

3.0 PHYSICAL INTERFACES

3.0.1 Payload Definition

3.0.1.1 (Reserved)

3.0.1.2 (Reserved)

3.0.1.3 Sidewall-Mounted Payloads Physical Definition

The payload shall be mounted as follows: (1) MightySat 1 in bay 6 port side (2) SAC-A in bay 2 forward port side. Physical definition, thermal and dynamic envelope as well as mechanical interface definition shall be as shown in Figure 3.0.1.3-1.

3.0.1.4 (Reserved)

3.0.2 UNIQUE MISSION SPECIFIC REQUIREMENTS

3.0.2.1 PAYLOAD UNIQUE DEFINITION

3.0.2.1.1 Payload Mounting Provisions

The MightySat 1 canister, and Hitchhiker avionics box on a Light weight Avionics Plate (LAP) shall be mounted on a GSFC-supplied Hitchhiker adapter beam which shall be attached to the Orbiter. The SAC-A shall be mounted on a GSFC-supplied Hitchhiker adapter beam which shall be attached to the Orbiter. The mechanical interfaces for the GSFC-supplied Hitchhiker adapter beam to Orbiter are defined in Figure 3.0.2.1.1-1. The Hitchhiker adapter beam shall attach to the sill longeron, main and stub frames and shall utilize standard STS-GAS adapter beam mounting hardware. Table 3.0.2.1.1-1 identifies the adapter beam mounting hardware. The sub assembly installation of payload-to-payload and payload-to-GSFC HH adapter beam shall be defined in IRD-21358.

3.0.2.1.2 STS-to-Cargo Element Interfaces

All cargo element connectors shall consist of socket (female) contacts for interfacing with the cable connectors. The cargo element shall provide cable support, as required, such that there shall be no unsupported lengths of cables greater than 18 inches with adequate allowance for mating and demating of connectors. The payload cable departure points shall be defined in Figure 3.0.2.1.2-1. The payload shall supply harnesses from the unique interface panel(UIP) interface to the payload avionics box. The payload cable length from Mightysat 1 connectors J006, J007, and J008 to the UIP are 96.00 +3/-0, inches for Mightysat 1 element mounted in bay 6 port side.

3.0.2.1.2.1 Wire Harness Installation

Cargo element supplied wire harness shall be installed in accordance with MIL-W-5088 and IRD-21358. Wire harness installation and routing from the cargo element to the UIP interface panels shall be a STS function. The physical characteristics of the unique electrical interface in the cargo bay are defined in Figure 3.0.2.1.2.1-1. The payload shall provide cable support provisions such that the cables can be clamped within 6 inches of the connectors. The cable support provisions shall be either a No. 10 (0.1900)-32 UNF self- locking threaded receptacle or a tie strap retention device which

will accommodate STS provided tie straps (Part No. ME127-0074-0001).

3.0.2.1.3 EVA Slidewire Tether Installation

Installation of EVA slidewire tether on SAC-A GAS beam is shown in Figure 3.0.2.1.3-1.

3.0.3 SMALL PAYLOAD UNIQUE INTERFACES NOT APPLICABLE

3.0.4 ORBITER-TO-PAYLOAD DEDICATED ACCOMMODATIONS

3.0.4.1 (Reserved)

3.0.4.2 LONGERON/ADAPTER MOUNTED PAYLOADS

3.0.4.2.1 (Reserved)

3.0.4.2.2 (Reserved)

3.0.4.2.3 Payload Connector Location and Cable Clamping

The Payload electrical interface location is defined to be at the payload avionics box. The UIP interfaces of connectors J103, J107, J108 are defined in Paragraph 3.0.2.1.2. The payload interface shall be on the outer perimeter of the payload with the connectors facing forward, aft or down in Bays 2 through 8 and forward or downward in Bay 13. Figure 3.0.4.2.3-1 defines the allowable zone. The payload shall provide cable support provisions such that the cables can be clamped within 6 inches of the connectors. The cable support provisions shall be either a No. 10 (0.1900)-32 UNF self-locking threaded receptacle or a tie strap retention device which will accommodate STS provided tie straps (Part No. ME127-0074-0001).

3.0.4.2.4 Payload-to-Orbiter Electrical Bond

Each payload shall provide a Payload-to-Orbiter electrical bond in accordance with Paragraph 3.0.4.2.4.1, 3.0.4.2.4.2 and/or 3.0.4.2.4.3 unless otherwise determined by payload unique requirements. All electrical bond interfaces shall conform to requirements specified in Paragraph 10.7.4.2.

3.0.4.2.4.1 FAULT-CURRENT BOND

3.0.4.2.4.1.1 Bus Connector Bond

The bus connector bond is defined to be the main Orbiter-to-Cargo power interface and shall be accomplished by a single wire in each power connector, as specified in Paragraph 10.7.4.2.2.1.1.

3.0.4.2.4.1.2 (Reserved)

3.0.4.2.4.2 RF BOND

3.0.4.2.4.2.1 Cargo-to-Orbiter RF Bond Strap

The Cargo-to-Orbiter RF bond strap shall be STS-provided and shall be connected between Orbiter structure and payload ground point provisions as defined in Figure 3.0.1.3-1. This bond shall meet bonding requirements specified in Paragraph 10.7.4.2.

3.0.4.2.4.3 (Reserved)

3.0.4.2.5 (Reserved)

3.0.4.2.6 Ground Handling at KSC

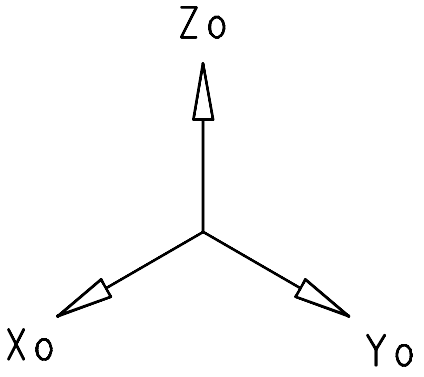
Sidewall mounted payloads shall be installed while the Orbiter is in a horizontal position.

TABLE 3.0.2.1.1-1 HH ADAPTER BEAM ASSEMBLIES

BAY	BEAM ASSEMBLY NUMBER	SHEAR PLATE LOCATION							
		NONE		FWD		AFT		FWD AND AFT	
		PORT	STBD	PORT	STBD	PORT	STBD	PORT	STBD
2	GE1507106	NA	NA	-1-32	NA	NA	NA	NA	NA
3	GE1507106	NA	NA	NA	NA	NA	NA	NA	NA
4	GE1507106	NA	NA	NA	NA	NA	NA	NA	NA
5	GE1507106	NA	NA	NA	NA	NA	NA	NA	NA
6	GE1507106	NA	NA	-7-32	NA	NA	NA	NA	NA
7	GE1507106	NA	NA	NA	NA	NA	NA	NA	NA
8	GE1507106	NA	NA	NA	NA	NA	NA	NA	NA

NOTES:

