UNP

MISSION CONCEPTS

A Summer Series
in Collaboration with NASA , USAF & USSF

Program Overview

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A Collaboration to Broaden Access to Space

UNP MISSION CONCEPTS

Educating the Workforce of the Future

UNP MISSION CONCEPTS

UNP maximizes educational impact through its goals to:

- Produce quality personnel for the workforce.
- Support universities to increase their impact.
- Leverage innovation at universities.

Established in 1999 by the Air Force, UNP was the first federally-funded program dedicated to university participation in spacecraft development and nearly 5,000 students from 38 U.S. universities have participated since its beginning.

20 + YEARS
40 UNIVERSITIES

8 LAUNCHES
15 SATELLITES

The Full UNP Process

Guided by years of spacecraft development history, the UNP structure is divided into four distinct phases. Successful completion of each phase is accomplished through specific entrance and exit criteria. Phases include various reviews and program down-selects intended to help as many teams as possible achieve successful spacecraft mission operations.

Phase A
DESIGN AND DEVELOPMENT

- Emphasize design process from system concept to critical design review maturity

Phase B
INTEGRATION AND TEST

- Support satellite assembly, integration, and testing

Phase C
ENVIRONMENTAL TEST

- Provide environmental testing capabilities including bake out, thermal cycling, vacuum, and vibration testing
- Finalize with Space Test Program & launch vehicle

Phase D
MISSION OPERATIONS

- University teams operate spacecraft
- AFRL serves & advises in operations & data transfer

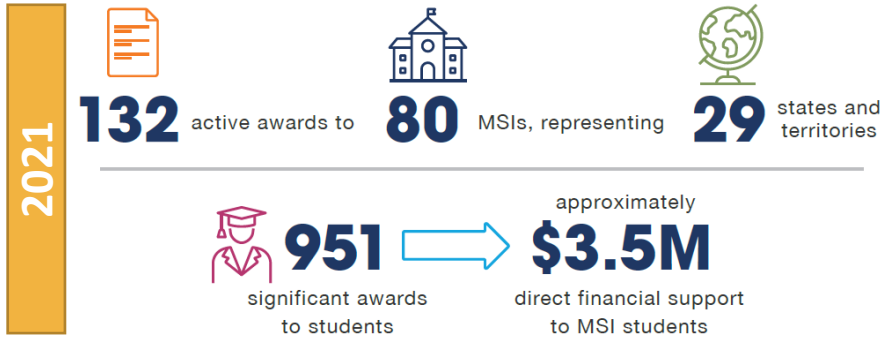
Engaging the Next Generation of Explorers

UNP MISSION CONCEPTS

NASA's Office of STEM Engagement & Mission Directorates work to:

- Create unique opportunities for students to contribute to NASA exploration & discovery.
- Deliver tools for students and educators to learn and succeed.
- Build a diverse future workforce by engaging students with NASA people, content & facilities.

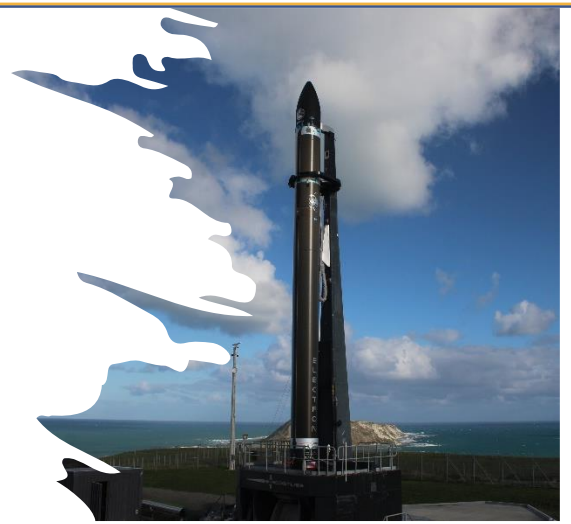
NASA Minority University Research and Education Program (MUREP) is one of four major program areas of STEM engagement. MUREP investments enhance the research, academic and technology capabilities of Minority Serving Institutions (MSIs) through multiyear cooperative agreements.



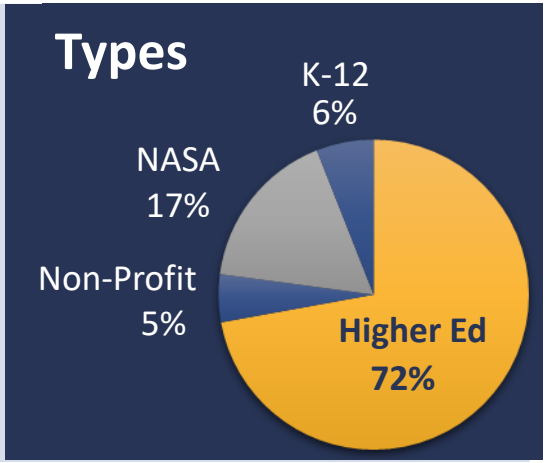
Engaging the Next Generation of Explorers

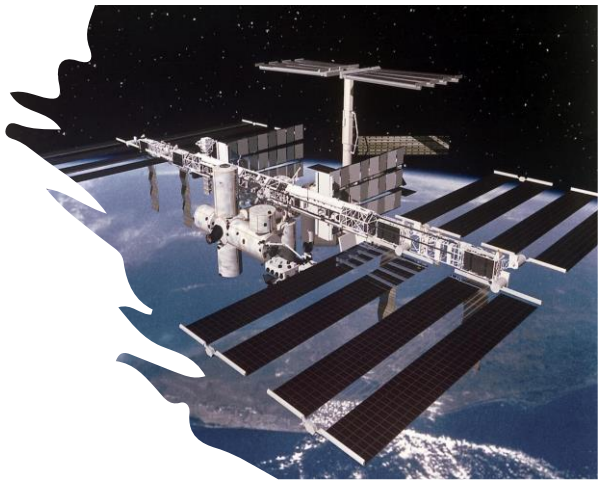
UNP MISSION CONCEPTS

NASA's **CubeSat Launch Initiative (CSLI)** provides U.S.-developed small satellites with flights as auxiliary payloads on previously planned launches or commercial missions to low-Earth orbit and deep space destinations, as well as ISS deployments.



