

NanoStructure 12U

AIV Manual
12U platform for nano-satellites

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Author: Nikita Seider

Approved by: Peter Bach

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1 Table of Contents

1	TABLE OF CONTENTS.....	2
2	DISCLAIMER	3
3	SCOPE	3
4	TIGHTENING TORQUES	3
5	CONTENT	3
	5.1 BoM.....	3
	5.2 Overview	4
6	SECONDARY STRUCTURE ASSEMBLY	6
7	FRAME ASSEMBLY	8

2 Disclaimer

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3 Scope

The scope of the document is to describe step by step assembly of the 12U platform.

The platform consists of a primary structure (Frame structure) and secondary structure (Bus section)

4 Tightening torques

Table 4-1: Tightening torques for assemblies with screw lock helicoils.

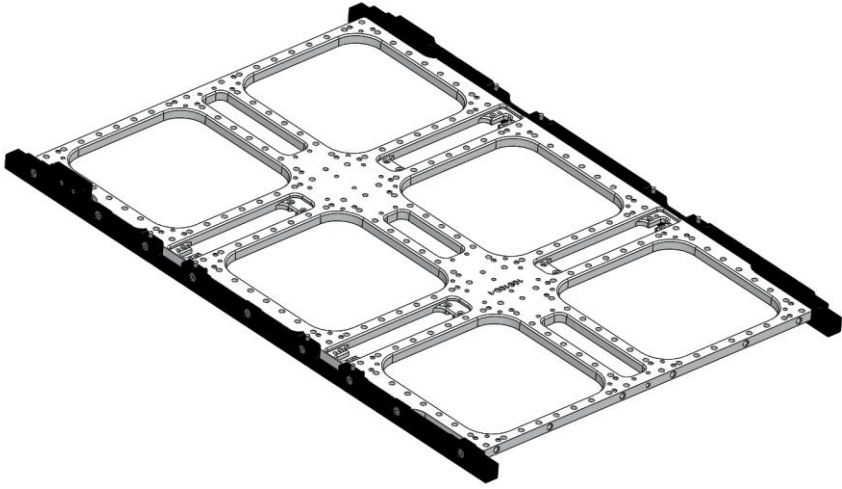
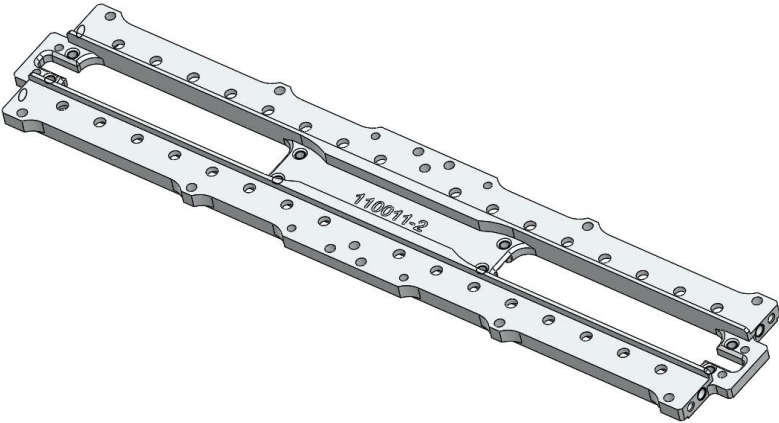
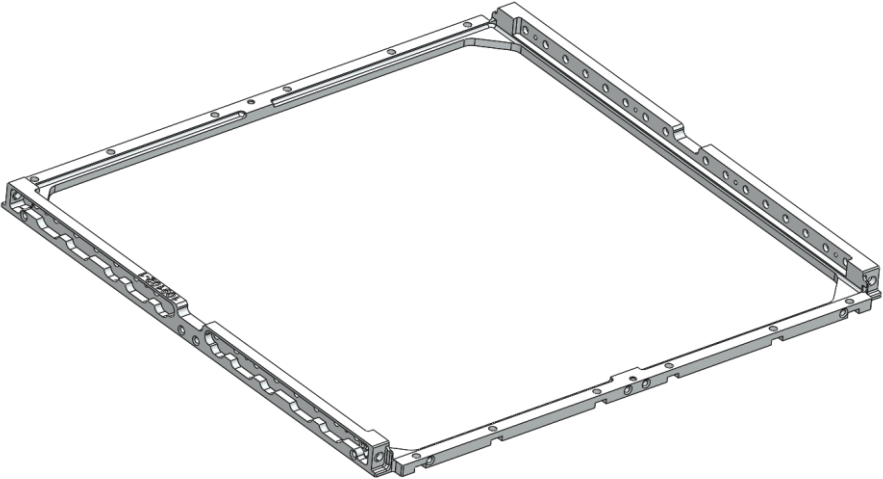
Standard Bolt Assembly with Screw lock Helicoils			
Thread	First-time on nom. (min/max) [Nm]	First-time off nom. (min/max) [Nm]	Fifth-time off nom. (min/max) [Nm]
M2	0.51 (0.44/0.57)	0.38 (0.31/0.44)	0.37 (0.30/0.43)
M2.5	0.97 (0.83/1.11)	0.75 (0.61/0.89)	0.72 (0.58/0.86)
M3	1.69 (1.41/1.90)	1.34 (1.10/1.59)	1.30 (1.06/1.55)
M4	3.68 (3.12/4.24)	2.96 (2.40/3.52)	2.90 (2.34/3.46)
M5	7.19 (6.07/8.31)	5.88 (4.76/7.00)	5.79 (4.67/6.91)
M6	12.42 (10.53/14.3)	9.87 (7.98/11.75)	9.72 (7.83/11.60)

