

# NanoStructure 6U Mk2

## Manual

6U structure for nano-satellites

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## 2 Changelog

Revision	Date	Name	Description
1.0	04-10-2024	FJVO	Initial release

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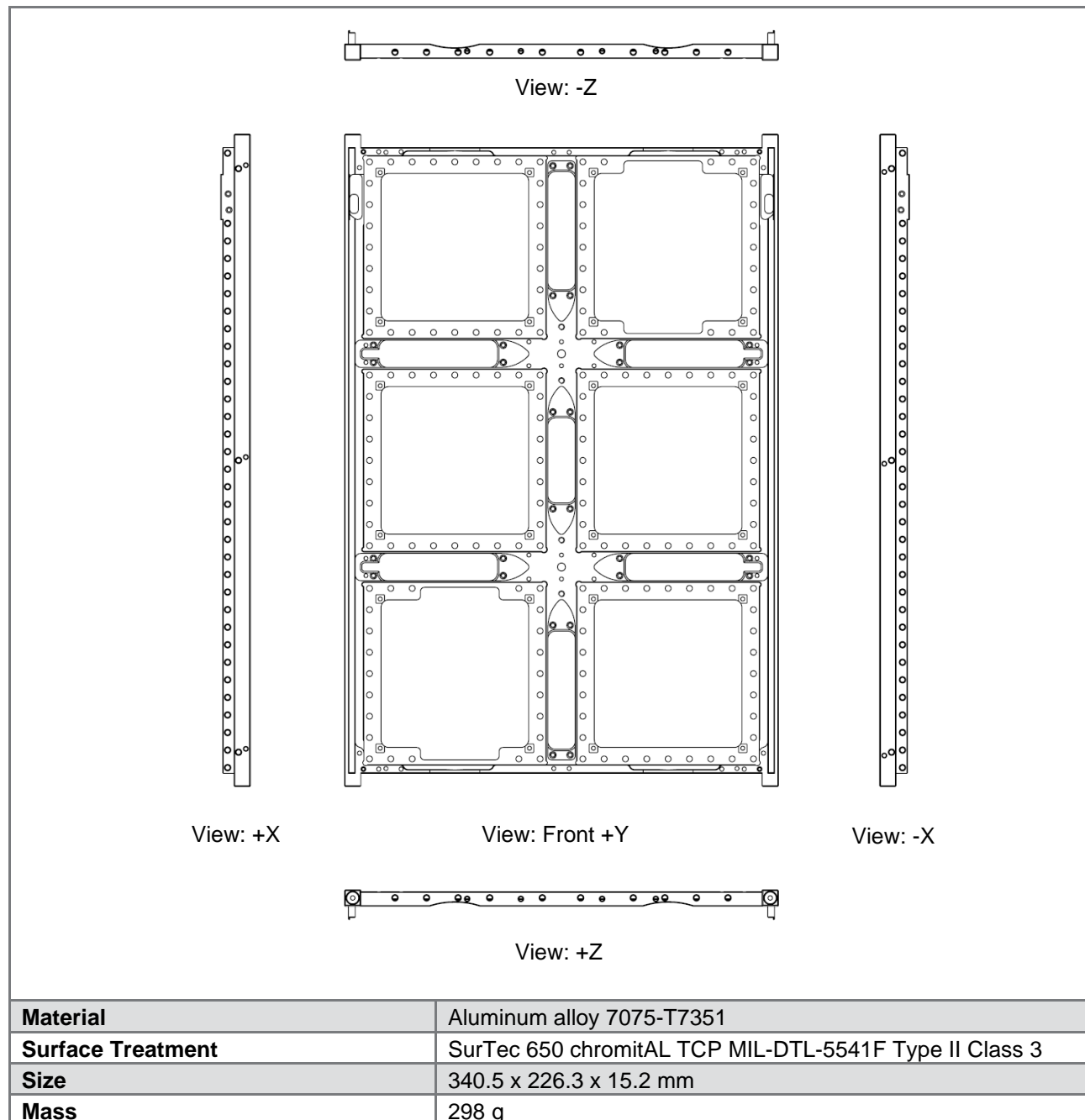
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## 4 Introduction

This manual provides an overview of the use, properties and assembly of the GomSpace NanoStructure 6U. Each part of the structure is described in detail and it is shown how to assemble the structure around your satellite hardware. The structure is shipped pre-assembled.

## 5 Structural Parts

### 5.1 NanoStructure 6U Wall




### 5.2 Kill Switch


The structure arrives pre-mounted with a harness for each kill switch. The housing is glued to the frame. Do not attempt to open it.


