

GENERAL DYNAMICS

SATCOM Technologies

4096-706
May 27, 2009
Revision B

ASSEMBLY MANUAL

4' x 4' 2-Piece Non-Penetrating Mast Mount

**General Dynamics
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4' x 4' NPMM INSTALLATION INSTRUCTIONS

B	Revised Company Name and Logo	5/27/09	RAH
A	Added 1.2m Ballast Tables	02/23/07	R. Frye
-	ORIGINAL RELEASE	11/01/05	R FRYE
REV.	DESCRIPTION	DATE	APPROVED

INSTALLATION INSTRUCTIONS

4' x 4' NON-PENETRATING MAST MOUNT

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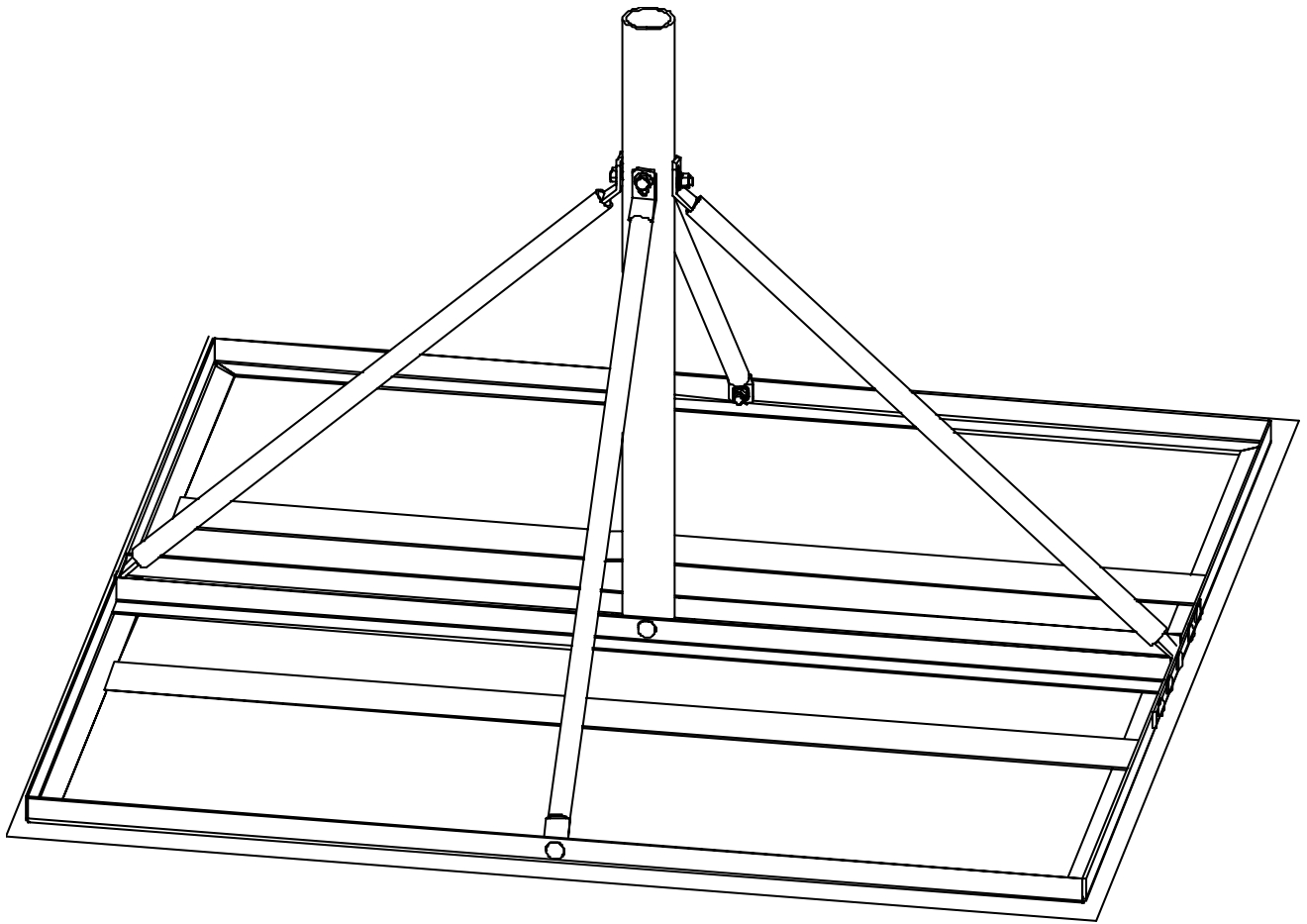