1. The 5 cubic foot canister shall require use of shear pins and the associated load bearing adapter plates.



ORIENTATION VIEW
PORT SIDE

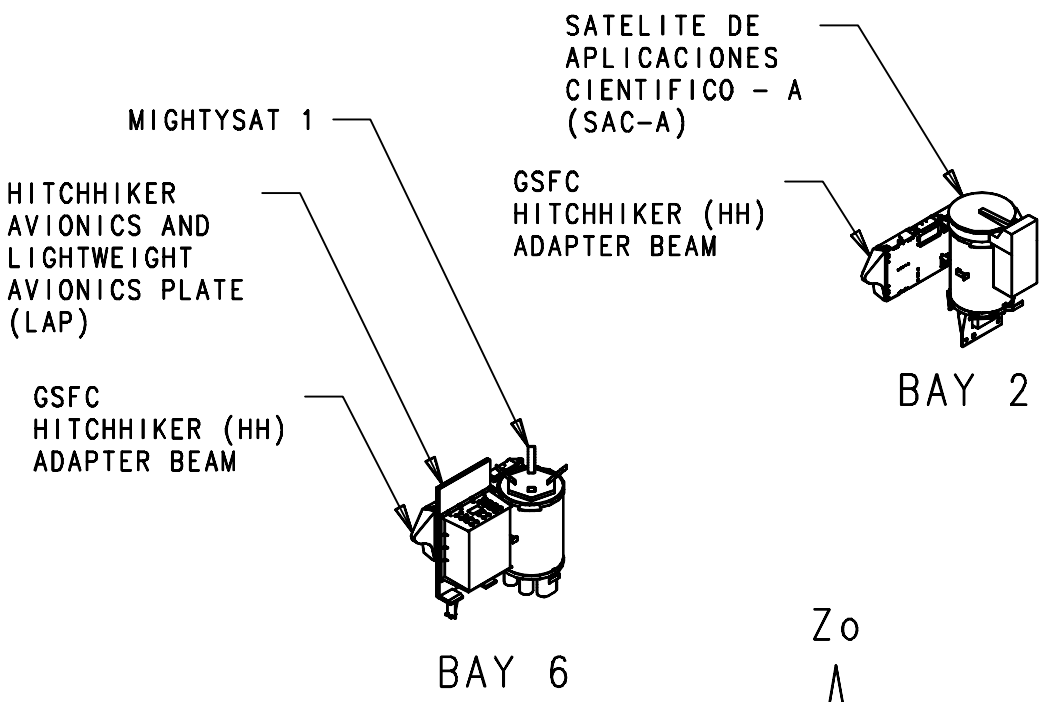


FIGURE 3.0.1.3-1 PAYLOAD PHYSICAL DEFINITION AND THERMAL AND DYNAMIC ENVELOPE
(SHEET 1 OF 4)

FIGURE 3.0.1.3-1 PAYLOAD PHYSICAL DEFINITION AND THERMAL AND DYNAMIC ENVELOPE (SAC-1)
(SHEET 2 OF 4)

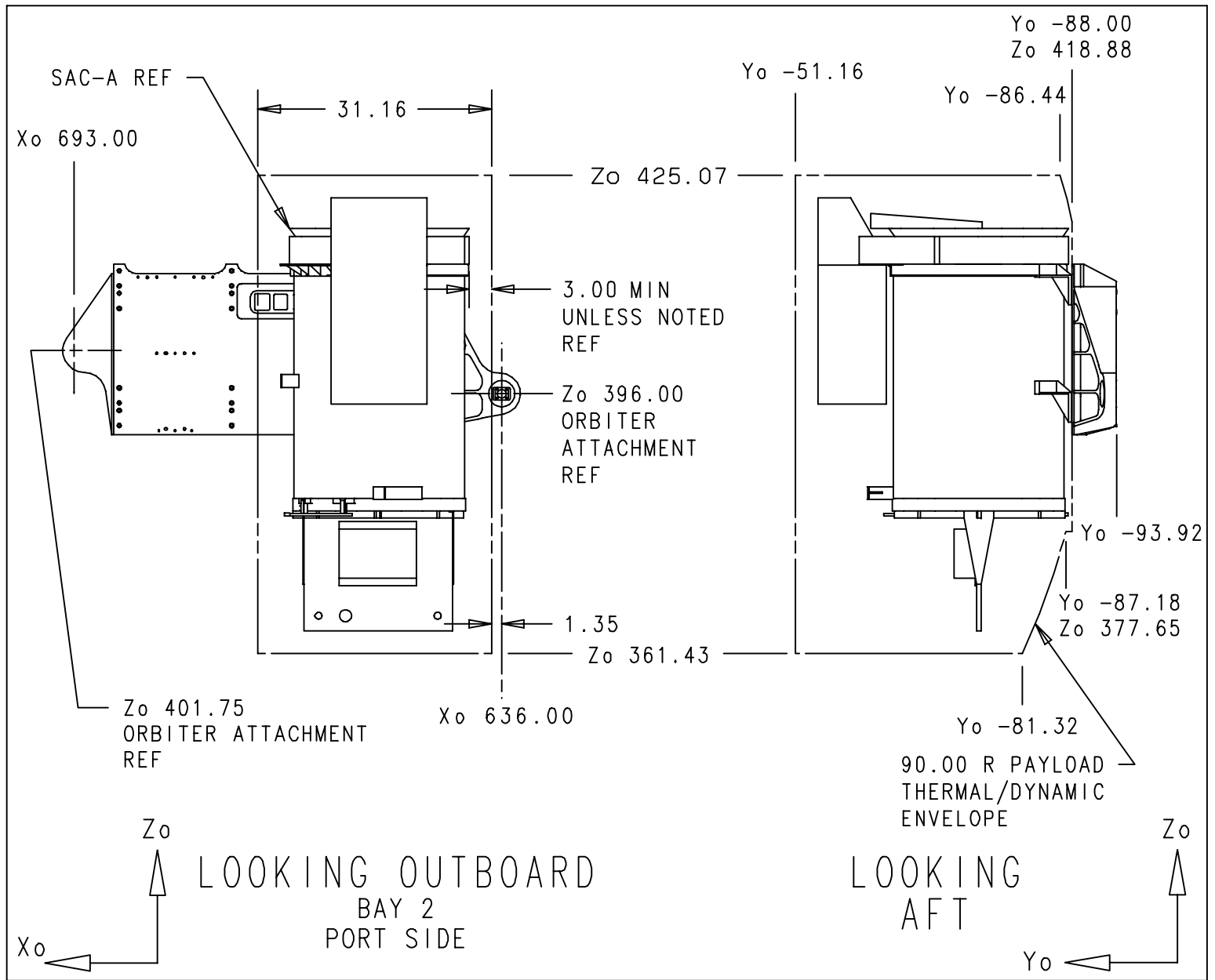
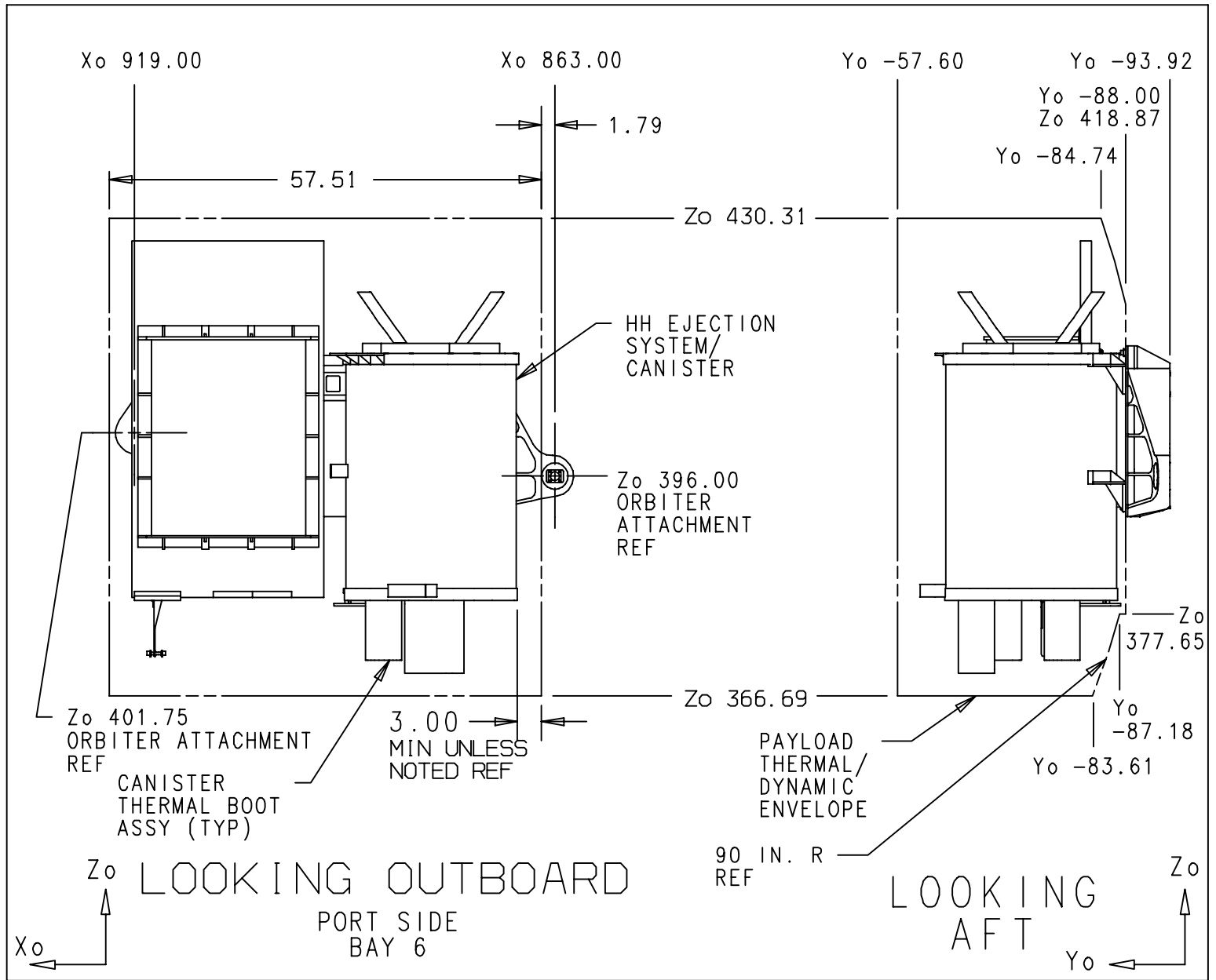


