



# CubeSat Launch Initiative (CSLI) Update

CDW 2023

National Aeronautics and  
Space Administration



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Launch Services Program

NASA-KSC

**CSLI**  
CubeSat Launch Initiative



Scan the QR code  
for more information about  
NASA's CubeSat Launch Initiative

# CubeSat Launch Initiative



## Mission

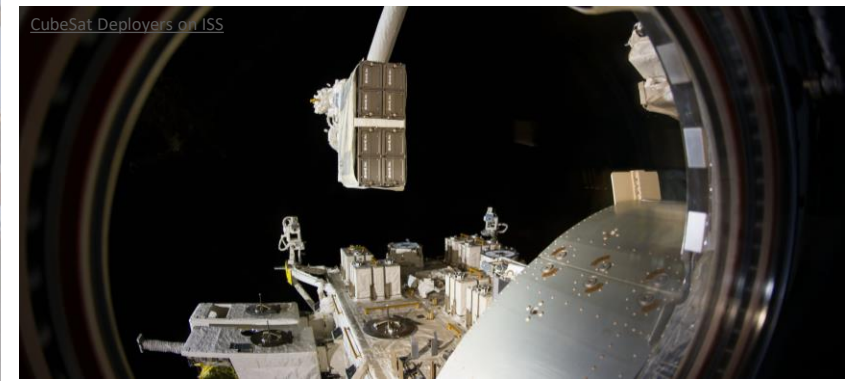
Providing launch opportunities to U.S. CubeSat developers, thereby giving them a pathway to conduct research in the areas of science, exploration, technology development and education.

## Accomplishments to Date

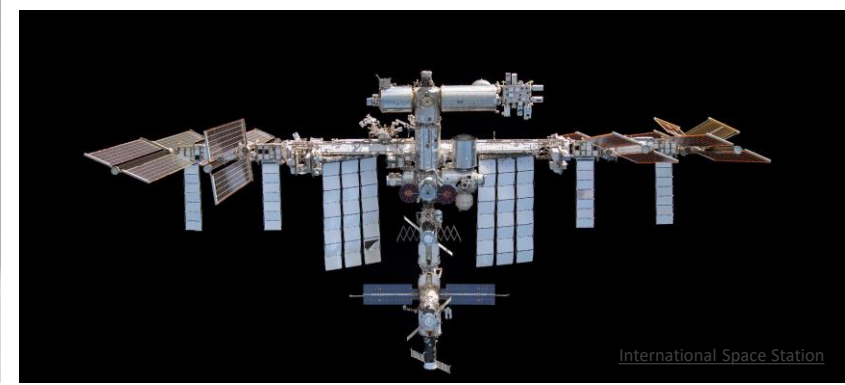
- 200+ CubeSat Projects selected from 100+ organizations from 40+ states, Washington DC and Puerto Rico
- 150+ CubeSats launched to date



[LightSail](#), Credit: The Planetary Society



[CubeSat Deployers on ISS](#)



[International Space Station](#)

Image: ELaNa 19 Launch, Credit: Rocket Lab/Trevor Mahlmann



# Recent Launches (last 12 months)



## ELaNa 39, STP-S29A, LauncherOne, 07/02/2022

- CTIM-FD, University of Colorado at Boulder
- GPX2, NASA Langley Research Center

## ELaNa 45, SpX-25, Falcon 9, 07/14/2022

- BeaverCube, Massachusetts Institute of Technology
- CapSat-1, The Weiss School
- D3, Embrey-Riddle Aeronautical University
- JAGSAT, University of Southern Alabama

## ELaNa 49, SpX-26, Falcon 9, 12/29/2022

- MARIO, University of Michigan
- petitSat, NASA Goddard Space Flight Center
- SPORT, NASA Marshall Space Flight Center
- TJREVERB, Thomas Jefferson High School