Figure 1

SECTION 1 **GENERAL INFORMATION**

1.0 GENERAL INFORMATION

1. Prior to installation, verify that the installation site roof material and supporting structure have been investigated and found capable of withstanding all loads imposed by the proposed antenna system. Confirm that the supporting surfaces, anchors, and/or safety cables, if required, have been found to be adequate to resist the reactions from the antenna system and that the installation will be in accordance with any/all applicable local, state, and federal requirements.
2. All antenna installations should be grounded to meet all applicable codes.
3. Rubber pads (when provided) are to protect the roof surface.
4. For assistance in determining ballast requirements refer to chart in section 3.
5. All metal parts are of galvanized construction to help prevent corrosion.

1.1 UNPACKING & INSPECTION

1. **UNPACKING & INSPECTING**
The mount should be unpacked and inspected at the earliest date to ensure that all material has been received and is in good condition.
2. **FREIGHT DAMAGE**
Any damage to materials while in transit should be immediately directed to the freight carrier. He will instruct you on the matters regarding any freight damage claims.
3. **MATERIAL - MISSING OR DAMAGED**
Any questions regarding missing or damaged materials that is not due to freight carrier should be directed to General Dynamics' Customer Service Department at:

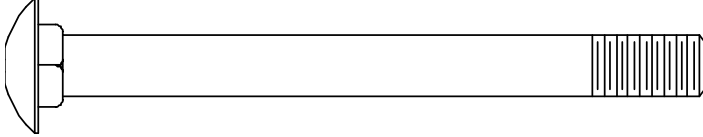
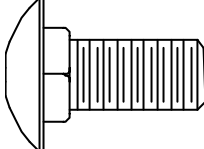
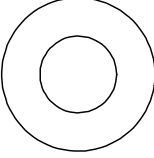
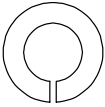
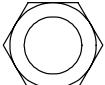
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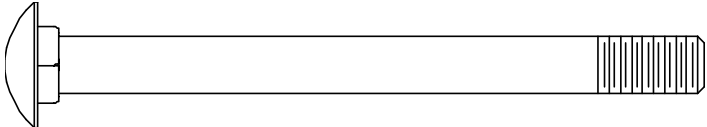
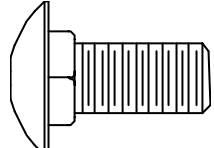
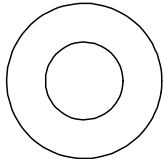
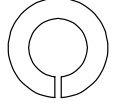
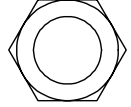
1.2 **SUGGESTED TOOL LIST**

1. SITE PREPARATION TOOLS
The following tools are suggested for site preparation.
 1. Shovel (for ground installation)
 2. Broom

2. SUGGESTED TOOL LIST
The following tools are suggested for the NPMM installation.
 1. Ratchet
 2. Socket, 1/2"
 3. Wrench, combination 1/2"
 4. Tape measure

1.3 PARTS LIST

PARTS LIST - 4' x 4' NPMM W/2.38" O.D. Mast			
ITEM NO.	PART NO.	DESCRIPTION	QTY
1	0250-907	Mast Pipe – 2.38" o.d.	1
2	0185-540	Base Frame – Half	2
3	0211-904	Support Brace	4
4	0158-254	Splice Plate	2
5	5003-038	54" x 54" Pad (if supplied)	1
6	8038-028	5/16" x 3.50" Bolt 	3
7	8038-006	5/16" x .75" Carriage Bolt 	12
8	8201-041	5/16" Flat Washer 	15
9	8202-041	5/16" Lock Washer 	15
10	8101-009	5/16" Hex Nut 	15