5.3 Corner Brackets

	
Surface Treatment	SurTec 650 chromitAL TCP MIL-DTL-5541F Type II Class 3
Size	93.0 x 16.8 x 13.2 mm
Mass	10 g

5.4 Mounting Rings

<p>A and B Ring</p> 	
Material	Aluminum alloy 7075-T6
Surface Treatment	SurTec 650 chromitAL TCP MIL-DTL-5541F Type II Class 3
Size	95.0 x 95.0 x 6.0 mm
Mass pr. Ring	14 g

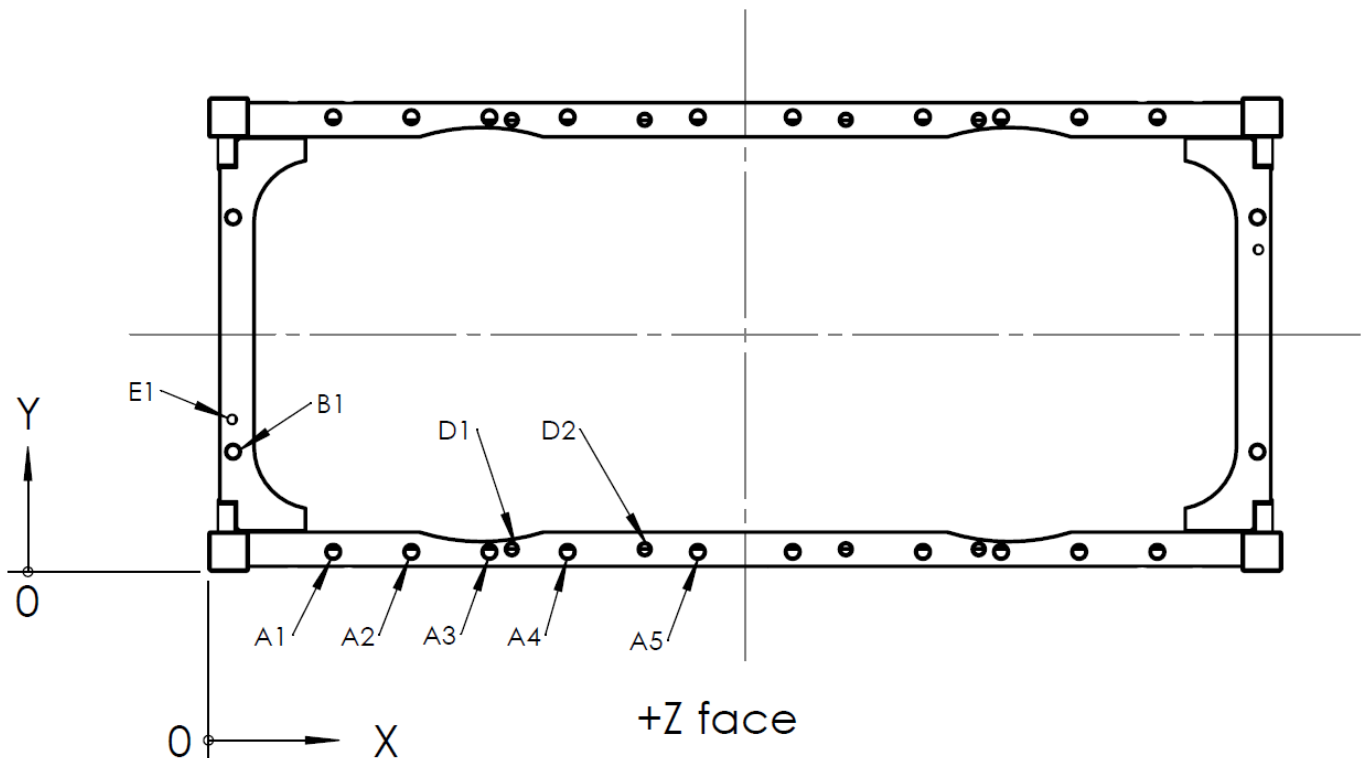
<p>YA and YB Ring</p> 	
Material	Aluminum alloy 7075-T6
Surface Treatment	SurTec 650 chromitAL TCP MIL-DTL-5541F Type II Class 3
Size	95.0 x 95.0 x 8.6 mm
Mass pr. Ring	24 g

<p>Connector Rod</p> 	
Material	Steel AISI 304
Surface	Polished
Size	3.0 mm diameter x varying length
Mass	0.0495 g/mm