FIGURE 3.0.1.3-1 PAYLOAD PHYSICAL DEFINITION AND THERMAL AND DYNAMIC ENVELOPE
(MIGHTYSAT 1)
(SHEET 3 OF 4)

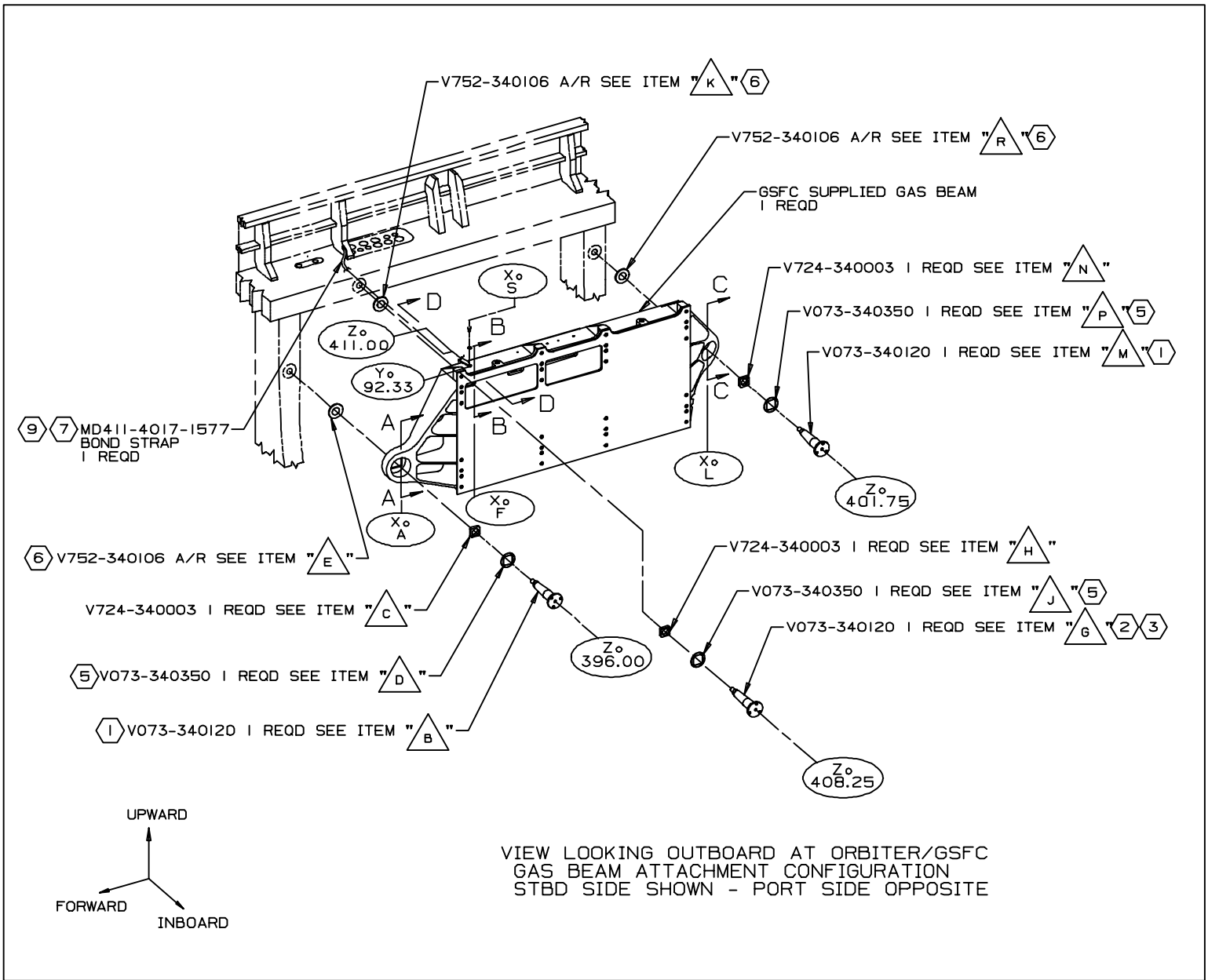


NOTES:

1. FOR ALL PORT SIDE CONFIGURATIONS: MPM'S MUST BE DEPLOYED PRIOR TO THE PAYLOAD'S EJECTION FROM ITS CANISTER

FIGURE 3.0.1.1.3-1 PAYLOAD PHYSICAL DEFINITION AND THERMAL AND DYNAMIC ENVELOPE
(SHEET 4 OF 4)

FIGURE 3.0.2.1.1-1 SHUTTLE ORBITER/HH ADAPTER BEAM MOUNTING PROVISIONS
(SHEET 1 OF 7)