PARTS LIST - 4' x 4' NPMM W/2.88" O.D. Mast			
ITEM NO.	PART NO.	DESCRIPTION	QTY
1	0250-912	Mast Pipe – 2.88" o.d.	1
2	0185-540	Base Frame – Half	2
3	0211-904	Support Brace	4
4	0158-254	Splice Plate	2
5	5003-038	54" x 54" Pad (if supplied)	1
6	8038-029	5/16" x 3.75" Bolt 	3
7	8038-006	5/16" x .75" Carriage Bolt 	12
8	8201-041	5/16" Flat Washer 	15
9	8202-041	5/16" Lock Washer 	15
10	8101-009	5/16" Hex Nut 	15

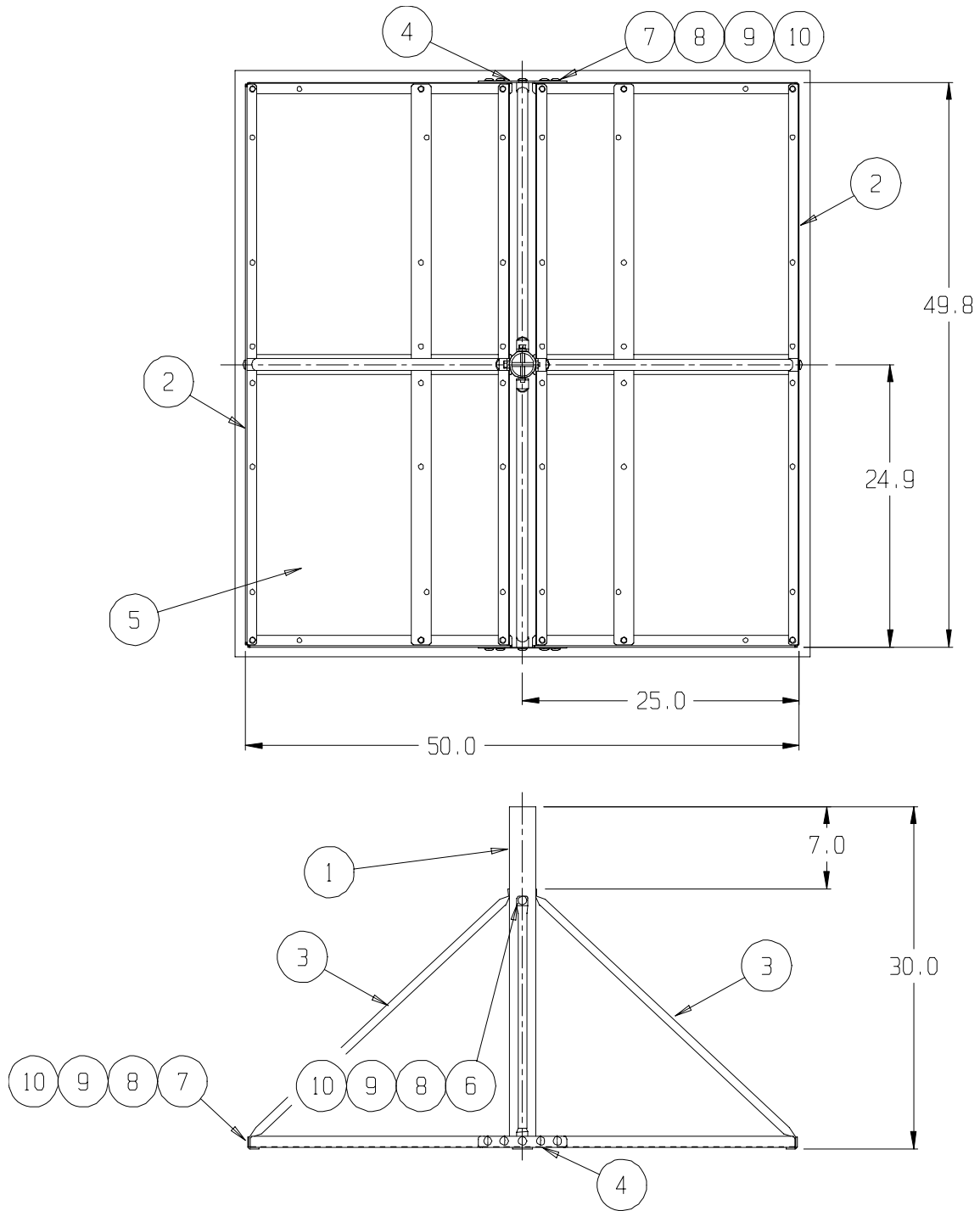
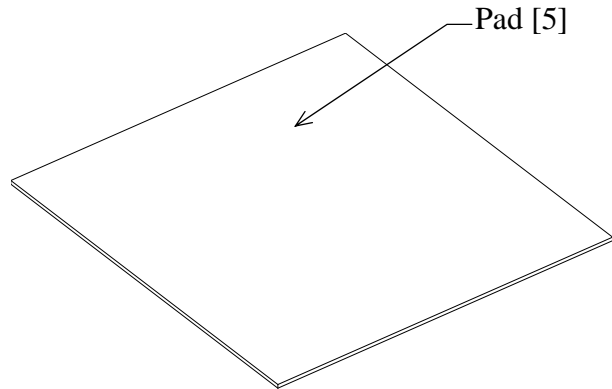