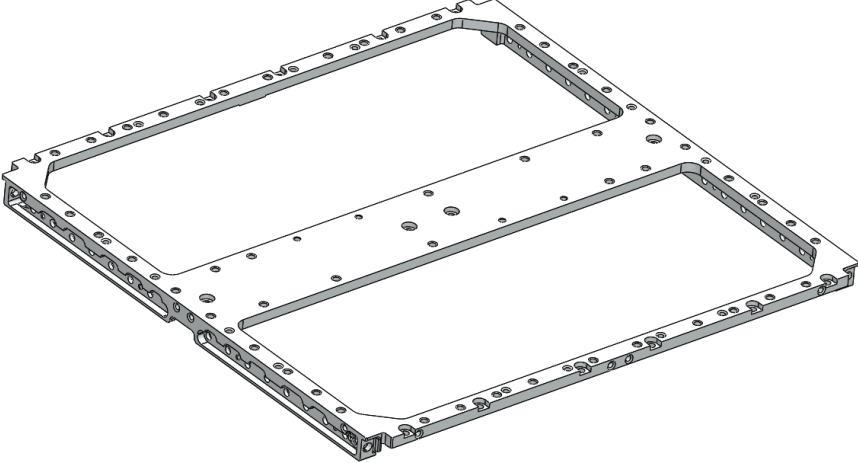
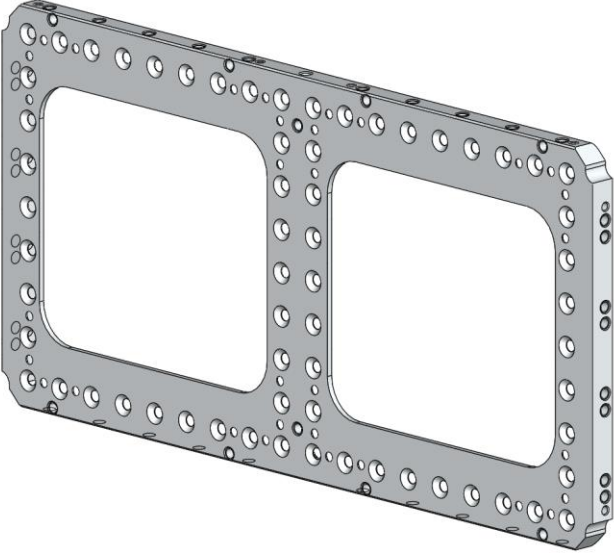
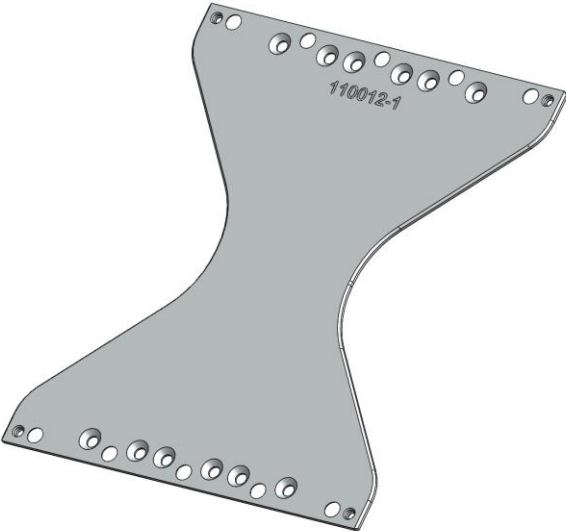
5 Content

