



Amateur Radio on the International Space Station

ARISS-US Region Report July 2009–October 2011

October 2011 – Houston TX

ARISS-US Delegates:
Rosalie White, K1STO and Dave Taylor, W8AAS



ARISS Goals

- Overall objective of ARISS
 - to inspire an interest in science, technology, engineering, and mathematics (STEM) subjects and in STEM careers among young people, using NASA missions and resources
- Part of goal
 - to expose students to learning opportunities and capabilities offered by ham radio

ARISS = EDUCATION



US Replaces School Application Process with US Education Proposal Process

- Change first discussed September 2010
 - JSC's Teaching From Space (TFS) staff asked ARISS leaders to revise how we work with schools and find new ways to allow thousands more educators to learn about ARISS
- New process started May 19, 2011
 - Johnson Space Center (JSC) Education Office distributed message about ARISS proposal window to over 18,000 US educators – kicked off new procedures for US proposal process



Purpose of US Educational Proposal Process

- To increase the number of educators learning about ARISS
- To attain a more consistent level of robust educational outcomes from all US schools/ groups hosting ARISS education contacts
- To ensure that all NASA education programs follow a similar process



Further Goals of US Educational Proposal Process

- To provide an educational opportunity for students, teachers, and the general public to learn about space exploration, space technologies, and Amateur Radio communications
- To provide educators with resources related to wireless technology and Amateur Radio
- To provide an opportunity for Amateur Radio experimentation with new technologies.



ARISS US team Worked Hard in Past Year Planning End-to-End Transition

HOW THE PROCESS STARTS—

- During 2 windows of opportunity each year, NASA notifies educators about the proposal process to apply for an ARISS QSO
- First window opened May 19, closed July 15
- Interested educators emailed/called NASA with questions



New US Educational Proposal Process

(continued)

- By July 15 deadline, JSC TFS staff:
 - handled 113(!) inquiries from educators asking for more details
 - received 24(!) fine education proposals
- After July 15, JSC TFS staff answered a larger number of educator questions regarding the next window of opportunity



New US Educational Proposal Process

(continued)

NEXT STEPS OF PROCESS—

- Excited educators sent comprehensive proposals
 - ARISS contact was 1 of many creative components related to NASA & ARRL education content to maximize student learning
 - NASA and ARRL education content were used in creative ways to maximize student learning
- In September, a NASA/ARISS team reviewed proposals and chose the best based on pre-defined set of standards



New US Educational Proposal Process

(continued)

- Selected schools/groups can immediately begin implementing education plans
 - ARISS mentors volunteer for particular schools/groups up-front and assist with contact planning
 - Schools/groups are encouraged to pursue a direct contact
- ARRL and AMSAT-NA to aid educators if they need help finding local Amateur Radio operators experienced in satellite ops and able to help set up a temporary—or permanent—Amateur Radio satellite station in the school



New US Educational Proposal Process

(continued)

- If the ISS footprint doesn't reach the school's /group's location or if the school/group is in a remote area where no satellite Amateur Radio operators live:
 - ARISS will schedule a telebridge-assisted QSO
 - ARRL and AMSAT-NA will try to find area hams to assist educators with Amateur Radio lesson topics



Amateur Radio Gains a Great Deal from New Process

- Thousands of educators learned about ARISS and Amateur Radio
- Every 6 months, thousands of educators will hear again about ARISS and Amateur Radio



What Else was New for the
US ARISS Region Since
Mid-2009...



Dave Taylor, W8AAS, Named as AMSAT-NA US Delegate

- In Aug 2010, Dave Taylor, W8AAS, was named as the second ARISS-I US Delegate
- Dave has been actively involved with ARISS since 2000
- In addition to his duties as Delegate, Dave is an operator at the K6DUE telebridge station and works as a mentor and ops coordinator



Cindy McArthur Steps Up — Ed Pritchard Moves to New NASA Spot in Late 2010

- Ed Pritchard at NASA Johnson Space Center's Teaching From Space office moved up to a new NASA education position
- Cindy McArthur became head of the JSC Education Office Teaching From Space office—she oversees all TFS education programs, including ARISS
- The US portion of the ISS was named by the US Congress as ISS National Lab



Thank You, Debbie Biggs

- Up to June 2011, the ARISS US Team continued to enjoy NASA-supported help from Debbie Biggs in all areas of ARISS
 - Debbie was with us during SAREX days and at the very beginning of ARISS days
 - Debbie was instrumental in establishing the new US proposal process

Thank you, Debbie, for all of your work.



Trinesha Dixon

- Trinesha Dixon of Johnson Space Center's Teaching From Space office was named in June 2011 to have direct oversight of ARISS, under Cindy McArthur

Welcome, Trinesha!



US In-person Meetings for ARISS Team Members

- Johnson Space Center (JSC) Education Office requested a meeting with the ARISS education team (NASA, ARRL, AMSAT) to discuss a new school selection process based on education proposals—ARRL hosted meeting in Connecticut, Oct 2010
- JSC Education Office requested a meeting to discuss how the transition was progressing toward new proposal process—Dave Taylor hosted meeting in Maryland, Mar 2011
- An ARISS US Ops meeting was held at the 2009 AMSAT Annual Symposium in Maryland to discuss education and operations.