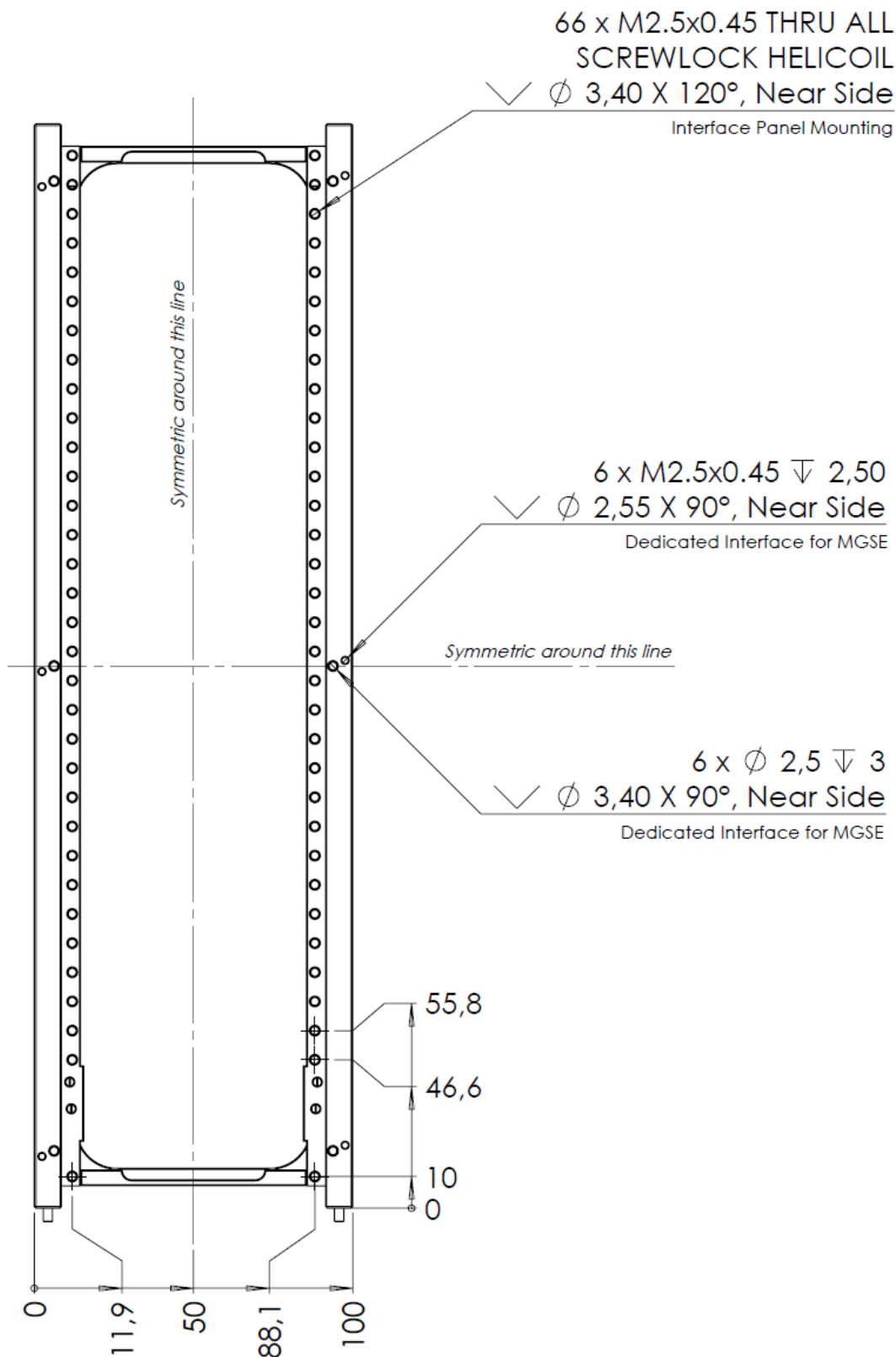
## 6 Holes and Screws

### 6.1 Z-face (2U Side) – Hole Callouts

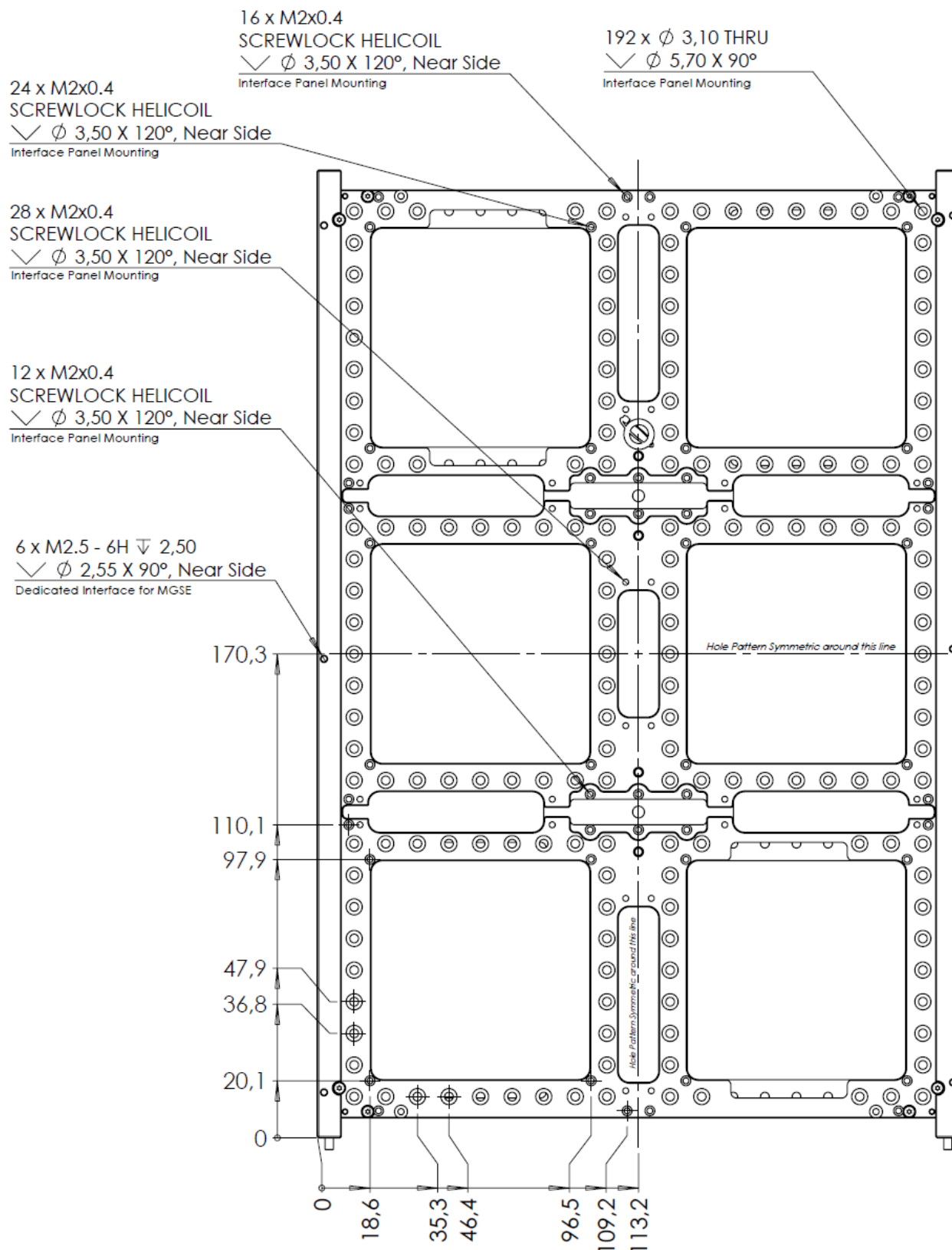
Hole Table			
TAG	X LOC	Y LOC	SIZE
A1	26,30	4,20	M2.5x0.45 SCREWLOCK HELICOIL Insert = 1.5 * Dia. Do NOT apply Loctite or similar
A2	42,77	4,20	
A3	59,24	4,20	
A4	75,70	4,20	
A5	103,15	4,20	
B1	5,21	25,30	M2.5x0.45 SCREWLOCK HELICOIL Insert = 1.5 * Dia. Do NOT apply Loctite or similar
D1	63,95	4,75	M2x0.4 SCREWLOCK HELICOIL Insert = 2.0 * Dia. Do NOT apply Loctite or similar
D2	91,95	4,75	M2x0.4 SCREWLOCK HELICOIL Insert = 2.0 * Dia. Do NOT apply Loctite or similar
E1	5,01	32,10	Ø 2 Note: Skew-symetric around only one of the symetry lines



## 6.2 X-Face (3U Side) – Hole Callouts



### 6.3 Y-Face (6U Side) – Hole Callouts





## 7 Assembly

### 7.1 Standard Tightening Torque for Screws

Below is a table for suggested tightening torque for screws inserted in Helicoils.

Standard Bolt Assembly <u>with</u> Screw lock Helicoils		
Thread	First-time on Nom. (min/max) [Nm]	First-time off Nom. (min/max) [Nm]
M2	0.51 (0.44/0.57)	0.38 (0.31/0.44)
M2.5	0.97 (0.83/1.11)	0.75 (0.61/0.89)

Below is a table for suggested tightening torque for screws without Helicoils.

Standard Bolt Assembly <u>without</u> Screw lock Helicoils		
Thread	First-time on Nom. (min/max) [Nm]	First-time off Nom. (min/max) [Nm]
M3	1.22 (0.98/1.47)	1.22 (0.98/1.47)

GomSpace recommends that all screws are secured with an appropriate screw locking feature eg. screw lock helicoils or Loctite 262. All joints in the 6U structure mentioned in this document are equipped with screw lock helicoils, unless explicitly mentioned.

