

SDL
PAYLOAD
CHALLENGE



SDL PAYLOAD CHALLENGE CRITERIA



SPACE DYNAMICS LABORATORY

Judging Criteria (1000 points possible):

Scientific or Technical Objective(s) (400 points)

How relevant and well-designed is your scientific or technical objective?

Payload Construction and Overall Professionalism (250 points)

Includes make/buy decisions, craftsmanship, material usage, poster, handouts, reports, etc.

Readiness / Turnkey Operation (50 points)

Will the payload interfere with launch operations? Will the payload operate after hours of launch preparation, rail time, heat, waiting for other launches, etc?

Execution of Objective (300 points)

Judges should be informed of results by Saturday at noon or a zero in this category will be assessed.
How well did it accomplish the objective(s)?

2.3.5 PAYLOAD FORM FACTOR

The following sections concern the required shape and dimensions of payload(s) submitted for weigh-in. These requirements are different if the payload is a non-functional “boiler-plate” (aka mass emulator) or if it is a functional scientific experiment/technology demonstration (i.e., those entered in the SDL Payload Challenge). Section 2.3.5.1 defines the requirements for non-functional payloads. Section 2.3.5.2 defines the requirements for functional payloads. ESRA’s “Payload Cube Unit” is defined in Table 1 below. This definition applies throughout this document. The definition is inspired by the CubeSat standard but is not identical to it.

| Payload Cube Units | Dimensions (Length x Width x Height) | Length and Width Tolerance | Height Tolerance |
|--------------------|---|-------------------------------|---------------------|
| 1U | 100 mm ×100 mm ×100 mm | ± 2 mm | ± 2 mm |
| 2U | 100 mm ×100 mm ×200 mm | ± 2 mm | ± 2 mm |

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Verify this is the correct version before use.

| | | | |
|----|------------------------|--------|--------|
| 3U | 100 mm ×100 mm ×300 mm | ± 2 mm | ± 2 mm |
| 4U | 100 mm ×100 mm ×400 mm | ± 2 mm | ± 2 mm |

Table 1:Payload Form Factor Definitions

2.3.5.3 DEPLOYABLE PAYLOADS

Deployable Payloads that eject a payload out during the flight and or eject once they have landed with the rest of the rocket are allowed. GPS for tracking these deployable payloads is required by the DTEG .Teams are advised to evaluate their designs as deployable payloads will bring a

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significant project risk and high level of scrutiny to that team’s entry. Deployable UAS payloads are prohibited.

2.4 GPS ROCKET TRACKING

All IREC launch vehicles shall carry a Global Position System (GPS) tracking system to expedite rocket recovery. GPS Tracking requirements are described in detail within the IREC Design, Test, and Evaluation Guide (DTEG), maintained on the ESRA website: (<https://www.soundingrocket.org/irec-documents--forms.html>).

2.0 INTERNATIONAL ROCKET ENGINEERING COMPETITION OVERVIEW

Student teams competing in the IREC must design, build, and launch a rocket carrying a payload of no less than 4.4 lbs. to a target apogee of either 10,000 ft, or 30,000 ft, or 45,000 ft above ground level (AGL). Team Projects will be divided into one of the following nine categories based on the type of project attempted. Teams are permitted to switch categories if required, prior to submitting their final Project Technical Report. The team must email prior to the submission of the Project Technical Report an e-mail entitled "TEAM <Your Team ID> FORMALLY SWITCHES CATEGORIES from Competition Year IREC" to general.info@esrarocket.org. For example, a team assigned the Team ID "100" would switch categories from the 2025 IREC by sending an e-mail entitled "TEAM 100 FORMALLY SWITCHES CATEGORIES FROM THE 2025 IREC" to general.info@esrarocket.org and must receive approval to this request.

