

Image: GomSpace NanoStructure 8U

## NanoStructure 8U

### Datasheet 8U structure for Nano-satellites

Product name: NanoStructure 8U

Document No.: 1066042

Revision: 1.1

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Reviewer: MOKJ

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## 2 Changelog

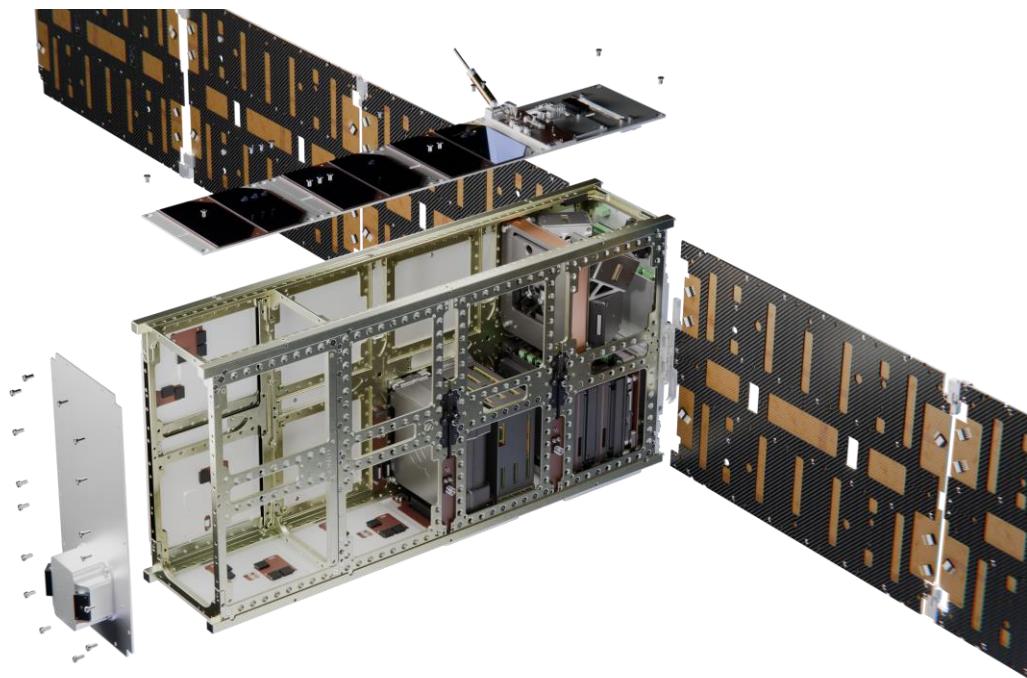
Revision	Date	Name	Description
1.0	19-03-2025	FJVO	Initial release
1.1	23-06-2025	FJVO	Purchase option for the secondary structure is now available.

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## 4 Overview

The GomSpace NanoStructure 8U is a generic structure to be used as framework for a Nanosatellite. Using Mounting Rings, hardware can be mounted inside the structure, either in a standard PC104 stack or directly onto the structure frame. Before mounting surface hardware (e.g. solar panels), all internal hardware are accessible. On the top of the structure there is four kill switches that can be used while the satellite is sitting in its deployer.



### 4.1 Highlighted Features

- Great flexibility for hardware mounting with and without Mounting Rings
- Four kill switches with flight heritage from previous 8U satellite missions
- Threaded holes with screwlock helicoils
- Dedicated interface for Mechanical Ground Support Equipment, MGSE
- Flat internal walls maximizing volume and accurate positioning of a payload.
- Interface for guide pins to increase positioning accuracy
- Material: Alu 7075-T7351
- Total mass of structure, including secondary structure: 956 g
- Outside measurements without kill switches: 454 x 226.3 x 100.0 mm
- Designed to facilitate seamless integration with GomSpace products

### 4.2 Product Contains

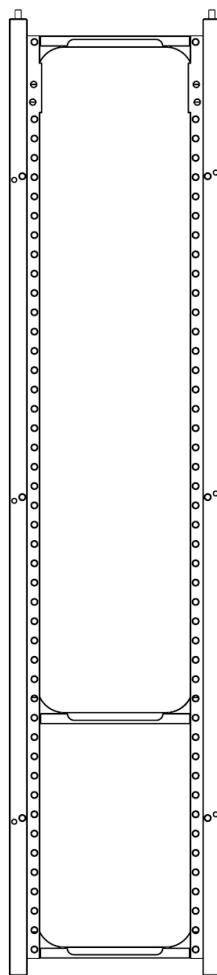
- 2x Side Walls with Kill Switch Assembly mounted to it.
- 6x Corner Brackets
- Screw & Pin kit
- Assembly Manual
- Optional: Secondary Structure for the 8U NanoStructure

## 5 The Structure

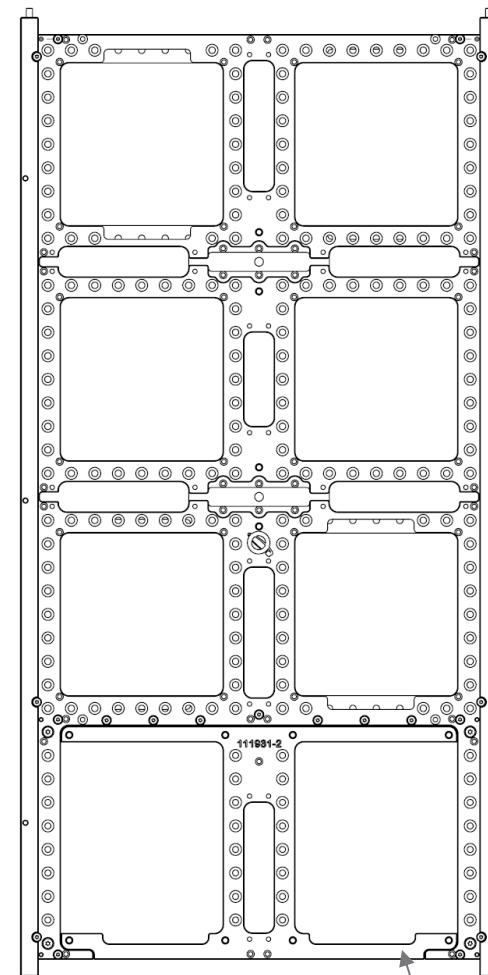
The Structure consist of 2 Side walls and 6 Corner Brackets. All threaded mounting holes have screwlock Helicoils. They are used for grounding and for thread locking without using a liquid locking adhesive solution such as Loctite®.