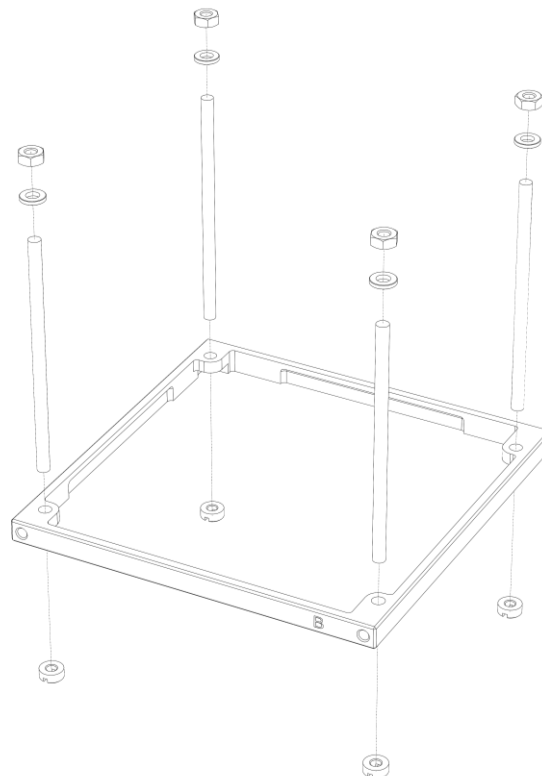
### 7.2 Secondary Structure Assembly - PC104 Stack

The PC104 Stack is assembled prior to installing it inside the structure.

#### 7.2.1 Step 1

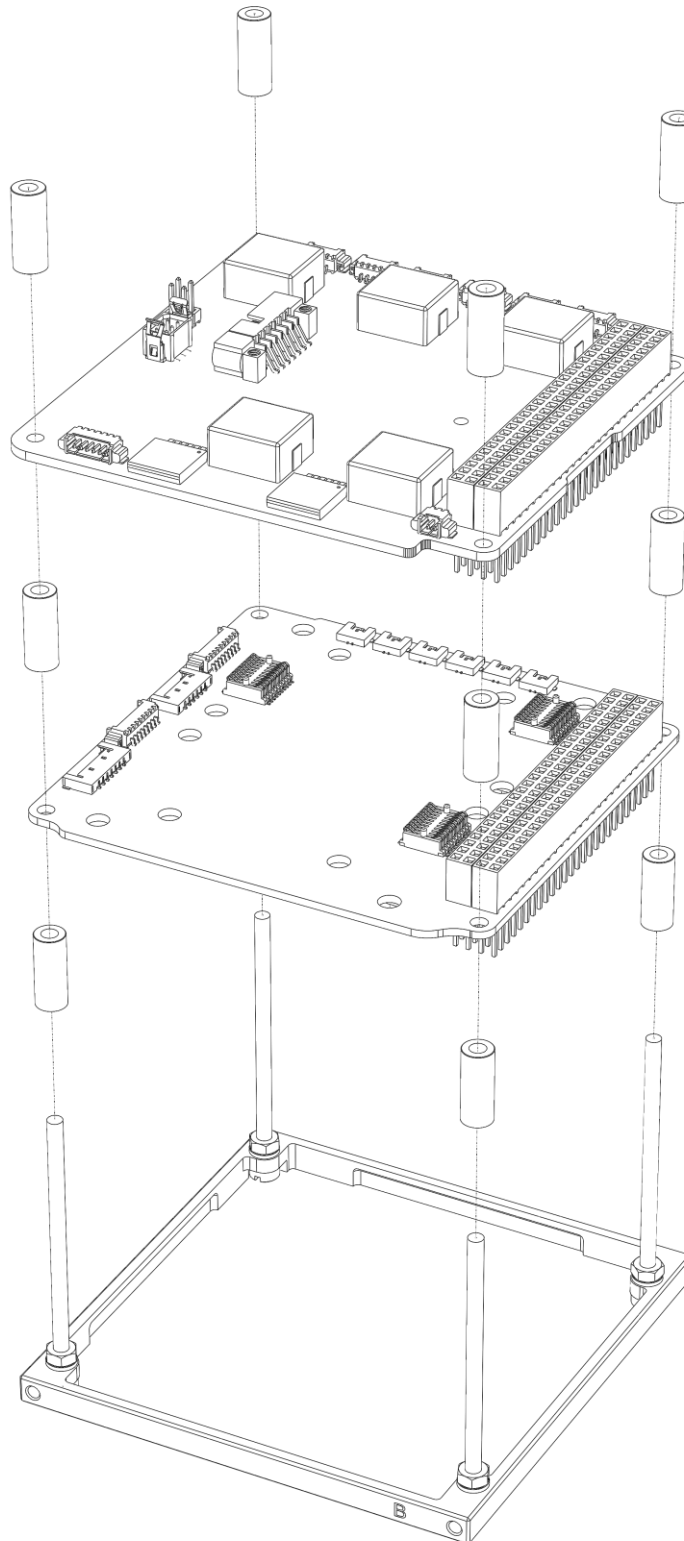
Start with the B-ring, view the orientation in the illustration below. Insert four rods through the ring holes and screw on four slotted nuts from the bottom. To ensure that the assembly can be torqued correctly in Step 4, it is recommended to add M3 nuts from the top side to fasten the rods to the ring. In that case it is suggested to put a washer under the nut. Make sure the end of the rods are at level with the bottom of the B-ring.

