



## ELaNa 26 International Space Station CubeSat Deployment

Launch April 2019 – Deployment June 2019

### OVERVIEW

NASA will enable the deployment of three small research satellites, or CubeSats, developed by four member universities of the Virginia Space Grant Consortium. These CubeSat missions were selected through the CubeSat Launch Initiative (CSLI). The Educational Launch of Nanosatellites (ELaNa) 26 mission will embark on Northrup Grumman's 11th Commercial Resupply Services mission to the International Space Station contracted by NASA, guided to space on an Antares rocket that will lift off April 17 from Wallops Flight Facility in Virginia at 4:46 p.m. EDT. Over the past three years, more than 140 students have been involved in the design, development, and construction of these CubeSats that will be deployed from the space station via the commercially-developed NanoRacks CubeSat Deployer, or NRCSD.

CubeSats are playing an increasingly larger role in exploration, technology demonstrations, scientific research and educational investigations at NASA. These miniature satellites provide a low-cost platform for NASA missions, including planetary space exploration; Earth observation; fundamental Earth and space science; and technology demonstrations such as cutting-edge laser communications, energy storage, in-space propulsion and autonomous movement capabilities. They also provide educators an affordable means to engage students in all phases of satellite development, operation and exploitation through real-world, hands-on research and development experience on NASA-funded ride-share launch opportunities.

CSLI enables the launch of CubeSat projects designed, built and operated by students, teachers and faculty, as well as NASA Centers and nonprofit organizations. Managed by the Launch Services Program at NASA's Kennedy Space Center in Florida, ELaNa missions provide a deployment opportunity or ride-share launch to space for CubeSats selected through CSLI. ELaNa mission managers and their teams engage schools and colleges across the United States, providing spaceflight education through the preparation (licensing, integration and testing) of payloads flown in space. Since its inception in 2010, the initiative has selected more than 175 CubeSats and launched 85 CubeSat missions primarily developed by educational and government institutions



### BASIC CUBESAT FACTS

- Built to standard dimensions of 1 unit (1U) which is equal to 10x10x10 cm
- Can be 1U, 2U, 3U or 6U in size
- Weigh less than 3 lbs (1.33 kg) per U – 6U may be up to 6.3 lbs (14 kg)

around the United States. These miniature satellites were prioritized and selected through a formal NASA review of proposals submitted in response to CSLI announcements. NASA plans to announce another call for proposals in early August 2019.



# NASAfacts

## CUBESAT DEPLOYMENT

In preparation for deployment, the CubeSats are placed inside the NanoRacks CubeSat Deployer (NRCS), a stackable, modular, ground-loaded launch dispenser. Built by NanoRacks, LLC in Webster, Texas, each dispenser accommodates up to 6.5U of CubeSat volume. Astronauts aboard the space station stack the NRCSs into an eight-dispenser configuration, which are then mounted on the Japanese Experiment Module airlock slide table and moved outside of the station. The robotic arm captures the table and positions the facility toward Earth. After NASA and the Japan Aerospace Exploration Agency (JAXA) provide approval to proceed, the NRCSs are commanded one-by-one. The dispenser doors open and the large internal spring releases, deploying the CubeSats into an orbit 400 km above Earth, slightly lower than the space station. After 30 minutes in orbit, the internal timers on the CubeSats allow their onboard computers to activate and begin transmitting. The CubeSat teams utilize ground stations to listen for beacons to determine their small satellite's functionality and operational status. CubeSat missions are anticipated to last at least 120 days, although durations sometimes vary. Upon mission completion, the CubeSats begin a final fall through Earth's atmosphere, where tremendous heat generated by friction causes them to disintegrate.

## SAFETY AND MISSION ASSURANCE

Each CubeSat developer has verified their satellite is compliant with the P-POD requirements. NASA conducts a joint mission readiness review with each CubeSat developer. Each ELaNa CubeSat complies with U.S. and NASA orbital debris mitigation standard practices.

## THE CUBESATS

### Libertas, Aeternitas and Ceres · Virginia CubeSat Constellation

**Virginia Space Grant Consortium** – Hampton, Virginia  
**Hampton University** – Hampton, Virginia  
**Virginia Polytechnic Institute and State University**  
– Blacksburg

**Old Dominion University** – Norfolk, Virginia  
**University of Virginia** – Charlottesville

The Virginia CubeSat Constellation consists of three CubeSats that will conduct a scientific investigation to measure the orbital decay of a constellation of small satellites, informing a database of atmospheric drag and the variability of atmospheric properties. Current atmospheric data are necessary to accurately predict orbits for small satellites in low-Earth orbit and the data will provide better understanding of the effects of solar activity and space weather on small satellites.

The Virginia Space Grant Consortium mission provides hands-on experience to students at the University of Virginia, Old Dominion University, Virginia Tech and Hampton University. The satellites are named after Roman goddesses: Libertas, the goddess of individual liberties; Aeternitas, the goddess representing eternity; and Ceres, the goddess of agriculture. The Virginia CubeSat Constellation is funded by NASA's Undergraduate Student Instrument Project.



Photograph of Virginia CubeSat Constellation team leads and their CubeSats.  
Credit: Virginia Space Grant Consortium

To contact the ELaNa 26 Launch Public Affairs Office, call 202-358-1100.

National Aeronautics and Space Administration

**Headquarters**  
300 E Street, SW  
Washington, DC 20546  
[www.nasa.gov/centers/hq](http://www.nasa.gov/centers/hq)

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### FOR MORE INFORMATION

For additional information about the NASA's CubeSat Launch Initiative, visit:

[http://go.nasa.gov/CubeSat\\_initiative](http://go.nasa.gov/CubeSat_initiative)

For additional information about the ELaNa 26 CubeSats, visit:

<https://www.youtube.com/watch?v=4INtY2Qyel0&feature=youtu.be>