### 5.1 Side Walls

A Hole pattern is specifically made to fit GomSpace various range of product, and to give as high flexibility to integrate hardware as possible. Below is a view shown of the hole patterns that are available from XYZ planes, please consider the Mechanical Drawing, paragraph 8 to see the Panel mounting in more detail.

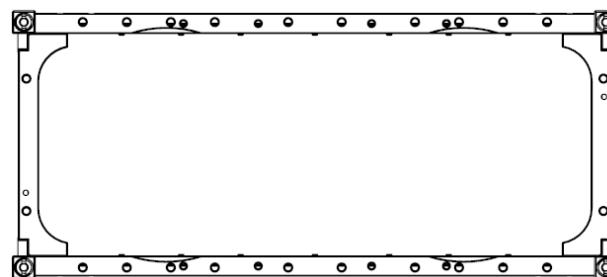


X-Panel Mounting  
(4U Side)



Y-Panel Mounting  
(8U Side)

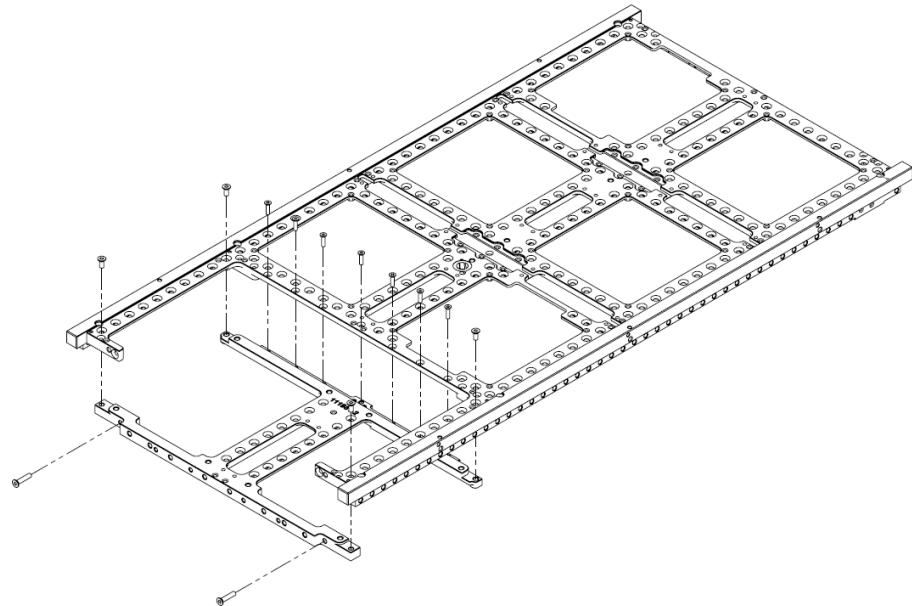
**Optional**  
Secondary Structure



Z-Panel Mounting  
(2U Side)

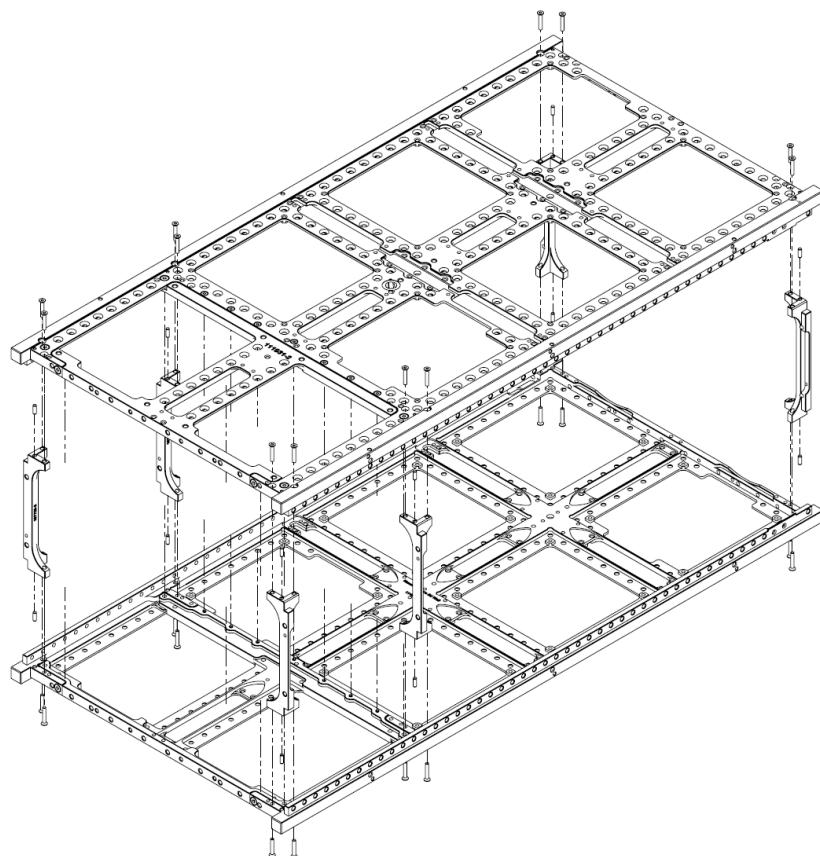
## 5.2 Secondary Structure

The design of the 8U Structure allows to mount a secondary structure to accommodate various designs to hold 2U payloads. It's optional to purchase a secondary structure that resemble the GS hole pattern while maximising room for payloads.