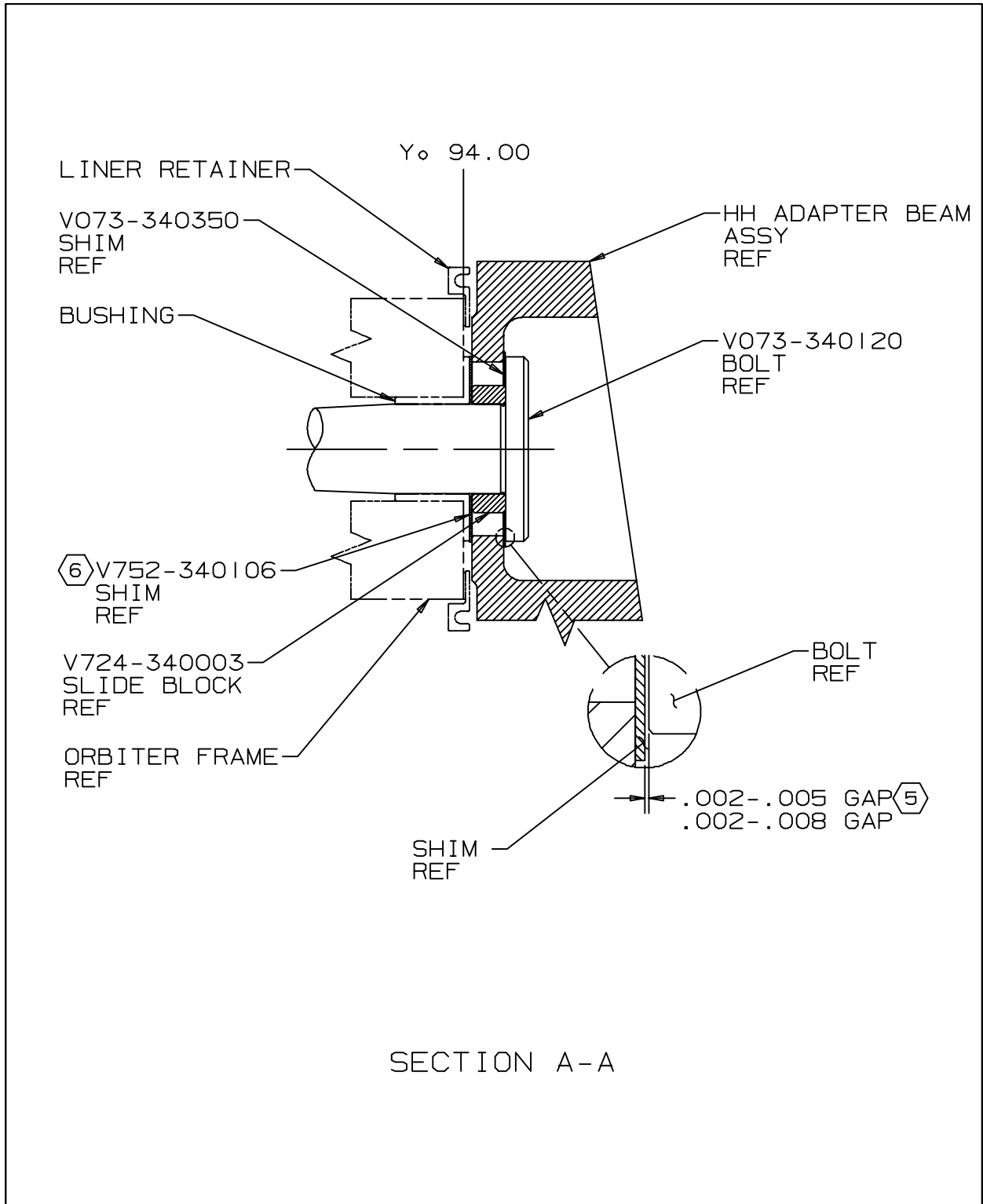


FIGURE 3.0.2.1.1-1 SHUTTLE ORBITER/HH ADAPTER BEAM MOUNTING PROVISIONS
(SHEET 2 OF 7)

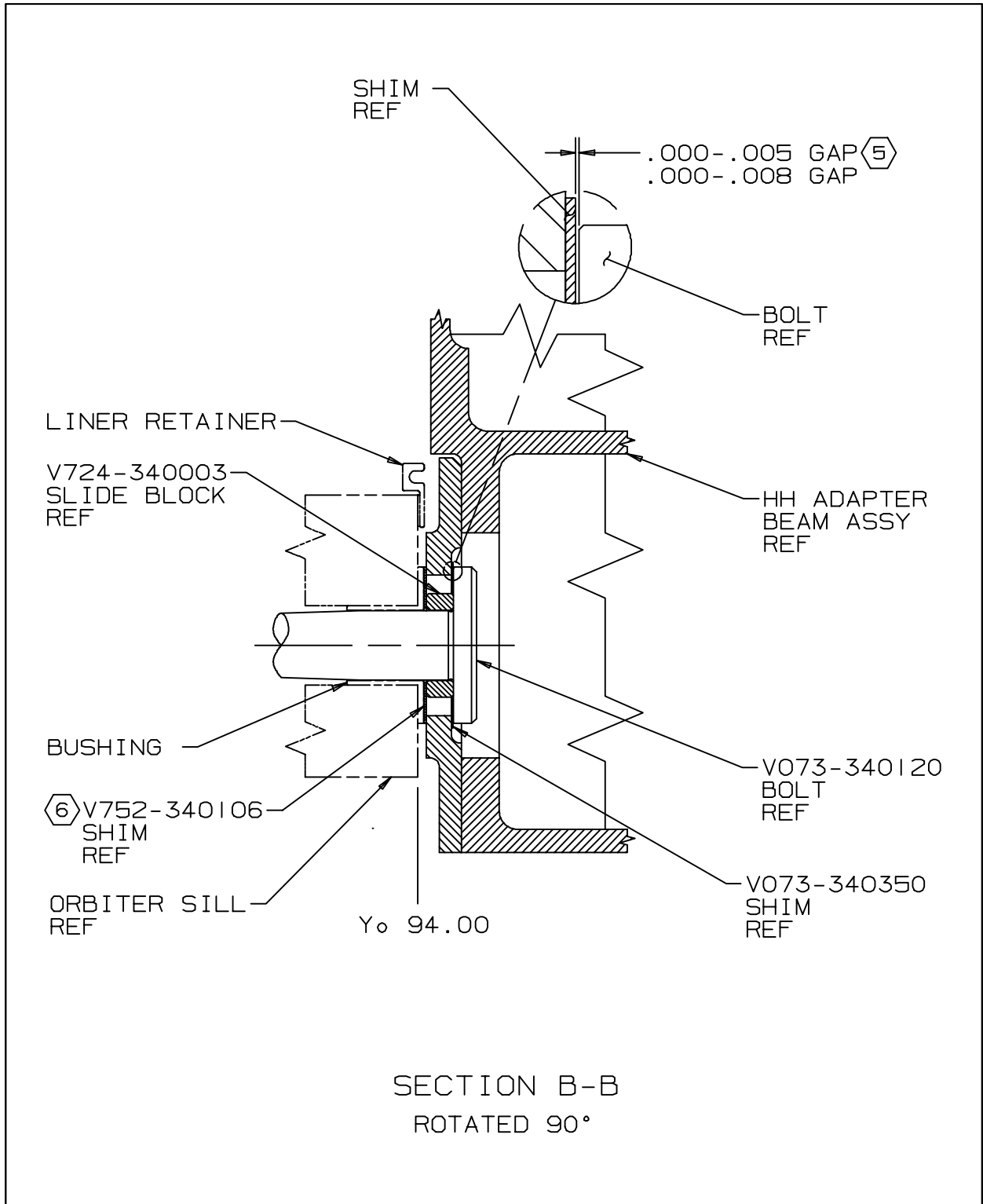


FIGURE 3.0.2.1.1-1 SHUTTLE ORBITER/HH ADAPTER BEAM MOUNTING PROVISIONS
(SHEET 3 OF 7)

