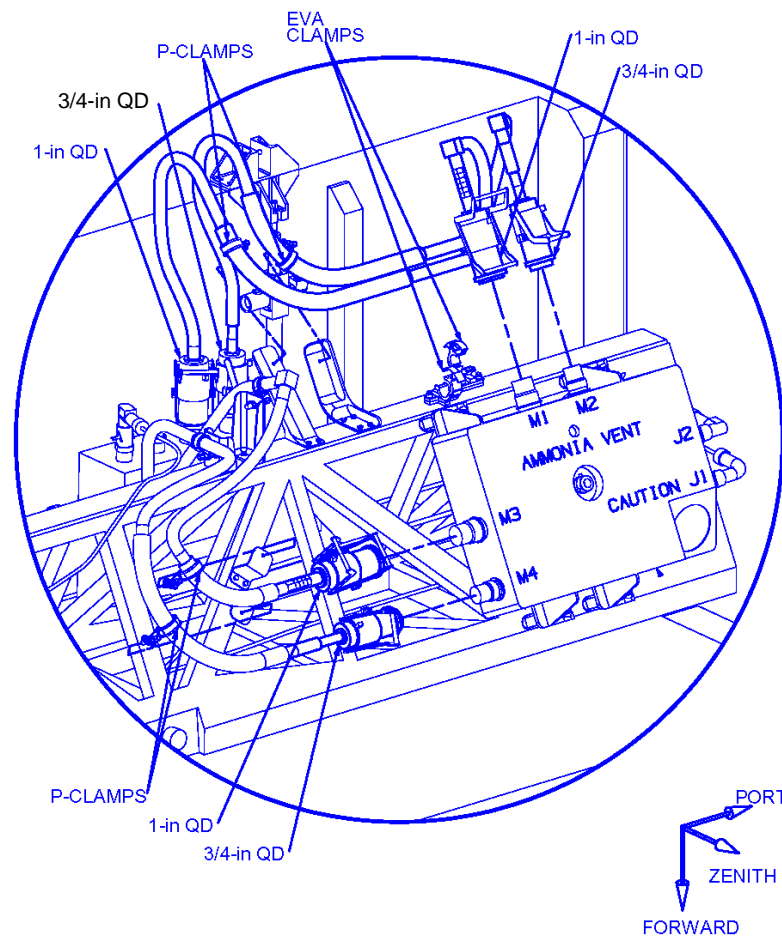




**RBVM QDs (1.0-IN)**

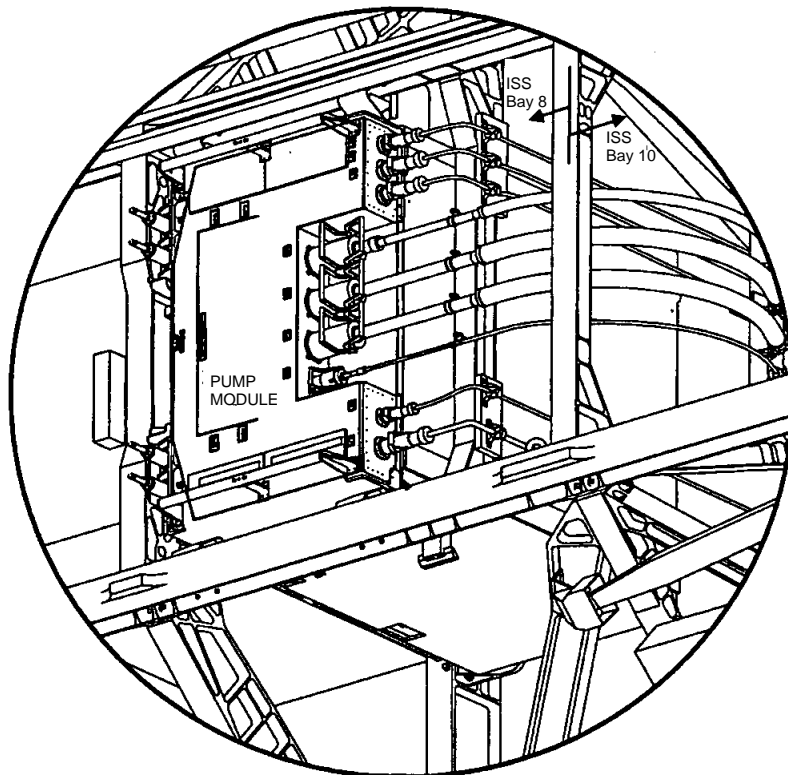


P1-1-2, P1-2-2, P1-3-2 RBVMs  
(Typical)

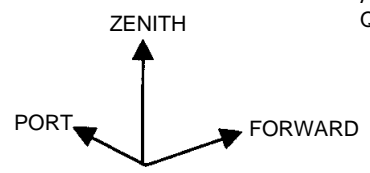
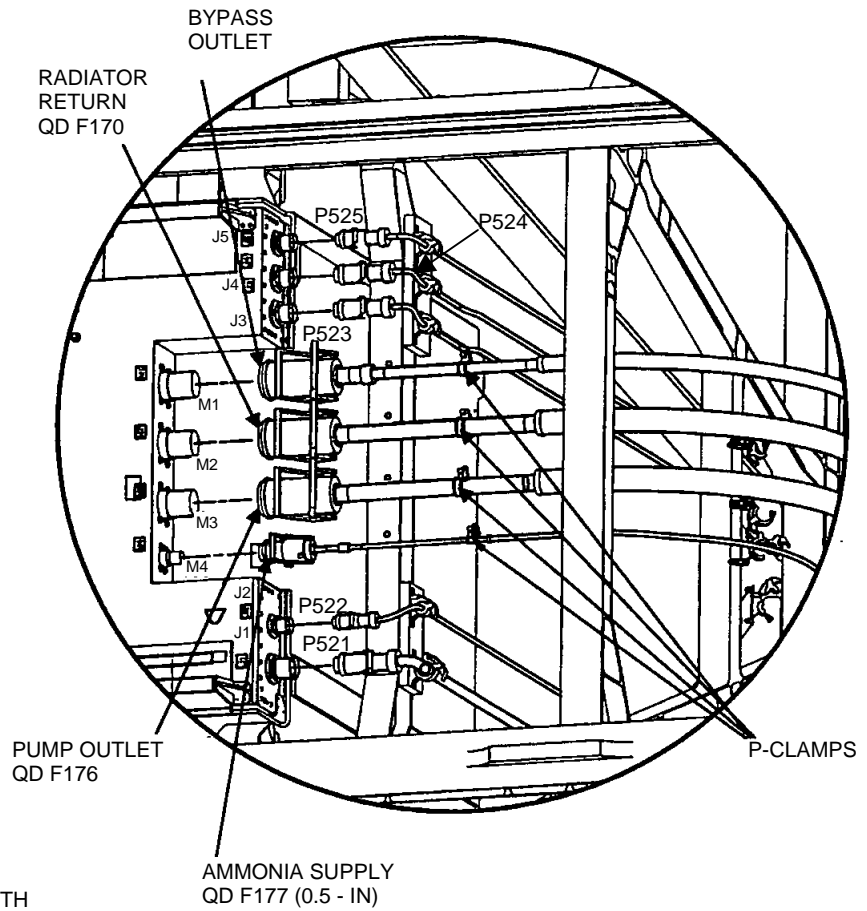


P1-1-1, P1-2-1, P1-3-1 RBVMs  
(Typical)