5.1 BoM

Item NO.	Part Number	DESCRIPTION	QTY
1	110705	Nanostructure 12U wall subassembly	2
2	110011	NanoStructure X-side Bridge no HDRM	4
3	109102	NanoStructure 2Ux2U Z-side frame	1
4	110025	NanoStructure 2Ux2U Z-side SADA fit	1
5	110010	12U 16U multi function sec structure	4
6	110012	12U 16U sec structure support plate	8
7	102418	M2,5x5mm Torx countersunk ISO 14581 A4	86
8	102661	M2,5x16mm Torx countersunk ISO 14581 A4	16
9	102301	M2,5x6mm Torx medium socket head ISO 14580 A2-60	62
10	104101	d2x4 mm h8 parallel pin ISO 2338 A1/A2 (OPTIONAL)	46

5.2 Overview

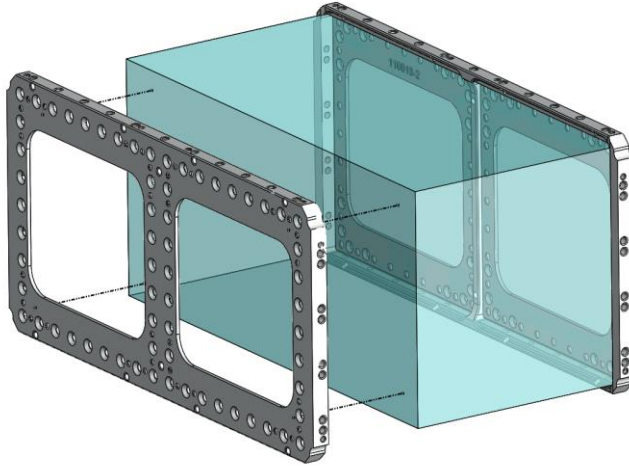
1		12U wall subassembly
2	 <p>110011-2</p>	NanoStructure X-side Bridge no HDRM
3		NanoStructure 2Ux2U Z-side frame

4		NanoStructure 2Ux2U Z-side SADA fit
5		12U 16U multi- function sec structure
6		12U 16U sec structure support plate

6 Secondary structure assembly

The section bellow describes only basic principle of secondary structure assembly.

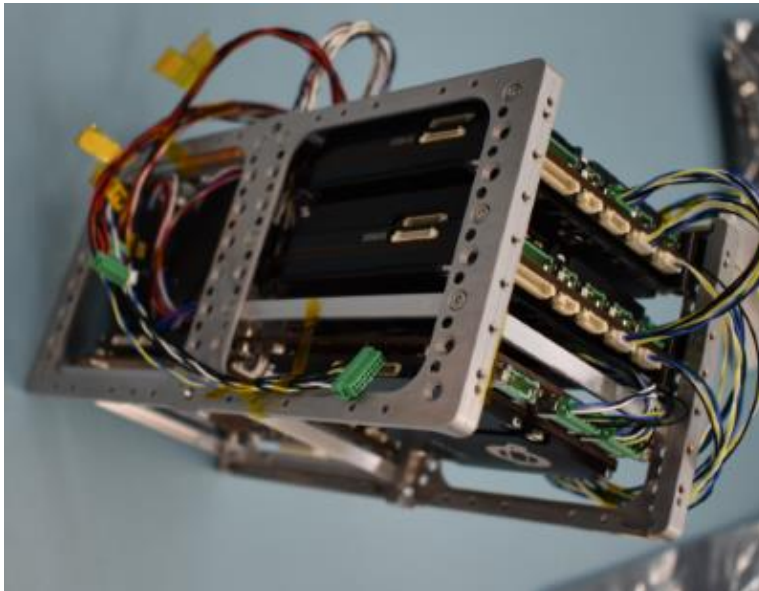
1



Take 2x 110010 - 12U 16U multi-function sec structure and integrate instrument between as shown in the picture.

