



F I R E F L Y
A E R O S P A C E

DREAM 2.0

Payload Submission Criteria

Alpha Launch Vehicle

Table of Contents

| | |
|---------------------------|---|
| Overview..... | 3 |
| Technical Submission..... | 3 |
| Formatting..... | 3 |
| Sections..... | 4 |
| Title Page..... | 4 |
| Executive Summary..... | 4 |
| Science..... | 4 |
| Spacecraft..... | 4 |
| Do No Harm..... | 4 |
| Organization..... | 5 |
| Facility..... | 5 |
| Schedule..... | 5 |
| Budget..... | 5 |
| Non-negotiables..... | 6 |
| Negotiable..... | 7 |
| Ideal Candidates..... | 7 |
| Winners..... | 7 |

Overview

Firefly Aerospace is on a mission to make space attainable for everyone, including the next generation workforce. As part of this mission, Firefly's DREAM program was established to encourage students to dream big and develop an interest in STEM by providing students with access to free launch services on our Alpha vehicle.

Firefly's excess capacity will be donated in support of educational payloads, such as CubeSats (1-6U form factor) or other technology demonstrations that can interface to an 8-inch diameter standard bolt pattern. By eliminating the cost of entry for launch, educational institutions can focus on developing and operating a small satellite or payload program in support of training the next generation of aerospace engineers.

Firefly is taking proposals on potential payloads for flights occurring 12 to 24 months in the future. All educational institutions from elementary schools to universities are welcome to submit proposals. Institutions have 6 weeks to respond with a 5-page proposal as outlined in the section below, which includes the following core elements:

- Show your organization has a plan, resources, and know-how to run a program to deliver the payload within a 12- to 24-month timeline.
- Show your payload's scientific objectives in space.
- Show your team's ability to navigate the appropriate licensing work required with the Federal Communications Commission (FCC) and possibly National Oceanic and Atmospheric Administration (NOAA) for imaging.
- Show team's ability to prove compliance with Firefly's "Do No Harm" assessment.

Firefly looks forward to reviewing your proposal and flying your experiment on a future Alpha flight!

Technical Submission

The following technical information is required in the proposal. If there are any known issues or concerns with meeting the technical requirements, please note that in your proposal. Though Firefly does not expect our applicants to be experts in the space business, we do require a basic understanding of good engineering, safety, and program management. Upon selection, Firefly will provide guidance as part of the payload integration planning, management, and execution, but the educational institute must take total ownership of their deliverables for the mission.

As part of the proposal, please address the following requirements with the defined sections and formatting rules and submit the information to Firefly at dream@fireflyspace.com by October 20, 2023.

Formatting

- All font in text and graphics shall be easily readable and no smaller than 10 point.
- The proposal shall be no more than 5 pages (8.5" X 11" with 1" margins), including any title pages or attachments. Any proposals with over 5 pages will not be reviewed. Any proposal that does not address each requirement defined with a "shall" statement will be rejected.

Sections

Title Page

- Payload Name/Acronym
- Institution Name
- Payload Contractor / Sponsor
- Principal Investigator/ Main Point of Contact Name, Email, and Phone

Executive Summary

The proposal shall include an executive summary with a top-level summary of the proposal, the mission, and the spacecraft. Firefly understands there may be some level of uncertainty in the design or science, however the proposal shall at least summarize a concept.

Science

The proposal shall include an overview of the science, maturity of the technology, educational or technological value of the science to the Academic or Aerospace Community, and a description of why this is value added. The proposal shall also show that the science is compatible with the 8-inch circular bolt pattern or with a standard 3U or 6U CubeSat dispenser.

Spacecraft

The proposal shall include of an overview of the spacecraft, including the following:

- Rendering or image of the Payload in the stowed and deployed configurations
- Payload Manufacturer
- Payload's Maximum Expected mass (Wet/Dry/Deployment system)
- Payload Standard Volume or Dimensions
- Description of deployables and details on the deployment system
- Does the payload require a dispenser?
- Describe current or preferred mechanical interface (i.e. tab-based or rail-based for CubeSats).
- Describe any special payload sensitivities (e.g. contamination, humidity, etc.)
- Payload End Use
- Desired Orbit Apogee [km]
- Desired Orbit Perigee [km]
- Desired Right Ascension of Ascending Node (RAAN) [deg]
- Desired Orbit Inclination [deg]
- Describe any flexibility to orbital parameters.

