

CASIS NATIONAL DESIGN CHALLENGE DENVER AREA PILOT PROGRAM

The research potential of the International Space Station U.S. National Laboratory is now available to educators and students, who can design their own experiments to fly to space! The Center for the Advancement of Science in Space (CASIS) has developed a pilot program for a STEM education initiative titled, the CASIS National Design Challenge (NDC). The NDC will be implemented in middle and high schools in Denver and the surrounding area. Schools will compete to design and implement their own authentic research experiment that will be sent to the space station. While on orbit, the data from these research experiments will be available for everyone to see and use in their classrooms. Students will be able to compare their ground-based and flight-based experiment data via an ISS downlink.

The NDC Denver Pilot Program will engage students and teachers in grades 7-12 during the 2014-15 school year to develop original research experiments that will be sent to the International Space Station National Laboratory in the Spring of 2015.

CASIS and its industry partners, Infinity Aerospace, SparkFun Electronics and NanoRacks will assist the schools in experiment and engineering design and payload integration by providing resources, professional development and technical support. Wings Over the Rockies Museum will host events and training sessions for educators.

Three awards will be made. Each winning school will receive a grant to purchase ground and flight-based hardware and to compensate the winning team with a stipend. CASIS and its industry partners will provide professional development and technical support in designing and implementing the experiments and transporting them to and from the Space Station.

Microgravity and its importance for research

The U.S. National Lab is a unique environment well suited for research because the effects of gravity on Earth are absent in microgravity. Experimental systems of all kinds behave differently in this environment, and knowledge gained from these experiments helps advance research on Earth. Experiments in human biology, materials science, technology development, fluid physics, protein crystal growth, and many other areas have already had a positive impact on improving life back on Earth.

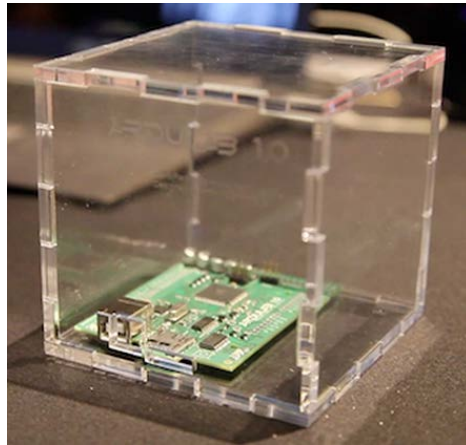
Areas of research that can be conducted on the ISS U.S. National Lab

The main types of research that can be conducted by teachers and students on the U.S. National Lab are biology, chemistry, materials and physical sciences.

How experiments will get into space

CASIS is partnering with Infinity Aerospace and NanoRacks, two experienced hardware developers and payload integrators, to get student experiments to the U.S. National Lab. NanoRacks, in concert with CASIS, will provide technical payload integration services, as well as assist in coordinating the launch and on-orbit logistical requirements. Hardware provider, Infinity Aerospace, has designed the ArduLab, a small container in which educators and students can build experiments. This platform includes a simple programmable micro-controller, allowing automation, control and data collection of the experiment. It is designed to be open source, using Arduino-based technology with “plug-and-play” sensors, cameras, and motors. The ArduLabs will be sent to the space station on a rocket and then stowed in a rack specifically designed to hold experiments.

The ArduLab Space Hardware



Project Timeline

January 30, 2014 – NDC application period opens

February 5, 2014 – Informational webinar and Q&A

March 31, 2014 – NDC application period closes

April 15, 2014 – NDC Winners are notified

May 8, 2014 – Kick-off meeting at Wings Over the Rockies and professional development workshop

May 9, 2014 – Professional development workshop

Summer 2014 – Teachers design their experiments and plan implementation of NDC within their schools; three days of professional development workshops

Fall 2014/Winter 2015 – Implement ground and flight-based experiments; payload integration of flight-based experiments begin

Spring 2015 – Experiments are launched to the ISS U.S. National Lab

Spring 2015 – Data downloaded and analyzed (up to 30 days)

Summer 2015 – Final project deliverables due