Do not fasten screws at this step (finger loose)

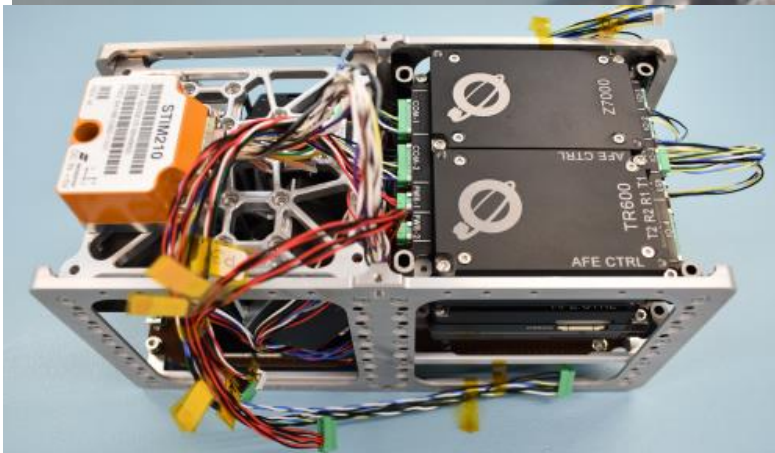
Apply Loctite 262 on fastener thread



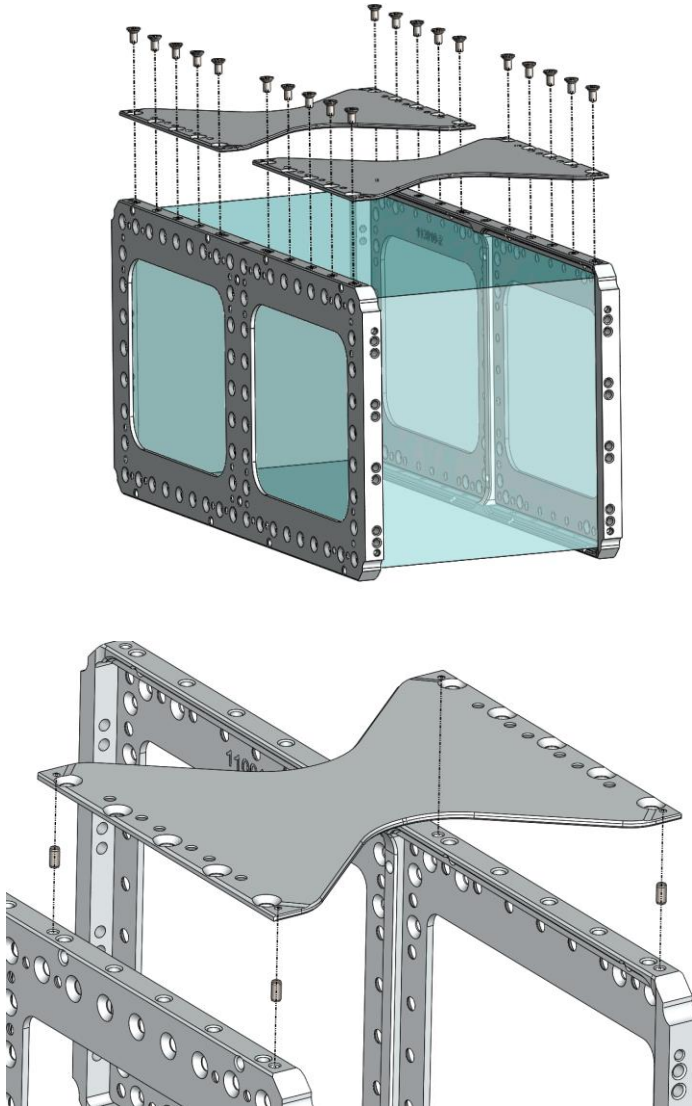
NOTE!The secondary structure is used both to add rigidity to the platform and to offer a mechanical interface for different components and subsystems. The attached pictures demonstrate the real case of using secondary structure.

Disclaimer!

Extra analysis should be performed in case secondary structure is not meant to be used.



2



Note: Next steps describing mounting of support plates are optional and the user can elect to remove them if the payload provides sufficient rigidity to the system.

Take 2x 110012 - 12U 16U sec structure support plate and fasten as shown in the picture.

