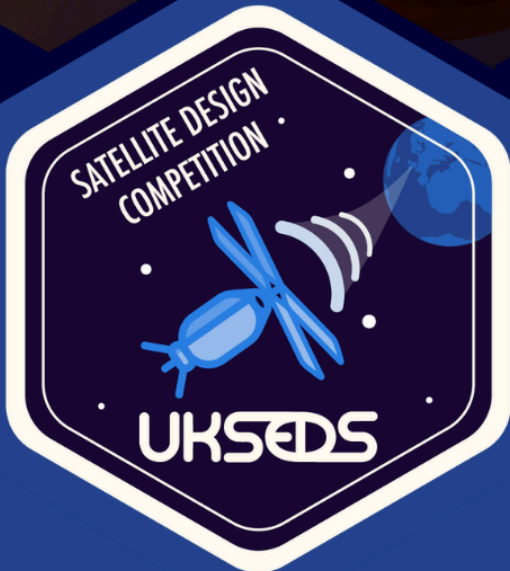


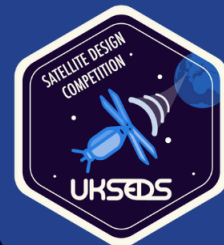


SATELLITE DESIGN COMPETITION 2026-27

**REQUIREMENT
SPECIFICATION**



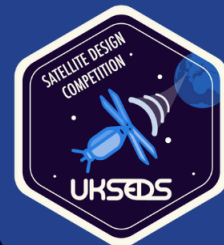
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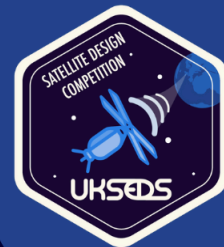


Document Information

Written By	Responsibility
Navraj Singh Khondhu Shing Sum Lo, Linus	SDC Co-Team Leads
Verified By	Responsibility
Harry Price Tayeb Jasseh	Competitions Co-Team Leads
Approved By	Responsibility
Harry Szpuk	UKSEDS Chair
Previous Contributors	Responsibility
Joel Vicente Cabrera Cordova Jason Richards Geethanjali Gopinath	Former SDC Lead Former Competition Co-Team Lead Former Competition Co-Team Lead

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SDC-RB-001	Initial Release	04/10/2026





1 ACRONYMS & REFERENCE DOCUMENTS

1.1 Acronyms

Acronym	Description
SOW	Statement of Work
SOH	State of Health
DOF	Degree of Freedom
TVAC	Thermal Vacuum Chamber
TT&C	Telemetry, Tracking and Command
ADCS	Attitude Determination and Control System
PDR	Preliminary Design Review
CDR	Critical Design Review
TRR	Test Readiness Review
MRC	Mystery Room Coordinator

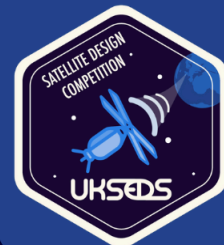
1.2 Reference Documents

1.2.1 Competition Documents

There are two other documents related to the competition to make a total of **three regulatory documents** this year. The three documents are as follows:

ID	Document	Description
SDC-RB	Rulebook	Outlines the overall competition rules, funding, team structures and so on - the competition logistics.
SDC-SOW	Statement of Work	Outlines the main deliverables teams shall be expected to deliver - the competition project requirements.
SDC-RS	Requirements Specification (this document)	Outlines the technical requirements the rover must be designed to meet

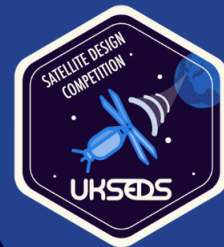




1.2.2 Useful Reference Documents

No.	Document	Description
1	ECSS-M-ST-10C Rev. 1	Space project management: Project planning and implementation
2	ECSS-S-ST-00-01C	Glossary of Terms: A list of commonly used terms in ECSS documents
3	ECSS-E-ST-10-03	Testing: Requirements for performing verification by testing of space segment elements and space segment equipment on ground prior to launch.
4	CubeSat Design Specification Rev.14.1	Design: Standardized design framework that defines the dimensions, interfaces, and requirements for nano satellites (CubeSats)





1.3 Requirement Numbering Definition

The following describes the layout of the requirements within this document.

SDC MRD-<A>-<n> | Rev: <R>

<Title>

<text>

VV Method: <v>

Parent: <p>

Key

<A>: Acronym for the section the requirement falls under.

<n>: Requirement number of 3 digits, starting from 001.

Note: <A> and <n> combine with the competition and document name acronyms to create the requirement ID.

<R>: Revision indicator, with "A" denoting the first version, "B" the second and so forth.

<Title>: Requirement title.

<text>: Requirement text.