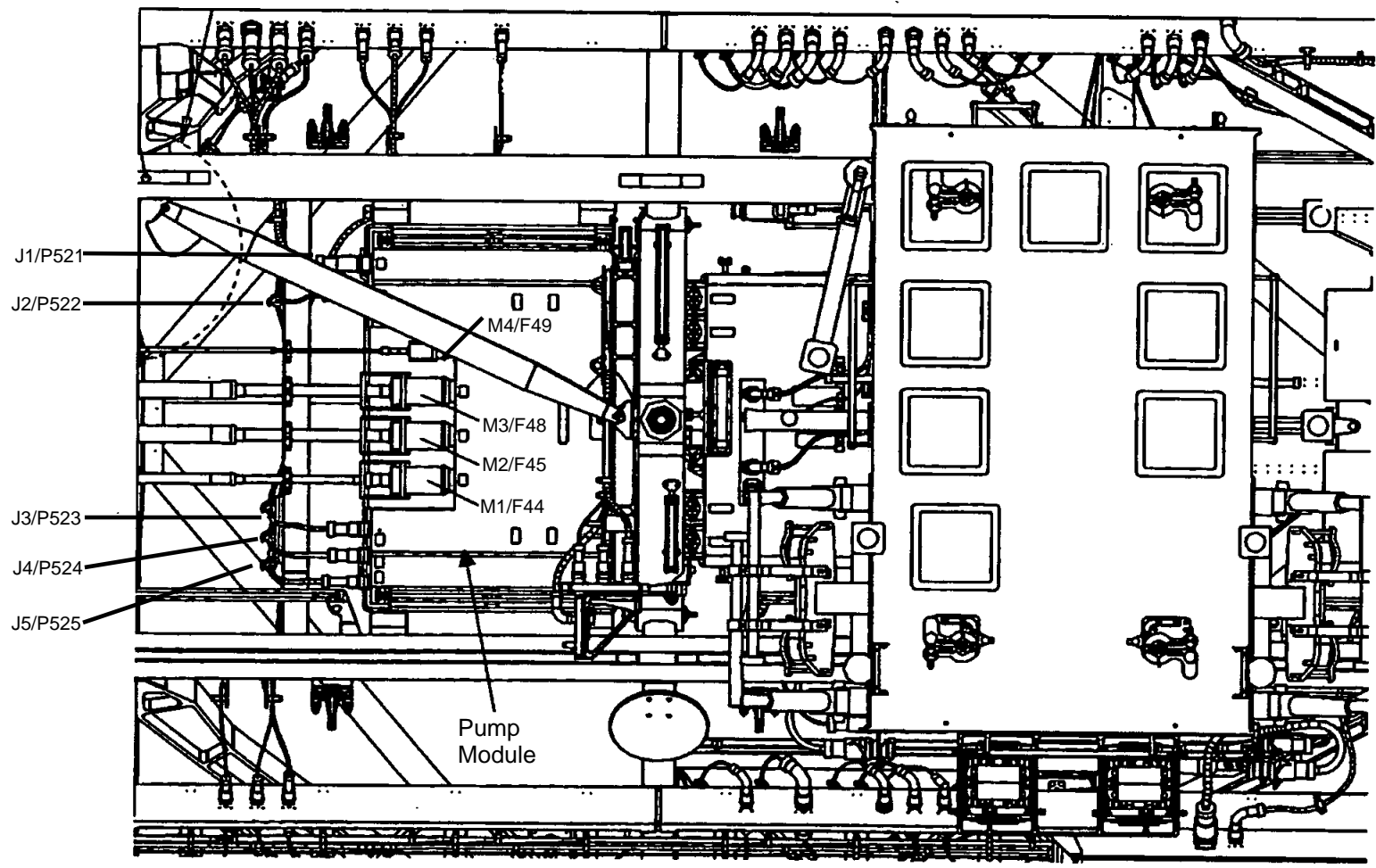
# P1 PUMP MODULE FLUID QDs (1.5-IN, 0.5-IN)