Use 20x ISO14581 M2,5x5

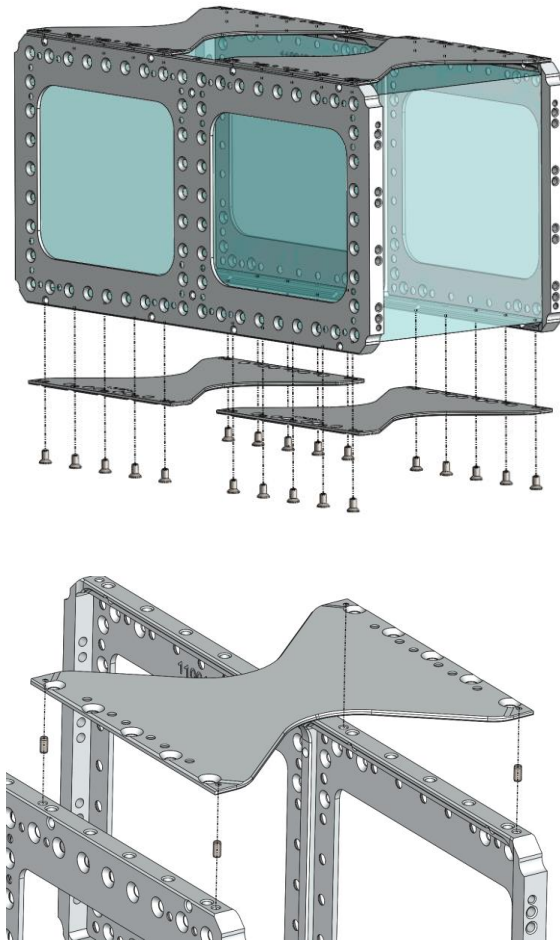
Apply Loctite 262 on fastener thread

Do not fasten screws at this step (finger loose)

To increase the position accuracy, there is an option to use guide pins while mounting support plates.

WARNING! Mind the guide pins assembling/disassembling support plates

3



Take 2x 110012 - 12U 16U sec structure support plate and fasten as shown in the picture.

Use 20x ISO14581 M2,5x5

Apply Loctite 262 on fastener thread

It is advised to alternately fasten screws from STEP 2 & STEP 3. After they are torqued, torque instrument fasteners from STEP 1.

To increase the position accuracy, there is an option to use guide pins while mounting support plates.

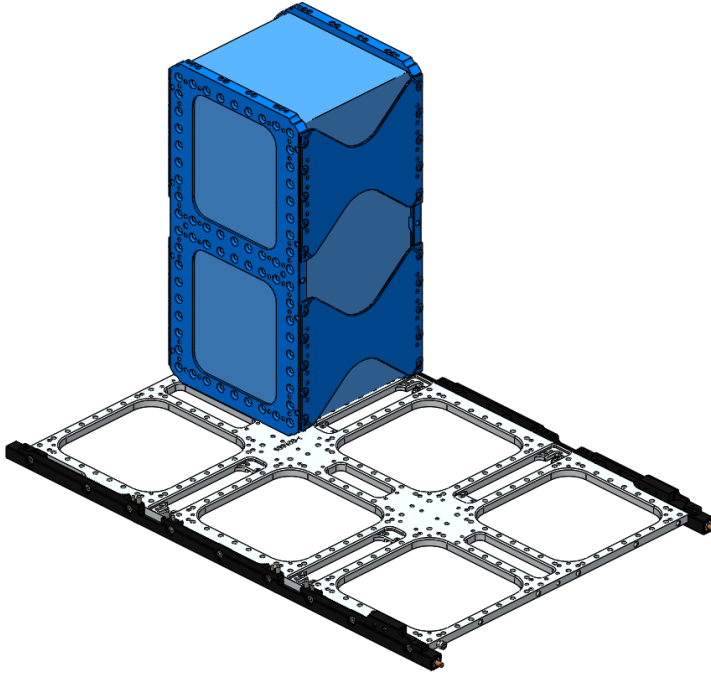
WARNING! Mind the guide pins assembling/disassembling support plates

7 Frame assembly

This section describes the assembly of the NanoStructure 12U frame only.