- 110+ unique organizations selected
- 95+ academic organizations selected for participation
- 148 CubeSats launched to date
- 140+ CubeSat missions deployed
- 38 spacecraft on contract or manifested for launch





The CSLI Process

For the annual CSLI process, NASA begins by releasing a call for proposals, typically during August of each year. Responses are usually due in November, with selections traditionally occurring during March of the following year. This includes a funding amount allocated for final integration and launch. The CSLI process has four distinct parts, described below.

Part 1
PROPOSAL

- NASA solicits proposals through an Announcement of Partnership Opportunity
- Eligible Organizations submit proposed CubeSat Missions in response

Part 2
SELECTION

- NASA Committee reviews proposals
- Committee makes final recommendations
- NASA announces final selections

Part 3
DESIGN & BUILD

- Selectee builds satellite
- Selectee raises all funds for satellite construction
- Selectee provides completed satellite to NASA for launch integration

Part 4
MANIFEST & LAUNCH

- NASA manifests satellite, Orbital Debris Assessment
- Reimbursable agreement executed by NASA
- Launch operations and CubeSat deployment
- Mission operations (selectee), reentry occurs
- Selectee submits written report to NASA

What is the UNP Mission Concepts Summer Series?

UNP MISSION CONCEPTS

Helping Schools & Students Get Ready for Space Opportunities

- The next Full UNP Cycle begins in 2024, now is the time to prepare!

- Provide support for and strengthen readiness of universities, teams and faculty*
  - Prepare teams for Full UNP Cycle
  - Prepare teams for NASA CSLI

- Alleviate high barrier to entry
  - Full satellite development is not easy
  - UNP/CSLI cycle(s) have aggressive schedule(s)
  - Improve university proposals

**Participation in this summer series does not guarantee future selection for Full UNP Cycle or NASA CSLI.*

UNP Mission Concepts Summer Series Events

Kickoff and Mission Design

- Location: Centralized (Plan A: NASA hosted - Florida, Plan B: UNP hosted - Albuquerque)
- Kickoff: Welcome, logistics, expectations (for teams and PIs)
- Mission Design Course: Nominally 2-day course. Teams develop mission around UNP/NASA-provided abstracts. Professors expected to participate as well

System Concept Review

- Location: Virtual
- Duration: ~4 hours per school
- Very similar to standard UNP system concept review (SCR) and CSLI Merit Review. Review of proposed mission/concept/objectives feasibility, relevance, etc.

System Requirements Review

- Location: Virtual
- Duration: ~4 hours per school
- Very similar to standard UNP system requirements review (SRR). Review of requirements

Closing & Final Review/Event

- Location: Centralized (UNP hosted – Albuquerque),
- Duration: 30-45 min per school
- Likely somewhere between standard UNP PMR and PDR. Approximate to CSLI Feasibility Review. Team covers their full design concept, requirements, budgets, etc.

UNP Mission Concepts Summer Series Proposals

- **Proposed criteria (equal weight between the following)**
  - Educational impact
  - University program impact/development
  - Minority outreach/support
  - NASA/DoD relevance

- **UNP Expectations**:
  - Teams bring their mission ideas (multiple welcome)
  - Rather than a focus on the initial propose products, the program guides teams to think through ideas, to ensure that end-products will meet UNP expectations

- **Selection of 10+ Teams (as funding allows)**

UNP Mission Concepts Summer Series Funding

Goal: ~$70k per school

- $10k: Faculty stipend
- $25k: Student stipends
- $25k: Travel
- $10k: Overhead

Contracting Details

- Space Dynamics Lab subcontracts to universities (existing UNP model)
- Bare minimum deliverables, university owns products. Final review/documents are considered final report “deliverables”

Why Participate?

Funding level significantly alleviates participation difficulty for teams

Faculty no longer required to deal with other funding sources

4-5 students can be paid for a summer as interns at AFRL

Allows professor/students to form a team without much existing university support – not a drain on university resources

Team can travel to multiple events (kickoff and final event)

UNP Mission Concepts Summer Series Plan

Inaugural Program: Mission Concepting 1 (MC-1) Summer 2023

UNP-provided Resources

- User Guide (shorter version tailored to this program)
- Mission Design Course curriculum
- 30+ presentation recordings on Small Sat design
  - Possibly some live repeats of mission concepting presentations
- Engineer/reviewer support
- Contract vehicle/support
- Student/intern hosting
- Event planning/hosting

NASA Resources

- Additional funding for more schools
- Additional reviewer/expert support to cover all reviews
- Hosting 1+ event(s) at Kennedy Space Center (Florida) or nearby

UNP Mission Concepts 2023 Summer Series Timeline

- Request for Proposals (RFP): Jan 5 at **https://universitynanosat.org/solicitation/**
- Additional funding obligated: End of December
- RFP close: Feb 3
- Selection complete/notification: February 17-20
  - Need to ensure schools can commit to student internship/participation over summer
- Kickoff: Mid-late May
- System Concept Review: Mid-late June
- System Requirements Review: Mid-late July
- SmallSat Conference: Early August (teams are encouraged to attend, possible final event location)
- Final Event: Mid-late August