## ELaNa 50, SpX-27, Falcon 9, 03/14/2023

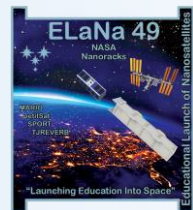
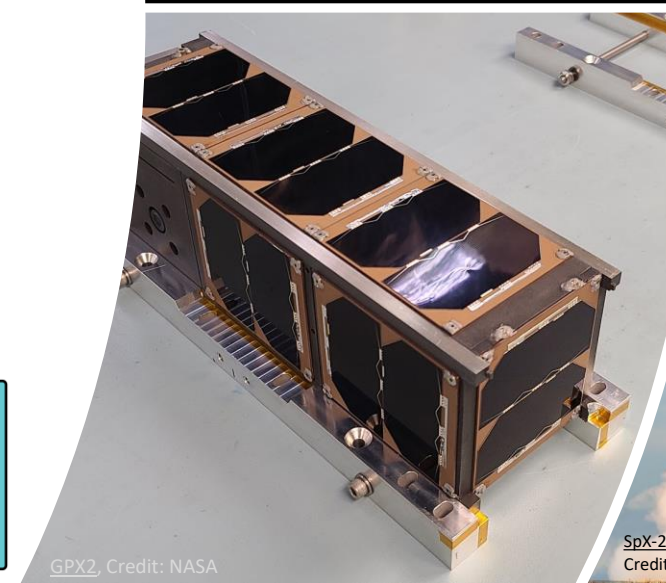
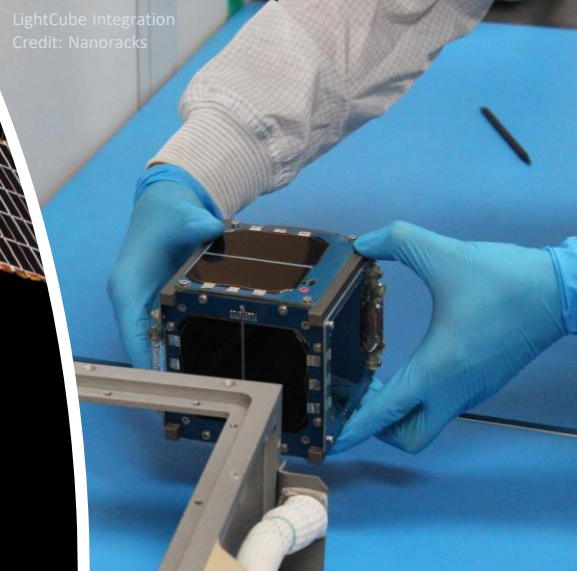
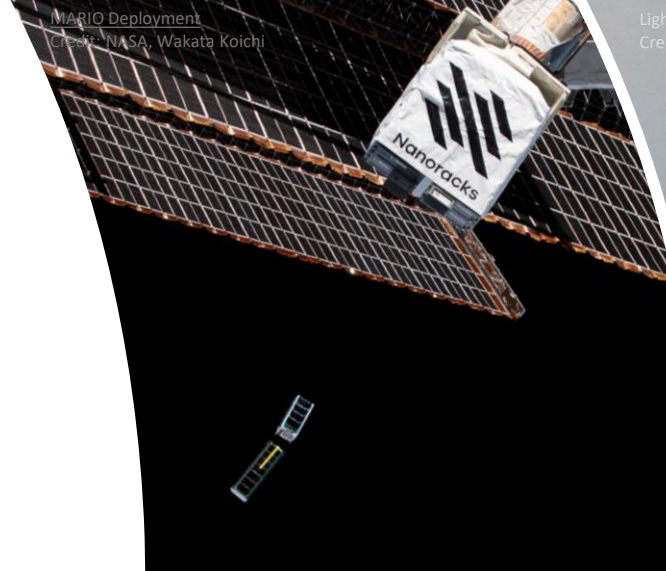
- ARKSAT-1, University of Arkansas
- LightCube, Arizona State University