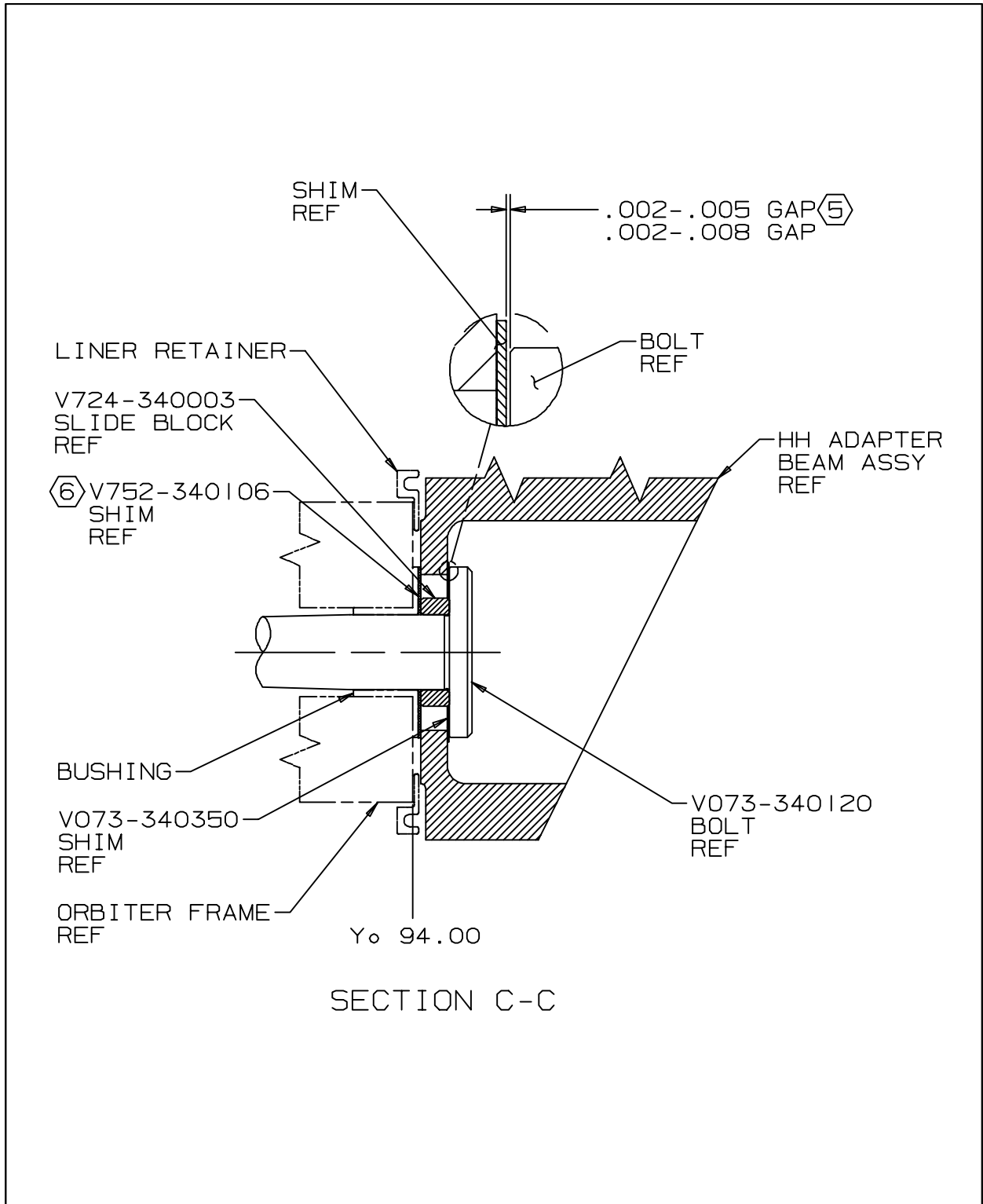


FIGURE 3.0.2.1.1-1 SHUTTLE ORBITER/HH ADAPTER BEAM MOUNTING PROVISIONS
(SHEET 4 OF 7)

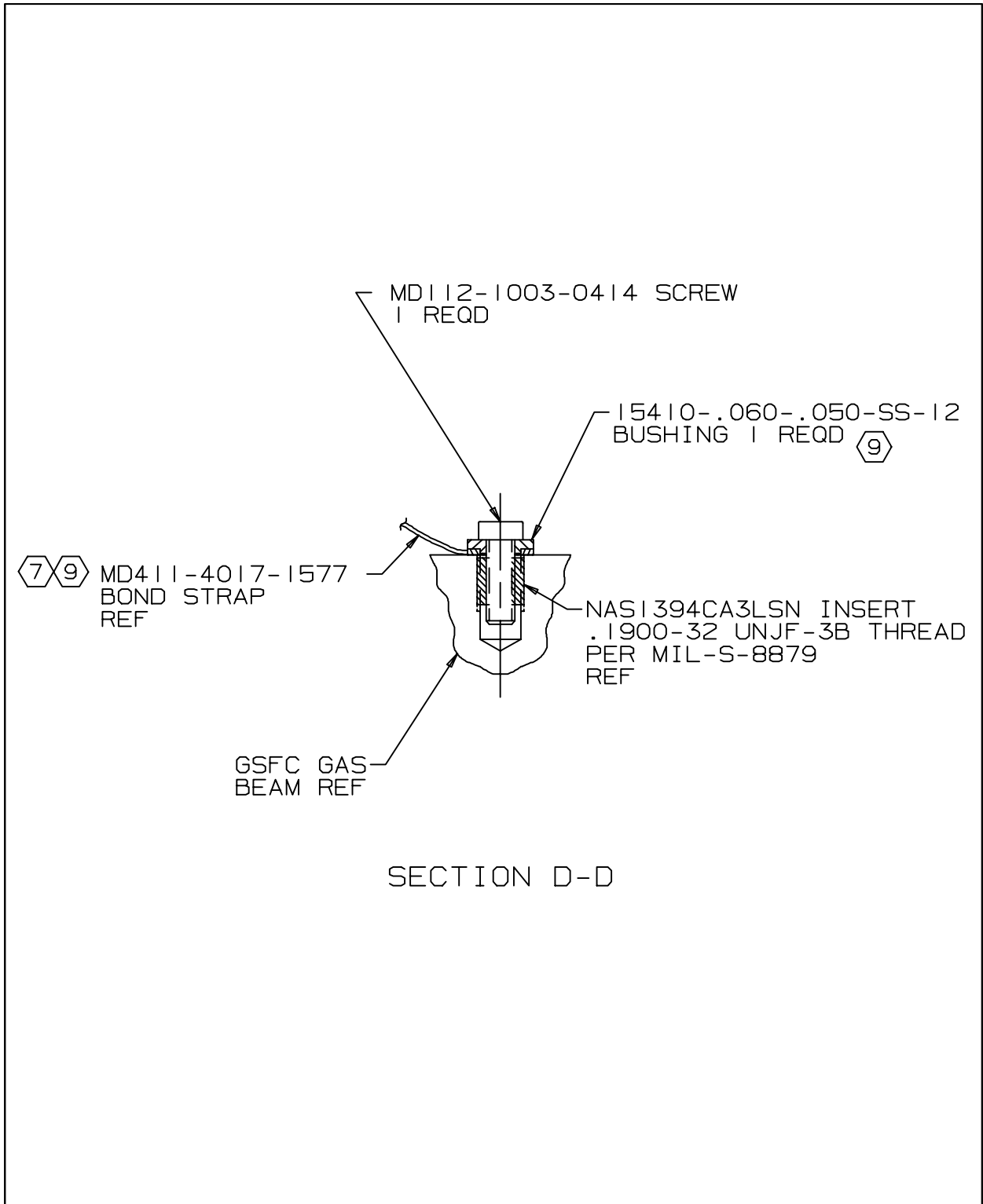


FIGURE 3.0.2.1.1-1 SHUTTLE ORBITER/HH ADAPTER BEAM MOUNTING PROVISIONS
(SHEET 5 OF 7)

GAS BEAM ASSEMBLY INSTALLATION MATRIX

FWD FRAME HOLE						
BAY	X _o A	BOLT V073- 340120	SLIDE BLOCK V724- 340003	SHIM V073- 340350	SHIM V752- 340106	
2	636.00	-012	-001	-001	-005	
3	693.00	-012	-001	-001	-005	
4	750.00	-012	-001	-001	-005	
5	807.00	-011	-002	-001	-003	
6	863.00	-011	-002	-001	-003	
7	919.00	-012	-001	-001	-005	
8	979.50	-012	-001	-001	-005	
SILL LONGN HOLE						
BAY	X _o F	BOLT V073- 340120	SLIDE BLOCK V724- 340003	SHIM V073- 340350	SHIM V752- 340106	
2	649.00	-016	-003	-005	-006	
3	715.00	-016	-003	-005	-006	
4	776.90	-017	-004	-011	-004	
5	833.00	-017	-004	-011	-004	
6	892.50	-017	-005	-012	-004	
7	951.00	-013	-006	-013	-008	
8	1011.40	-013	-006	-013	-008	
AFT FRAME HOLE						BOND JUMPER
BAY	X _o L	BOLT V073- 340120	SLIDE BLOCK V724- 340003	SHIM V073- 340350	SHIM V752- 340106	BEAM X _o S
2	693.00	-019	-007	-007	-007	649.00
3	750.00	-019	-007	-007	-007	715.00
4	807.00	-019	-007	-007	-007	772.00
5	863.00	-012	-001	-001	-005	829.00
6	919.00	-011	-002	-001	-003	876.00
7	979.50	-011	-002	-001	-003	948.65
8	1040.00	-012	-001	-001	-005	992.50

