



SSEP

Student Spaceflight Experiments Program

a program of the
National Center for Earth and Space Science Education
and the Arthur C. Clarke Institute for Space Education

Inspire...then Educate

Revised 10/21/21



New Flight Opportunity for School Communities
(School Districts, Schools, Colleges, and Informal STEM Education Organizations)

SSEP Mission 16 to the ISS
Started September 2021



Student Spaceflight Experiments Program

Inspiring and engaging the next generation of scientists and engineers by providing communities with their own very real space program.

The Student Spaceflight Experiments Program (SSEP) immerses students across a community in every facet of authentic scientific research of their own design, using a highly captivating spaceflight opportunity on the International Space Station (ISS).



Pedagogical Approach

SSEP Empowers the Student As Scientist, and Within the Real-World Constraints of Science that is Far More than Exploration through Inquiry

Like Professional Scientists, SSEP Allows Students to –

- Design an Experiment with real constraints imposed by the experimental apparatus, current knowledge, and the environment in which the experiment will be conducted
- Write a formal Research Proposal requiring critical written communication skills
- Experience a real 2-Step Science Proposal Review Process
- Have their own Science Conference – a venue where they are immersed in ***their*** Community of Researchers and in which they can communicate their thoughts, ideas, and experimental results to their peers



Become Part of the Adventure on the High Frontier –

Participate in an SSEP Mission to the ISS Engaging Grade 5-16 Students in Real Microgravity Experiment Design and Proposal Writing



Important Considerations –

- A team of educators in a participating community will engage typically 300 grade 5-12 students (at least 100, and at least 30 for undergraduate participation) over 9 weeks of experiment design and proposal writing spanning September through November.
- Students across the community are separated into teams of 3-5, each team designing a microgravity experiment in a science discipline of their choice, and through a formal written proposal, making the case for why their experiment should be selected for flight to ISS.



SSEP Student Researchers from Harper Woods, MI (left) and Bellevue, WA (right) designing and testing microgravity experiments for SSEP Mission 14 to ISS



SSEP provides STEM Project-Based Learning through Immersion in a Fully Authentic, High-Visibility Research Experience – an Approach that Embraces the Next Generation Science Standards



One Student Designed Experiment In Each SSEP Community Selected to Fly to the ISS

- SSEP Mission 16 Flight Experiments to be Ferried to the ISS in a Dragon 2 Spacecraft Launched atop a SpaceX Falcon 9 Rocket During a Cargo Resupply Mission Conducted under a Commercial Resupply Services Contract with NASA
- The SpaceX Falcon 9 Rocket will Launch from NASA's Kennedy Space Center in Cape Canaveral, Florida
- SSEP Students and their Families, Teachers, and Other Community Stakeholders will be given the Opportunity to Attend the Launch [LIVE](#) from NASA's Kennedy Space Center in Florida





Astronauts Aboard ISS Conduct SSEP Flight Experiments

- ISS Crew Members Operate the Flight Experiment According to Interactions Defined By Student Flight Teams
- Experiments are then Returned to Earth on Crew Dragon 2, Splashing Down Off the Coast of Florida
- The Payload is Retrieved and Flight Experiments Returned to the Community and the Student Flight Team for Analysis

SSEP is Not a Simulation – Participating Communities Truly Are Part of America's Space Program.