## ELaNa 40, Transporter 1, Falcon 9, 4/14/2023

- LLITED, The Aerospace Corporation

## ELaNa 47, Transporter 1, Falcon 9, 4/14/2023

- CIRBE, University of Colorado at Boulder



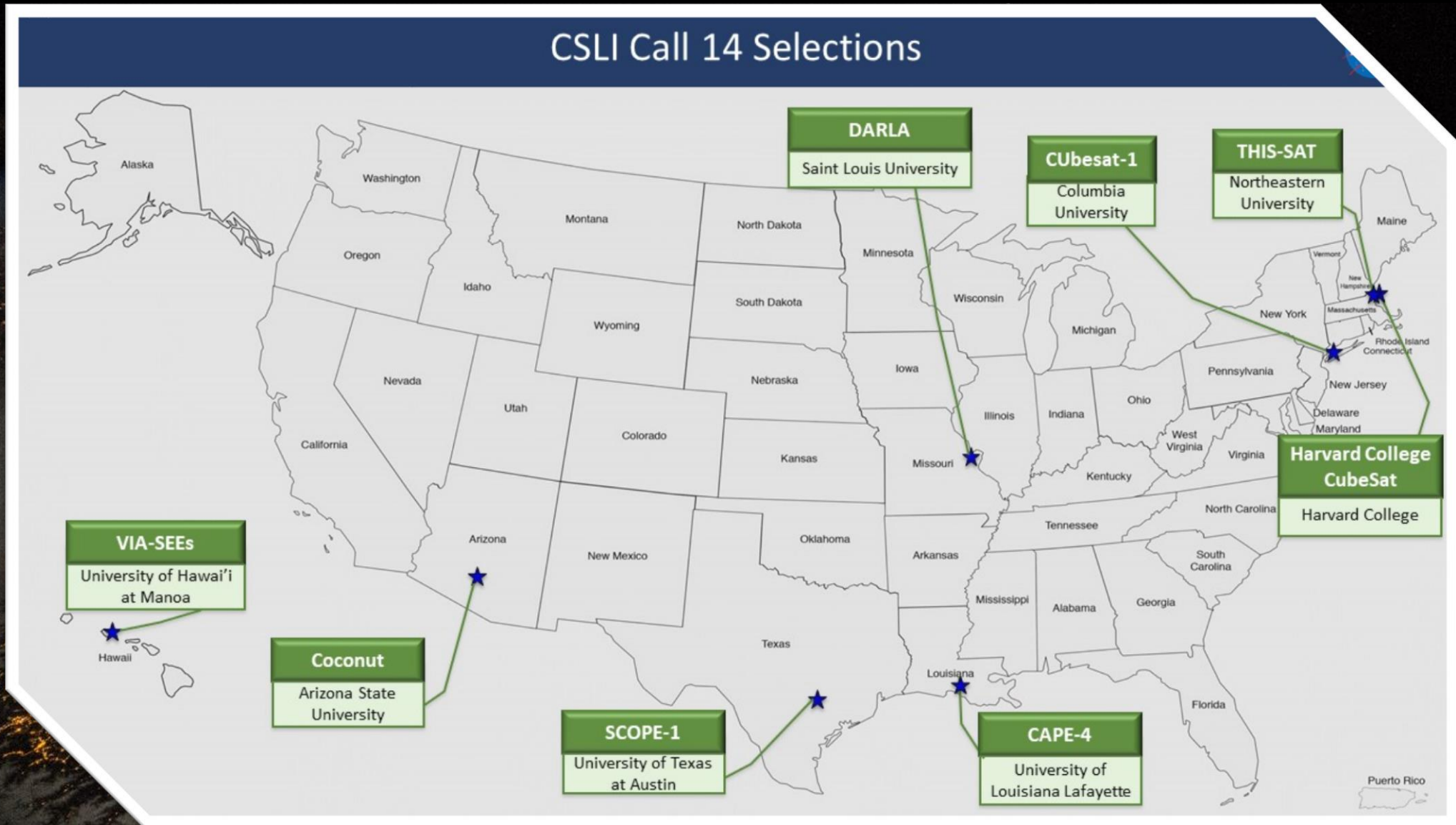
# Upcoming Launches (with Tentative Manifests)