## 5.3 Corner Brackets

The Corner Brackets are allocated in each corner and is each assembled with two screws. Guided pins are used in the assembly to ensure accurate and repetitive assembly of the structure.



## 5.4 Kill Switch and Separation Springs

At the top of the structure frame are four Kill Switches, which are pressed down while the satellite is placed in its orbital deployer. The switches are intended to be connected to the power system of the satellite, to prevent powering up the satellite during launch. As soon as the satellite is released, it can power up and work normally.

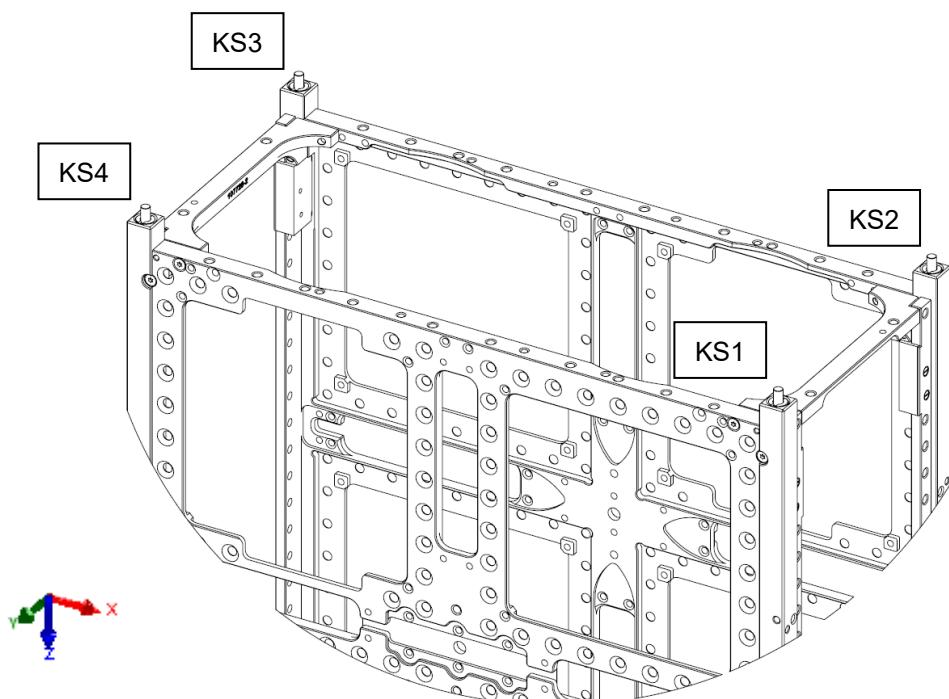
The kill switches can be configured either as normally closed (NC), or Normally Open (NO), as an example of a NC configuration, please consider the illustration underneath. Upon ordering the NanoStructure 8U, through its Option Sheet, it is possible to select the length and type of cables to attach to each Kill Switch, which is soldered to the switch pins and then glued inside the housing.

Killswitch standard configuration (NC)



It is also possible to decide to add wires only to some of the Kill Switches, rather than to all four. Regardless of whether any Kill Switch is connected, the spring plunger is always installed to provide uniform separation force from all four structure feet. The configuration is defined through the option sheet of the structure.

Please Note: the force from each kill switch is 6 N along Z-axis when the switch is pressed down and is flush with the structure feet.



## 5.5 Mounting Rings

The mountings Rings are used for a highly modular internal layout, allowing for numerous variations of the PC104 stack. Each stack is mounted inside the structure frame and can point in any of the three main axis's.

There are two pairs of mounting Rings available A + B and YA + YB. Each pair can be connected with threaded rods and secured with a slotted nut on the two sides. The slotted nut is placed in the indents of the Rings, which is on the opposite side on Ring A and B and of Ring YA and YB (for this reason the Rings are usually used in pairs. A and B are used in the top and bottom of a PC104 stack when mounting on the frame.

YA and YB are used in the top and bottom of a of PC104 stack when mounting the PC104 stack to point out the 8U side.