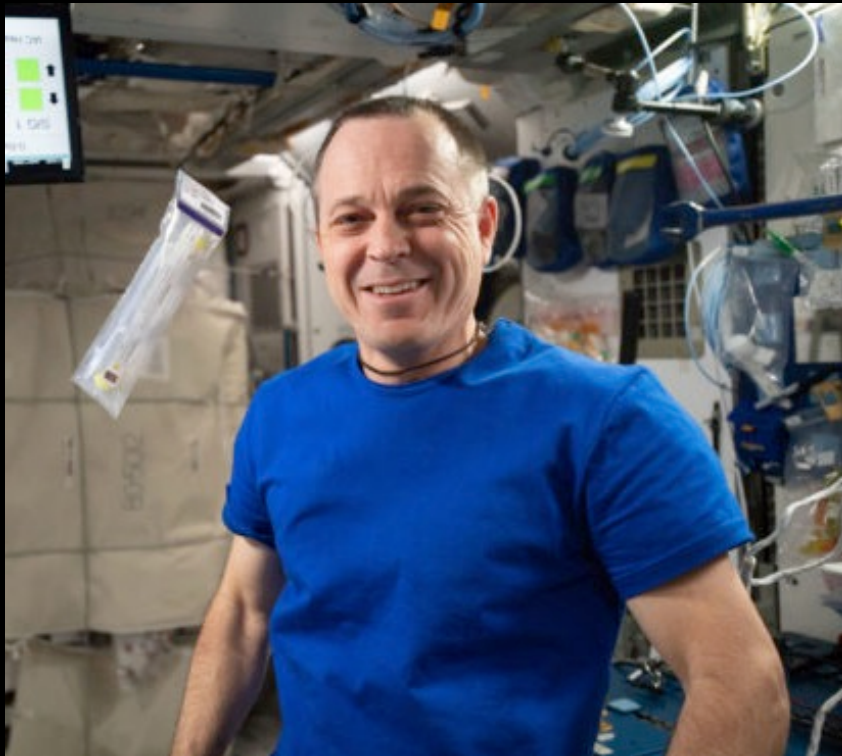




SSEP Experiments Aboard ISS

SSEP Student Flight Experiments Have Been Conducted By –

- 15 American Astronauts Aboard the ISS,
- 4 ISS Crew Members from the European Space Agency,
- 2 ISS Crew Members from Japan, and
- Several Space Shuttle Astronauts



Flight Engineer Ricky Arnold (USA) demonstrates weightlessness aboard the ISS during SSEP Mission 12 to ISS



ISS Commander Sunita Williams (USA) activates a student flight experiment from SSEP Mission 2 to ISS



Flight Engineer Koichi Wakata (Japan) shakes to mix a Student Flight Experiment from SSEP Mission 3b/4 to ISS



Live Launch Viewing Opportunities

for SSEP Students and their Families, Teachers and other Community Constituents

Launch viewing opportunities vary widely from mission to mission due to the factors and fluidity associated with Spaceflight. However, there is one thing that is certain about viewing a rocket launch – especially one carrying something you designed, held in your hands, or personally made possible . . . *There is nothing else like it on Earth!*

SSEP launch viewing opportunities have included:

- Interviews with Media During a Press Conference for Student Flight Experiment Teams at NASA's Wallops Visitor's Center
- Student Flight Teams Conducting Oral and Poster Presentations for the General Public at various NASA Visitor's Centers and Exhibit Halls
- Behind the Scenes Tours of NASA Facilities
- Team Dinners in Celebration of the Launch
- A Private Viewing Party in the Milestones of Flight Gallery at the Smithsonian National Air and Space Museum





The Launch Experience



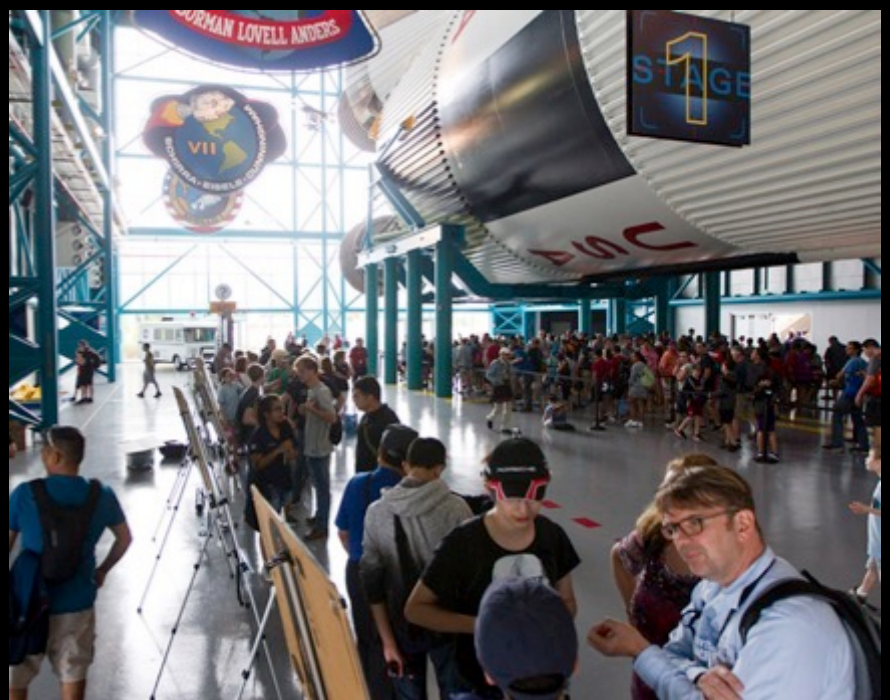


The Launch Experience





The Launch Experience





- Students Support Foundational Instruction on Science Conducted in Microgravity and on Experiment Design
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Hundreds More Students Engaged in STEAM Initiative – the Mission Patch Art and Design Competitions

