



DATASHEET

Structure 1.5U

STRUCTURE 1.5U – DATASHEET

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STRUCTURE 1.5U

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This user manual details the applications, features and operation of EnduroSat's **Structure 1.5U** product. **Structure 1.5U** is an acronym for **Structure 1.5 Unit**.

Please read carefully the manual before unpacking the elements to ensure safe and proper use.



Figure 1 – EnduroSat's Structure 1.5U

1 CHANGE LOG

Date	Version	Note
24/04/2017	Rev 1	Initial Document
22/11/2017	Rev1.1	Minor changes text and drawings
25/10/2018	Rev1.2	Tolerances update and text changes
16/11/2018	Rev1.3	Technical writing enhancements

2 OVERVIEW

EnduroSat's **Structures** have a minimalistic design and are easy to assemble. They also provide a physically safe environment for the customer's payload and subsystems during all phases of the mission (e.g. launch phase). These qualities ensure stable operation of the CubeSat.

Our **Structure** products comply with the CubeSat standard and are compatible with a wide range of CubeSat subsystem producers. They also come with kill switches and 2 separation springs already integrated.

A full campaign of tests at qualification level were performed on the Qualification Engineering Model of EnduroSat's **Structure** products following ESA standard ECSS-E-ST-10-03C and NASA standard GEVS: GSFC-STD-7000A

3 HIGHLIGHTED FEATURES

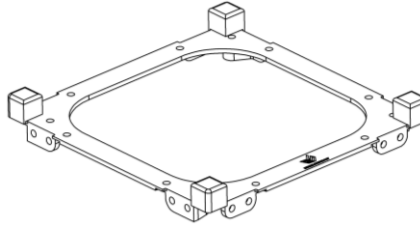
- Dimensions 1.5U: 100x100x170.2 mm
- Material: Aluminum 6061 or 6082
- One/two kill switches option
- Two separation springs
- Customizable design
- Custom nuts
- Weight 1.5U*: 114 g

*including bolts

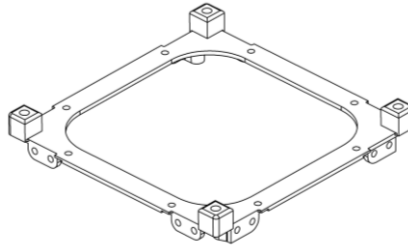
4 ELEMENTS

EnduroSat's **Structure** products are designed to be modular and are made up of 3 types of element (top, bottom, and legs). This design approach allows the top and bottom elements to be used for different form factors. For instance, a **1.5U Structure** can be converted to a **1U Structure** by changing only the leg elements

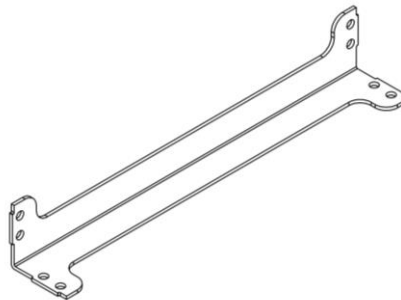
1 x Top Element
(Z+)



1 x Bottom Element
(Z-)



4 x Leg 1.5U Element



5 MECHANICAL DRAWING

The following drawings show main dimension of **Structure 1.5U**. All dimensions are in mm.

A STEP file can be provided upon request.