- **ELaNa 42**
  - R5-S3, NASA Johnson Space Center
  - R5-S5, NASA Johnson Space Center
  - R5-S6, NASA Johnson Space Center
- **ELaNa 43**
  - CatSat, University of Arizona
  - KUBEsat-1, University of Kansas
  - MESAT-1, University of Maine
  - OwlSat, Rice University
  - R5-S2-2.0, NASA Johnson Space Center
  - R5-S4, NASA Johnson Space Center
  - REAL, Dartmouth University
  - Serenity, Teachers in Space
  - SOC-i, University of Washington
  - TechEdSat-11, NASA Ames Research Center
- **ELaNa 46**
  - TechEdSat-12, NASA Ames Research Center
- **ELaNa 48**
  - CURIE, University of California at Berkeley
- **ELaNa 51**
  - Alpha, Cornell University
  - BeaverCube II, Massachusetts Institute of Technology
  - Big Red Sat-1, University of Nebraska at Lincoln
  - BLAST, Yale University
  - BurstCube, NASA Goddard Space Flight Center
  - CougarSat-1, Washington State University
  - CySat-1, Iowa State University
  - DORA, Arizona State University
  - EagleSat-2, Embry-Riddle Aeronautical University
  - Foras Promineo, Perkins School District
  - GW-Sat, George Washington University
  - HyTi, University of Hawaii at Manoa
  - OreSat, Portland State University
  - RHOK-SAT, University of Nebraska at Lincoln
  - SNoOPI, Purdue University
- **ELaNa 52**
  - AEPEX, University of Colorado at Boulder
  - CANVAS, University of Colorado at Boulder
- **ELaNa 53**
  - Dione, NASA Goddard Space Flight Center
  - SPRITE, University of Colorado at Boulder
- **ELaNa 55**
  - INCA-2, New Mexico State University
- **ELaNa 56**
  - TRYAD, Auburn University
- **ELaNa 57**
  - M3, Missouri University of Science and Technology



# Recent CSLI Selectees



Background: Earth  
Credit: Samantha Cristoforetti



The CSLI Announcement of Partnership Opportunity is divided into two Appendices

# A

## **Educational Institutions and Non-Profits**

Eligibility under Appendix A is limited to US Accredited Educational Organizations and US. Non-Profits. Entire project must be led, built and managed by students, with designated student project managers. Professional and Faculty Mentors allowed and encouraged

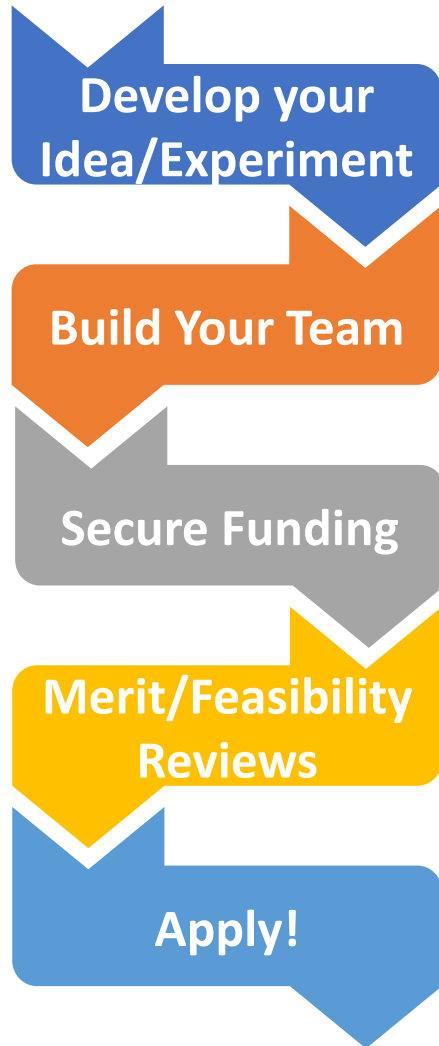
# B

## **Internal NASA Projects**

Eligibility Limited to NASA Centers and/or JPL for the purpose of early career workforce development. One or more team mentor(s) consisting of senior NASA employee(s) is encouraged to promote knowledge transfer



# How to join CSLI...



1

With the assistance of a faculty advisor, professor and/or mentor develop a scientific experiment/demonstration that is in line with NASA's strategic goals and objectives

2

If you are an educational institution, your team must be composed of students and be student run and student led. Professional and Faculty mentors are not only encouraged but required. Clearly define all roles and responsibilities and maintain redundancy for all roles

3

Secure all funding required for your mission. CSLI submittals must show evidence that all funding is secured prior to submittal

4

Conduct a **structured** (if possible competitive) merit and feasibility review, with independent reviewers not affiliated with your project. List the names and qualifications of all your reviewers, record action items and how you addressed each one.

