



# **ISS National Lab Education Project**

## **National Council of Space Grant Directors Fall Meeting**

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# Vision

- Develop the ISS National Laboratory Education Project (ISS NLE) as a national resource for science, technology, engineering and mathematics (STEM) education, utilizing the unique educational venue of the International Space Station per the NASA Congressional Authorization Act of 2005.
  - The ISS NLE will serve as an educational resource which enables educational activities onboard the ISS and in the classroom.
  - The ISS NLE will be accessible to educators and students from kindergarten to post-doctoral studies, at primary and secondary schools, colleges and universities.
  - Additionally, the ISS NLE will provide ISS-related STEM education opportunities and resources for learners of all ages via informal educational institutions and venues.



# Objectives

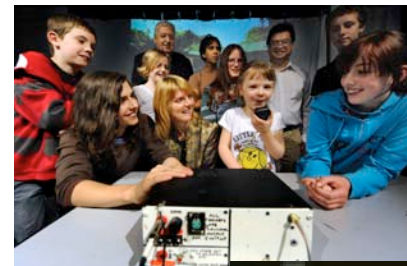
- Objective 1: Encourage the acquisition of STEM knowledge through credible educational experiences utilizing the unique resources and venue of the ISS Program.
- Objective 2: Attract Americans from all age groups and socio-economic backgrounds to enter into and sustain their STEM education, to advance their literacy in STEM subject matter, and/or facilitate their future STEM employment.
- Objective 3: Develop partnerships with agencies and organizations outside of NASA (to include other U.S. federal agencies, non-profit organizations, academic institutions, commercial entities, professional organizations as well as ISS International Partner space agencies and affiliated entities) for the development and execution of activities under the ISS NLE portfolio.
- Objective 4: Make the ISS National Lab Education a “nationally recognizable brand” through the promotion of the above activities.



# Current ISS NLE Activities

## Amateur Radio on the ISS (ARISS)

- Enables students to interact with ISS crewmembers via amateur radio equipment.
- <http://www.nasa.gov/audience/foreducators/teachingfromspace/students/ariss.html>



## ISS Earth Knowledge Acquired by Middle School Students (EarthKAM)

- Enables student-controlled Earth observations using cameras onboard the ISS.
- <https://earthkam.ucsd.edu/>



## In-Flight Education Downlinks

- Enables two-way audio and on-way video interaction with crewmembers onboard the ISS.
- <http://www.nasa.gov/audience/foreducators/teachingfromspace/students/downlinks.html>



# Current ISS NLE Partnership Activities

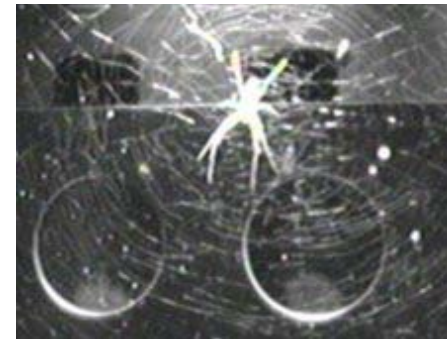
## Zero Robotics Competition

- Enables students to design software to control the on-orbit SPHERES hardware
- Partnership with MIT
- <http://www.zerorobotics.org/web/zero-robotics/home-public>



## Commercial Generic Bio-processing Apparatus (CGBA) Science Inserts (CSI)

- Enables students to conduct ground-based control group/flight following experiments based on experiment kits onboard the ISS that have contained plants, spiders, caterpillars/butterflies.
- Partnership with BioServe
- <http://www.bioedonline.org/>



## LEGO Bricks

- Enables students to become co-investigators by studying basic STEM concepts using LEGO kits similar to those onboard the ISS.
- Partnership with The LEGO Group
- [www.legospace.com](http://www.legospace.com)



# Future ISS NLE Activities

## Saturday Morning Science

- Don Petit will be videotaping several science demonstrations during his ISS mission scheduled for Dec. 2011 – May 2012. ISS NLE is seeking a partner to edit and disseminate this video to the higher education community.
- [http://science.nasa.gov/science-news/science-at-nasa/2003/25feb\\_nosoap/](http://science.nasa.gov/science-news/science-at-nasa/2003/25feb_nosoap/)



## ISSLive!: (Deploys in Early FY12)

- Enables students and the public to participate in a rich, educational and interactive experience that streams real-time data explaining how the ISS works and what the crew is doing. All of the content is delivered in a STEM context using the Internet and mobile applications and tablets.
- <http://spacestationlive.jsc.nasa.gov>



# Future ISS NLE Activities

## ISS*Live!* Education Activities

| <u>Subject</u> | <u>Lesson</u>                     | <u>Key Topics</u>   | <u>Console Position</u> | <u>ISS System</u>                    |
|----------------|-----------------------------------|---|-------------------------|--------------------------------------|
| Chemistry      | External Thermal System           | Liquids & Solids, Chemical Bonding, Stoichiometry                     | SPARTAN                 | Thermal Control                      |
| Chemistry      | Oxygen Generator System           | Reactions, Electrochemistry, Stoichiometry                            | ETHOS                   | Environmental Control & Life Support |
| Physics        | ISS position, velocity & momentum | Velocity & acceleration in X,Y, and Z position, Momentum              | TOPO                    | Motion Control                       |
| Statistics     | Commanding the ISS                | Construct, interpret & summarize graphical displays of distributions, | CRONUS                  | Command and Data                     |
| Physics        | Solar Arrays                      | TBS   | SPARTAN                 | Electrical Power                     |
| Chemistry      | EMU Battery                       | TBS   | EVA                     | Extravehicular Activity              |
| Physics        | TBS                               | TBS   | ADCO                    | Motion Control                       |
| Environmental  | Regenerative System               | TBS   | ETHOS                   | Environmental Control & Life Support |

# How Can You Participate?

- ISS NLE will be announcing opportunities for new educational activities and partnerships at the NASA Education Stakeholder's Summit II, November 29 - December 2, 2011, at the Westfields Marriott Conference Center in Chantilly, VA. Come join us!
- Additional information will be available at: [www.nasa.gov/education](http://www.nasa.gov/education)
- Center for the Advancement of Science in Space (CASIS)