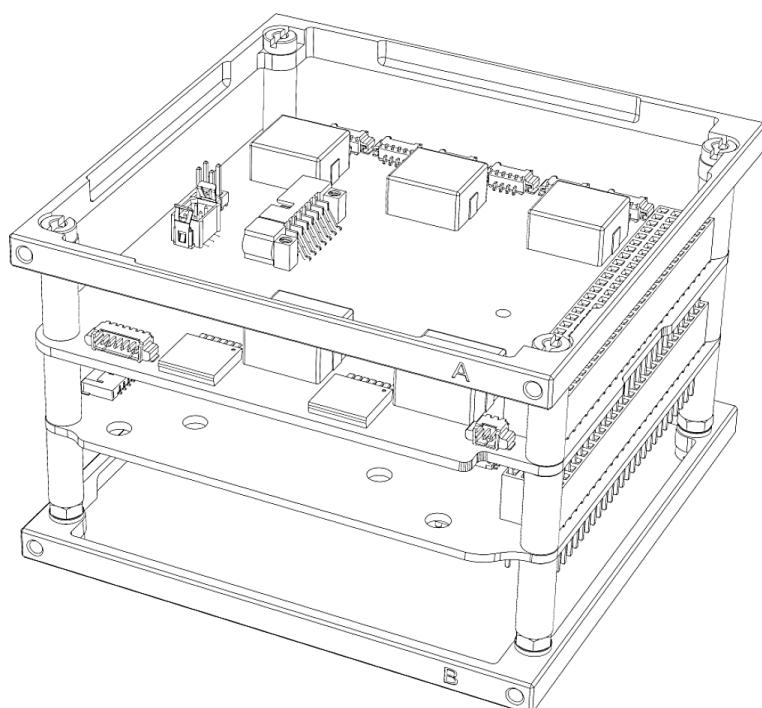


A + B Ring

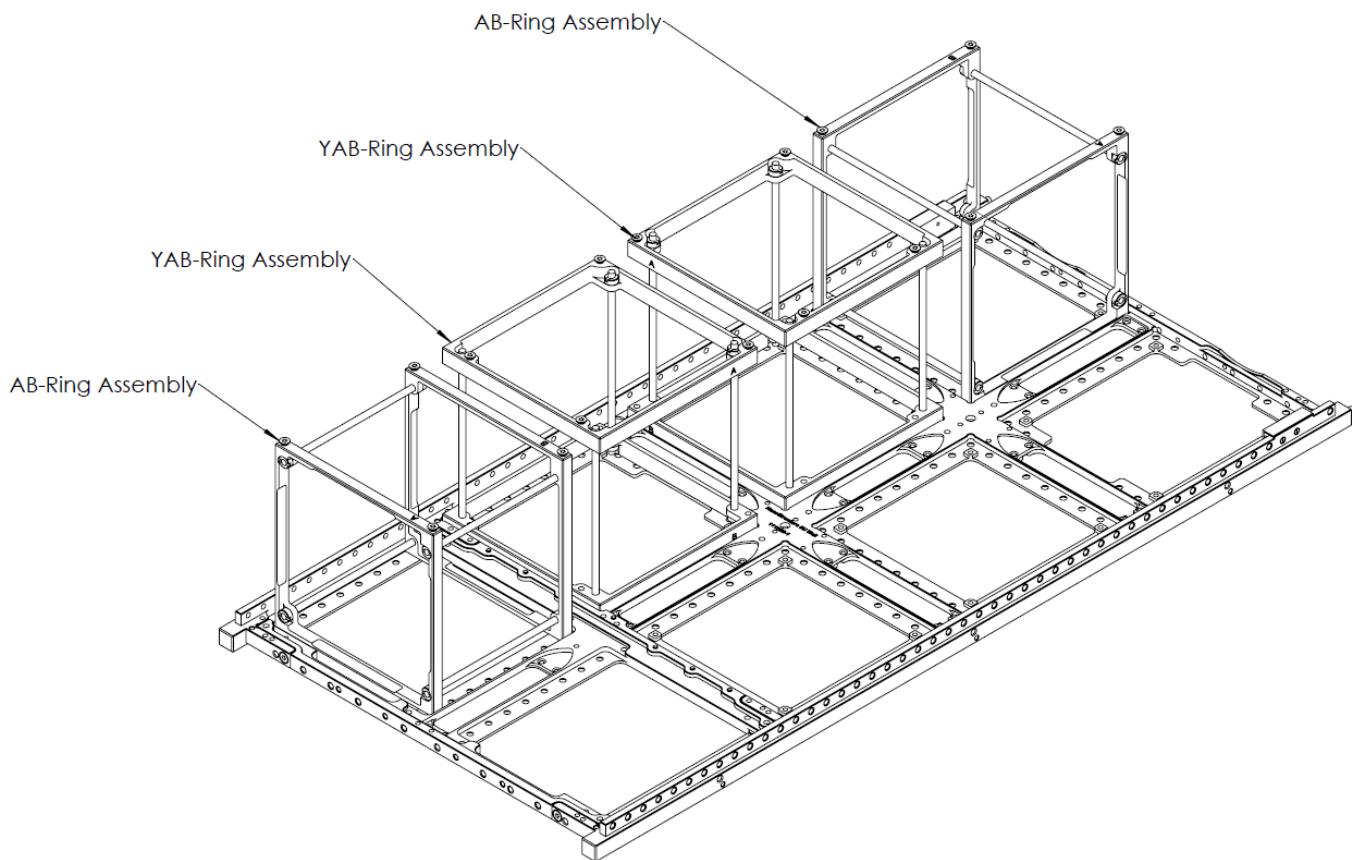


YA + YB Ring

The PC104 stack is built around GomSpace modular technology, allowing numerous configurations of modules, as the stack shows below:



Below is a drawing illustrating four stacks attached to the 8U Wall Structure, oriented in various positions.



The stacks built with Ring A and B pairs can be mounted shorter and taller than a 1U height. Below is an illustration showcasing various ways the stacks can be used. Additional intermediate mounting Rings can be inserted in a stack in case additional support is required. Ring sets are ordered through the Option Sheet.

## 6 Physical Properties

### 6.1 Size

With deployment switches stowed.

Description	Value	Unit
Size	454 x 226.3 x 100.0	mm

### 6.2 Mass

Total mass for 8U Structure including the optional secondary structure, 2x Wall Structure, 2x Secondary structure and 4x corners brackets, including screw and pin kit.