- 10,000 ft AGL apogee with commercial-off-the-shelf (COTS) solid or hybrid rocket propulsion system

2.3.5.2 SCIENTIFIC EXPERIMENT PAYLOAD

Any functional scientific experiment or technology demonstration payload and its associated structure (i.e. those entered in the SDL Payload Challenge) may be constructed in any form factor, provided the experiment/technology and its associated structure remain in compliance with Sections 2.3.1, 2.3.2, 2.3.3, and 2.3.4 of this document. With special regard to compliance with Section 2.3.1, the required minimum payload mass should be achieved primarily by the experiment(s)/technology and associated support structure. The payload design may incorporate up to 3.25 lbs. of non-functional “boiler-plate” mass to meet the required mass minimum while remaining exempt from Section 2.3.5.1 above. This non-functional “boiler-plate mass must be weighed separately from the rest of the payload to ensure it does not exceed the allowed mass as specified above. Competition officials may impose a point penalty on any team believed to be violating the spirit and intent of this rule in accordance with Section 2.8.1.6 of this document.

Finally, despite this exemption, ESRA highly encourages teams to adopt the Payload Cube Unit physical standard for their payload(s) whenever possible – either as the payload structure itself, or as an adapter which the payload is mated to prior to the combined assembly’s integration with the launch vehicle (such an adapter could be included in the official payload mass). To promote this encouragement, teams whose functional payloads do adopt the Payload Cube Unit physical standard will be awarded bonus points in the IREC in accordance with Section 2.8.1.7. To meet this requirement, a payload will have to fit completely in a Payload Cube Unit dispenser with nothing protruding or physically connecting outside as listed in the Table 1 of Section 2.3.5.

2.3.4 RESTRICTED PAYLOAD MATERIALS

Payloads shall not contain significant quantities of lead or other heavy metals. Additionally, payload shall not contain any hazardous materials that impact the health and safety of team members, staff, the general public, the convention center, or the launch site itself. Similarly, any use of radioactive materials shall be permitted only if operationally necessary and approved by competition officials. If approved, any such materials shall be fully encapsulated and are limited to 1 μC or less of activity. Finally, payloads shall not contain any live, vertebrate animals. Approvals shall be gained prior to attending the event and will not be granted on site. If teams have any questions about payload materials, they should seek clarification on HeroX as early as possible.

2.6.2 PROJECT TECHNICAL REPORT

Each team shall submit a Project Technical Report which overviews their project for the judging panel and other competition officials. The Project Technical Report shall be formatted similarly to the template provided below and shall use the American Institute of Aeronautics and Astronautics (AIAA) style guide, found on the AIAA website.

<https://www.aiaa.org/publications/journals/Journal-Author/punctuation-spelling-and-style>

2.6.2.1 PUBLICATION

All reports will be publicly published after the event concludes. Petitions for confidentiality will not be accepted.

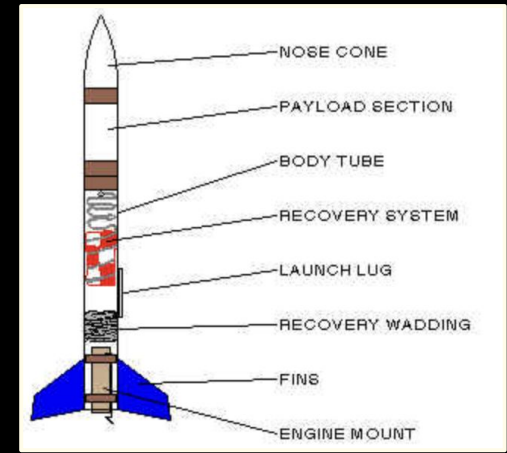
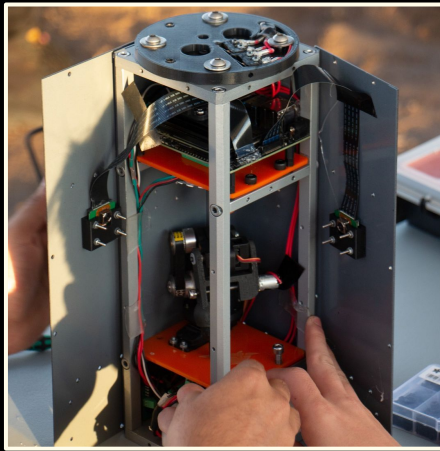