VIEW LOOKING AFT/STBD



# S1 PUMP MODULE FLUID QDs (1.5-IN, 0.5-IN)

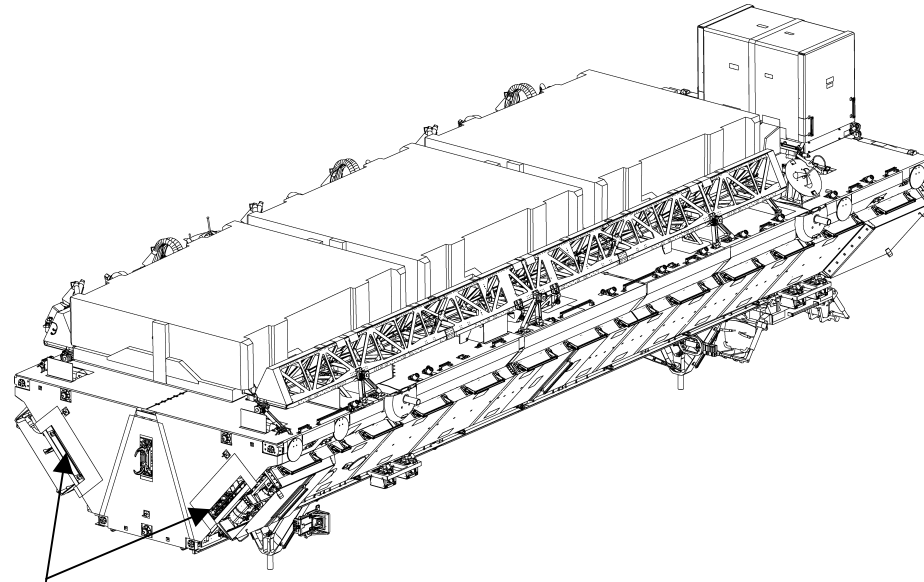


NOTE: CETA Cart, Keel Pin and Drag Link shown in launch config

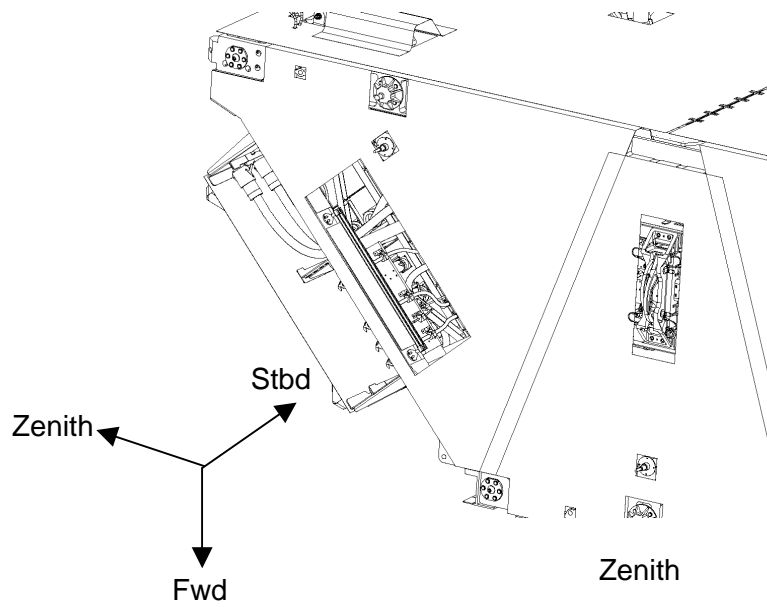
FWD FACE

Stbd ←  
↓ Nadir

# P1/P3 LINE CLAMPS

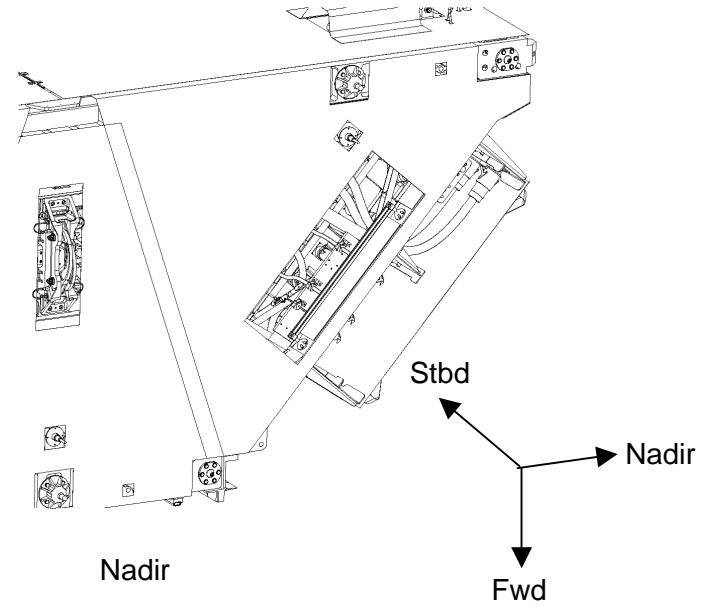


P1/P3 Line Clamps



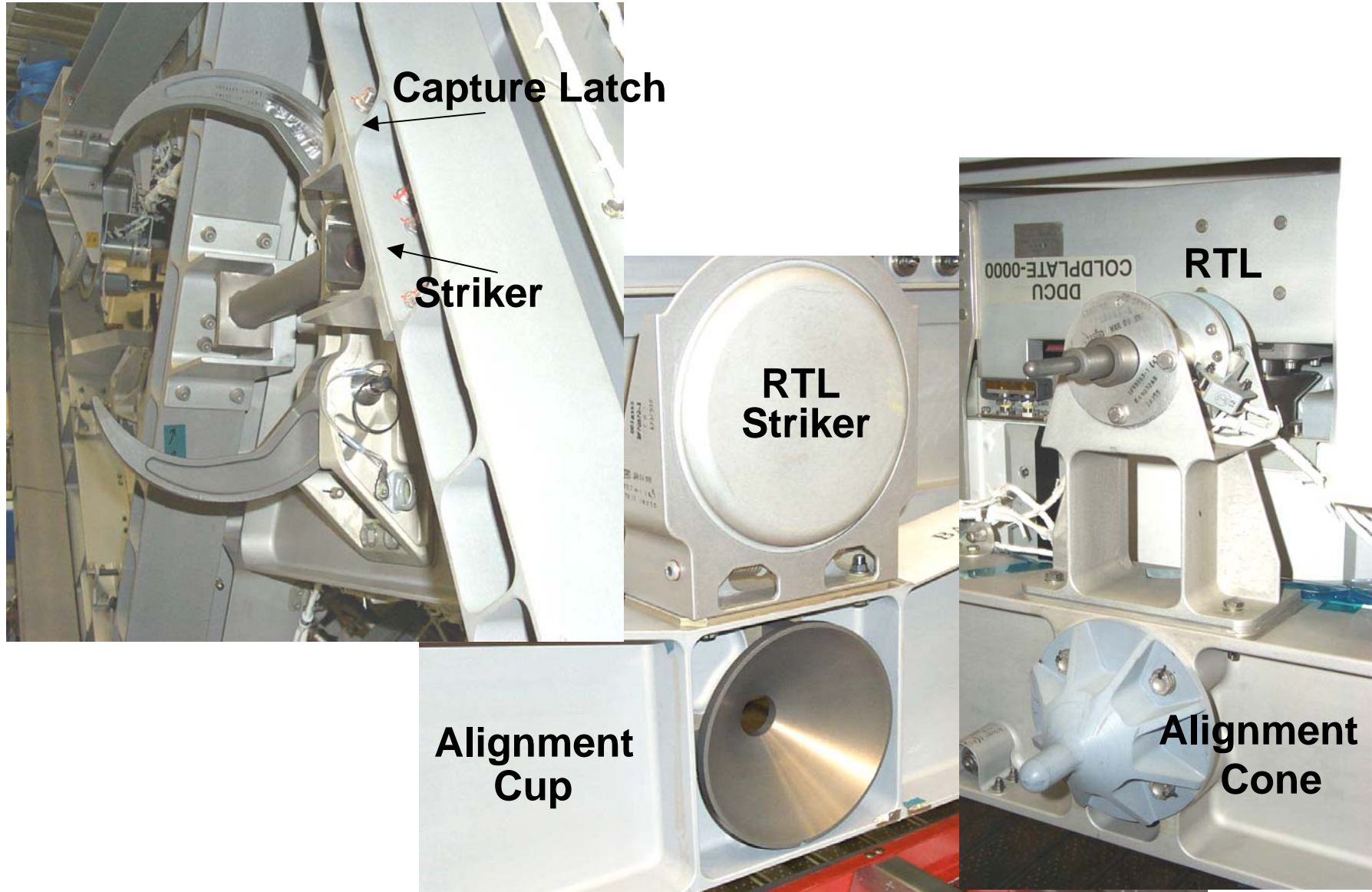
Zenith

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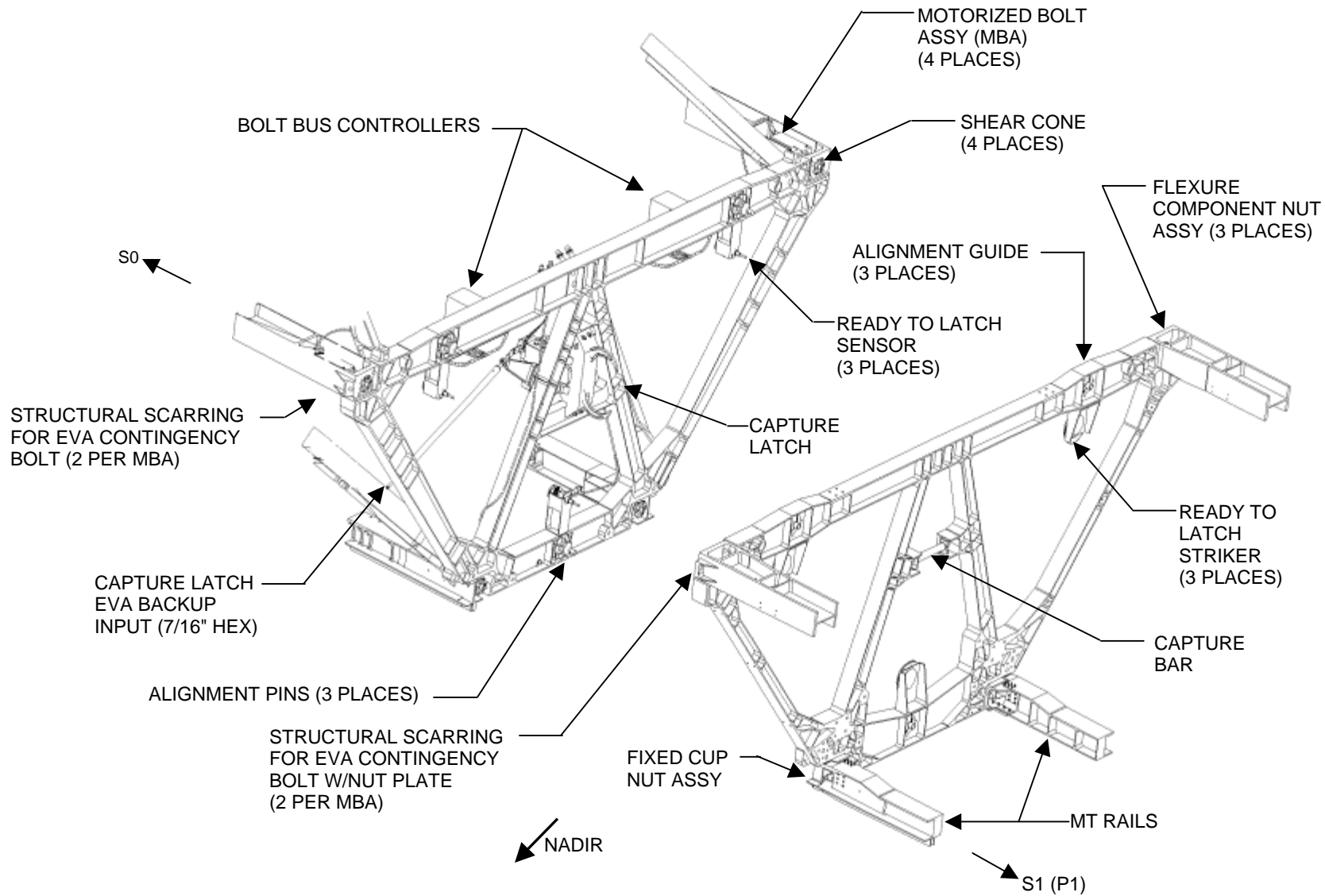