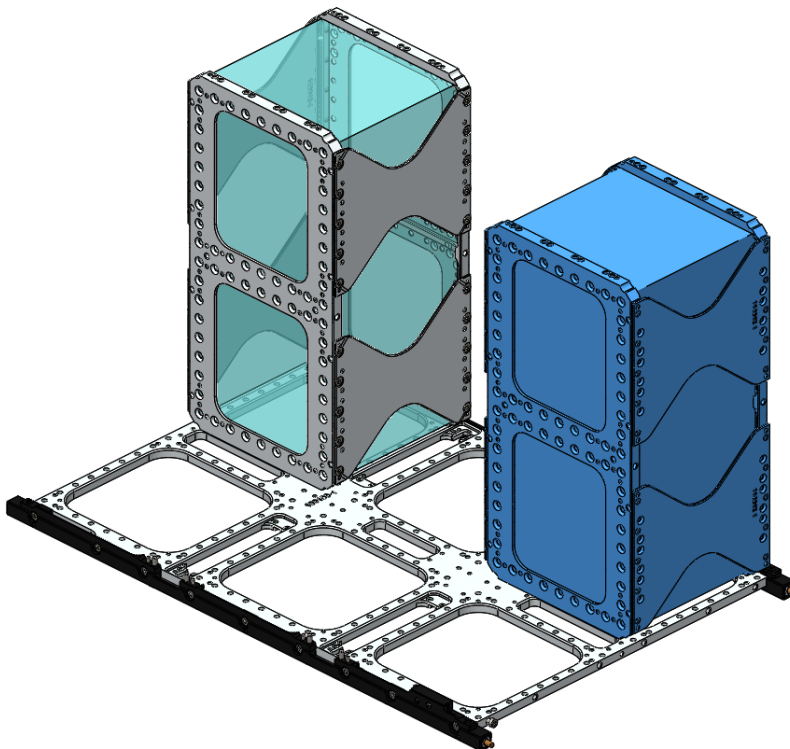
For the assembly of a full spacecraft and its subsystems, it is advised to start instrument & secondary structure integration before processing to the frame assembly as shown in the STEP 0. The assembly of a full spacecraft requires a tailored approach taking into account its components disposition and harnessing, which is not in the scope of this manual.

0



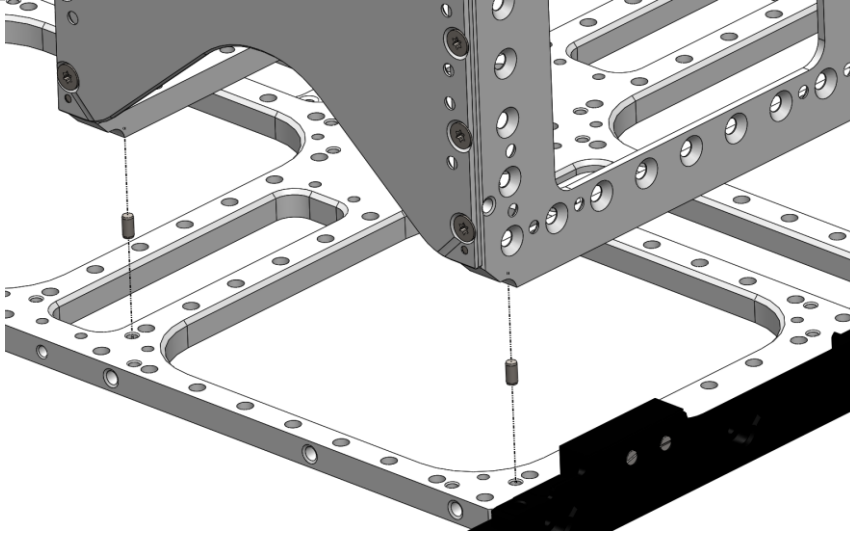
Disclaimer! The picture on the right illustrates only one of many examples how to allocate secondary structure inside the frame.

0



Disclaimer! The picture on the right illustrates only one of many examples how to allocate secondary structure inside the frame