<v>: The verification method(s) needed to demonstrate compliance to each requirement. The letters shall be only the following:

Letter	Verification Method	Description
I	Inspection	Physical examination of the relevant system(s) using one or more of the five senses
A	Analysis	Use of calculations/models to provide a prediction of the relevant system(s) performance
D	Demonstration	Use of the relevant system(s) as intended to be used
T	Test	Use of the relevant system(s) with a controlled, predefined set of inputs or environments

<p>: Denotes if a requirement is derived from another requirement. Parent requirements shall be listed by the Requirement ID. If no Parent Requirement exists, the value shall be N/A.





2 REQUIREMENTS

2.1 Mission Requirements

The technical specification given here contains all the mission requirements that must be met by a team's CubeSat to progress through both the Phase 0 - D and to progress to the competition event.

2.2 Structure and Mechanics

SDC RS-SM-001 | Rev: A

Mass

The total satellite mass shall be compliant with CubeSat Design Specification section 2.2.10, with CubeSats not exceeding a 3U CubeSat.

([CubeSat Design Specification Rev. 14.1](#))

VV Method: <I,A>

Parent: N/A

SDC RS-SM-002 | Rev: A

Volume

The total satellite volume shall not exceed **3U**

*1U refers to an independent volume of (10x10x10) cm

**Volumetric envelope shall follow the cubesat standard specification.

(See [CubeSat Design Specification Rev. 14.1](#) section 1.1)

VV Method: <I,A>

Parent: N/A

SDC RS-SM-003 | Rev: A

Cubesat Standard

All satellite components and mechanisms shall be compliant with cubesat standard specification volumetric envelope in stowed configuration.

(See [CubeSat Design Specification Rev. 14.1](#) section 2.2)

VV Method: <I,A>

Parent: N/A





SDC RS-SM-004| Rev: A

Deployables and Mechanism

Deployable elements are allowed under release command.

VV Method: <D,T>

Parent: N/A

SDC RS-SM-005| Rev: A

Interface

The satellites shall accommodate the interface for suspension (this can be to interface with a hook, rope or any other type of interface).

VV Method: <D>

Parent: N/A

SDC RS-SM-006 | Rev: A

Pyrotechnics

No pyrotechnic components shall be used.

VV Method: <I>

Parent: N/A

SDC RS-SM-007 | Rev: A

Debris Mitigation

No item or parts shall be released into "space". This includes all lock-down and release mechanisms.

VV Method: <I,A>

Parent: N/A



SDC RS-SM-008 | Rev: A

Vibration

The satellites shall be capable of attaching to the vibration system using the interface shown in Figure 1.