Do No Harm

The proposal shall address the following do-no-harm topics:

- Describe any payload hazards (e.g., propulsion, battery systems, toxic materials, deployables, etc.). Note that the payload provider is responsible for ensuring that all hazardous items, such as Li-ion batteries, meet requirements for shipping.

- For propulsion systems, describe the fuel and any pressurized vessels including the Maximum Operating Pressure. Explain if the fueling will occur prior to delivery at the integration site or if fueling will occur at the integration or launch site.
- If the payload is to have a pressurized system, it shall only contain systems rated above a 4 to 1 safety factor to burst and already qualified for flight.
- The payload shall be powered off during launch.
- The payload shall be able to sit unattended prior to launch without any electrical or physical access for up to three months.
- The proposal shall describe how the hardware will be designed, analyzed, built and tested to ensure it will not create a hazard to the primary mission. Areas of increased scrutiny will be on propulsion systems, hazardous chemicals, pressurized systems, batteries, and deployables. The proposal shall highlight any potential hazards and how they will be mitigated.
- Payload shall be built to meet NASA outgassing requirements, be delivered to NASA “Visually Clean”, and shall not create debris or contamination for other payloads.

Organization

The proposal shall consist of an overview of the organization, key mentor(s), participant size and age range, and highlights of past performance.

Facility

The proposal shall consist of information related to the facility to design and build the hardware.

Schedule

The proposal shall contain a schedule from start of the program through delivery to the launch site. The schedule shall have a minimum of 6 months margin until deliver to launch and contain enough time for appropriate qualification and acceptance testing per GEVS (NASA Goddard environmental test standard). Include the following deliverables in your schedule:

- | | |
|---|-------|
| • Payload Mechanical Interface Control Diagram (MICD) | L-6m |
| • Payload test Reports Due | L-3m |
| • Payload License(s) Received | L-2m |
| • Payload Delivery for Integration | L-45d |

Budget

The proposal shall contain key financial data covering the cost of the program, current funds for the program within the organization, and the current fundraising plan to raise the additional amount.

Regulatory

The proposal shall contain a list of all licenses required for the launch, deploy, and operation of the payload (e.g. FCC, your Country’s national administration/agency, NOAA (if applicable), etc.) and the respective status.

If you already have copies of your license(s), please attach with your submission. If you don't know what licensing you need or how to navigate the licensing process, Firefly can provide some guidance.

Non-negotiables

Mission Design

- Payload shall not drive launch date, time, and orbit.
- The payload must conform to the latest CubeSat Design Specification.
- The payload shall be at 80% completion or better when manifested with an expected completion in Q2 of the launch date year and ready to ship to the launch site at L-2 months.

Structural and Mechanical

- CubeSat payload shall fit in a qualified aerospace dispenser/mechanism (1U to 6U).
- Hosted payload shall fit in a ~6U envelope to be fixed (non-separating) to the Launch Vehicle second stage during the mission.
- The payload provider shall provide a flight worthy mass simulator with compatible mass properties (Center of Gravity (CG) and total mass within +/-5% of predicted) and compatible with the dispenser or bolted interface if unable to provide flight spacecraft by L-4 months.

Electrical

- The payload electrical system shall be always at a power-off state when integrated with the Dispenser.
- In the event the deployment switches are toggled from the actuated state and back, the timer that controls the payload activation shall be reset to $t = 0$ seconds.
- Dispenser unit or deployable PL shall not require any electrical interfaces beyond 2 separation loops for them to sense separation, 2 separation loops for the Launch Vehicle to sense separation, and a redundant separation signal of 3-5 amps for 150-500 ms.
- Battery system shall be procured from a reputable vendor and include protection circuitry.
- Battery design shall be able to tolerate six months of storage without trickle charging.
- The payload battery cells must comply with UN3481.