Figure 2

SECTION 2

ASSEMBLY INSTRUCTIONS



STEP 1:

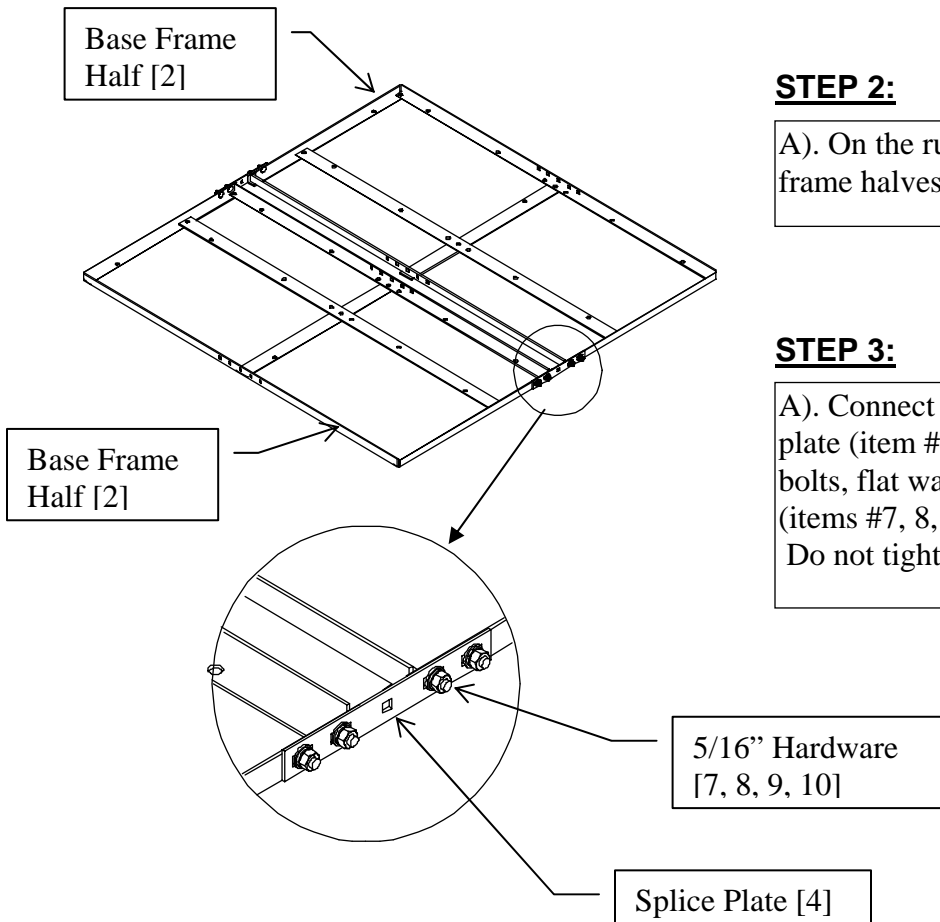
- A). Locate site of installation and clear an area of 5 x 5 square feet of all debris.
- B). Place rubber pad (item #5) within the cleared area.