EVA/113/FIN

# SSAS COMPONENTS

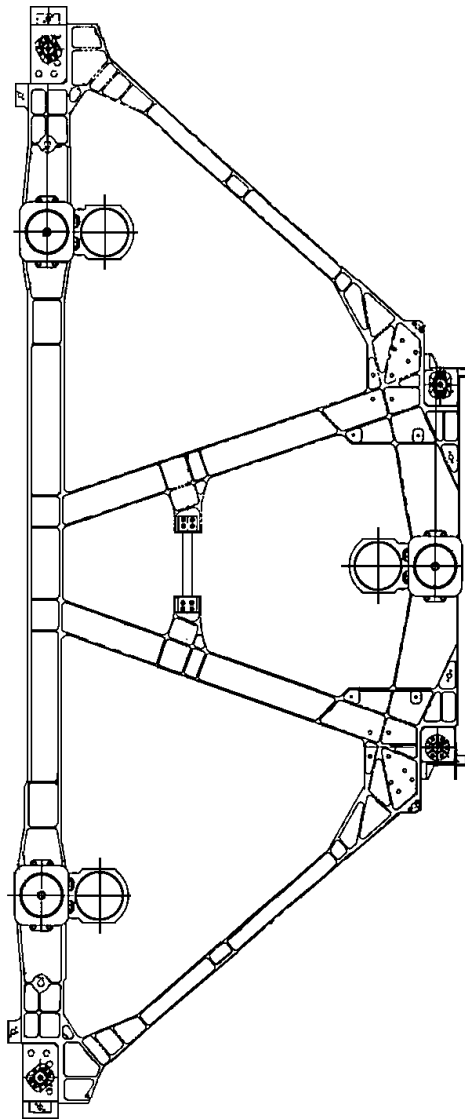


SSAS OVERVIEW

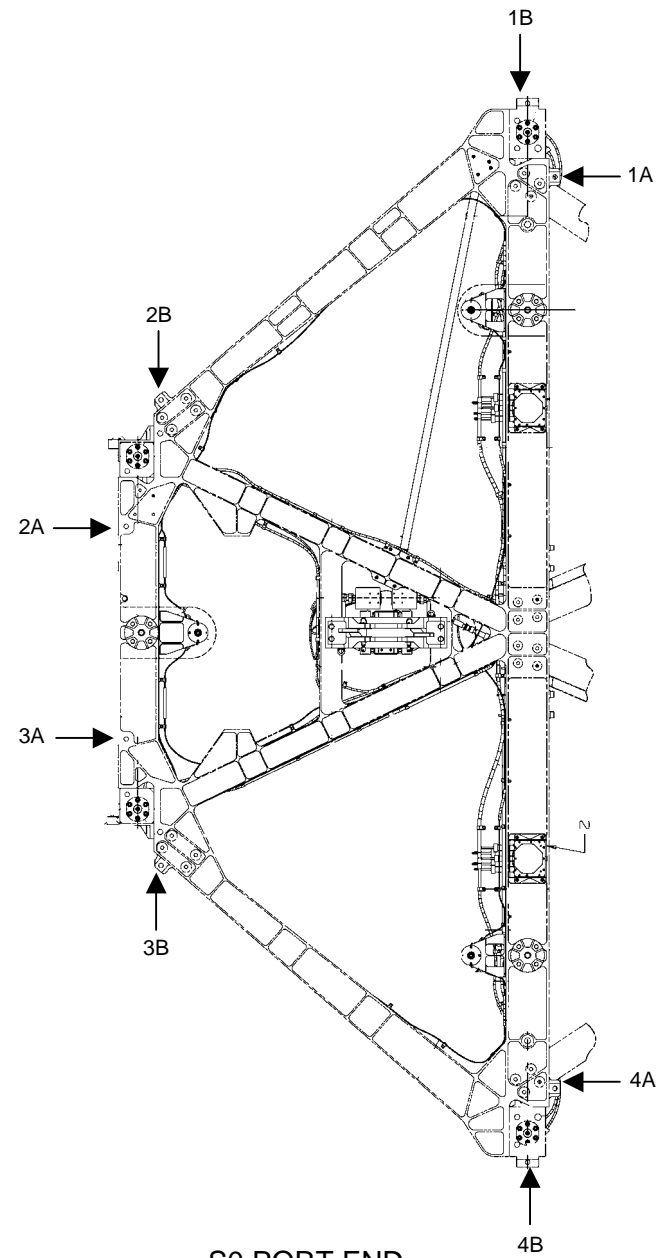


NOTE: S0-S1 interface shown.  
S0-P1 similar

# S0-P1 SSAS BOLT LOCATIONS

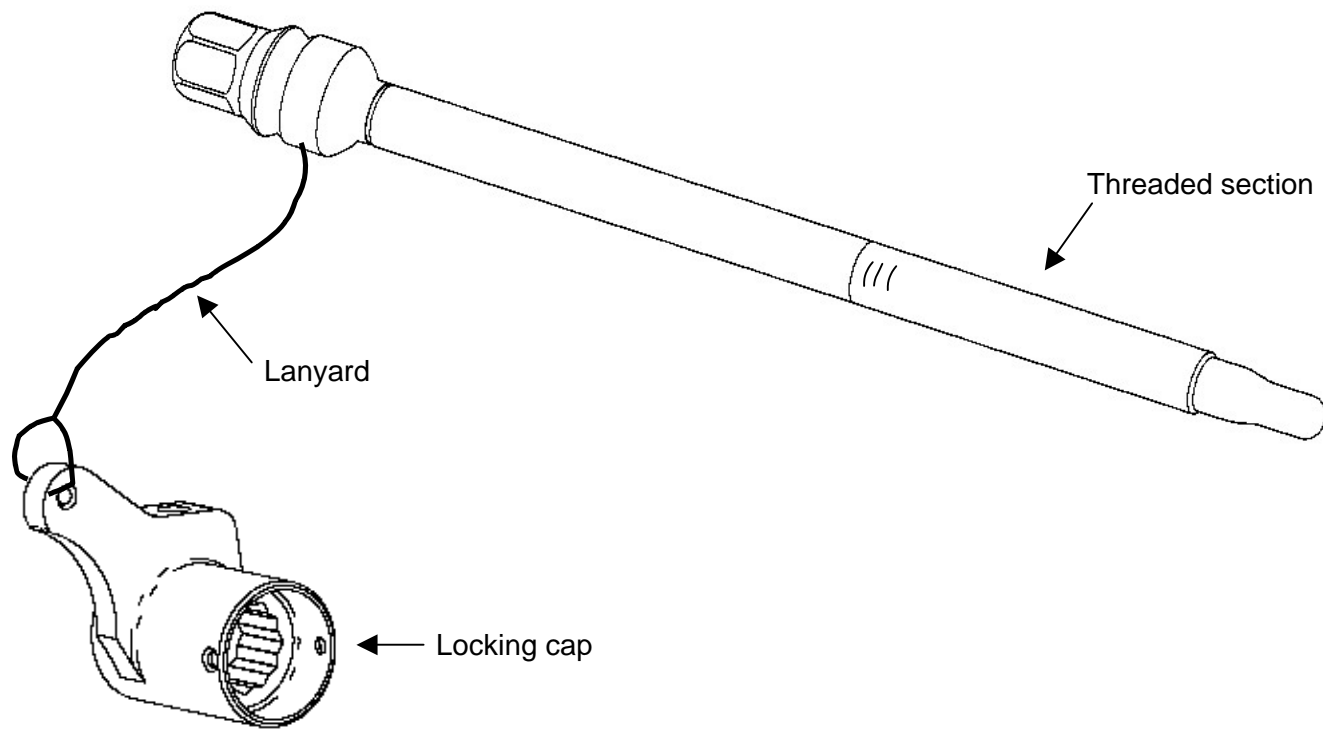