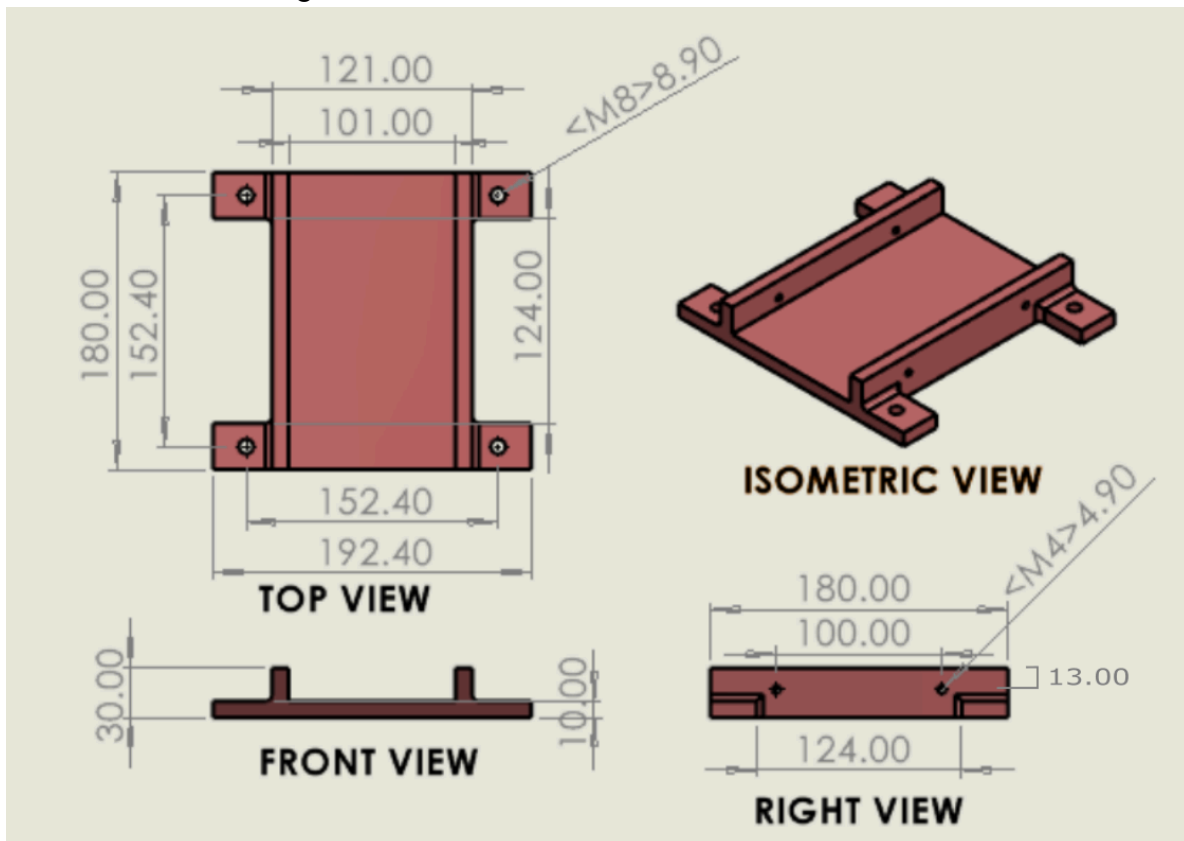


Figure 1: CubeSat vibration interface for SDC competition.

VV Method: $\langle D, T \rangle$

Parent: N/A

Important Note: Vibration testing is subject to the availability of the vibration shaker on test day, and can not be determined until closer to competition date. If vibration testing cannot go ahead, another form of environmental testing may be performed. Interfaces used in the different environmental testing will use the same interface shown in Figure 1.



SDC RS-SM-009 | Rev: A

Vibration Test

Vibration Test shall have the vibration characteristics as highlighted in Table 1, and run for 60 seconds.

Table 1: Vibration Random Test 60 seconds

Frequency	Amplitude Spectral Density g^2/Hz
20 – 80 Hz	+6 dB/octave
80 – 500 Hz	0.025 dB/octave
500 – 2000 Hz	-6 dB/octave
Overall	4.5 G_{RMS}

VV Method: <D,T>

Parent: N/A





2.3 Power

SDC RS-P-001 | Rev: <R>

Power System provision

The on-board power system shall be designed and provided by each team.

Teams are not required to design solar panels

VV Method: <D>

Parent: <p>

SDC RS-P-002 | Rev: <R>

Power Storage

The on-board power system shall store enough energy to ensure power throughout the test mission.

VV Method: <A,T>

Parent: <SDC RS-P-001 >

SDC RS-P-003 | Rev: <R>

Hazardous Materials

No hazardous, explosive, or toxic components shall be used for the power system.

VV Method: <v>

Parent: <p>





2.4 Communications

SDC RS-COM-001 | Rev: A

Communication system provision

The communication system shall be designed and provided by each team.

VV Method: <D>

Parent: <p>

SDC RS-COM-002 | Rev: A

Wireless

The communication system shall be wireless.

VV Method: <I,A>

Parent: <SDC RS-COM-001>

SDC RS-COM-003 | Rev: A

Operation

The communication system shall be able to operate the satellite from an isolated operating room with no line of sight.

VV Method: <D,T>

Parent: <SDC RS-COM-001>





SDC RS-COM-004 | Rev: A

Dedicated Communications

The communication system shall not make use of pre-existing infrastructure (No Bluetooth/NFC/LoRa usage is permitted) except for WiFi.

VV Method: <A>

Parent: <SDC RS-COM-001>

SDC RS-COM-005 | Rev: A

Legality

All wireless communications must use UK legal frequencies and should be used responsibly.

VV Method: <A>

Parent: <SDC RS-COM-001>

2.5 Environment

SDC RS-ENV-001 | Rev: A

Temperature

The satellite shall be able to operate at temperatures between 0°C to +40°C

VV Method: <D,T>

Parent: <p>





SDC RS-ENV-002 | Rev: A

Access

The satellite shall not be accessed during the test mission.

VV Method: <I>

Parent: <p>

2.6 Safety

SDC RS-SFT-001 | Rev: A

Live Voltage

No exposed point or area of vehicle should carry a live voltage at any point during operation of the satellite payload.

VV Method: <A,T,I>

Parent: <p>

SDC RS-SFT-002 | Rev: A

Battery

When handling batteries, good battery practice should be followed.

VV Method: <v>

Parent: <p>





SDC RS-SFT-003 | Rev: A

Battery

Batteries shall be protected from the following conditions; over voltage, under voltage, over current, over temperature, short circuit and reverse connection.

