2015 Pathway to Adventure Council, BSA
Space Station National Design Challenge
Sponsored by CASIS

The International Space Station (ISS) U.S. National Laboratory is a one-of-a-kind research platform that is now available for student research via the Center for the Advancement of Science in Space (CASIS). CASIS has developed a pilot program titled, the Space Station National Design Challenge, which is a research competition, that facilitates authentic student research and experiment design with selected experiments being flown to the space station.

Space Station National Design Challenge will be implemented in Chicago and the surrounding area through the Pathway to Adventure Council, BSA to youth ages 12-20. Teams will compete to design, build and send their own original research experiments to the International Space Station in the summer of 2016. While on orbit, the data from these experiments will be available for the student teams to analyze and compare to their ground-based data via an ISS downlink.

Awards

CASIS will award three flight-based projects. Each selected project will receive a ground and flight-based NanoLab and a grant in the amount of $6,000 to purchase materials to support the experiment. CASIS and its industry partners will provide technical workshops and support in designing and implementing the experiments plus transporting them to and from the Space Station.

The Boy Scouts of America (BSA) will award three or more ground-based experiments from the list of runners-up. They will receive a BSA award in the amount of $5,000.00 to purchase materials to build a ground-based experiment and to assist in other activities in support of a flight project.

Science in space for life on Earth

The U.S. National Laboratory on the International Space Station 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.

The Experiment in Space

CASIS is partnering with NanoRacks and Texas A&M University, two experienced hardware developers and payload integrators, to get student experiments to the U.S. National Lab on the ISS. CASIS, in concert with NanoRacks, will provide technical payload development and integration services, as well as assist in coordinating the launch and on-orbit logistical requirements. Hardware provider, Texas A&M University, has designed the NanoLab, a small container in which 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 control sensors, cameras, and motors. The NanoLabs will be sent up to the ISS on a rocket and then stowed in a rack specifically designed to hold experiments for up to 30 days.

Program Timeline

Apr 22, 2015: Informational Webinar for Adult Facilitators and Mentors

Apr 23, 2015: Application period opens

May 29, 2015: Application period ends

June 15, 2015: Projects selected (flight and ground)

June 22: Kick-off event

June 23-25 Technical Workshop

July - August 2015: Experiment research and concept design

September - November 2015: Implement ground and flight-based experiments; develop prototype; subsystem and ground testing

December 2015: Critical Engineering Design Review Workshop

Spring 2016: Testing of flight units; payload integration of flight-based experiments begin

Summer 2016: Flight projects are launched to the ISS; 30-day experiment period on ISS; data downloaded and analyzed

Fall 2016: Final project deliverables due