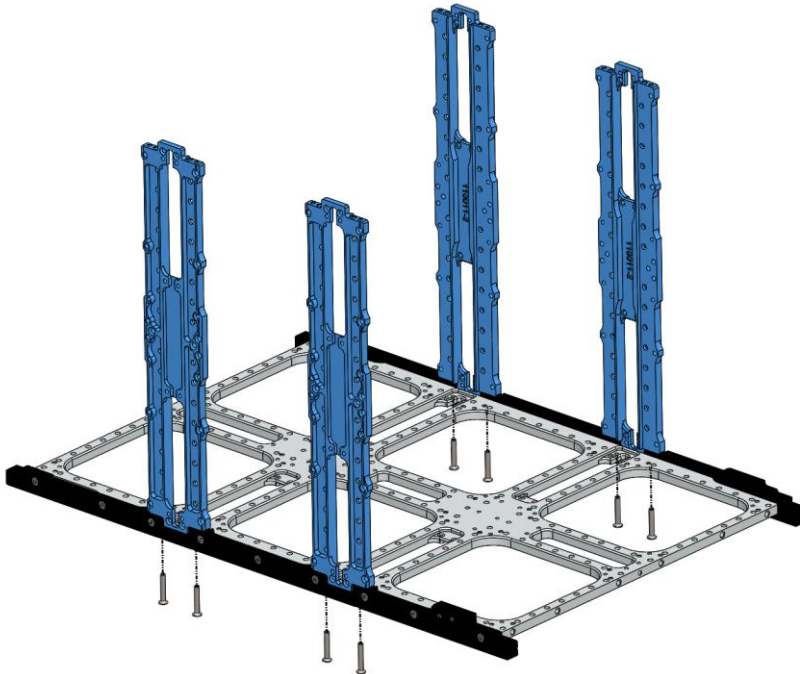
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To increase the position accuracy, there is an option to use guide pins while mounting secondary structure to the frame wall as shown in the picture.

WARNING! Mind the guide pins assembling/disassembling support plates

1

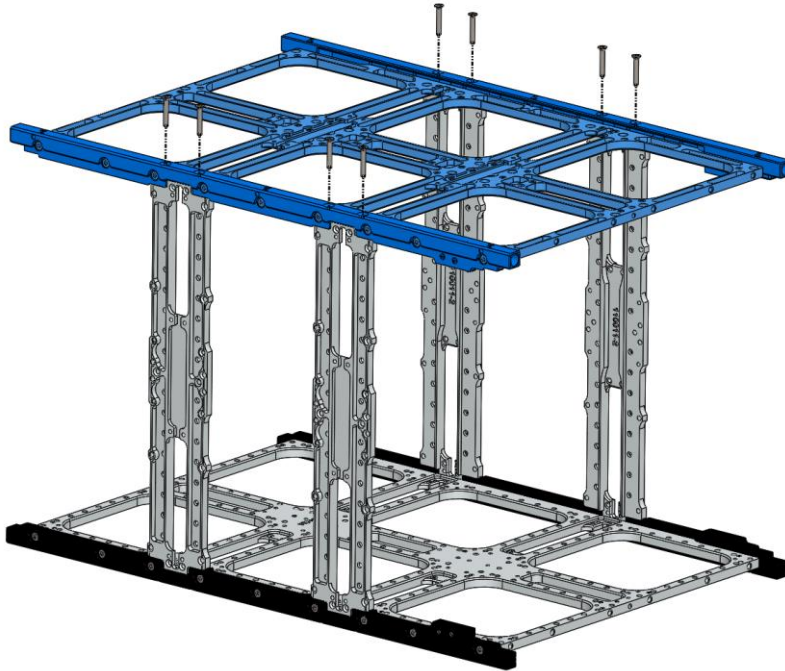


Mount 4x Bridges (110011-2) to one frame wall, as shown in picture. Ensure that hollowed out faces of the frame wall and the bridges, are facing out. Fasten components using 8x ISO14581 M2.5x16

NOTE! Apply Loctite 262 on the thread BUT do **NOT** torque fasteners - "finger loose"

Bridge is symmetrical component; orientation does not matter.

2



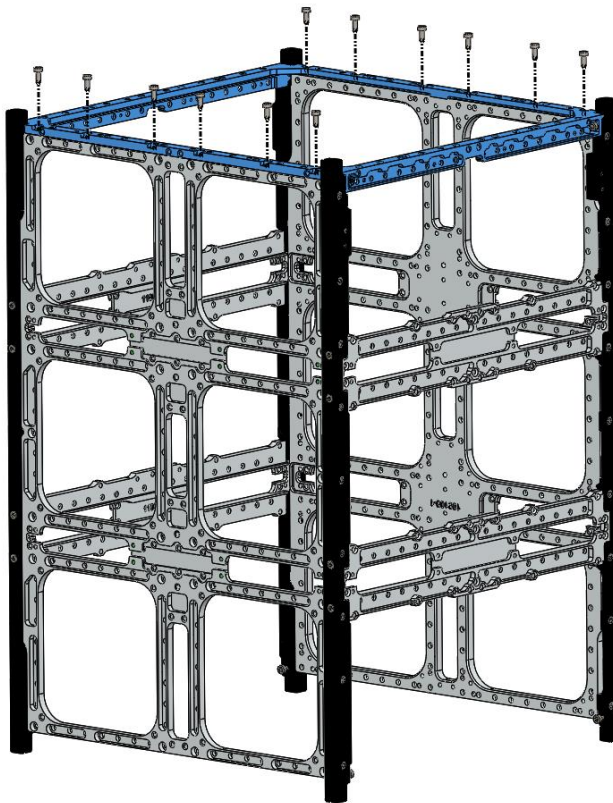
Mount the second frame wall to the 4 bridges. Ensure that the second frame wall is mounted with plungers oriented in the same direction as the plungers on the first frame wall, and that hollowed out section is facing outwards.