EMI/EMC

- The payload shall be designed such that it poses no harm to other payloads or the Launch Vehicle when exposed to the radiated emissions levels from the launch vehicle and launch site.
- The payload shall limit unintentional RF emissions while in the vicinity of the Launch Vehicle.
- The payload system and its transmitter shall be powered down during nominal flight and can only transmit 30 minutes after deployment or 30 minutes after power on signal is received if hosted on the second stage.

Mission Environments

- The payload must meet Alpha environmental requirements by test.
- The payload should show compatibility with the maximum predicted shock environment of the LV.
- The payload shall only contain high-pressure systems rated above a 4 to 1 safety factor to burst and already qualified for flight.

Contamination and Hazardous Materials

- The following prohibited material shall not be used on the payload: cadmium parts, cadmium-plated parts, zinc plating, mercury and/or compounds containing mercury, pure tin or tin electroplate, and silicone rubber or room-temperature-vulcanizing (RTV) silicones with probability or transfer to Co-payload(s) or Launch Vehicle hardware.
- The payload shall not contain any pyrotechnic devices, lasers, or nuclear sources.

Ground Segment

- The payload shall not require access post payload fairing encapsulation.
- The packaged payload shall be able to survive in uncontrolled storage temperature inside 50-80 deg F and general warehouse air quality environments which it could see during pre-launch integration storage.
- payload provider shall be responsible for all range safety inputs and approvals.

Regulatory and Licensing

- The payload is required to determine and obtain the necessary licenses. Firefly will not integrate the payload unless copies of required regulatory licenses allowing launch, deploy, and operation of payload are provided and certified as true and correct.
- The inclusion of the payload cannot invalidate Firefly's launch, Federal Aviation Administration, and FCC license applications.

Negotiable

- Preferred that the payload can sit un-powered for up to 3 months without battery charging.
- Payload deployables should be identified early in the process to ensure compatibility with other spacecraft – examples include gravity gradient booms, solar arrays, antennas, and radiators.

Ideal Candidates

- A payload that demonstrates a technology that Firefly can benefit from in the future.
- Educational organization that Firefly can support as part of a charitable donation.

Winners

Firefly will accept as many proposals as deemed credible and will manifest them per available launch capacity.

The winners of the competition will be publicly announced with approval from the education institution. Organizations are encouraged to use this opportunity as a mechanism to raise additional funds, in-kind hardware, and donations as needed.

Firefly reserves the right to not choose, drop or not fly a payload in the selected window. If for any reason your payload does not comply to the rules and requirements above, poses major risk or technical concern for Firefly, or is from a Firefly restricted region, you will not be chosen as a winner. If you cannot or do not meet mission deliverables and the associated timeline, you may be dropped from the mission.



Please submit the above information to Firefly at dream@fireflyspace.com if you meet the technical guidelines.

The following scorecard is an example of how each submission will be reviewed and scored.

| DREAM 2.0 RFP Scorecard | | | | |
|--|-------------|------------------|---------------------|--|
| Applicant Name | Email | Institution Name | Payload Name | Purpose |
| | | | | |
| Payload Information | | | | |
| Mass | Form Factor | Volume | Dimensions | Provides Deployer/Dispenser (Y/N) & Type |
| | | | | |
| RFP Score | | | | |
| <p>The following criteria will be scored as follows:</p> <ul style="list-style-type: none"> - The General and Benefits criteria will be scored on a 1-3 scale, with 1 being a does not meet expectations and 3 being a meets all expectations. - Technical competence will be scored on a 1-4 scale, with 1 being does not comply and 4 being fully complies. <p>The highest possible score is 10.</p> | | | | |
| Scoring Criteria | Score | Justification | Additional Comments | |
| General - Follows Formatting Guidelines - Includes all Required Sections - Meets Submission Deadline | | | | |
| Technical Competence - Submission details the applicant's plan, resources, and know-how to deliver their payload within a 12- to 24-month timeline - Submission details applicant's ability to navigate the appropriate licensing work - Meets Technical Requirements - Complies with Do No Harm Assessment - Submission details payload's scientific objectives in space | | | | |
| Benefits - Technology that Firefly May Benefit From - Technology that Others May Benefit From - Charitable Organization - Plans for Mentorship | | | | |