



ELaNa 32 CubeSat Mission Deployment

June 2020

MISSION OVERVIEW

NASA enabled the deployment of one small research satellite, or CubeSat, selected through its CubeSat Launch Initiative (CSLI). The Ad-Hoc Network Demonstration for Extended Satellite-Based Inquiry and Other Team Endeavors (ANDESITE) CubeSat mission is a 6U satellite developed by electrical and mechanical engineering students and professors at Boston University. ANDESITE is the Educational Launch of Nanosatellites 32 (ELaNa) rideshare mission and flew as payload aboard Rocket Lab's Electron launch vehicle from Mahia, New Zealand on June 13.

ABOUT CSLI

CubeSats are playing an increasingly larger role in exploration, technology demonstrations, scientific research and education 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 inexpensive 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. To learn more about CSLI, visit <https://www.nasa.gov/content/about-cubesat-launch-initiative>

ABOUT ELaNa

Educational Launch of Nanosatellites (ELaNa) is a NASA initiative created to attract and retain students in the science, technology, engineering and mathematics disciplines. Managed by the Launch Services Program (LSP) at NASA's Kennedy Space Center in Florida, ELaNa reaches students by introducing educational spaceflight in high schools and colleges across the United States. Students are heavily involved in all aspects of the mission from developing, assembling, and testing payloads to working with NASA and the launch vehicle integration teams.

CubeSat Basics:



Built to standard dimensions of 1 unit (1U), which is equal to 10x10x10 cm.



Can be 1U, 2U, 3U, 6U or 12U in size.



HIGHLIGHTS

Since its inception, 101 CubeSat Missions have been flown on 27 ELaNa Missions with 35 manifested for flight. CubeSat missions are primarily developed by educational and government institutions around the United States. These miniature satellites are prioritized and selected through a formal NASA review of proposals submitted in response to CSLI announcements. NASA will announce another call for proposals in August 2020.

NASA Facts



CUBESAT DEPLOYMENT

In preparation for deployment from the Electron launch vehicle, ANDESITE was integrated into its dispenser in Huntington Beach, CA, 40 days prior to launch.

ANDESITE was then shipped from California to Auckland, New Zealand to prepare for final integration with the Electron rocket. From there, the Electron rocket and its payload were transported to Rocket Lab's Launch Complex 1 in Mahia, New Zealand. ANDESITE was installed on the Electron payload plate—the interface between the rocket and satellite—and then was encapsulated inside the Electron rocket's payload fairing, where it remained until it arrived in space. After the Electron rocket launched, the CubeSats were deployed into orbit within one hour.

ANDESITE

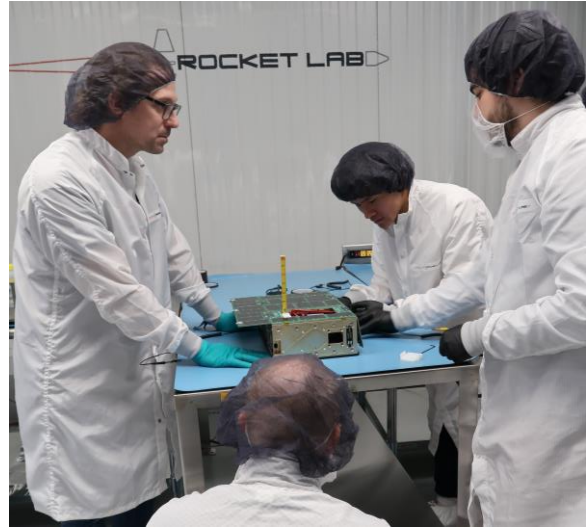
Ad-Hoc Network Demonstration for Extended Satellite-Based Inquiry and Other Team Endeavors
Boston University – Massachusetts

ANDESITE is a 6U spacecraft that will deploy eight free-flying sub-satellites to make multipoint magnetic field measurements in low Earth orbit. The goal of this mission is to study dynamics in magnetosphere-ionosphere coupling to allow for better modeling of its effects. While passing through the aurora, the CubeSat constellation will measure perturbation (the deviation in the motion of a celestial object caused by either gravitational or non-gravitational forces) within the local magnetic field. ANDESITE will initiate measurements of the magnetosphere with onboard sensors and later release eight small satellites carrying tiny magnetometer sensors to track electric currents flowing in and out of the atmosphere, which is a phenomenon also known as space weather.

Although images of the aurora have revealed the prevalence of small-scale structure in magnetosphere-ionosphere coupling, the spatial structure of the return current has not been sufficiently measured due to limitations of single spacecraft point measurements. With ANDESITE's closely separated constellation monitoring magnetic perturbations, this return current can finally be determined.

SAFETY AND MISSION ASSURANCE

Each ELaNa CubeSat is verified compliant with all applicable launch range and vehicle regulatory and dispenser requirements and also complies with U.S. and NASA orbital debris mitigation standard practices.



ANDESITE Team prepares the Cubesat for integration into the Electron launch vehicle at the Rocket Lab facility in Huntington, Beach, CA

Credit Boston University/Rocket Lab



ANDESITE Team members pose with the CubeSat during integration at Rocket Lab's facility in Huntington Beach, CA

Credit Boston University/Rocket Lab

National Aeronautics and Space Administration



To learn more about ELaNa missions, visit https://www.nasa.gov/mission_pages/smallsats/elana/index.html

For more information about CSLI, visit: http://go.nasa.gov/CubeSat_initiative

To learn more about the CSLI proposal process, visit <https://www.nasa.gov/content/announcement-of-opportunity-for-cubesat-launch-initiative>.

For additional information about the ELaNa 32 ANDESITE CubeSat mission, visit the websites below:

- Rocket Lab Press Release: <https://www.rocketlabusa.com/news/updates/media-release-rocket-labs-next-mission-to-launch-satellites-for-nasa-nro-and-the-university-of-new-south-wales/>
- ANDESITE CubeSat Mission page: <http://www.bu.edu/busat/missions/andesite/>
- Boston University (BU) Today blog post: <http://www.bu.edu/articles/2015/bu-satellite-team-nasa>

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