STEP 2:

- A). On the rubber pad, layout the (2) base frame halves (item #2).

STEP 3:

- A). Connect the 2 frame halves using a splice plate (item #4) and (4) 5/16-18 x .75" carriage bolts, flat washers, lock washers, and hex nuts (items #7, 8, 9, & 10) on each of the two sides. Do not tighten.



STEP 4:

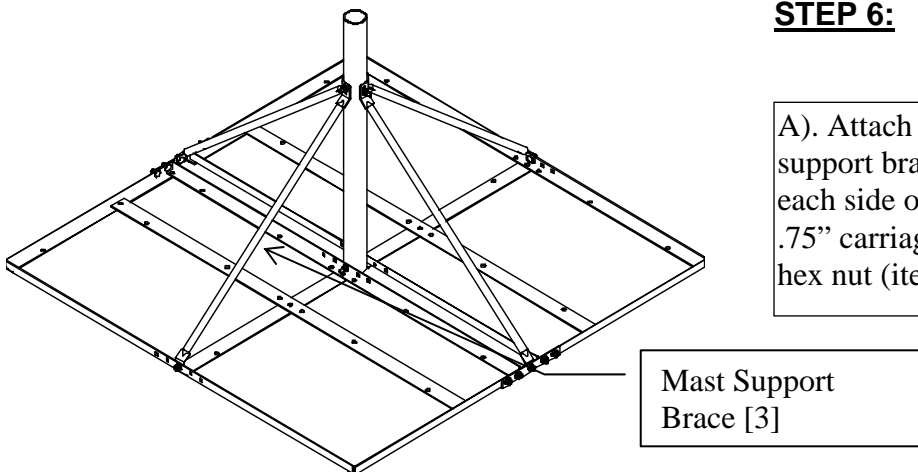
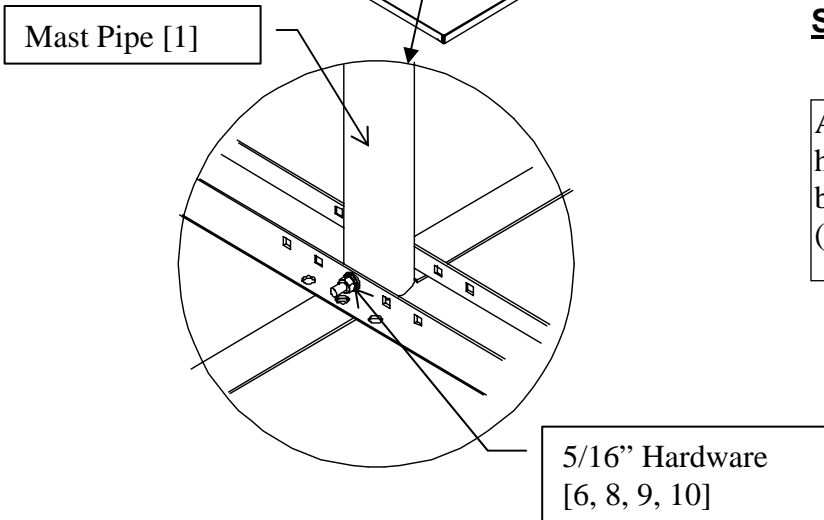
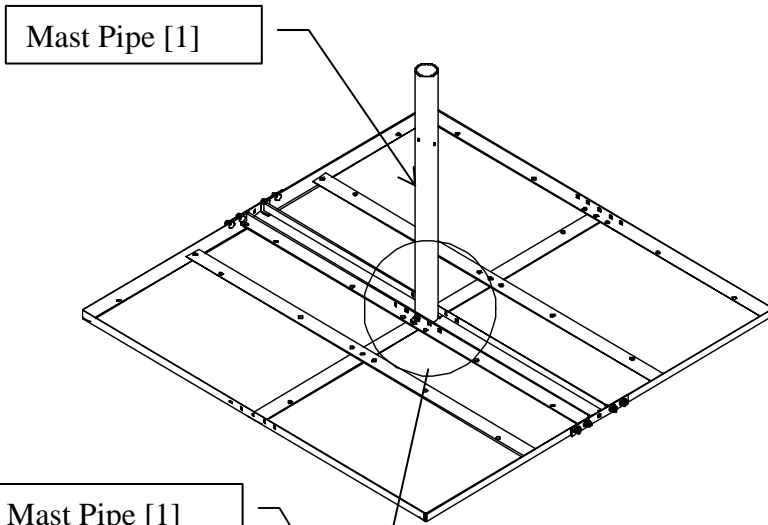
A). Place the mast pipe (item #1) between the two frame halves by sliding the halves together or apart at the splice plates enough to accommodate the diameter (2.38" or 2.88") of the mast pipe.

