

SAREX Working Group (Amateur Radio on the International Space Station)

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Document 24

Report: ARISS Activity for January - June 2005

Highlights:

- * The new head of NASA is a ham -- Michael Griffin, NR3A.
- * The ARISS Team is working closer with NASA Explorer School (NES) teachers, introducing them to ARISS. This enmeshes ARISS deeper into NASA programs, and the NES program has money for us, which our old NASA sponsor doesn't!
- * Hams enjoy ISS packet – 4,000 unique call signs were logged since the mode was activated. Also, ISS crews report hearing hams use the ARISS repeater.
- * We hope for an autumn launch of SuitSat -- an old Russian spacesuit that will house a ham system installed by the ISS crew, and deployed during a space walk.
- * Leroy Chiao set a record for the number of school QSOs (23) made during a single ISS increment.
- * 6 of the 7 crewmembers on the Return to Flight space shuttle mission are hams!
- * John Phillips, KE5DRY, and Sergei Krikalev, U5MIR, thrilled hams with Field Day QSOs (25 by John).
- * SSTV hardware was delivered to Russia for the Progress 19P rocket launch.
- * US Naval Academy students designed PCSAT2 to launch on the next shuttle mission, and deployed on a truss of the ISS.

* The ARISS international team raised funds for the L/S-band antennas to be developed and constructed for a future ham station on the European module.

* We expect a shortfall of funds from NASA in late 2005. Money is being siphoned for President Bush's *Moon, Mars and Beyond*; the ARISS Team has applied for grants, and awaits answers.

Hardware

SuitSat

SuitSat is an old Russian spacesuit, and will soon house an ARISS radio system. The ISS crew will install the system, and then deploy SuitSat overboard (the ARISS Team wrote the required deployment directions). The Russians built the launch container. The teams assembled two systems consisting of 2 each: transmitters, digi-talker assemblies, control boxes, dummy loads, antenna cables, control cables. Voice greetings from students in English, Spanish, German, French, Japanese and Russian (plus the voice ID, RS0RS), were recorded along with a celebratory message for an anniversary of the Bauman Institute where cosmonauts are trained. These were burned into memory, along with almost 200 pieces of educational materials we solicited; these can be downloaded by students worldwide.

The SuitSat Team met at Johnson Space Center to address thermal and vacuum issues, dual-band antenna, and interface between the computer and the radios, among other things. The team performed safety tests, and then the hardware went to Russia for final tests and certification. SuitSat's systems were completed under a very tight deadline, but we made it! Currently, we are waiting for a firm launch date on the Russian 19P Progress rocket launch (August – September).

PCSAT2

As part of ARISS' educational outreach, students at the US Naval Academy, in collaboration with the Department of Defense and ARISS, and under the direction of Bob Bruninga, WB4APR, designed and developed PCSAT2. This payload will be carried on a Materials International Space Station Experiment, and includes APRS packet, FM voice repeater, and 10-meter PSK-31 transponder. The payload will be launched on the Return to Flight space shuttle mission currently scheduled for mid-July. It will then be deployed during a space walk and installed as an external payload on a truss of the ISS. Project details are at <http://www.ew.usna.edu/~bruninga/pcsat2.html>

SSTV and a New Computer

Frank hand-carried the SSTV hardware to Houston, and it was tested and then shipped to Russia with SuitSat and a new headset. The ARISS team finalized a CD of instructions

on using the SSTV equipment and software programs, and it will be sent to the ISS crew on the 19P Progress rocket launch. The SSTV equipment will be used with the Kenwood and Yaesu radios. The US ARISS Team acquired an A31 computer to be used with the SSTV equipment.

ARISS Packet

Hams are enjoying ISS packet operations. Since this mode was activated using the Kenwood D-700, over 4,000 unique call signs have been logged. According to the logging software, about 750 call signs appear more than once, showing some hams are “regulars.”

Ham Station for the European ISS Module

Enough funding has been raised, now, to start the L/S-band antenna project on *Columbus*, the European ISS module to be launched in the future. AMSAT Belgium collected the donations, and the Royal Belgian Amateur Radio Union (UBA) will sign the contract with the Wroclaw Technical University on behalf of ARISS to develop and construct the combined L-band / S-band patch antennas. The antennas will be delivered to ESA in October to install on *Columbus*. The ARISS International Team hopes to raise more funds before the end of August so as to order UHF antennas. The sum needed for these is 30.000 Euro. The next step would be to study and develop the onboard Amateur Radio station.

