

University of Colorado students, staff help NASA decommission satellite

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CU-Boulder student command controllers Melanie Dubin, left, and Andrew Berg, center, work with professional command controller Matt Dahl to upload commands to a satellite at the Mission Operations Center at the Laboratory for Atmospheric and Space Physics. Credit: Photo by Glenn Asakawa/University of Colorado

University of Colorado at Boulder undergraduates, who have been helping to control five NASA satellites from campus, participated in the unusual decommissioning of a functioning satellite with a failed science payload in recent days, bringing the craft into Earth re-entry to burn up yesterday.

The [satellite](#), known as the Ice, Cloud and Land Elevation Satellite, or ICESat, orbited Earth for seven years, gathering valuable data on the polar regions and helping scientists develop a better understanding of ice sheets and sea ice dynamics. The CU-Boulder control team at the

Laboratory for Atmospheric and Space Physics -- made up primarily of undergraduates who work side-by-side with LASP professionals -- uploaded commands for the satellite to burn its remaining fuel and switched off the transmitter.

The satellite successfully re-entered Earth's [atmosphere](#) Aug. 30 and largely burned up, with pieces of debris falling into the Barents Sea -- which is part of the Arctic Ocean north of Norway and Russia -- said LASP Missions Operations and Data Systems Director Bill Possel. Built by Ball Aerospace and Technologies Corp. of Boulder, the ICESat spacecraft worked perfectly throughout the entire mission, said Possel.

"CU-Boulder undergraduates have controlled ICESat for the past seven years from our Mission Operations Center here," said Possel. "Although we are sad to see such a successful science mission come to an end, we are proud of our students' role in bringing the spacecraft safely out of orbit."

According to Darrin Osborne, LASP flight director for ICESat, the students had specific procedures to follow during the satellite decommissioning. "They ran calculations to determine where the spacecraft was located and made predictions for [NASA](#) ground stations that tracked it," he said. "The students did this seven days a week until the decommission was complete."

The LASP satellite control team continues to operate four satellites for NASA from LASP's Space Technology Building. They include the Solar Radiation and Climate Experiment, or SORCE mission, a \$100 million satellite designed and built by LASP to study how the sun's variation affects Earth's climate. A second satellite, the Aeronomy of Ice in the Mesosphere mission, or AIM, is looking at polar clouds that may be related to increases in carbon dioxide and methane in Earth's atmosphere. Two of the three instruments on AIM were designed and

built at LASP.

The LASP control team also operates the \$600 million Kepler satellite, a NASA spacecraft that has identified more than 700 potential planets orbiting other stars since its launch in 2009, as well as the QuikSCAT satellite that measures global wind speeds and directions, helping to improve weather forecasting and predict tropical cyclones.

LASP is one of a handful of institutes in the world that provide undergraduates the training and certification needed to operate NASA spacecraft and the only university to have controlled five unique satellites, said Possel. LASP employs 20 undergraduates as LASP satellite operators, where they work for at least three years.

The students go through an intensive 10-week summer training program followed by practical and written tests leading to certification as satellite controllers by LASP. The students work 20 hours per week, including nights, holidays and during CU-Boulder's winter and spring breaks, Possel said. "Student operators provide a lower cost to NASA, and CU students at LASP receive hands-on training and experience that helps position them for a future in space-related careers."

"It's amazing for an undergraduate like me to get hands-on experience controlling multimillion-dollar NASA satellites," said aerospace engineering sciences student Katelynn Finn, a junior who attended Grandview High School in Aurora and who has been a LASP satellite mission controller for more than a year. "The experience I'm getting at LASP is already preparing me for a career in aerospace once I get out of college."

Most LASP student controllers are majoring in space science, engineering or computer science, although nothing precludes participation by non-science majors, Possel said.

The opportunity to assist with the decommissioning of a spacecraft is rare. The last time a NASA satellite re-entered Earth's atmosphere was in January 2002, when the Extreme Ultraviolet Explorer spacecraft re-entered the Earth's atmosphere and was decommissioned by NASA professionals.

Provided by University of Colorado at Boulder

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