**Note:** that the rod doesn't have any screw locking feature, hence GomSpace recommends using Loctite 262.



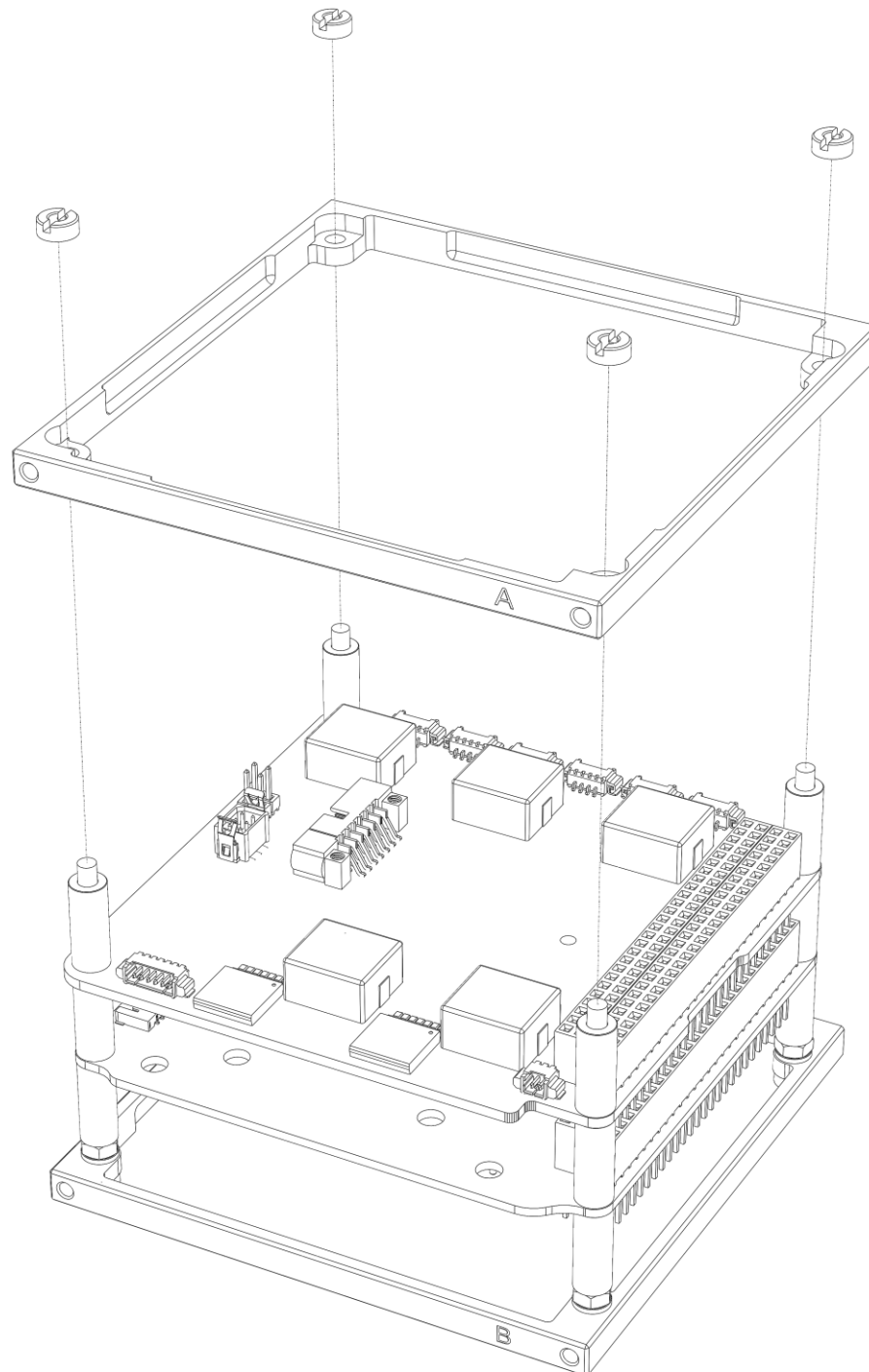
### 7.2.2 Step 2

Start with a spacer and then alternate between a PCB and a spacer, and end with a spacer at the top as shown in the illustration below. Make sure the stack connectors between each PCB have a proper connection (insertion length between 3.68mm and 6.35mm for the stack connectors). Unless the PCB has a specific insert to support its own weight when mounted on spacers, it's recommended to add a washer on both sides of each PCB. Note that this is not represented in the illustrations.