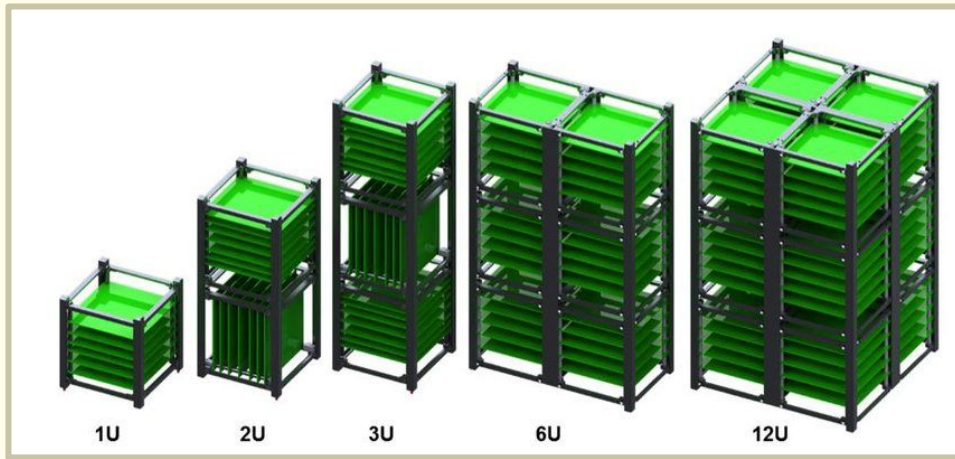
Amendment 9.1.5 -

Rockets with deployed payloads shall contain no more than a single (1) independently recoverable body.

Amendment 2.3.1 -

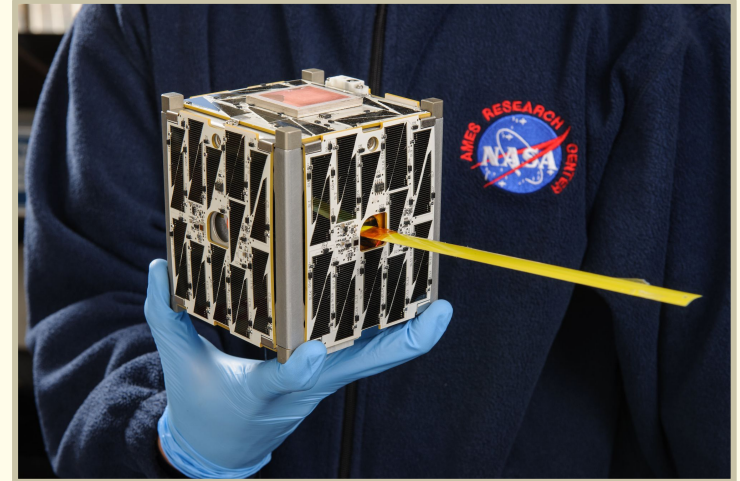
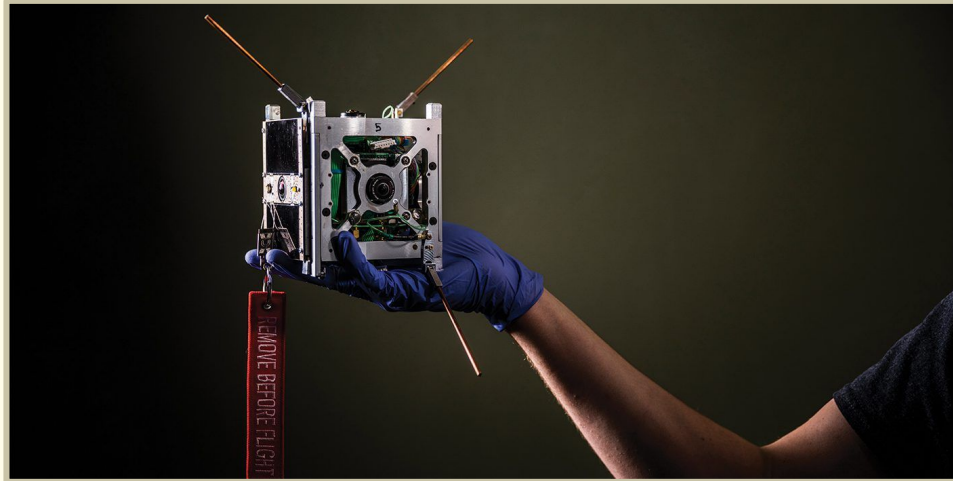
The launch vehicle shall carry no less than 4.4 lbs. of payload. Payload is defined as being replaceable with ballast of the same mass, with no change to the launch vehicle trajectory in reaching the target apogee, or its successful recovery. This payload may be assumed present when calculating the launch vehicle's stability. There is no requirement for launch vehicles to be stable without the required payload mass on board.