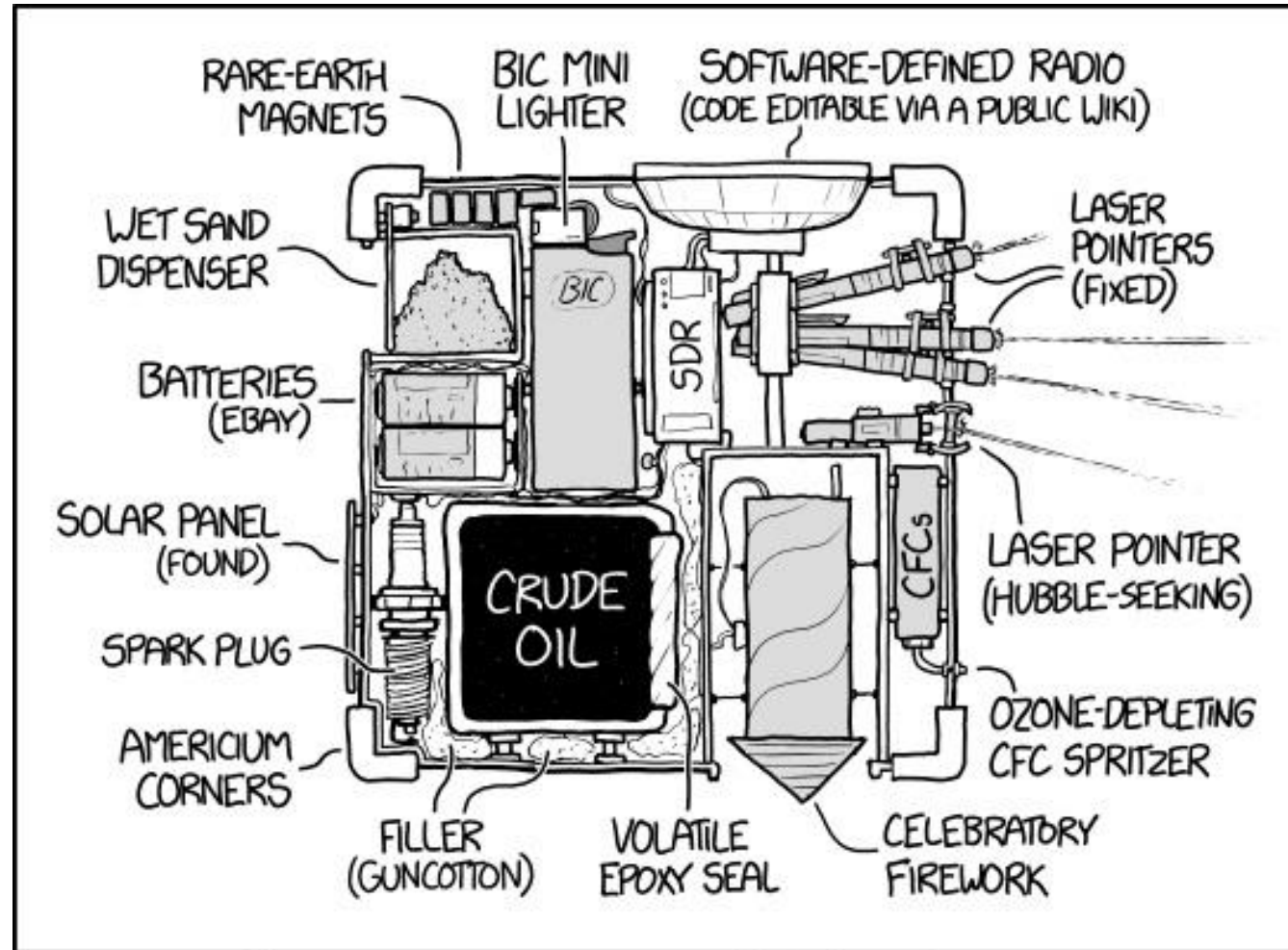
5

Announcement of Partnership Opportunity is released around the first week of August every Year. Applications are due around Thanksgiving.