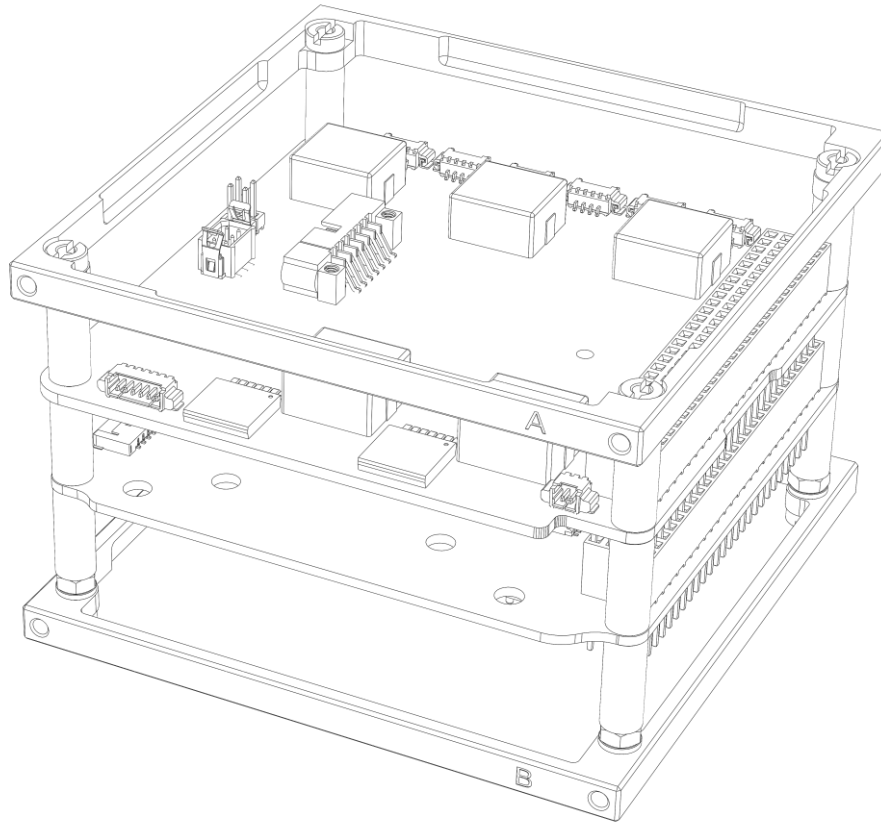
### 7.2.3 Step 3

Place the A ring on top and finger tighten it with four slotted nuts, as shown in the illustration below.



#### 7.2.4 Step 4

Tighten all eight slotted nuts with the recommended torque level as described in Standard Tightening Torque for Screws paragraph. Measure the height of each corner to make sure the rings are parallel and that the holes in the rings fit into the holes in the structure (multiples of 11.125 mm). Adjust height with shims if needed.



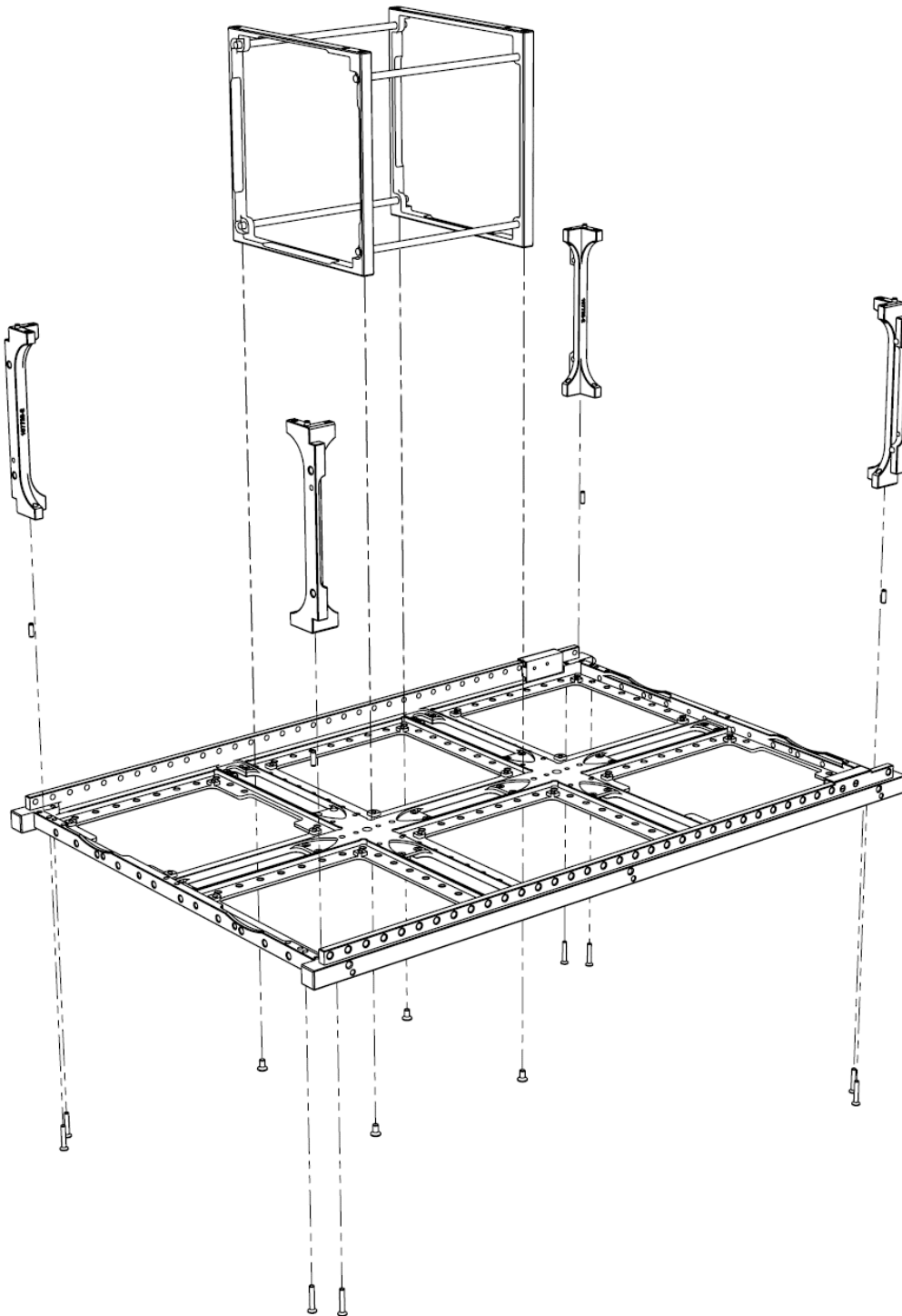
The stack is now ready to be installed in the structure.