- Up to two Mission Patches from each community selected to fly to the ISS with the flight experiment
- After the flight, the Mission Patches are embossed '*Certified Flown in Space*', returned to the community, and serve as enduring symbols of the community's engagement in SSEP
- The Mission Patch Competition Component of SSEP Forges Interdisciplinary Connections between STEM Fields and Art and Design, so that SSEP is a True STEAM (Science, Technology, Education, Art, and Mathematics) Initiative

Mission Patches Have Been Part of Human Spaceflight Since the Days of Project Mercury in the 1960's – the SSEP Mission Patch Competitions Therefore Allow Communities to Engage in Another Authentic Aspect of the Space Program

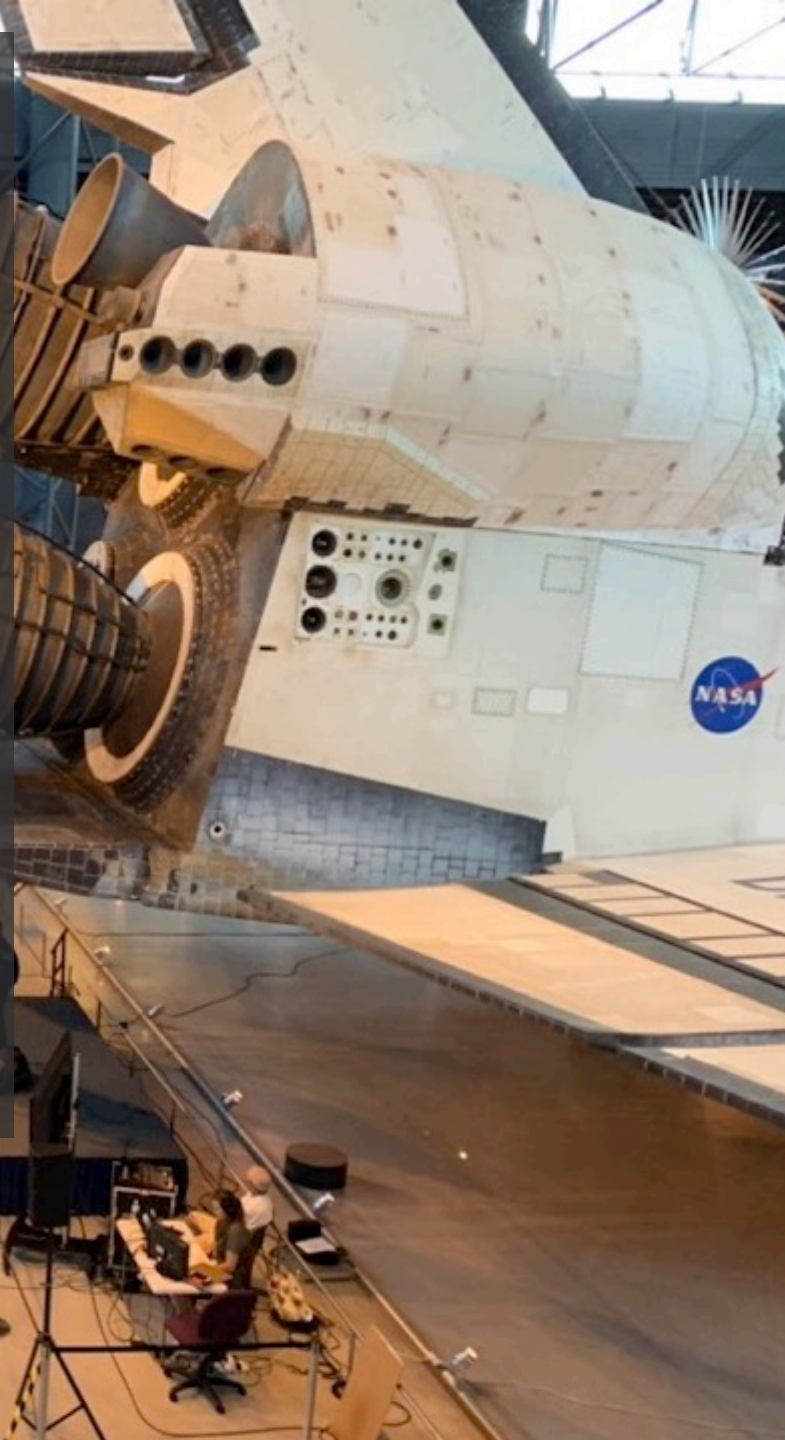




SSEP National Conference Held Annually in the Nation's Capital

- Student Researchers Present on Their Experiment Designs, and Those with Experiments that Flew, Report on Analysis and Results
- Feature Presentations by Nationally Recognized Space Scientists and Engineers Talking Passionately about Exploration on the Frontier and Inspiring Students to Follow in their Footsteps
- Held at the Smithsonian National Air and Space Museum on the National Mall or the Steven F. Udvar-Hazy Center in Chantilly, VA

