

2021 STUDENT ROCKET LAUNCH PROGRAM

Request for
Payload Proposals



ULA Student Rocket Launch Returns in 2021

The Student Rocket Launch is an annual event presented by United Launch Alliance (ULA) and Ball Aerospace that provides a unique educational opportunity to students from kindergarten through graduate school. The event offers participants hands-on experience designing and building their own payloads (devices, objects, experiments, instruments, etc.) to fly on sport rockets. The sport rockets, built by ULA interns, carry payloads built by Ball Aerospace interns and K-12 students. The launch event is planned for July 2021 in Pueblo, Colorado, pending COVID-19 restrictions.

Program Objectives

- Provide students hands-on design, analysis, build, test and engineering experience
- Allow students and interns to be involved in launching the rocket
- Provide a fun and enriching experience that inspires students to pursue careers in science, technology, engineering and math (STEM)

We encourage all participants to attend the launch. Check out a [video of the 2019 launch](#).

Plans for 2021 Launch

Sport Rocket Launches with Payloads

- ULA interns will build three high-power sport rockets that will fly approximately 5,500 feet above ground level.
- K-12 student teams will be given an opportunity to design and build payloads to launch with the sport rockets.

Payload Design Competition

- K-12 student teams will provide payload design proposals, and ULA will select 12 for possible integration to a rocket. These payloads may serve any purpose within the guidelines included with this request for proposals (RFP).
- All selected payloads will be integrated and flown on a high-power sport rocket.
- Payload teams will participate in a series of design reviews and scored on a rubric. The three highest scoring teams will win prizes!

Wanted: K-12 student teams interested in designing and building a payload

- Teams should be led by a teacher or mentor associated with the school or organization
- ULA or Ball Aerospace employees will mentor teams as needed
- Important dates:
 - ASAP: Teams should notify studentrocketlaunch@ulalaunch.com of their intent to participate
 - April 5: Team leaders submit a simple payload proposal to ULA
 - April 12: ULA notifies teams of their status
 - May 26: Critical Design Review (Notify if alternate date is needed)
 - July 12-15: Schedule fit check at ULA warehouse in Centennial, Colorado
 - July 17: Planned launch

See the proposal form for detailed instructions about how to participate.