Description	Value	Unit
<b>Total mass</b>	956	g
<b>Total mass of Secondary Structure</b>	148	g

Mass for individual components:

Description	Value	Unit
<b>Side Frame, including kill switches</b>	442.5	g
<b>Corner bracket</b>	10	g
<b>A or B mounting Ring</b>	14	g
<b>YA or YB mounting Ring</b>	24	g
<b>M3 threaded rod</b>	0.05	g/mm
<b>Flying Leads, 60 cm</b>	6	g

### 6.3 Surface Treatment

The structure is clear hard anodized, MIL-A-8625F Type III Class 1, leaving all countersunk holes free and treated with SurTec 650 chromiAL TCP MIL-DTL-5541F Type II Class 3, to provide a moderate corrosion resistance while maintaining electrical conductance for leveling electrical potential throughout the structure.

### 6.4 Material

For all parts of the primary structure, EN AW7075-T7351 is used. The material properties for this material, as specified through its datasheet, can be found below.

#### Typical physical properties:

<b>Density [g/cm3]</b>	2,80
<b>Elastic modulus [GPa]</b>	72
<b>Thermal conductivity [W/m*K]</b>	130 - 160
<b>Thermal expansion coefficient [K-1*10-6]</b>	-50°C - 20°C 20°C - 100°C 20°C - 200°C 20°C - 300°C
<b>Specific heat J/(kg * K)</b>	21,6 23,4 24,3 25,2
<b>Electrical conductivity [m/Ω*mm2]</b>	862
<b>Shear modulus [GPa]</b>	19 - 23

Delivery Condition	Tensile strength Rm		Elastic limit R p0.2		Elongation	
	MPa	MPa	MPa	MPa	%	%
AW7075-T7351	min.	max.	min.	max.	A50mm	A
	475	-	390	-	-	5

## 7 Qualification

To simulate the harsh conditions of launch and space, the 8U NanoStructure has been exposed to several environment tests. Levels can be seen in the table below.

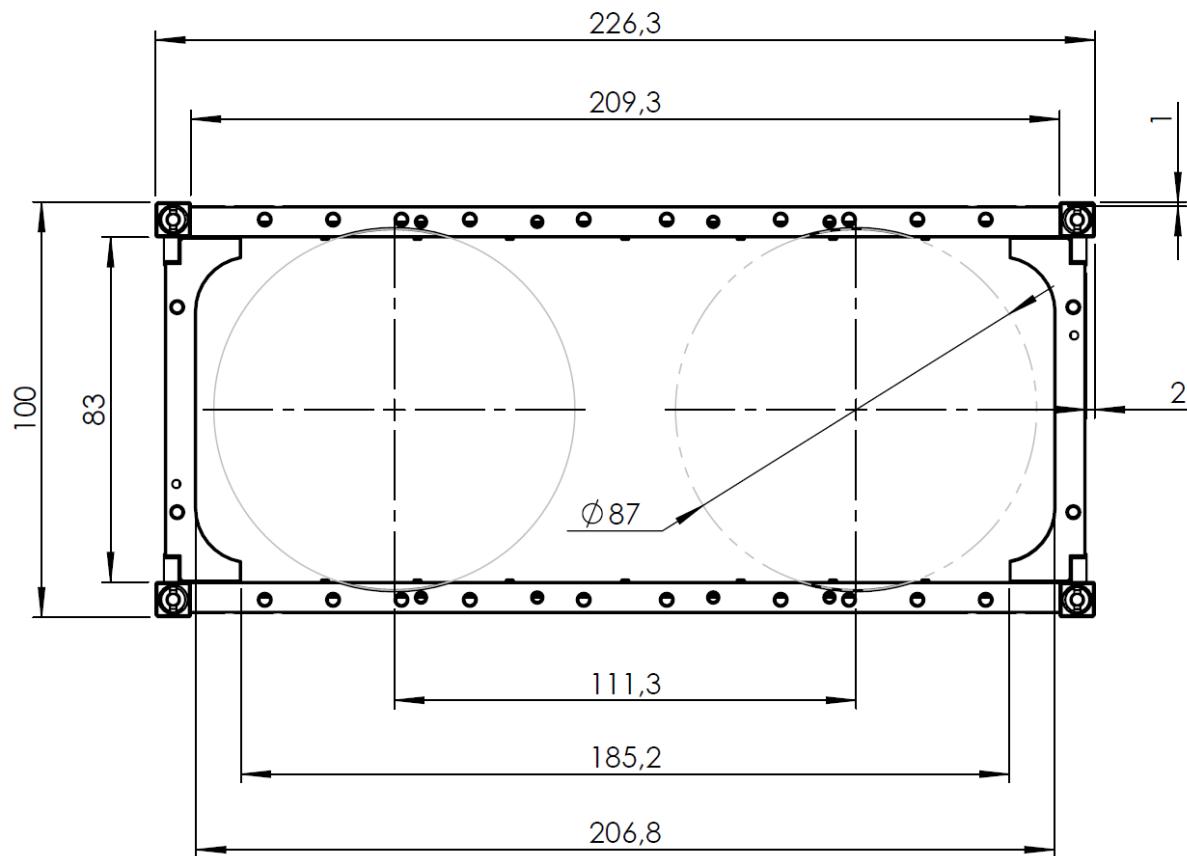
Test	ECSS/ESCC Reference	Major Limits	
Structural and Mechanical	Quasi-static test	ECSS-E-ST-10-03C	Frequency [Hz]
			30
			Level [g]
			18.75 (+/-10%)
			No cycles/burst
			19
			No of full load cycles/burst
Structural and Mechanical	Random Vibration	ECSS-E-ST-10-03C	No of burst
			1 in each direction
			Directions
			X Y Z
			NASA GEVS levels + 3dB
			Frequency [Hz]
			ASD Level [g <sup>2</sup> /Hz] (+/-3db)
Structural and Mechanical	Sinusoidal Vibration	ECSS-E-ST-10-03C	20
			0.052
			20-50
			+6 dB/Oct
			50-800
			0.32
			800-2000
Structural and Mechanical	Sinusoidal Vibration	ECSS-E-ST-10-03C	-6 dB/Oct
			2000
			0.052
			Overall
			20 G <sub>rms</sub> (+/-10%)
			Sweep rate: 2 octaves / minute
			Frequency [Hz]
Structural and Mechanical	Sinusoidal Vibration	ECSS-E-ST-10-03C	Levels
			5-8
			10 mm(0-p)
			8-100
			4.5G (+/-10%)