P1 STBD END



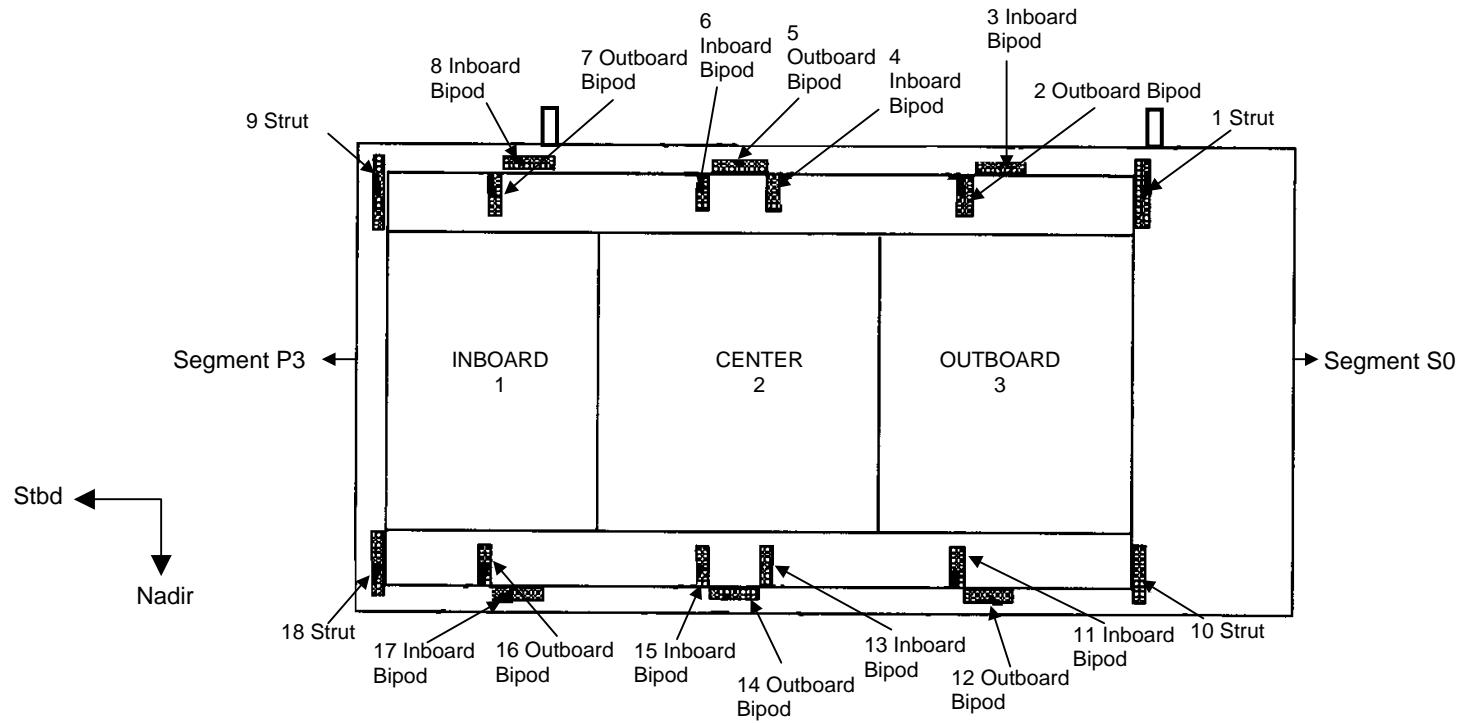
S0 PORT END

# SSAS CONTINGENCY BOLTS





# RADIATOR BEAM LAUNCH LOCKS



VIEW LOOKING FWD



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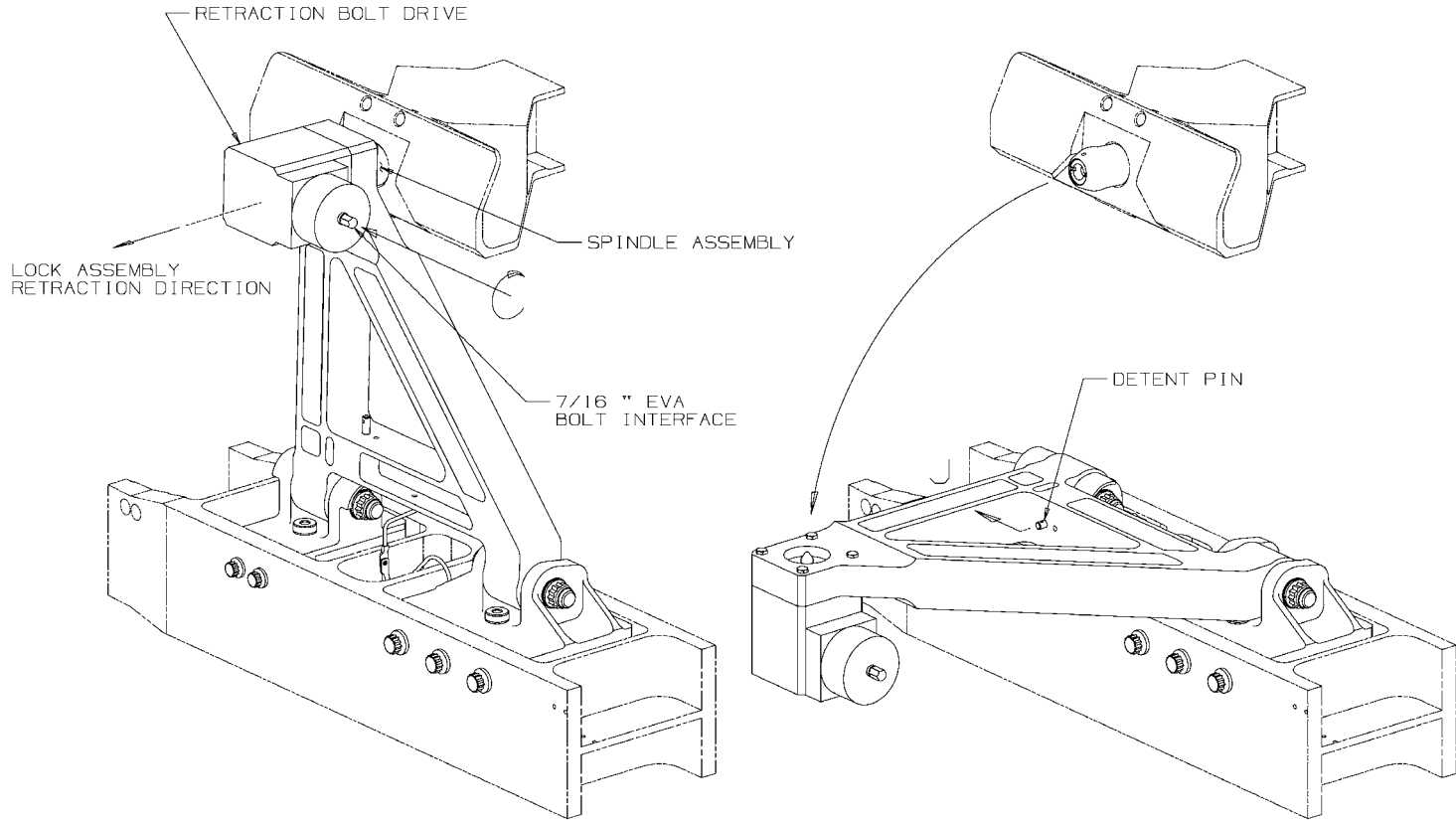