***Follow all Directions in the Application and the scoring Rubric!***



# Lessons Learned...



MY CUBESAT PROPOSAL WAS THE FIRST TO BE REJECTED FOR VIOLATING EVERY DESIGN AND SAFETY REQUIREMENT SIMULTANEOUSLY.

Credit: XKCD  
<https://xkcd.com/1992/>  
<https://xkcd.com/license.html>





- Be flexible to optimize manifesting options (and reduce launch cost)
  - ❖ Be compatible with many dispensers
    - Comply with CubeSat Design Specification (CDS)
    - Comply with LSP-REQ 317.01 whenever possible
  - ❖ Be flexible with orbit requirements
    - Unique orbits drive costs & reduce launch opportunities
    - Avoid overly congested orbits
- CSLI's contribution to your launch service is capped at \$300K – you or your sponsor are responsible for covering any “overages”
- Choose a UNIQUE name for your CubeSat and BE CONSISTENT! Avoid names that are a single common word (“Chart,” “Press,” “Hello 5”). Avoid special characters, exponents, subscripts, emojis, etc.
- Communicate with LSP about any hazardous materials or “provocative features”
- If your SC can affect its orbit (ex., propulsion system or drag device)
  - Use GPS and reflectors to assist in tracking
  - Consider cybersecurity
- Design to passivate your SC at end of mission (ex., deplete batteries, disconnect solar panels, vent stored pressure)



# Tips on Licensing



- Start early and be persistent!
- We cannot integrate your spacecraft for launch without all applicable licenses. **This can cause you to miss your launch!**
- Plan which licenses you will need (IARU, NTIA, NOAA, FCC)
- Be able to disconnect your transmitter via ground command
- Be flexible in case your preferred frequency/band is not available to you
- Prepare your ground station (and backup) to be operational and tested well before launch. Practice tracking/listening to existing spacecraft.



Image Credit: NASA/JPL-Caltech



*... persistence ...*



# Reference Documents



NASA CubeSat 101: [https://www.nasa.gov/sites/default/files/atoms/files/nasa\\_csli\\_CubeSat\\_101\\_508.pdf](https://www.nasa.gov/sites/default/files/atoms/files/nasa_csli_CubeSat_101_508.pdf)

NASA Spacecraft Conjunction Assessment and Best Practices Handbook: [NASA Releases Best Practices Handbook to Help Improve Space Safety | NASA](#)

NASA CSLI: [https://www.nasa.gov/directorates/heo/home/CubeSats\\_initiative](https://www.nasa.gov/directorates/heo/home/CubeSats_initiative)

NASA Small Spacecraft Virtual Institute: <https://www.nasa.gov/smallsat-institute>

CubeSat.org: <https://www.CubeSat.org/>

Space-track.org: <https://www.space-track.org/auth/login>

NOAA Remote Sensing Licensing: <https://www.nesdis.noaa.gov/CRSRA/generalApplication.html>

IARU: <https://www.iaru.org/on-the-air/satellites/>

FCC Experimental Licensing System Search: <https://apps.fcc.gov/oetcf/els/reports/GenericSearch.cfm>

FCC Generic License Search: <https://wireless2.fcc.gov/UlsApp/UlsSearch/searchLicense.jsp>

Sarah Rogers Collection: <http://phxCubeSat.asu.edu/resources/documents>

**GSFC-STD-7000 (GEVS)**

**GSFC-HDBK-8007**

**FCC DA: 13-445**

**NASA/SP-2007-6105**

**NASA/SP-20205011318**

**SMC-S-016**

**NASA-STD-6016**

**TOR-2016-02946**

**NASA-STD-8719.14**

**LSP-REQ-317B**

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# Questions?

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