**Disclaimer:** the overall mass of a spacecraft and placement of masses might lead different results if changed. A specific secondary structure was designed for a particular purpose, tested, and subjected to the qualification program mentioned above. For further information about the tests please contact GomSpace.

## 8 Mechanical Drawing

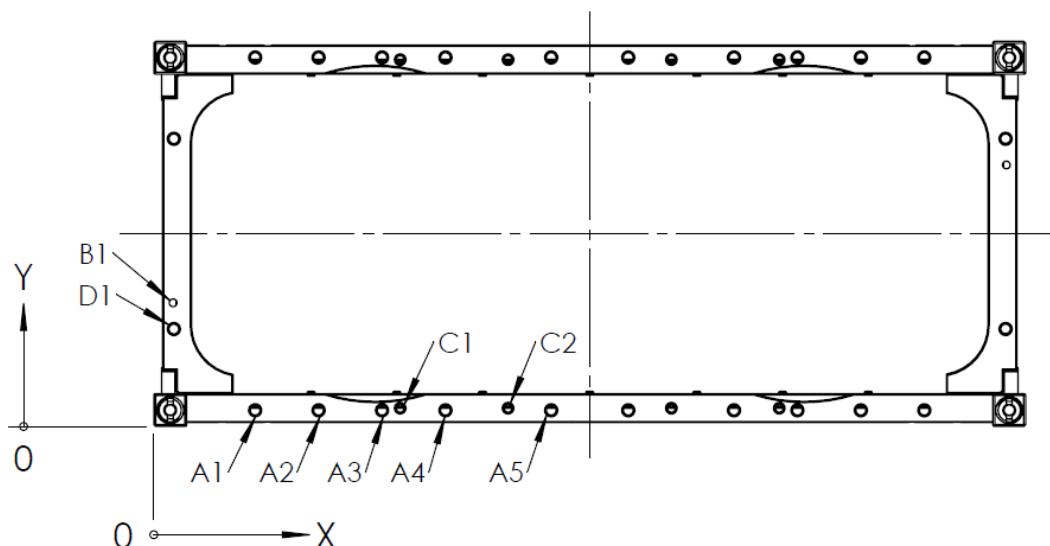
All dimensions shown in mm.