EVA/113/FIN

## RADIATOR

# RADIATOR

## RADIATOR BEAM LOCK ASSEMBLY



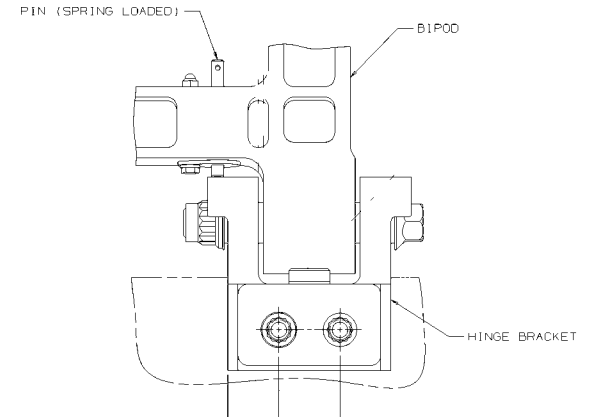
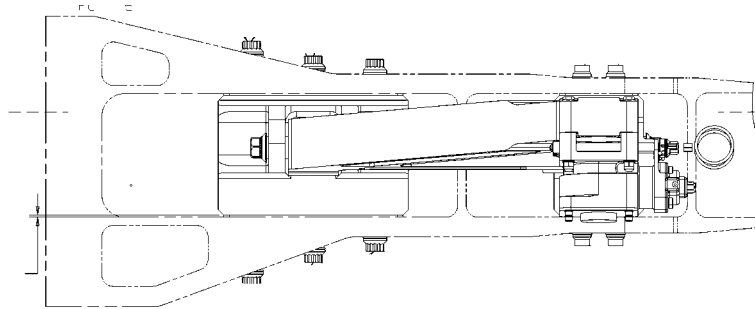
STEP 1 ACTUATE RETRACTION BOLT DRIVE TO RETRACT LOCK ASSEMBLY OFF SPINDLE ASSEMBLY

STEP 2 ROTATE BIPOD LOCK ASSEMBLY ABOUT ITS HINGE TO ITS FULLY RETRACTED AND DETENTED POSITION

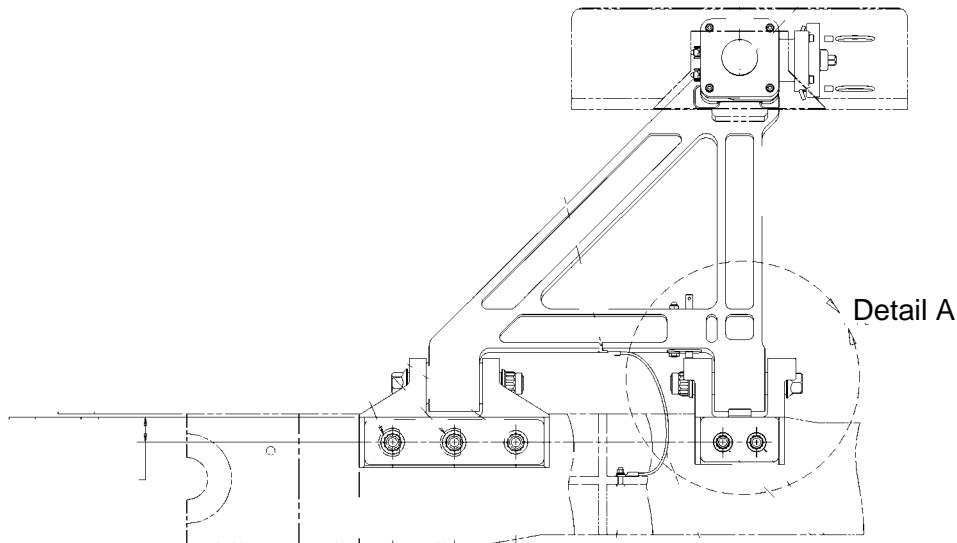
TYPICAL DEPLOY

TYPICAL STOW

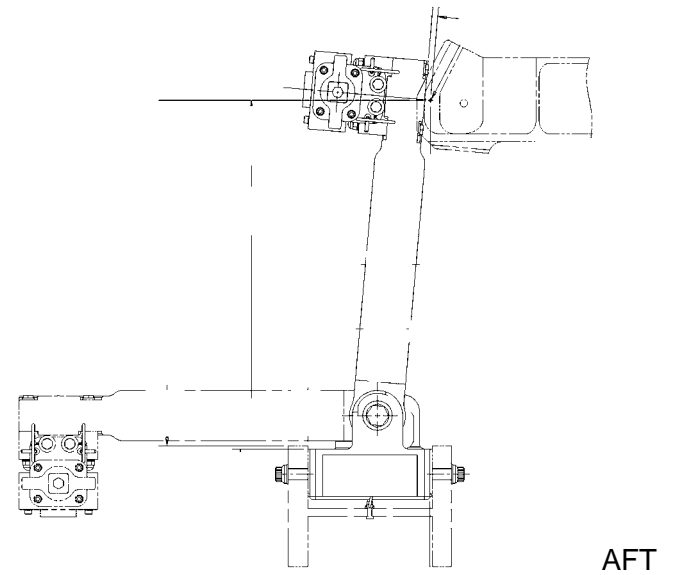
# RADIATOR BEAM LAUNCH LOCKS - BIPOD TYPE (14)