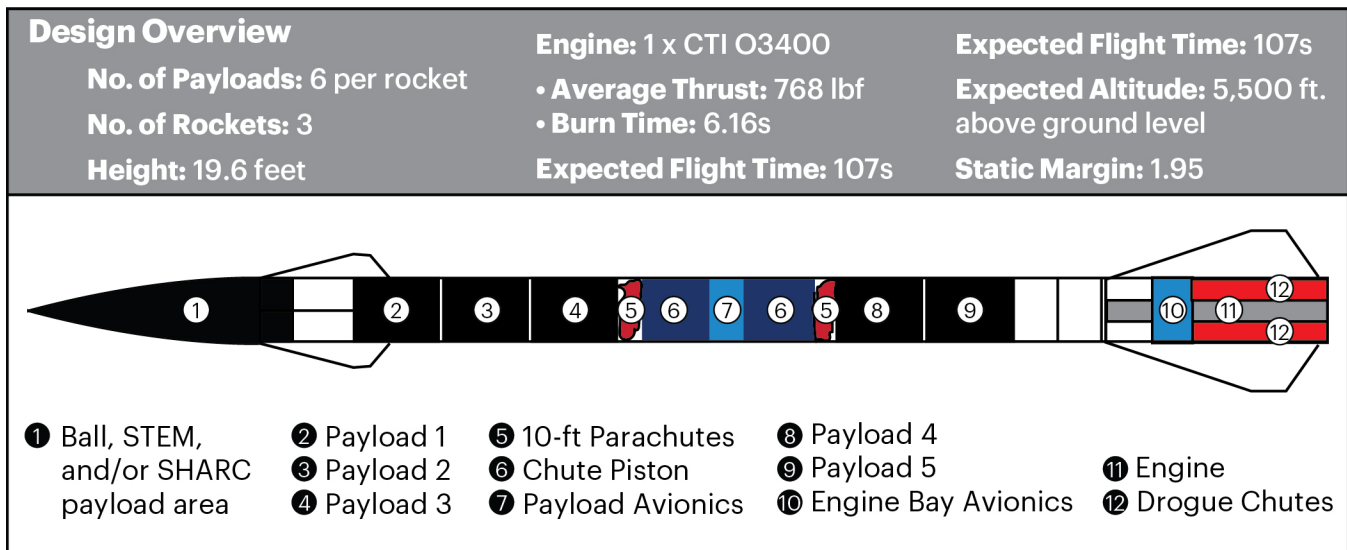


Figure 1

2021 K-12 Payload Accommodation Plan

The 2021 intern-built rockets will carry up to 18 payloads; three nose cone payloads, and fifteen standard payload slots. Twelve of the slots will be allocated to K-12 student groups through this RFP (Figure 1).

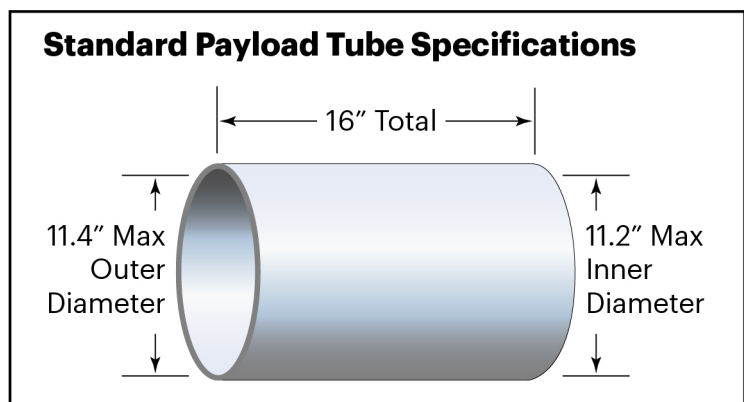


Figure 2

Payload Accommodation

Payloads must fit inside an 11.4-inch-diameter by 16-inch-long payload tube (Figure 2). ULA will provide phenolic-reinforced cardboard tubes; they are open-ended cylinders. All payloads will be ejected out of the rocket. ULA will provide the tubes in the Spring. Payloads must provide their own parachutes, which must fit inside the payload tube with the payload.

Teams can use the payload tube in several ways or choose to not use them at all. For instance:

- The tube can be used as the outer structure of the payload, i.e., items can be attached to the inside of payload tube.
- The tube can be split into two 180-degree half shells that surround and protect the payload during jettison and then fall away.

Payload Requirements

1. Payloads may not utilize any active aerial control systems to guide the payload during descent. Passive control, i.e.: fins, deployable wings, etc., are allowable provided they do not have any autonomous or remote-control systems.
2. Payloads may not include live animals, explosives, flammable liquids, bio-hazards or nuclear materials. Small pyrotechnics for device actuation are permissible with approval from ULA.

3. All payloads will be deployed from the rockets.
4. Estimated maximum acceleration during flight = 10 Gs.
 - In other words, make your payload sturdy. A good test to see if your payload is sturdy enough is to drop it from a height of 10 inches onto a 0.5-inch-thick carpeted floor several times, dropping it from vertical and horizontal positions. If it survives this drop test, it should survive the rocket flight and jettison events.
5. ULA will provide each payload team with a tube as noted above.
6. Payload installation in the rocket must be complete with no further access at least 120 minutes (preferably 150 minutes) prior to launch. Some lessons learned from previous launches:
 - Test your payload to ensure it has adequate battery life and/or memory, if applicable.
 - Test your payload to ensure it does not auto-power-off after 90 minutes or less of inactivity, darkness, quiet, etc.
 - Temperature of payloads in the rocket prior to launch may reach 130° F or higher depending on weather; make sure your payload can handle such temperatures.
7. If a payload plans to transmit radio frequency (RF) signals, transmissions must be coordinated in advance with ULA. Due to possible interference with rocket system electronics, payloads may not transmit RF signals until after the payload has been ejected from the rocket. Additional restrictions governing RF transmissions and unmanned ground vehicles (UGVs) will be provided in the spring. No unmanned aerial systems (UASs) are allowed.
8. Payloads are planned to be ejected from the rocket after apogee while descending at approximately
9. Maximum allowed mass for small payloads is 10 lbs. The mass limit includes the weight of the ULA-provide modules, tubes, or parachutes. Contact ULA if you need to exceed these mass limits.