SSEP is Dedicated to Letting Students Step into the Shoes of Scientists and Engineers, so it is Fitting that Students are Immersed in the Experience of a Science Conference





SSEP National Conference





Testimonials



"SSEP is designed to empower the student as scientist, and within the real-world context of science. Student teams design a real experiment, propose for a real flight opportunity, experience a formal proposal review, and go through a NASA flight safety review. They even have their own science conference at the Smithsonian National Air and Space Museum, where they are immersed in their own community of researchers"



"SSEP is about introducing real science to our students and if you give them a chance to be scientists, stand back and be amazed."

—Dr. Jeff Goldstein
creator of SSEP and
NCESSE Center Director



Testimonials

"... **EPIC MOTIVATION & INSPIRATION** to be the best student scientist ambassadors for Canada & the world. The program has meant a monumental shift in thinking about science and its future impacts. Our kids have dreamt huge dreams of cures, treatments, and solutions to some of the world's greatest challenges: disease, health promotion, hunger, food production, waste reduction and innovative fuel sources. It has impacted the way they view science, engineering, technology and math in an exhilarating and captivating way. It has paired kids with each other to work towards a common goal: be the best real scientist you can be and work hard to be better, challenge each other, cooperate together, be leaders and become leaders, strive for greatness and work as a team of cohesive learners and goal setters. The awe-inspiring emotions felt here is like the excitement felt when Neil Armstrong first walked on the moon in the Apollo mission. **Simply put it has been MAGICAL!**

—Maria Nickel, Woodlands Elementary Middle Years Science Coordinator
SSEP Community Program Director, Interlake School Division
Stonewall, Manitoba, Canada





Testimonials

SSEP is the best real life application program that my students have ever experienced!

—Alison Thammovongsa, 7th grade science teacher,
SSEP Community Program Director
Peoria Unified School District Peoria, Arizona

This whole thing is so unbelievable. We are doing real science research that really matters. What we design will really fly in space aboard the very last space shuttle mission. This could be a life-changer for me. It is something that I will someday tell my grandkids about. How cool!

—Isaac Jepsen, Senior
Ridge View High School Galva-Holstein, Iowa

Providing this kind of life-changing opportunity to students is what keeps us energized to come to work every morning . . .

—Terry Teays, PhD., Assistant Director
Maryland Space Grant Consortium





Testimonials

[SSEP] may be the most important development for the future of the U.S. space program.

– J.R. Dailey, Director of the Smithsonian National Air and Space Museum



Testimonials

"... it was also a game changer as far as college admissions are concerned. SSEP team members of the class of 2018 & 2019 have turned out outstandingly good college admissions decisions. There were several Columbia University acceptances from 2018, and while I am uncertain as to where other 2019 team members are going, Alejandro was awarded a Wilson Fellowship to study Physics at Johns Hopkins. It must be mentioned that his Fellowship application was about a continuation of the work developed from the student spaceflight experiment, meaning that we can speak with 100% certainty that he was awarded the fellowship (and his acceptance to Johns Hopkins) directly because of his work at Stamford High School on the spaceflight team."

—John Ross, Alejandro's Father
Stamford, CT





Testimonials

It is not often that an opportunity like SSEP comes along, with such an opportunity to create a lasting legacy for students, communities, and the nation. As the Director of the Indiana Space Grant Consortium, I am honored and humbled to support this worthy addition to Indiana's legacy of spaceflight and exploration; as someone who has had a passion for space since I was six, I am excited for, and in awe of, what the students from Avicenna Academy in Crown Point are accomplishing so early in their lives.

—Barrett S. Caldwell, Ph.D., Director, Indiana Space Grant Consortium





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A program of the National Center for Earth and Space Science Education in the U.S., and the Arthur C. Clarke Institute for Space Education internationally. It is enabled through a strategic partnership with Nanoracks, LLC working with NASA under a Space Act Agreement as part of the utilization of the International Space Station as a National Laboratory.



Nanoracks