Detail A

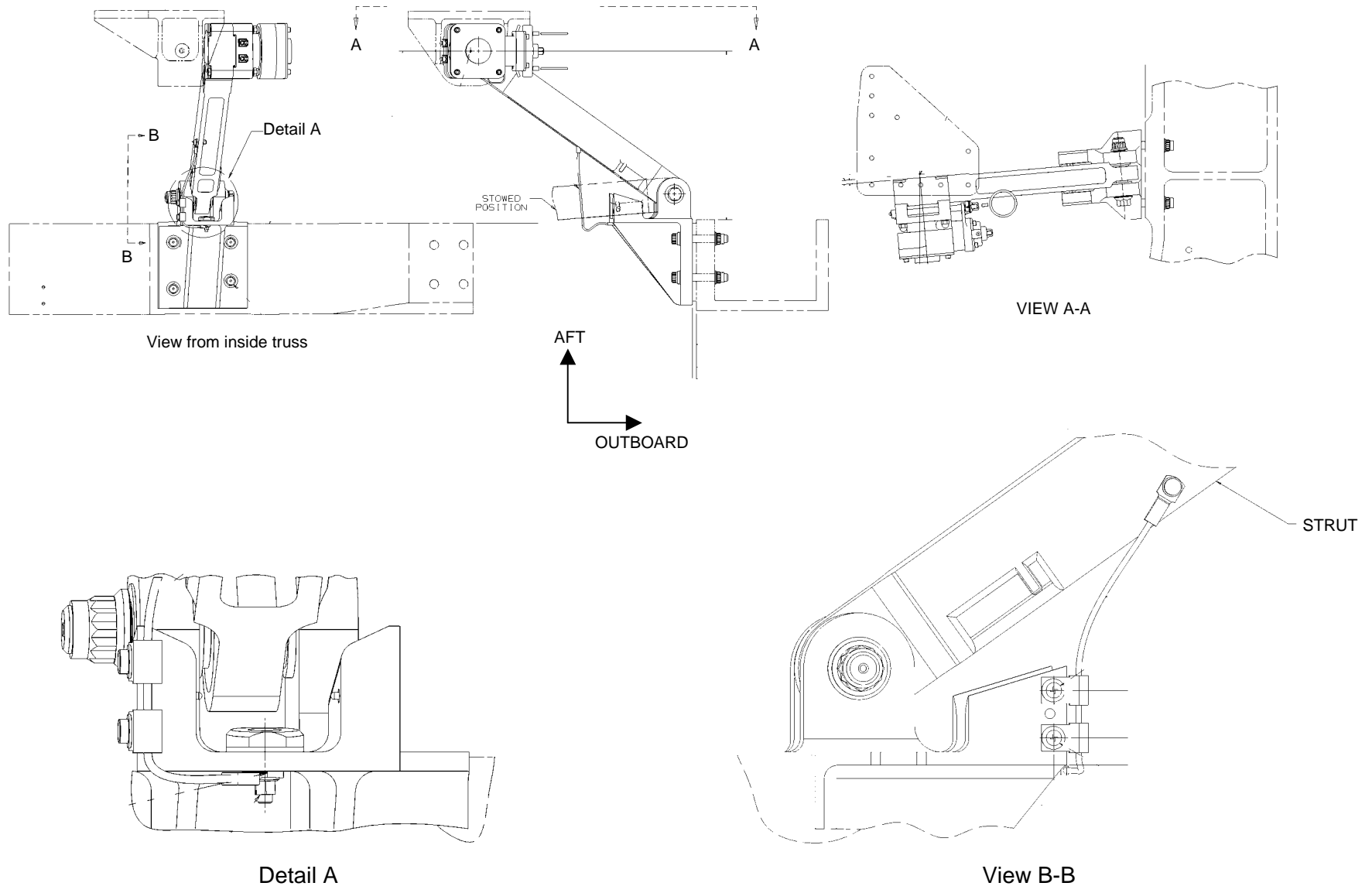


Detail A

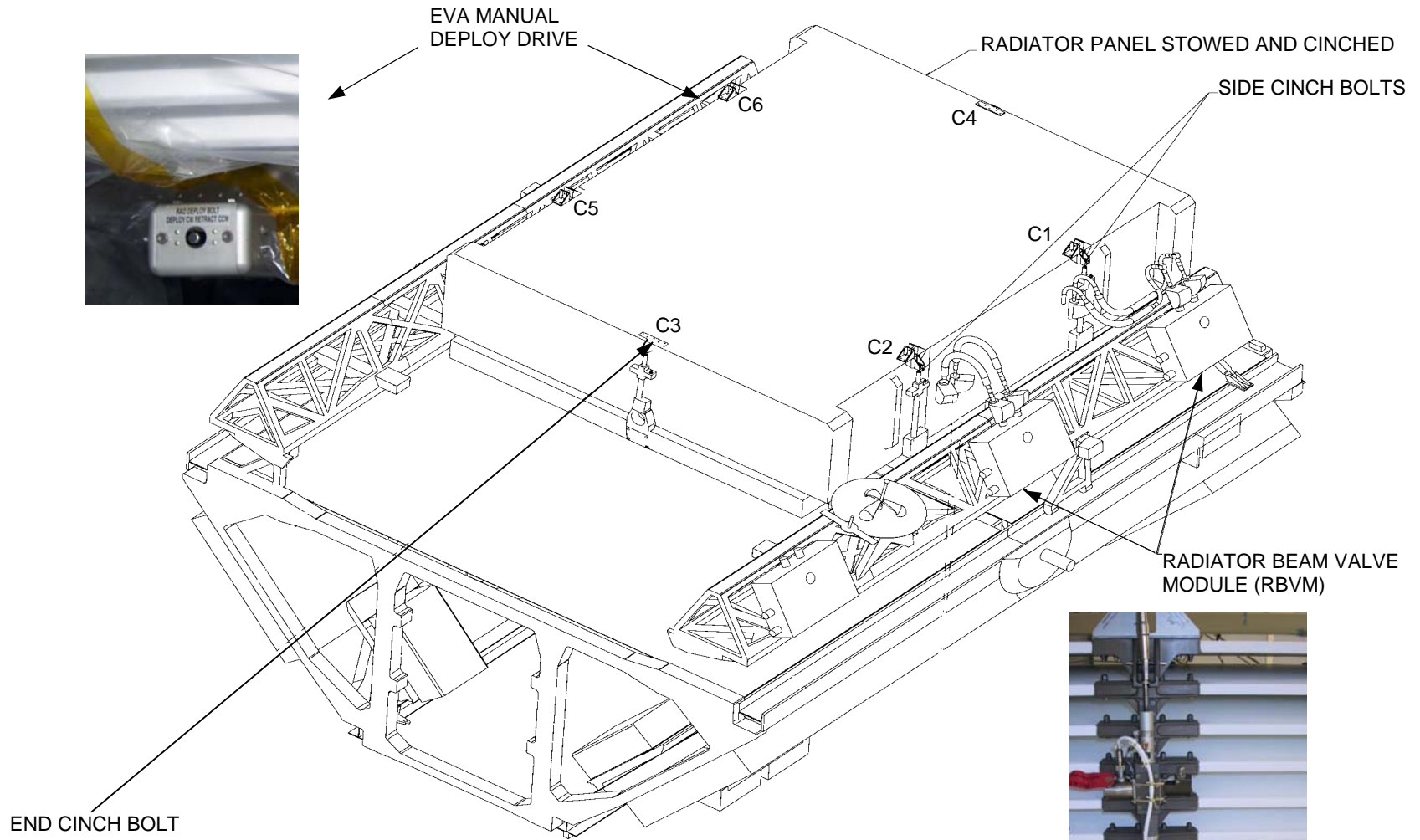


AFT  
OUTBD/PORT/STBD  
(depending on location)