VV Method: <I,T>

Parent: <p>

SDC RS-SFT-004 | Rev: A

Battery

Lead Acid batteries shall not be used

VV Method: <I>

Parent: <SDC RS-SFT-003>

SDC RS-SFT-005 | Rev: A

Battery

All batteries used shall be removable

VV Method: <I>

Parent: <SDC RS-SFT-002>





SDC RS-SFT-006 | Rev: A

Battery

In the case of LiPo batteries, charge bags and a CE marked LiPo charger shall be used

VV Method: <I>

Parent: <SDC RS-SFT-002>

SDC RS-SFT-007 | Rev: A

Kill Switch

The satellite shall have an external and easily accessible switch or button that isolates battery power from the rest of the satellite payload system and is clearly identifiable (identifiable refers to teams using colour coding or labelling of the kill switch).

Important Note: If the kill switch is deemed unsafe by either UKSEDS organisers or site organisers, the team will not be allowed to test their satellite. The decision behind what is considered an unsafe kill switch will be at the discretion of the organisers and cannot be appealed, however a full explanation will be provided to teams behind why it was deemed unsafe.

VV Method: <I,D>

Parent: <SDC RS-SFT-002>

SDC RS-SFT-008 | Rev: A

Non-toxic propulsion methods

Any propulsion methods that eject gas shall be non-toxic, flammable, or harmful to humans or the surroundings in an enclosed space.

VV Method: <I,D>

Parent: <N/A>





SDC RS-SFT-009 | Rev: A

Declaration of Autonomy

Satellites with autonomous capabilities shall be highlighted to the judges to ensure that sufficient safety measures are in place.

VV Method: <D,T>

Parent: <p>

SDC RS-SFT-010 | Rev: A

Laser

The laser diode used must be a dot laser classified Class 2 or below with a wavelength between 630nm and 670nm

VV Method: <I>

Parent: <N/A>

SDC RS-SFT-011 | Rev: A

Laser

When operating the laser, safety practices must be established and employed to prevent injuries.

VV Method: <I>

Parent: <N/A>

SDC RS-SFT-012 | Rev: A

Temperature

The satellite should be able to relay real time information on system operating temperatures.

VV Method: <D,T>

Parent: <N/A>



2.6.1 Mystery Room Hook Interface

Throughout the mystery room testing, the team's satellites shall be suspended on a piece of rope to enable rotational movement in one axis.

The satellite structure should have holes in the frame or an interfacing mechanism for the rope **within the 3U CubeSat volume limit**. Teams should decide on how they would like to tie the rope to the satellite. We encourage teams to practice this during the build and test phase in preparation of the competition challenge day.

2.6.2 Laser safety requirements:

When operating a laser or a laser module, health and safety regulations must be **STRICTLY** followed to prevent damage to eyes or properties.

The laser used must be a dot laser with wavelength between **630nm and 670nm**. The laser module used in the design must be classified **Class 2 or below**. This should be demonstrated with an appropriate laser warning label. The exact model must be clearly stated for verification in the PDR and CDR, and will be further verified in the TRR.

Please read the following article from the UK government on laser safety before proceeding with the competition: [Laser radiation: safety advice - GOV.UK](https://www.gov.uk/guidance/laser-radiation-safety-advice)

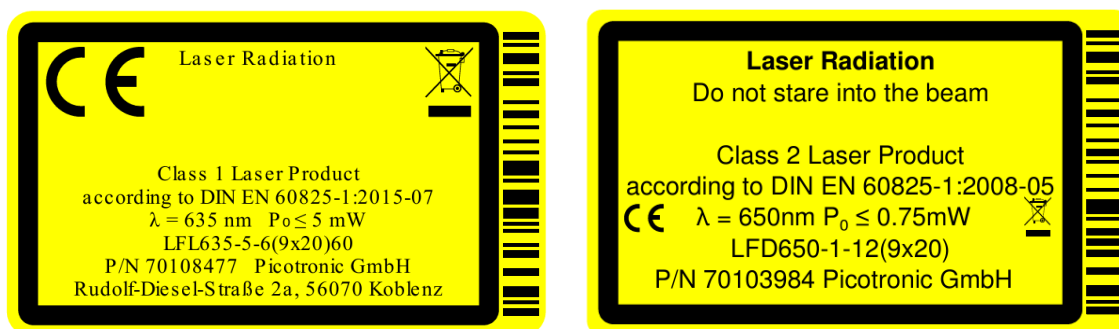


Figure 2: Example of a Class 1 and Class 2 safety label (Credit: Picotronic GmbH)





2.6.3 Structural Testing

As part of this year's Mystery Room challenge, a test will be carried out to simulate the loads experienced by the satellite during launch. During the test, teams will be required to remove their batteries. Once the test is complete, teams must reinstall their batteries and demonstrate the satellite's functionality to the UKSEDS organisers, proving its capability to withstand launch conditions.

Please note that structural vibration testing is dependent on the availability of Airbus' shaker facility. If this cannot be conducted, alternative testing will be arranged, such as Thermal Vacuum (TVAC) testing, which has been used in previous years.

END OF DOCUMENT