FIGURE 3.0.2.1.1-1 SHUTTLE ORBITER/HH ADAPTER BEAM MOUNTING PROVISIONS
(SHEET 6 OF 7)

NOTES:

- ① TORQUE FROM 300-425 IN-LBS PER MA0101-301.
- ② TORQUE FROM 525-840 IN-LBS PER MA0101-301 IN BAYS 2-6 ONLY.
- ③ TORQUE FROM 1000-1725 IN-LBS PER MA0101-301 IN BAYS 7 & 8 ONLY.
4. TORQUE ALL BOLTS TO CLASS 1 PER MA0101-301 UNLESS OTHERWISE SPECIFIED.
- ⑤ PEEL SHIM FOR CLEARANCE AS SHOWN BETWEEN BOLT HEAD AND SHIM. GAP REQUIREMENTS AROUND THE PERIMETER OF THE SILL & MAIN FRAME ATTACH POINTS SHALL BE .002 TO .005 IN AT LEAST ONE LOCATION AND .002 TO .008 IN ALL OTHER ACCESSIBLE LOCATIONS. GAP REQUIREMENT AROUND THE PERIMETER OF THE LONGERON SILL ATTACH POINT SHALL BE .000 TO .005 IN AT LEAST ONE LOCATION AND .000 TO .008 IN ALL OTHER ACCESSIBLE LOCATION.
- ⑥ SHIM AS REQUIRED TO CLEAR PAYLOAD BAY LINER RETAINERS.
- ⑦ ELECTRICAL BOND AND TEST PER ROCKWELL SPECIFICATION MA0113-306, CLASS R, TYPE I. MAXIMUM RESISTANCE NOT TO EXCEED 2.5 MILLI-OHMS (REF: MIL-B-5087B).
8. ALL HARDWARE SSP-SUPPLIED EXCEPT THE GODDARD GAS BEAM AND PAYLOAD.
- ⑨ V073-340296-002 BOND JUMPER AND MD153-0018-0003 WASHER ARE INTERCHANGEABLE WITH MD411-4017-1577 BOND STRAP AND 15410-.060-.050-SS-12 BUSHING.

FIGURE 3.0.2.1.1-1 SHUTTLE ORBITER/HH ADAPTER BEAM MOUNTING PROVISIONS
(SHEET 7 OF 7)

FIGURE 3.0.2.1.2-1 WIRE HARNESS LAST POINT OF ATTACHMENT AND HARNESS LENGTH
(Mightysat 1)
(SHEET 1 OF 2)

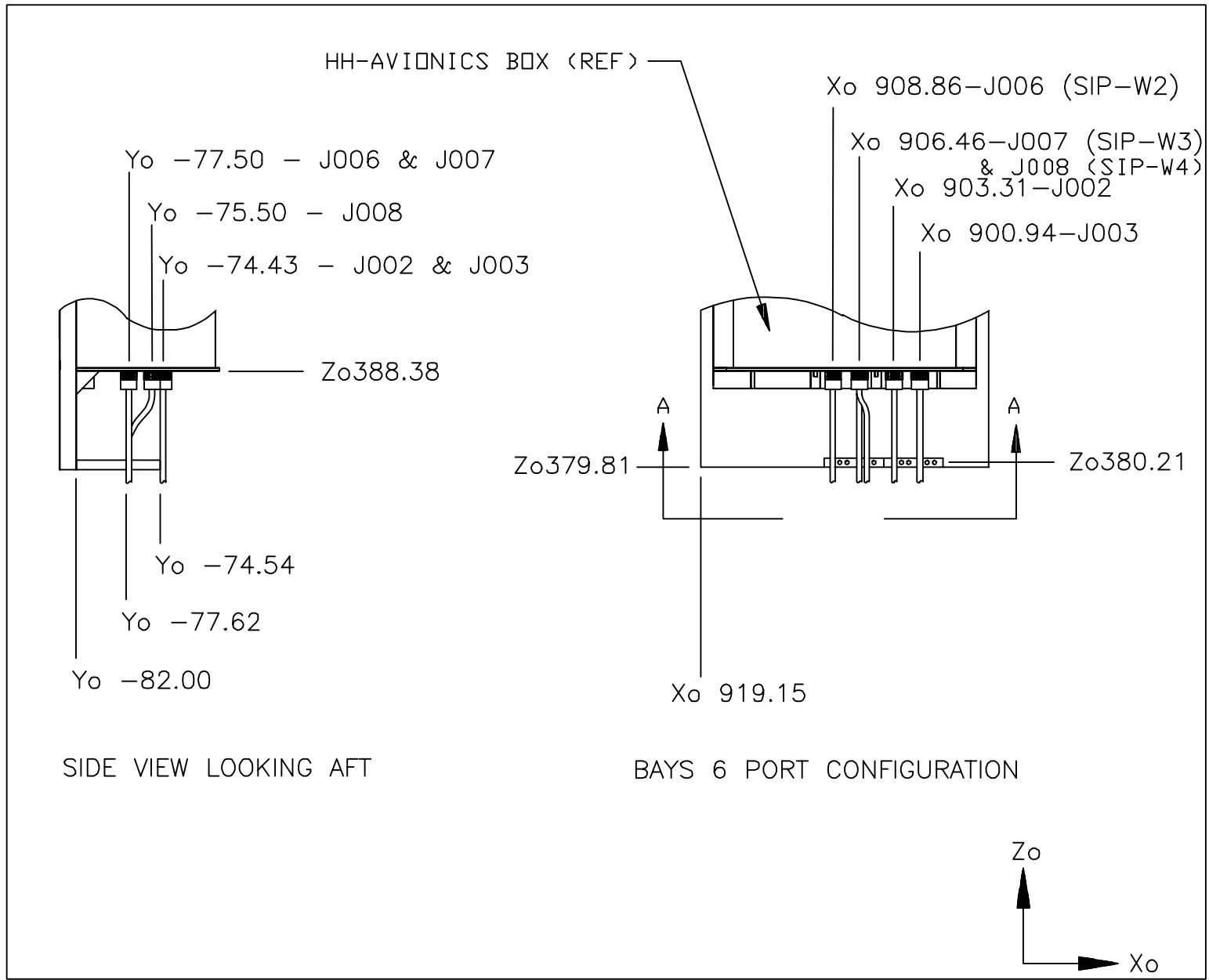
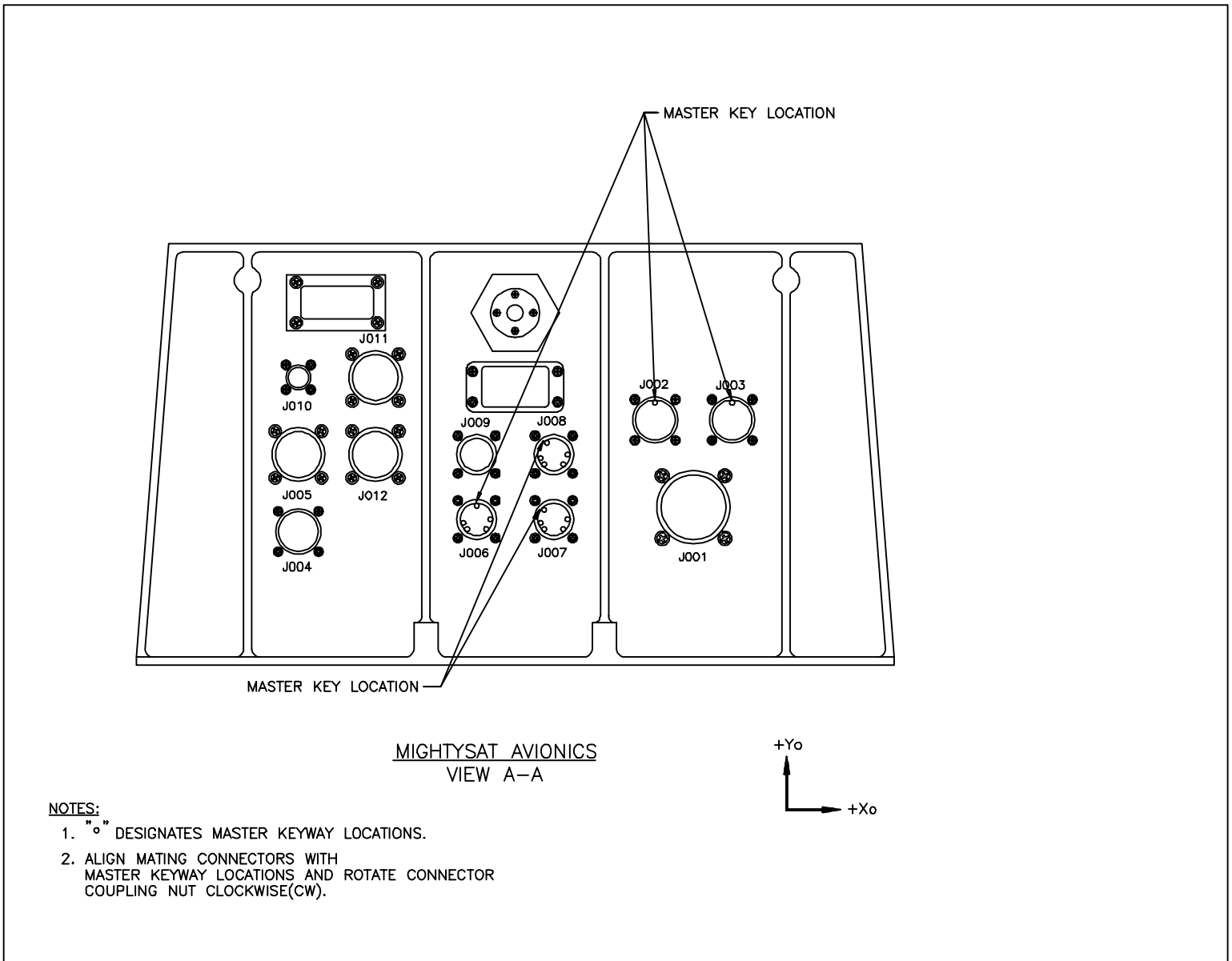