### 8.1 Z-face (2U Side) - General Dimensions

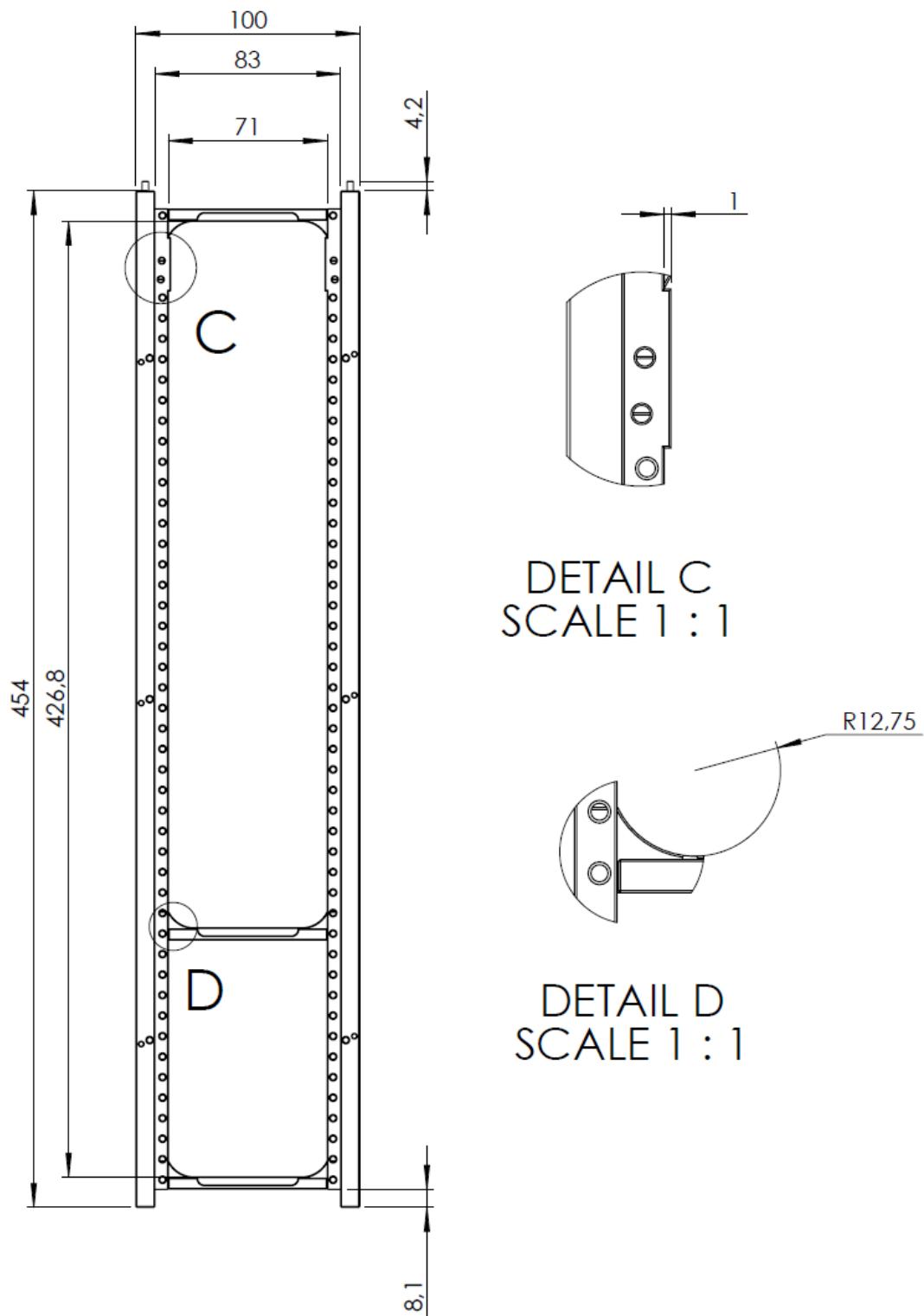


## 8.2 Z-face (2U Sde) - Hole Callouts

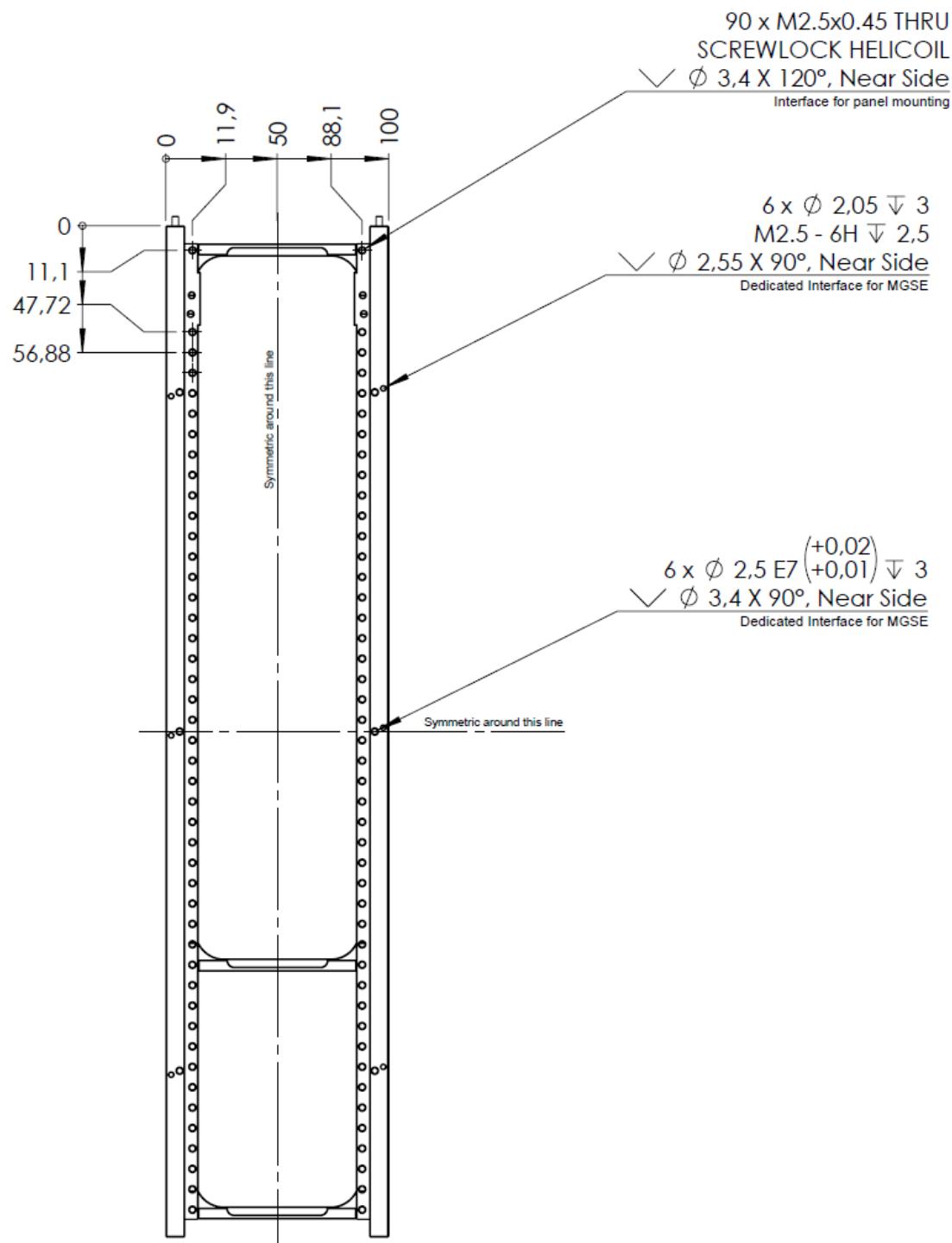
TAG	X LOC	Y LOC	SIZE
A1	26,30	4,20	$\phi 2,55 \downarrow 5,84$ $\vee \phi 3,4 \times 120^\circ$ , Near Side TAP FOR M2.5x0.45 SCREWLOCK HELICOIL Insert = 1.5 * Dia.
A2	42,77	4,20	
A3	59,24	4,20	
A4	75,70	4,20	
A5	103,15	4,20	
B1	5,01	32,10	$\phi 2 \downarrow 1,84$
C1	63,95	4,75	$\phi 2,1$ THRU $\vee \phi 3 \times 120^\circ$ , Near Side TAP FOR M2x0.4 SCREWLOCK HELICOIL Insert = 2.0 * Dia.
C2	91,95	4,75	
D1	5,21	25,30	$\phi 2,55 \downarrow 13,19$ $\vee \phi 3,4 \times 120^\circ$ , Near Side TAP FOR M2.5x0.45 SCREWLOCK HELICOIL Insert = 1.5 * Dia.