## 7.3 Assembling the 6U Structure

### 7.3.1 Step 1

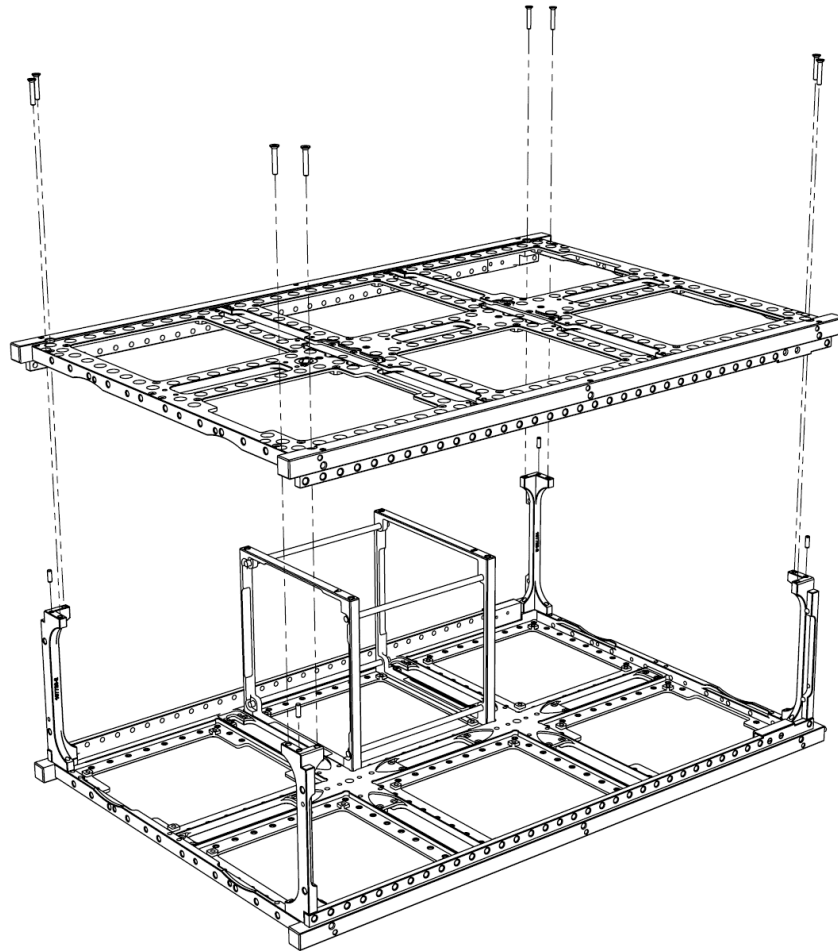
Place the mounting rings, PC104 stacks and other units on top the structure frame. Fasten them from the bottom using the correct screws supplied from the Screw Kit. Do not apply the full torque yet, only finger tighten the screws at this step.

Orient one side frame as shown in the illustration below and insert a corner bracket in each corner, make sure it's aligned correctly with the pins to preserve structural tolerances. Fasten the corner brackets, do not apply the final torque yet.



## 7.4 Step 2

Place the remaining structure frame as shown below and fasten them with same set of screws. Do not tighten them yet. Make sure the kill switches are in the same end.



### 7.4.1 Step 3

Now that all parts and subassemblies are in place, all fasteners must be tightened as described in Standard Tightening Torque for Screws paragraph. One by one tighten the screws in the corner brackets with a quarter turn, then start over with another quarter turn, repeat until torque limit has been reached. After that, tighten the remaining screws one after another with a quarter turn each until torque limit of all screws is reached.

The 6U structure is now fully assembled.