Fasten 8x ISO14581 M2.5x16

NOTE! Apply Loctite 262 on the thread BUT do **NOT** torque fasteners “finger loose”

Disclaimer! If it is not possible to perform Step 1 and Step 2 in the same day, Loctite should not be applied until the second frame is mounted, at which point the screws from Step 1 should be briefly removed one by one to apply Loctite.

3

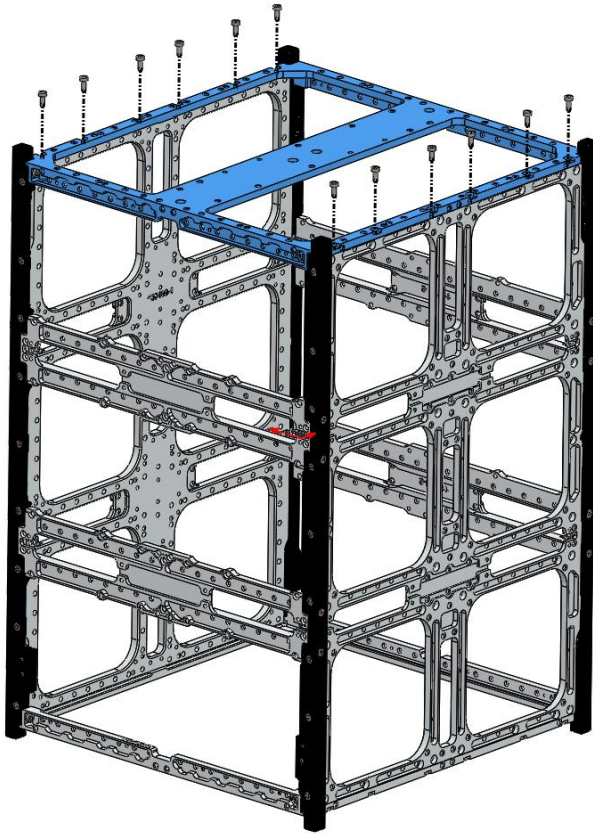


Mount NanoStructure 2Ux2U Z-side frame (109102-1) as shown in the picture.

Use 12x ISO14580 M2.5x6

Note! Apply Loctite 262 on the thread BUT do **NOT** torque fasteners at this stage

4



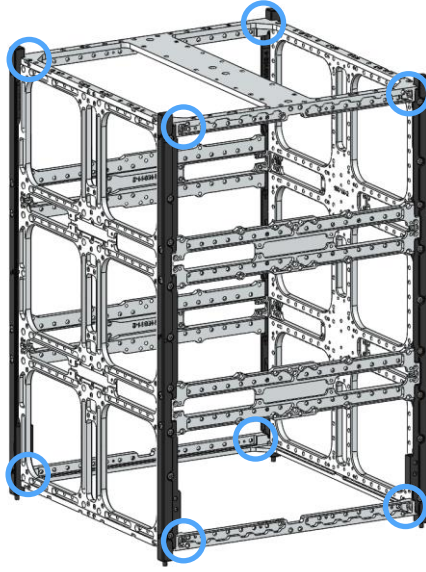
Mount NanoStructure 2Ux2U Z-side SADA fit (110025-2) as shown in the picture.

Use 12x ISO14580 M2.5x6

Note! Apply Loctite 262

Alternately fasten screws from STEP 1-4.

5



Secure the parts from
STEP 3 & STEP 4 with
8 fasteners

8x ISO14580 M2.5x6

Note! Apply Loctite
262