# RADIATOR BEAM LAUNCH LOCKS - STRUT TYPE (4)



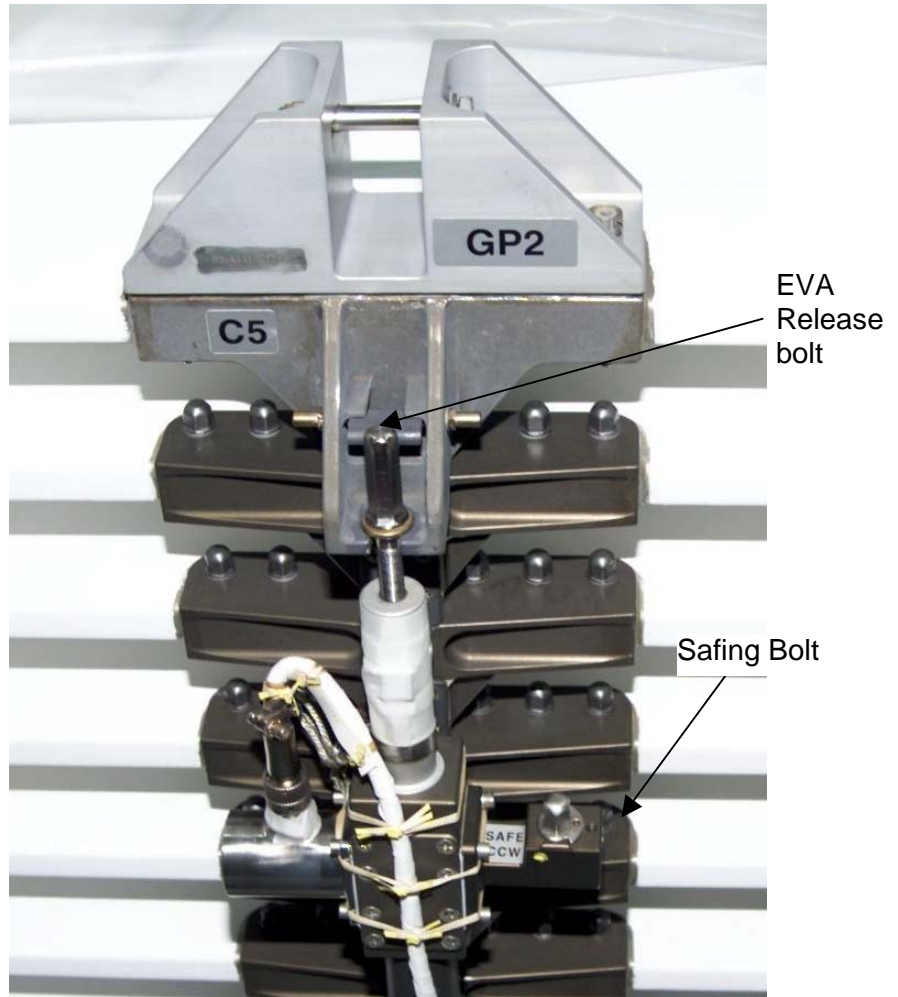
# RADIATOR OVERVIEW



EVA Manual Deploy Drive

CINCH

# RADIATOR CINCH RELEASE

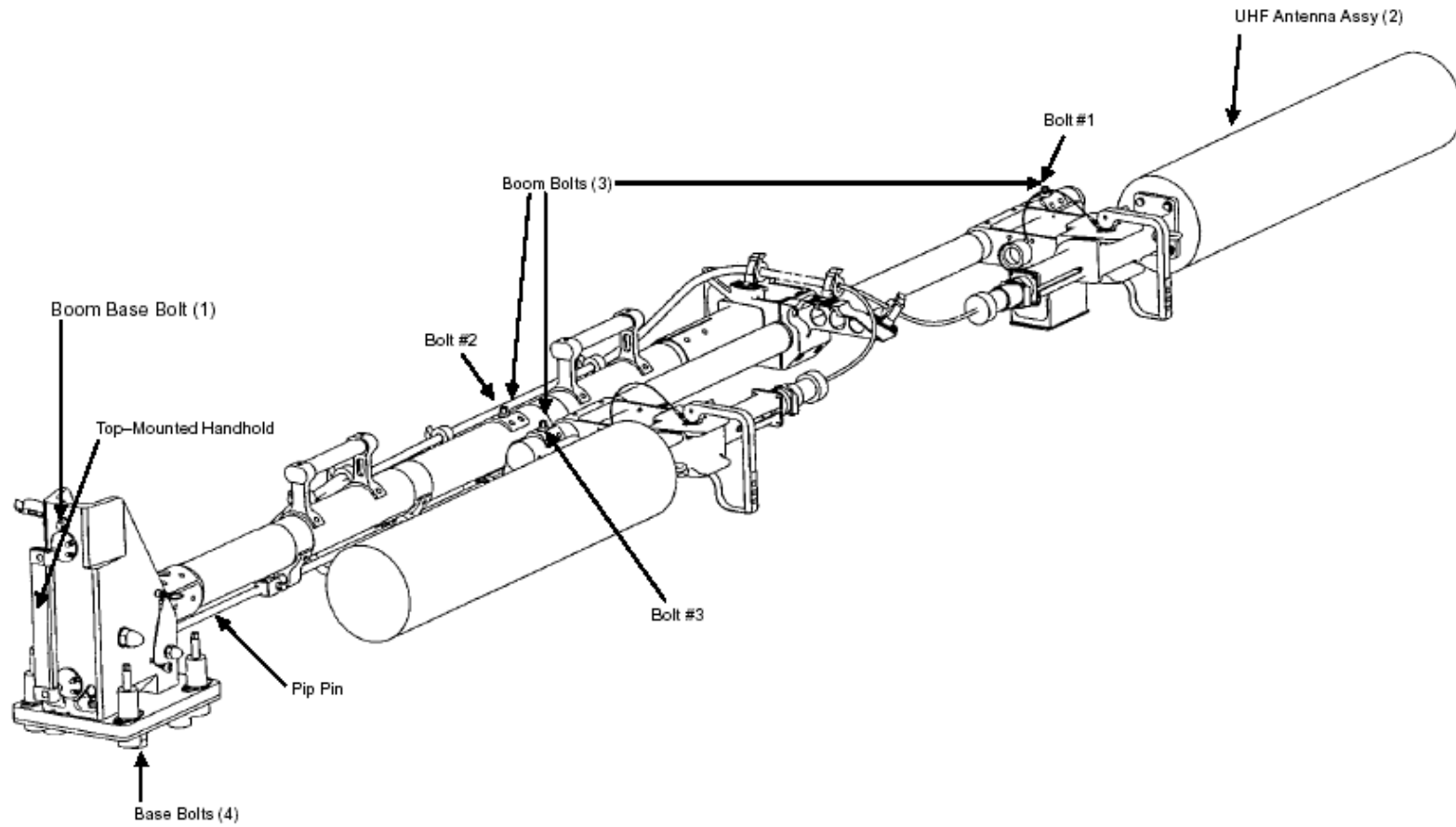


CINCH INSTALLED



CINCH DEPLOYED

# UHF ANTENNA



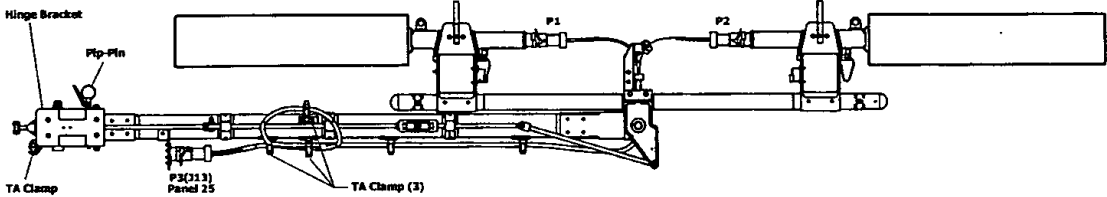
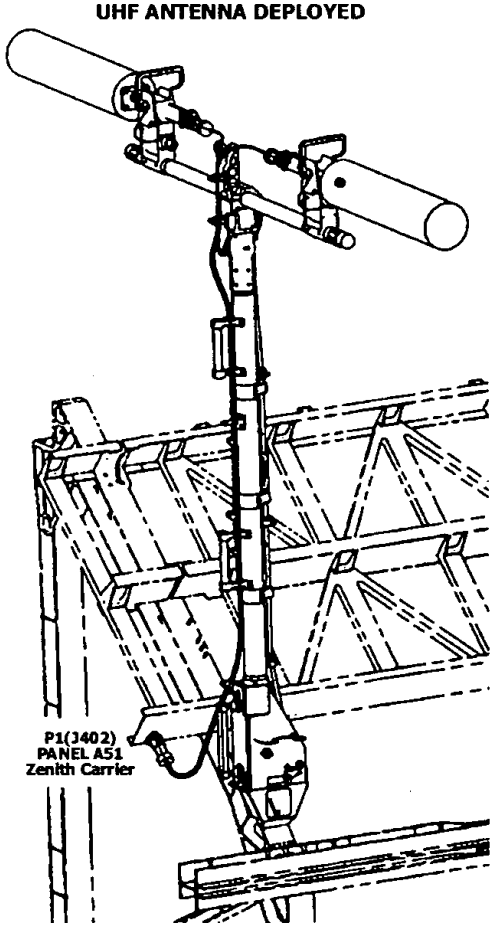
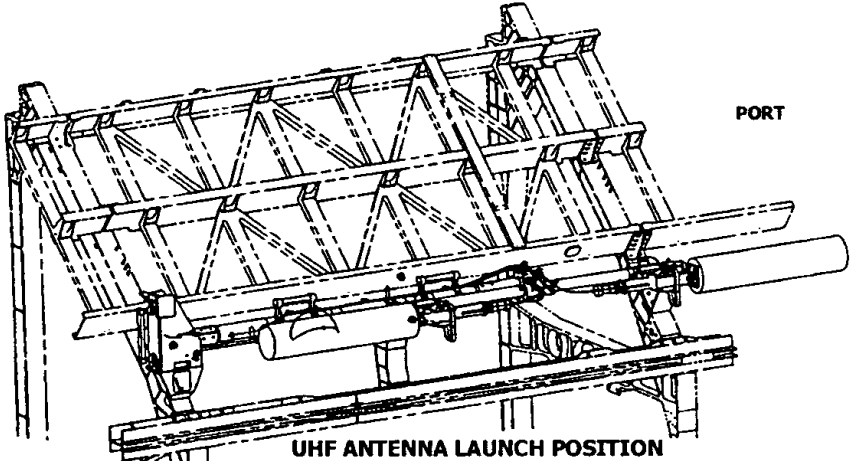
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UHF ANTENNA

EVA/113/FIN

# UHF ANTENNA

## UHF ANTENNA (Cont)



UHF ANTENNA – View from truss interface side





# EVA CHECKLIST

STS  
113