Payload Competition Information

The goal of the payload competition is to encourage students to design, build and operate a payload that is deployed from one of the intern-built rockets.

Judging will be based on a rubric that considers the design phase, testing phase and the payload performance. Winners will be selected based on a weighted total score with detailed factors and weighting to be announced. The rubric will be provided to all teams so everyone will understand the grading scheme. The top three winners will receive a ULA prize pack for their team.

Additional Prizes

Teams that provide a payload to fly on the day of launch will be entered in to a random chance drawing where five random winners will receive a 3D printer.

Additional Requirements for Payload Competition Teams

In addition to the standard payload requirements above, teams interested in the payload competition must abide by the following:

1. Teams must complete a design review with ULA prior to the launch
 - Teams will receive a design review outline in the spring
 - Students — not mentors — must present at the design review
2. Teams will bring their payloads to an open house at ULA about one week before launch.
3. Teams unable to attend the demo day may submit a video documenting their demo results. Please work with Sreyas Krishnan to ensure your demo is acceptable.
4. A detailed scorecard and rubric will be released in spring 2021.
5. Payloads will be ejected from the airframe after apogee to float down individually.
6. Each team must include a descent mechanism (e.g. parachute, streamer) to ensure payload descends at less than 30 miles per hour.
7. Payload positioning within the airframe will be randomly assigned.
8. No sharp edges are allowed.
9. Teams must be made up of K-12 students.
10. Collaborative team projects are prioritized over individuals
11. Mentorship is encouraged; however, the majority of the design and construction of the payload must be conducted by students.
12. ULA reserves the right to alter the criteria or disqualify any team at any time for ignoring these requirements or failing to meet the educational spirit of this competition.
13. Questions are highly encouraged! We are here to help!
 - We will do our best to communicate with all teams the responses to any questions or concerns associated with the launch or competition that are relevant to all.
 - ULA reserves the right to modify and add to these requirements as needed.
 - Send all inquiries to StudentRocketLaunch@ulalaunch.com

2021 Payload Proposal Form

To build a payload and participate in the 2021 Student Rocket Launch, please complete the form below.

Instructions:

1. Complete the information requested below (fill in red text)
2. Notify ULA (contact info below) of your intent to participate as soon as possible, so that we can gauge interest in the program.
3. Submit this proposal form to StudentRocketLaunch@ulalaunch.com by April 5, 2021.
4. Proposal team leaders will be notified by April 12 if ULA has selected their payloads.
5. Chances of being awarded a payload spot on the rocket depend on the number of proposals submitted. Proposals will be judged based on creativity, credibility and completeness.
6. There is no cost to the school to fly on the rocket, but teams are responsible for payload and travel costs.
7. Teams may submit more than one proposal; however, no team will be awarded more than one payload spot on the rocket unless there are more spots available than proposals received.
8. This form may be expanded to multiple pages, and illustrations included, if desired.
9. ULA and Ball engineers can be available to consult with payload teams during the development of the payloads.
10. Submit questions, notification of intent to participate and proposals to Sreyas Krishnan at StudentRocketLaunch@ulalaunch.com

Payload Proposal Form

Payload or Payload Team Name:

Team Leader Name and Contact Info:

Payload Concept Description:

Do you plan to participate as a competition payload and complete a design review?

Yes No

Team Description:

Are any members of your team planning to attend the launch in person?

Yes No How many people plan to attend?

Test Program:

Requests (optional):

Sell Your Project/Team Here:

Additional Information

ULA Intern Rocket Home Page

<https://www.ulalaunch.com/explore/intern-rockets>

Questions, Comments and Proposal Form Submission

Sreyas Krishnan

United Launch Alliance

StudentRocketLaunch@ulalaunch.com