FIGURE 3.0.2.1.2-1 WIRE HARNESS LAST POINT OF ATTACHMENT AND HARNESS LENGTH
(SHEET 2 OF 2)



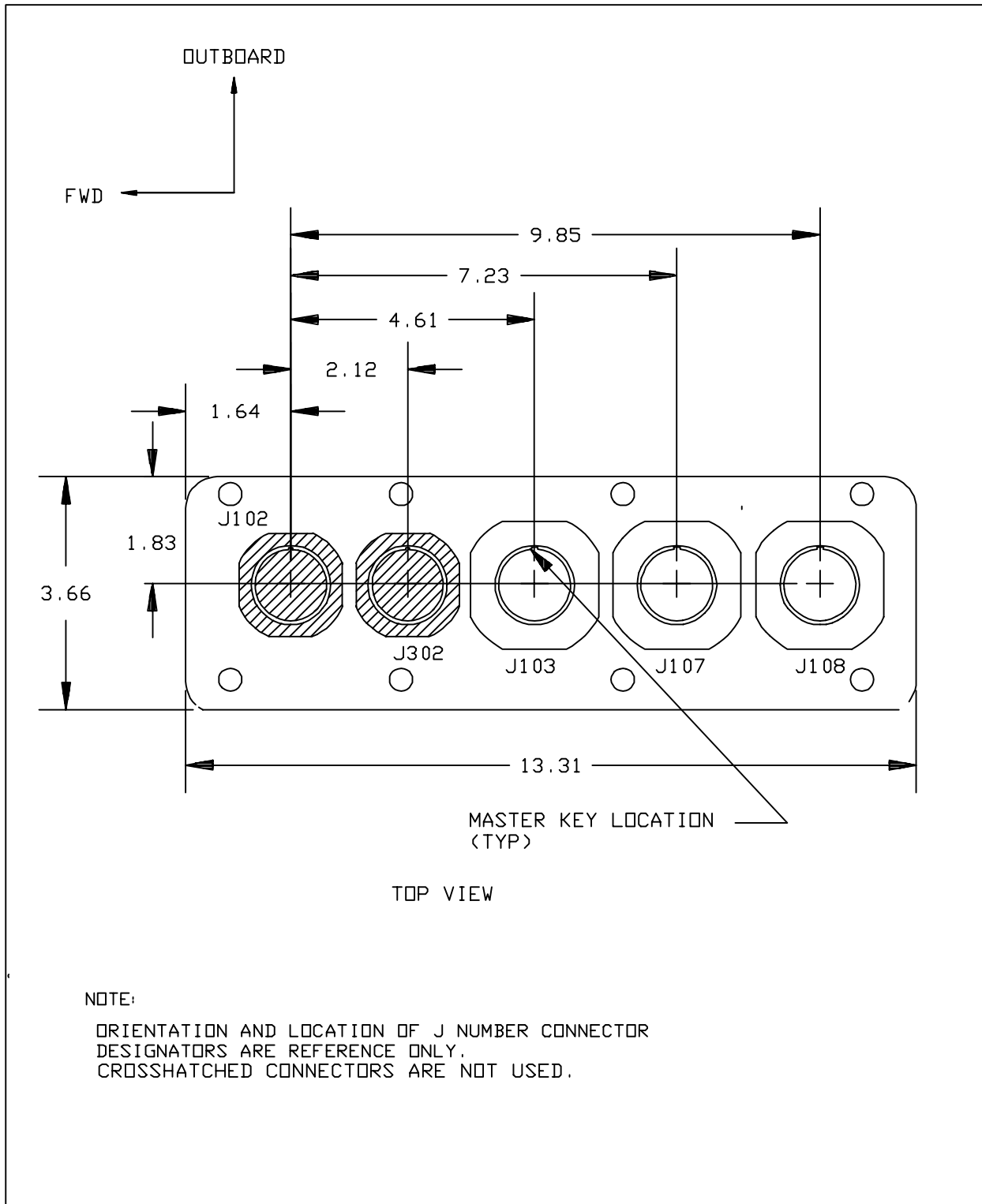


FIGURE 3.0.2.1.2.1-1 UNIQUE SMCH-IP ELECTRICAL INTERFACES

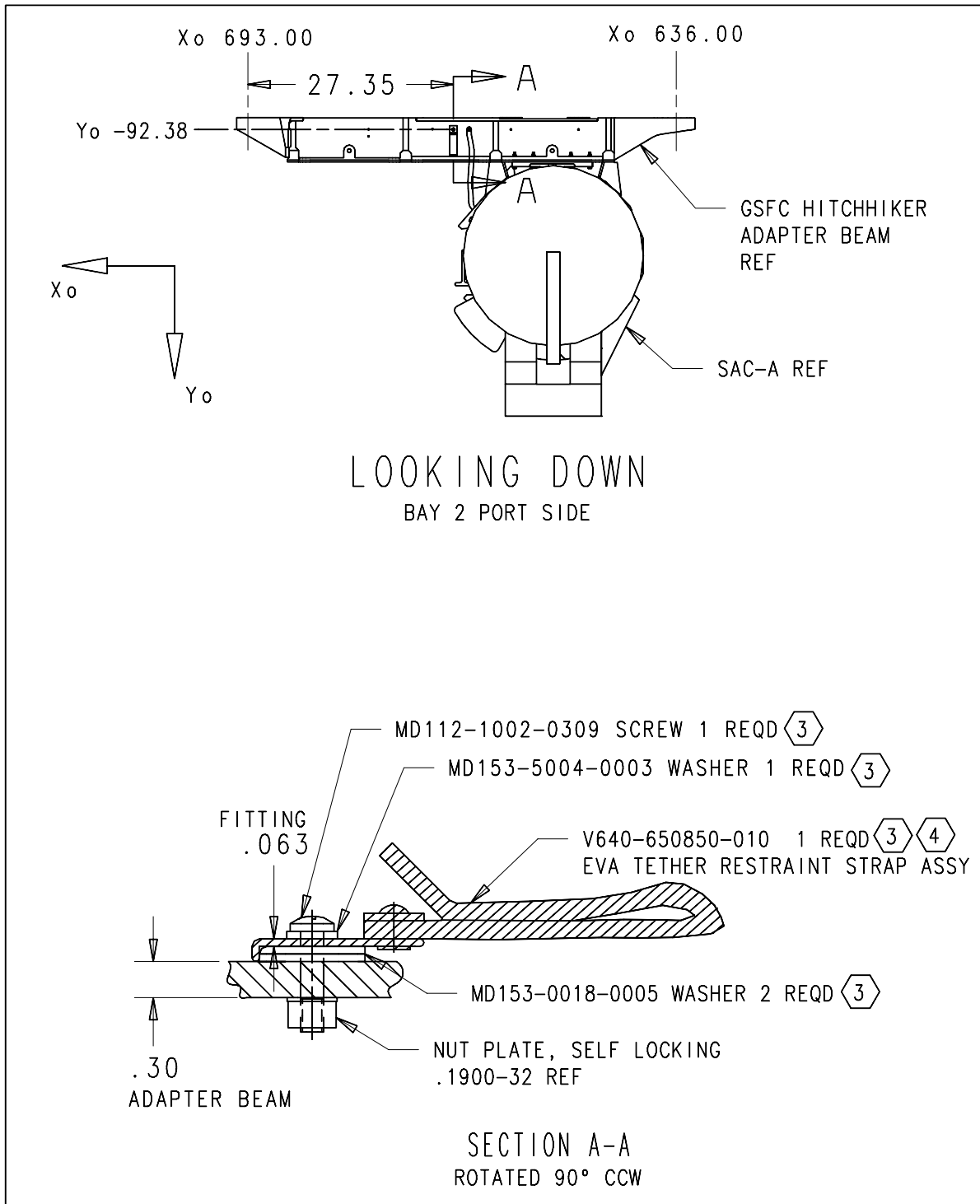


FIGURE 3.0.2.1.3-1 EVA SLIDEWIRE TETHER INSTALLATION
 (SHEET 1 OF 2)

NOTES:

1. ALL HARDWARE SUPPLIED BY PAYLOAD CONTRACTOR UNLESS OTHERWISE SPECIFIED.
2. INSTALL THREADED FASTENERS PER MA0101-301 AND TORQUE VALUE 20-30 IN-LBS.

