



Payload Requirements

 ${\rm COMPASS-2\ Triple-CubeSat}$

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1 PREAMBLE





Figure 1: COMPASS-2

1 Preamble

This document describes the requirements for the Payload experimental cubes for the COMPASS-2 experimental technology carrier.

COMPASS-2 will become the second student satellite from the FH-Aachen, Germany.

The spacecraft COMPASS-2 will be developed from students of the FH-Aachen, University of Applied Sciences Germany and of the RWTH-Aachen.

Like the first satellite project, COMPASS-2 will be designed based on the Cube-Sat standard. COMPASS-2 will be a Triple-CubeSat, which is defined by a total weight of 4 kg and dimensions of $100 \text{ mm} \times 100 \text{ mm} \times 340.5 \text{ mm}$.

The students of the FH-Aachen will redevelop the BUS-System with the necessary subsystems for power generation, power distribution, data handling, communication and data / power interface for the payload.

There will be two experimental boxes placed around the BUS-Cube that can easily be replaced using a standardised connection system that will be developed by the students of the FH-Aachen.

1 PREAMBLE



The experimental boxes will be separated from each other but also can be combined via an interconnection plug for a combined experiment.



2 Payload Requirements Single Cube

In the following documentation the mass, the balance point, the power and data rates will be defined for a single experimental box such as a certain payload customer will be able to build its payload without any intercommunication with the COMPASS-2 Team to adapt the Payload to the bus cube.

dimensions:

• $106.25 \,\mathrm{mm} \times 73.00 \,\mathrm{mm} \times 88.00 \,\mathrm{mm}$

maximum mass per box containment:

• 1.00 kg

balance point:

• sphere of 20 mm diameter around the volumetric centre

supply voltage:

• 3.3 V and 5.0 V

power available per experiment:

- 2.5 Wh = 1.6 W per orbit
- \bullet 310 mA @ 5V continuous power consumption for each experiment per orbit

maximum current:

• 300 mA per experiment box

data transfer protocol:

- I2C
- UART

connection and interconnection bus:

- 9 pole connection plug from each experiment to the bus cube
- 9 pole connection plug from one experiment to the other

max data rate:

• overall 1 MB per day and experiment box



3 Payload Requirements Double Cube

In the following documentation the mass, the balance point, the power and data rates will be defined for a double experimental box such as a certain payload customer will be able to build its payload without any intercommunication with the COMPASS-2 Team to adapt the Payload to the bus cube.

dimensions:

• $213.75 \,\mathrm{mm} \times 73.00 \,\mathrm{mm} \times 88.00 \,\mathrm{mm}$

maximum mass:

• 2.00 kg

balance point:

• sphere of 20 mm diameter around the volumetric centre

supply voltage:

• 3.3 V and 5.0 V

power available:

- 2.5 Wh = 1.6 W per orbit
- 310 mA @ 5 V continuous power consumption

maximum current:

• 600 mA

data transfer protocol:

- I2C
- UART

connection bus:

• 9 pole connection plug from the experiment to the bus cube

max data rate:

• overall 2 MB per day

temperature under the solar panels:

• -50° C to $+70^{\circ}$ C