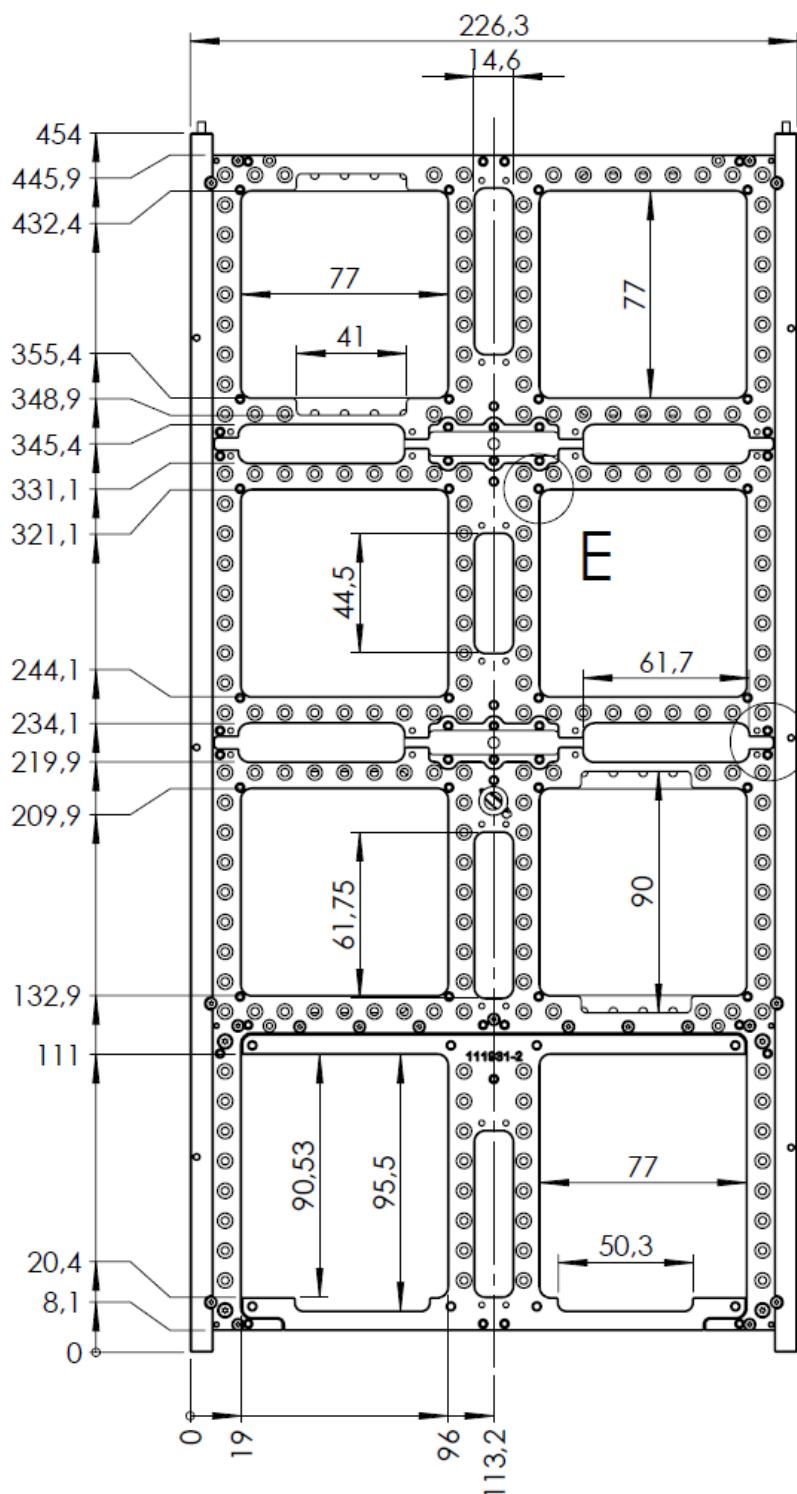
### 8.3 X-Face (4U Side) - General Dimensions



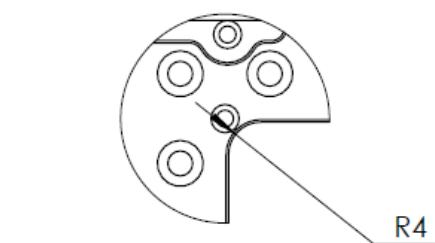
## 8.4 X-Face (4U Side) - Hole Callouts



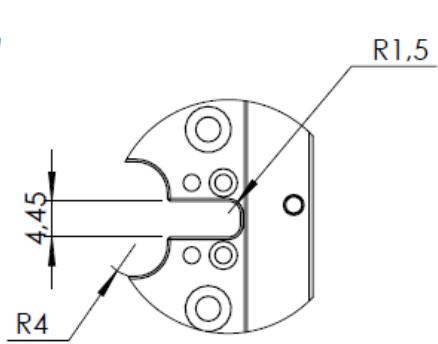
## 8.5 Y-Face (8U Side) – General Dimensions



DETAIL E  
SCALE 1 : 1



DETAIL G  
SCALE 1 : 1



## 8.6 Y-Face (8U Side) – Hole Callouts