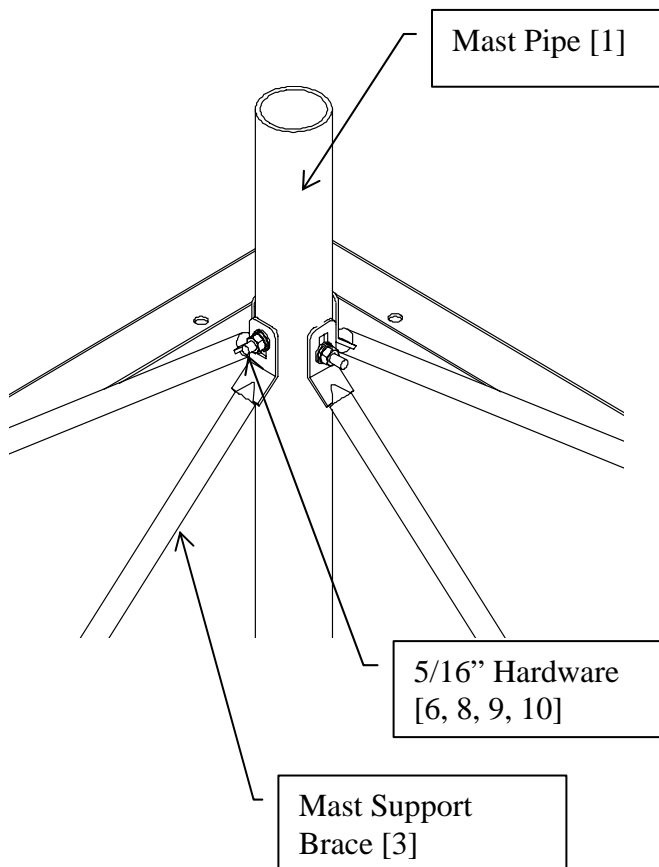
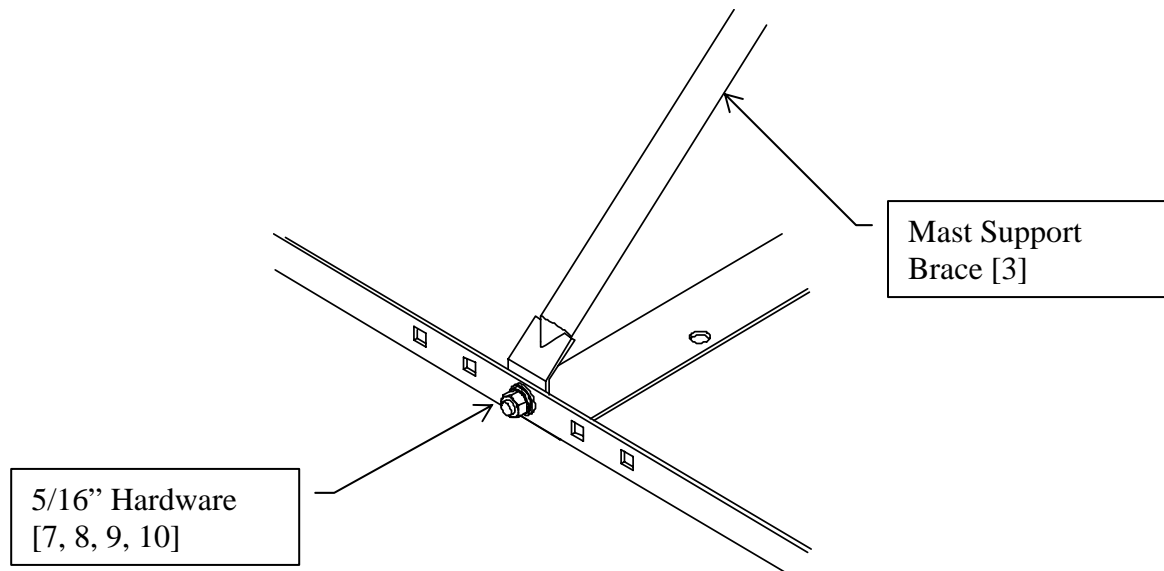
STEP 5:

A). Secure the mast pipe to the base frame halves with a 5/16-18 x 3.50" (or 3.75") carriage bolt, flat washer, lock washer, and hex nut (items #6, 8, 9, & 10). Snug only.

STEP 6:

A). Attach the short end of the four mast support braces (item #3) to the center hole on each side of the base frame using a 5/16-18 x .75" carriage bolt, flat washer, lock washer, and hex nut (items #7, 8, 9, & 10). Snug only.





STEP 7:

A). Attach the opposite end (long end) of the support braces to the mast pipe by passing a 5/16-18 x 3.50" (or 3.75") carriage bolt (item #6) through a brace, through the mast pipe, through the opposite brace, and secure with a flat washer, lock washer, and hex nut (items #8, 9, & 10). Snug only.

STEP 8:

A). Before tightening any hardware, place a ballast block in each of the four base frame corners.

B). Tighten all hardware. The maximum recommended torque is 12 ft-lbs.

C). Add remaining ballast and then install antenna system. See section 3 for ballast requirements.

SECTION 3

BALLAST REQUIREMENTS

3.0 BALLAST REQUIREMENT TABLES

EXPOSURE:

1. Exposure B is urban or suburban areas, wooded areas, or other terrain with numerous, closely spaced obstructions having the size of single family dwellings or larger. Obstructions must extend 1500 feet in all directions from the antenna.
2. Exposure C is open terrain with widely scattered obstructions having heights generally less than 30 feet. Includes flat open country and grass lands.

BALLAST:

1. Ballast tables are based on an overturning design with a 1.25 safety factor. Values shown provide sliding resistance to the wind speed shown with a 1.0 safety factor when used with a rubber friction pad (coefficient of friction = .64).
2. Recommended ballast material is concrete cap block, nominal dimensions of 4 x 8 x 16 inches. These blocks will weigh between 25 and 30 lbs each, depending on local variation. Average weight of blocks should be determined for correct ballast amount.
3. Minimum ballast required is 4 blocks placed at the 4 corners of the base frame. Place ballast equally on base frame working inward. If more than 18 blocks are needed, begin a second layer on top of the first.

TABLE 3.0-1 - 1.0M OR SMALLER CIRCULAR VSAT ANTENNA
 BALLAST REQUIREMENTS - EXPOSURE B - 30 FT. ABOVE GROUND

WIND SPEED (M.P.H.)	70	80	90	100	110	125
TOTAL BALLAST (LBS.)*	188	245	311	383	464	598
STATIC ROOF LOAD (LB./FT.2)	11.7	15.3	19.4	24	29	37.4

TABLE 3.0-2 - 1.0M OR SMALLER CIRCULAR VSAT ANTENNA
 BALLAST REQUIREMENTS - EXPOSURE B - 50 FT. ABOVE GROUND

WIND SPEED (M.P.H.)	70	80	90	100	110	125
TOTAL BALLAST (LBS.)*	220	289	366	452	545	705
STATIC ROOF LOAD (LB./FT.2)	13.8	18	22.9	28.2	34.1	44

TABLE 3.0-3 - 1.0M OR SMALLER CIRCULAR VSAT ANTENNA
 BALLAST REQUIREMENTS - EXPOSURE C - 30 FT. ABOVE GROUND

WIND SPEED (M.P.H.)	70	80	90	100	110	125
TOTAL BALLAST (LBS.)*	305	398	505	622	753	972
STATIC ROOF LOAD (LB./FT.2)	19	24.9	31.5	38.9	47.1	60.7