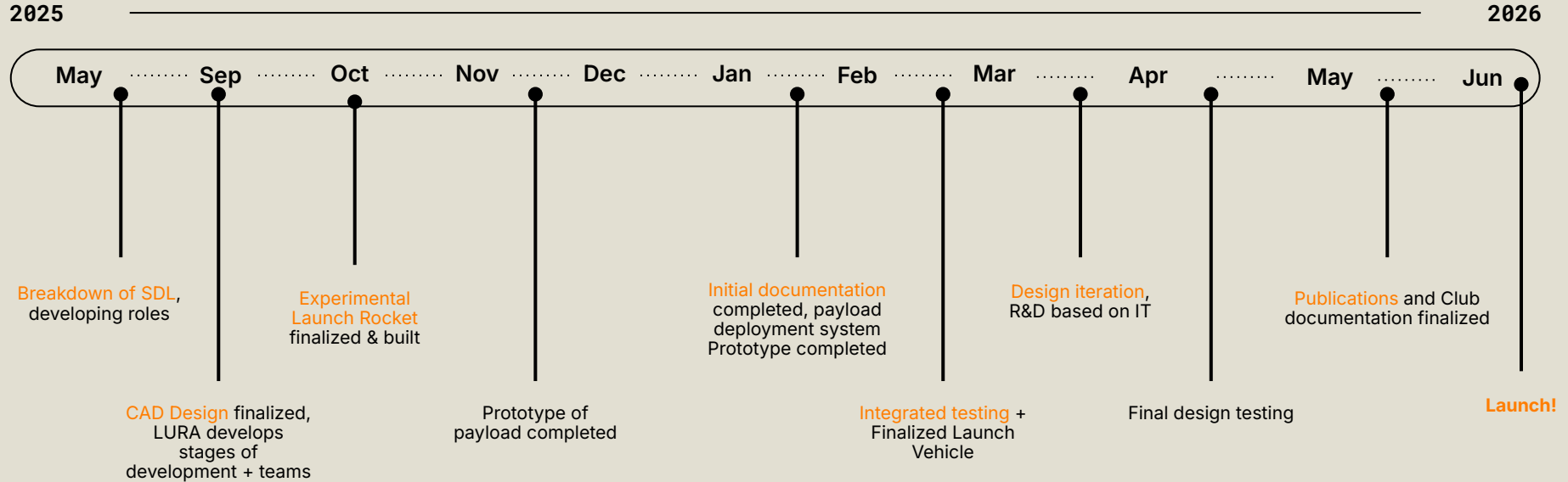


CubeSats are a class of nanosatellites with "1U" measuring 10x10x10 cms

10 cm ~ 4 inches, the Diameter of LURA KIT L1



SDL PAYLOAD CHALLENGE **TIMELINE**



REFERENCES AND PDFS

[IREC RULES](#)

[SDL PAYLOAD RULES](#)

[IREC TEST DESIGN AND EVALUATION GUIDE](#)

[MASTER SCHEDULE](#)

[REGISTRATION FORMS](#)

[ALLOWABLE BATTERIES](#)