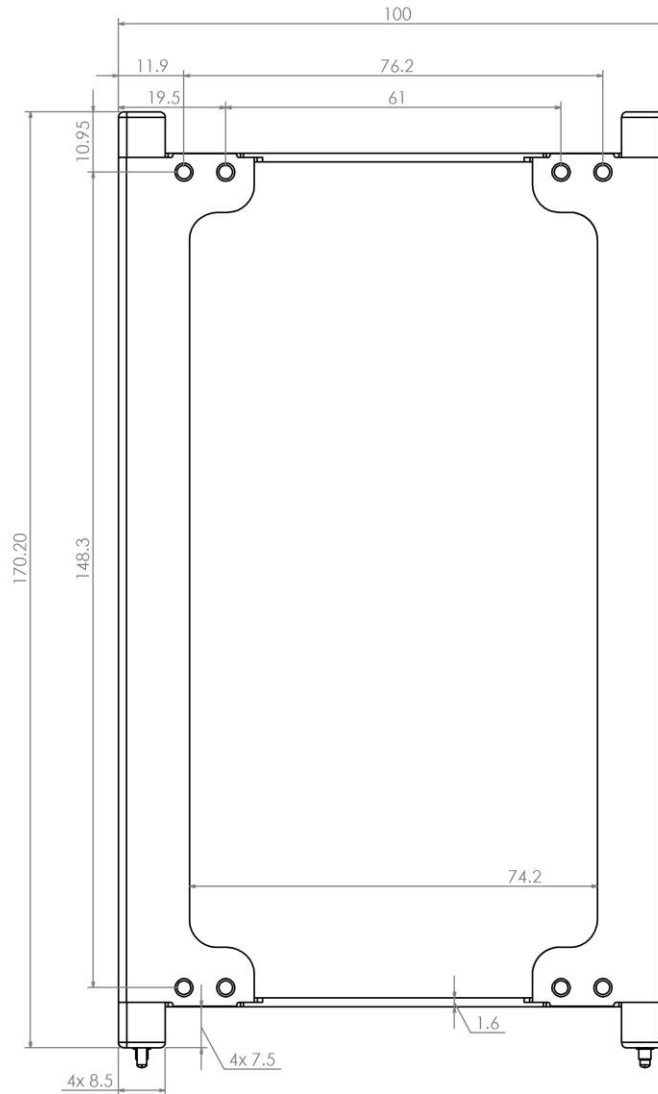


Figure 2 - Structure 1.5U – Side View

STRUCTURE 1.5U – DATASHEET

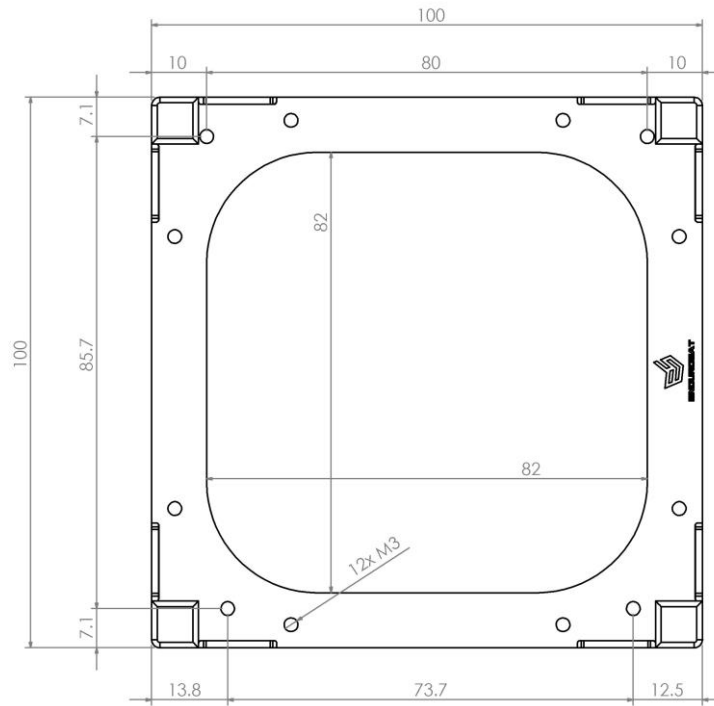


Figure 3 - Structure 1.5U – Top View (Z+)

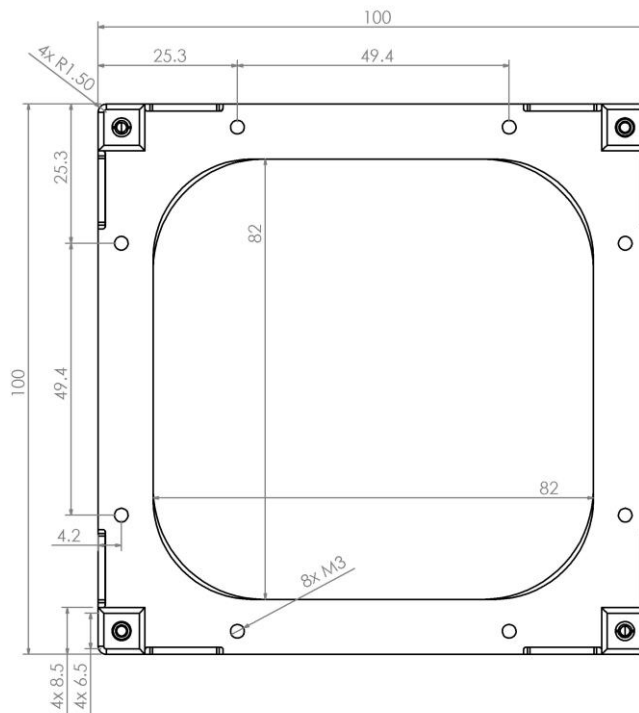


Figure 4 - Structure 1.5U – Bottom View (Z-)

The dimensional tolerances for an assembled Structure 1.5U comply with the CubeSat Design Specification (± 0.1 mm in all three axis).

6 MATERIALS

All the elements of EnduroSat's **Structures** are made of Aluminum 6061-T651 or Aluminum 6082-T6, pearl finished and hard anodized (25-30 μ m).

7 INCLUDED IN THE SHIPMENT

EnduroSat provides along with the **Structure**:

- Torx - DIN965/ISO 7046-1 -A2- M3 – Length: 5 mm
- Torx - DIN965/ISO 7046-1 -A2- M3 – Length: 8 mm

Recommended torque for mounting solar panels onto the structure is 0.8 Nm

8 MECHANICAL AND ENVIRONMENTAL TEST

A full campaign of tests at qualification level was performed on the qualification engineering model. Qualification test levels and duration follow the ESA standard ECSS-E-ST-10-03C and GEVS: GSFC-STD-7000A. Tests performed:

- Thermal Cycling
- Thermal Vacuum
- Random Vibration
- Sine Vibration
- Shock Test

Space qualification campaign link: <https://www.endurosat.com/space-qualification/>

9 HANDLING AND STORAGE

Particular attention shall be paid to the avoidance of damage to the elements of the **Structure** during handling, storage and preservation. The handling of the **Structure** should be performed in compliance with the following instructions:

- Handle using PVC, latex, cotton (lint free) or nylon gloves.
- The environment where structure module will be handled shall meet the requirements for a class environment 100 000, free of contaminants such as dust, oil, grease, fumes and smoke from any source.
- Store in such a manner as to preclude stress and prevent damage.
- To prevent deterioration, the **Structure** must be stored in a controlled environment (i.e. the temperature and humidity levels shall be maintained in the proper ranges):
 - Ideal storage temperature range: 15°C to 27°C
 - Ideal storage humidity range: 30% to 60% relative humidity (RH)