TABLE 3.0-4 - 1.0M OR SMALLER CIRCULAR VSAT ANTENNA
 BALLAST REQUIREMENTS - EXPOSURE C - 50 FT. ABOVE GROUND

WIND SPEED (M.P.H.)	70	80	90	100	110	125
TOTAL BALLAST (LBS.)*	341	445	564	695	842	1088
STATIC ROOF LOAD (LB./FT.2)	21.3	27.8	35.3	43.5	52.6	68

*Total Ballast includes weight of non-pen mount (30 lbs.) and antenna.

TABLE 3.0-5 - 1.2M CIRCULAR VSAT ANTENNA
 BALLAST REQUIREMENTS - EXPOSURE B - 30 FT. ABOVE GROUND

WIND SPEED (M.P.H.)	70	80	90	100	110	125
TOTAL BALLAST (LBS.)*	344	438	555	685	829	1068
STATIC ROOF LOAD (LB./FT.2)	21.5	27.4	34.7	42.8	51.8	66.8

TABLE 3.0-6 - 1.2M CIRCULAR VSAT ANTENNA
 BALLAST REQUIREMENTS - EXPOSURE B - 50 FT. ABOVE GROUND

WIND SPEED (M.P.H.)	70	80	90	100	110	125
TOTAL BALLAST (LBS.)*	395	518	656	809	977	1262
STATIC ROOF LOAD (LB./FT.2)	24.7	32.4	41	50.6	61.1	78.9

TABLE 3.0-7 - 1.2M CIRCULAR VSAT ANTENNA
 BALLAST REQUIREMENTS - EXPOSURE C - 30 FT. ABOVE GROUND

WIND SPEED (M.P.H.)	70	80	90	100	110	125
TOTAL BALLAST (LBS.)*	546	714	904	1114	1350	1742
STATIC ROOF LOAD (LB./FT.2)	34.1	44.6	56.5	69.6	84.3	108.9

TABLE 3.0-8 - 1.2M CIRCULAR VSAT ANTENNA
 BALLAST REQUIREMENTS - EXPOSURE C - 50 FT. ABOVE GROUND

WIND SPEED (M.P.H.)	70	80	90	100	110	125
TOTAL BALLAST (LBS.)*	608	794	1006	1241	1502	1940
STATIC ROOF LOAD (LB./FT.2)	38	49.6	62.9	77.6	93.9	121.2

*Total Ballast includes weight of non-pen mount (30 lbs.) and antenna.

3.1 **BALLAST REQUIREMENT INFORMATION**

- 3.1-1. Ballast requirements are provided to assist in determining the applicability of the NPMM for an antenna installation. The ballast data should not be relied upon without competent local professional examination and verification of its accuracy and suitability for a specific site or application.
- 3.1-2. Specific antenna types may require more strength and ballast requirements and must be investigated for each installation. The load carrying requirements of the supporting surface, the mast, the antenna and the antenna's connection to the mast must also be investigated for each installation.
- 3.1-3. Roof pads are recommended to prevent damage to roof membranes. Pads should be placed under all ballast and under the mast pipe. When roof pads are utilized, the minimum coefficient of friction between the ballast tray and roof pad or between the roof pads and the supporting surface must be used to calculate the wind speeds resulting in sliding.
- 3.1-4. When adhesive, sealant or pads are utilized, they must be compatible with the supporting surface. They must also be durable and have adequate strength. Precautions should also be taken to insure that damage to the supporting surface will not occur upon wind loading. Adhesives and sealants must be capable of resisting shear; otherwise, they may act as a lubricant and decrease the effective coefficient of friction between the ballast and the supporting structure.
- 3.1-5. The installation, roof materials and supporting structure must be capable of withstanding all loads imposed by the antenna system. Supporting structure, anchors and/or safety cables must be sufficient to resist the reactions from the antenna system. The installation must meet all applicable, local, state and federal requirements. ***Due to the many variables involved, General Dynamics does not accept responsibility for verifying the applicability of the NPMM for specific installation.***