3 STS HARDWARE.

4 EVA TETHER RESTRAINT STRAP ASSEMBLY INSTALLATION REQUIREMENT IS A MISSION SPECIFIC APPLICATION ONLY AND IT IS NOT PART OF PAYLOAD APPLICATION.

FIGURE 3.0.2.1.3-1 EVA SLIDEWIRE TETHER INSTALLATION
(SHEET 2 OF 2)

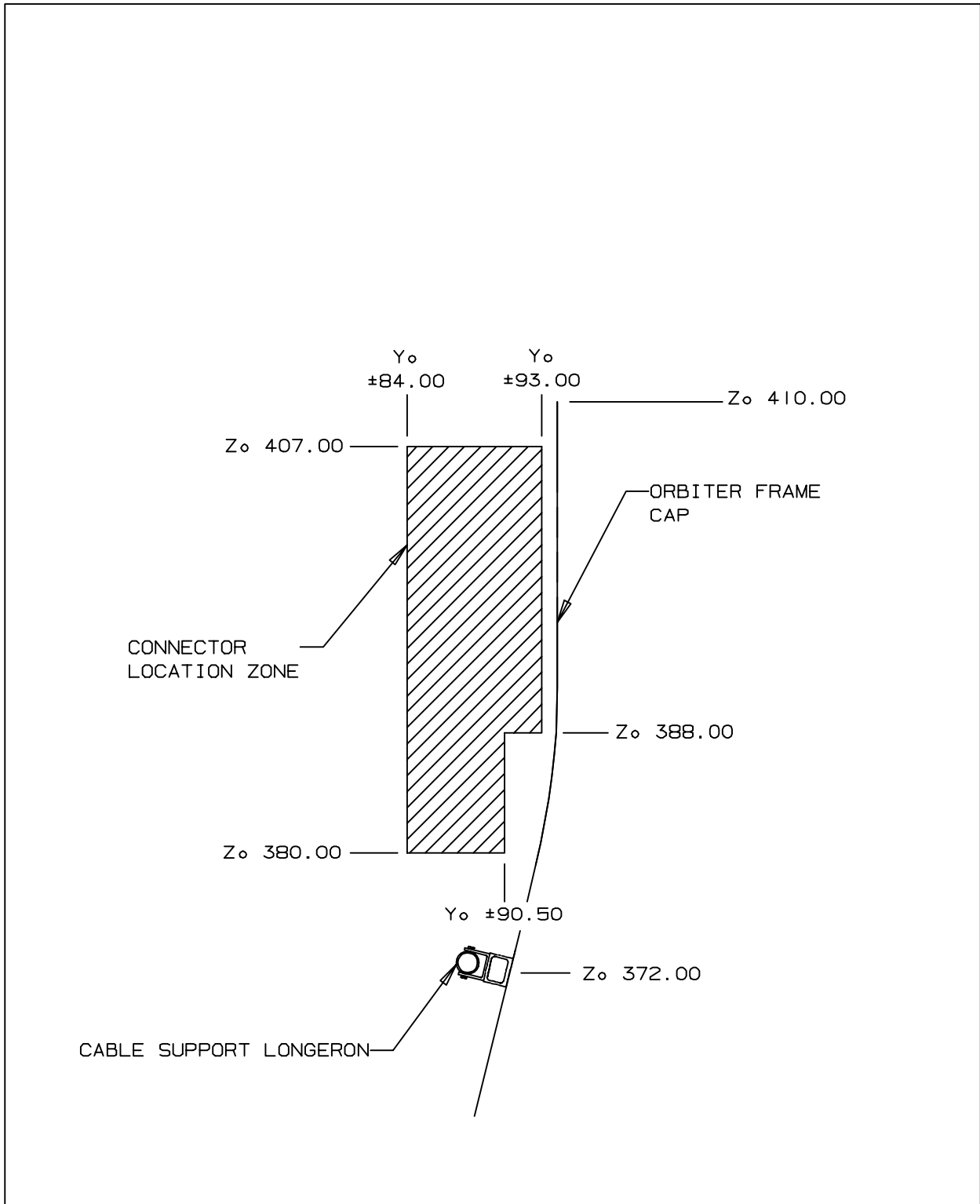


FIGURE 3.0.4.2.3-1 PAYLOAD CONNECTOR LOCATION AND CABLE CLAMPING

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