Reorganizing Planning Groups to Fit Needs

- Planning meetings proposed and set in place by NASA in Oct 2010:
 - ARISS Communications Committee
 - made up of NASA, ARRL, AMSAT representatives + ARISS Chairman
 - Meets quarterly
 - US ARISS Education Team
 - a US team, made up of NASA, ARRL, and AMSAT representatives
 - Meets monthly



A Thank You to US Astronauts for Service to ARISS Since Our Last ARISS Meeting

Michael Barratt, KD5MIJ
Timothy Kopra, KE5UDN
Nicole Stott, KE5GJN
Jeffrey N. Williams, KD5TVQ
Timothy J. Creamer, KC5WKI
Tracy E. Caldwell-Dyson, KF5DBF

Doug Wheelock, KF5BOC
Shannon Walker, KD5DXB
Catherine G. Coleman, KC5ZTH
Ronald J. Garan, KF5GPO
Michael E. Fossum, KF5AQG

- ARISS Team members in Houston presented lessons to seven NASA Astronaut Candidates (now full-fledged astronauts as of June) who chose to study for Amateur Radio licenses for ARISS
 - Takuya Onishi, KF5LKS; Gregory Wiseman, KF5LKT;
Michael Hopkins, KF5LJG; Jeremy Hansen, KF5LKU
 - Astronaut Kjell Lindgren, KO5MOS, upgraded to General Class
- We are thrilled to see great astronaut interest in supporting ARISS education



Telling the ARISS Education Story

- Johnson Space Center's Matt Keil, KE5ONH, gave a talk on NASA programs including ARISS at the International Technology Engineering Education Association's annual conference
- ARISS volunteer Brian Jackson, VE6JBJ, presented a talk at Space Center Houston's Space Educator's Conference about his school's ARISS education science outcomes
- Goddard Space Flight Center Education Office gave presentations about ARISS at dozens of teacher conferences
- A NASA writer composed an article for NASA's main educator web page on ARISS's 10th anniversary, *One Small Radio Call for a Ham*



Telling the ARISS Education Story (continued)

- A NASA writer prepared a story for NASA web pages about Hawaiian students at Sacred Hearts School's ARISS telebridge station and technology lessons students learned
- The ARISS Team gave multiple presentations at Dayton Hamvention, including ARRL and AMSAT special Dayton guest Astronaut Doug Wheelock, KF5BOC; Barry Baines, WD4ASW; Lou McFadin, W5DID; Keith Pugh, W5IU; Dave Jordan, AA4KN
- Forums were given at ham radio conventions by ARISS volunteers: Clint Bradford, K6LCS; Lou McFadin, W5DID; Keith Pugh, W5IU; Kenneth Ransom, N5VHO



NASA Gives Large Commemorative Image to US ARISS Schools/Groups

- NASA began giving US ARISS schools a framed 12"x17" color image of the ISS to commemorate their ARISS educational activities & permanently display in glass showcases
- The remembrance has the school/group's name and ARISS contact date on a tag that says:

NASA Education acknowledges your participation in Amateur Radio on the International Space Station (ARISS). Your dedication and hard work helped inspire the next generation.



Examples of Success with Schools/Groups

The next few slides give examples of our successes with schools and groups.



Greenville (IL) Elementary School - NASA Explorer School

- ARISS contact was capstone of a series of science, technology, math lessons
 - Lead teacher Donna Carlson earned ham radio license KC9LEG after submitting ARISS education proposal
 - Said ARISS helped her develop motivational real-life class activities
- Area ham radio operators provided in-service studies + radio demos to faculty, students; helped create school ham radio group
 - 5 students passed ham radio exams



St. Michael School (IN)

- Enhanced curriculum with an ARISS contact
- Students studied at Hammond Challenger Learning Center: the ISS, crew research, gravity, inertia, galaxies
- Lake County Amateur Radio Club classes at St. Michael on components of amateur radio stations; how antennas, repeaters and amateur satellites work; radio waves; and line-of-sight demonstrations



Nelson County (KY) Area Technology Center & Foster Heights Elementary School

- Students who were hams at Nelson County Area Technology Center were control ops at ARISS QSO for students at Foster Heights Elementary School
- Studies: ISS history and science research, ham radio satellites, radio waves/propagation, electromagnetic spectrum, frequency & wavelength, electrical circuits
- Center's teacher used ARRL Education Technology material, did Kentucky Space Science Academy activity



Fair Lawn (NJ) High School

- Students at Fair Lawn HS + all of the district schools
- Learning outcomes fulfilled NJ State Curriculum Standards
- District science supervisor directed teachers in how to integrate amateur radio technology and space studies into physics classes in high school, earth science and ham radio equipment at middle schools, space science in elementary schools
- Schools assisted by local Fair Lawn ham radio club



Lehman (TX) High School

- ARISS contact as culmination of studies in astronomy, geography, space travel, physics, and aerospace
- Students studied for Amateur Radio Technician licenses through the school's radio club, which has a ham satellite station



Thank you to US Representatives on ARISS-I Committees

- Ops committee
 - Keith Pugh, W5IU
- Education committee
 - Rosalie White, K1STO
- Hardware committees
 - Lou McFadin, W5DID
 - Kenneth Ransom, N5VHO



A thank you to US ARISS Mentors

ARISS US Mentors

- Kerry N6IZW
- Tim W6MU
- Gene K5YFL
- Dave W8AAS
- Greg N9CHA
- Keith W5IU
- Steve KB9UPS
- John AG9D
- Charlie AJ9N
- Kenneth N5VHO
- Dave AA4KN

with assistance from

- Rita KC9CDL
- Clint K6LCS
- Carol KB3LKI
- Steve N5WBI
- Barry K2JV



Other US ARISS Achievements from mid-2009 to now...

- Other US ARISS achievements (ARISSat-1, mentors' work, contacts, hardware updates) will be reported in other ARISS committee reports