ARISS Team Work Behind the Scenes -- Training and Meetings

Training

The ARISS Team trains astronauts and cosmonauts so that they can earn a ham radio license. ESA astronaut Leopold Eyharts is ready to take his US ham license exam, and US astronaut John Phillips (currently on the ISS for 6 months) passed his exam, and is KE5DRY. Russia is scheduling license training for future space tourist Greg Olsen.

The astronauts and cosmonauts get trained by the ARISS Team on how to use the ARISS radio systems. Those who received operations training, plus instruction for the new SSTV equipment, include:

- * ESA taxi astronauts Roberto Vittori, IZ6ERU; Thomas Reiter, DF4TR; and Leopold Eyharts
- * US astronauts Bill McArthur, KC5ACR; Clay Anderson, KD5PLA; Jeff Williams, KD5TVQ; and John Grunsfeld, KC5ZTF
- * Russian cosmonaut Alexander Lazutkin

Thomas and Leopold fly on the shuttle to the ISS in late summer, and will make school QSOs. Vittori liked the hardware in the Service Module, and said it was easy and convenient to use, and was scheduled for two school contacts during his short visit.

Meetings

Rosalie and Frank Bauer went to NASA Hq because our point of contact was leaving NASA. Besides meeting new personnel, discussions took place on NASA funding problems (**ARISS may run in to trouble with not getting NASA money during late 2005**), future programs and on the first quarter accountability report for NASA that Rosalie and Frank were required to write. One result of the meeting is that the ARISS Team is working closer with NASA Explorer Schools' (NES) teachers, introducing them to ARISS. Doing this enmeshes ARISS deeper in NASA programs, involves more of NASA's staff, and gains us inroads into President Bush's NASA Exploration initiative. More importantly, the NES program has money we can use! The NES schools are in disadvantaged areas or have well funded science programs nudging youth to space careers; one teacher was a Teach in Space finalist. ARISS selects NES ARISS applications for last-minute or summer slots that awaiting schools can't fill.

Michael Griffin, NR3A, was named NASA administrator. Frank Bauer said that he and Griffin crossed paths in years past at NASA, and at the right time, we will introduce Griffin to ARISS. Rosalie sent a *QST* that featured an ARISS story to Griffin.

Talks in Russia are on again for space tourist Greg Olsen to possibly fly on the ISS; Russian team member Sergej Samburov will meet with Olsen, soon. He wants to do 3 or 4 ARISS QSOs. The next ARISS International Meeting will be held in August at University of Surrey in England.

PR, Education, and Crew Enthusiasm for Ham Radio

PR

The Pinon (AZ) Elementary School's ARISS QSO was taped by University of California Television for use in their "Behind the White Coat" series seen by hundreds of schools.

Rosalie worked with astronaut Tony England, asking him to be our speaker at the Dayton Donor Dinner, and making arrangements. She compiled information on Tony for use in news releases about his Dayton talk. Tony proved to be popular, as more people came to the dinner than at any dinner previously held.

Two Web stories about SuitSat, one in *Space.com* and one in *WFMY (NC) News*, show that the unique educational satellite tool is catching the world's eyes! Rosalie fielded questions from a reporter for *NewScientist.com*, who is also doing a story on SuitSat. The European Space Agency (ESA) posted a story on its Web site on Italian ARISS QSOs

from last spring. If space tourist Greg Olsen flies this autumn, that will generate good PR for ARISS.

At Leroy Chiao's debriefing, he reported that ARISS systems performed well, and he was happy with the QSOs. NASA Administrator Mike Griffin was listening at this debrief. Leroy pointed out that both he and Griffin were hams!

Fairview (IL) Elementary School's successful ARISS QSO was simulcast to the Web and via IRLP, and involved nearly 800 participants and a number of media types. All of our QSOs are covered by people from many media outlets. Rick Lindquist does a fabulous job of covering the ham radio media outlet.

Educational Outreach

The ARISS Team wanted to allow school students to “take part in a space walk.” We solicited students’ greetings in English, Spanish, German, French, Japanese and Russian, and these were burned into SuitSat’s memory so that students worldwide can download the greetings. The ARISS Team also solicited educational material, lesson plans, student artwork, etc., and burned these onto CDs for SuitSat, and students around the world can download these items.

A NASA Explorer School Satellite Communication Class will be held at Goddard Space Flight Center (GSFC) in late July. The ARISS Team at GSFC will teach about orbital elements, how to set up a ham station, and how to get involved in ARISS, and will schedule ham radio time during the workshop to demo the usefulness of radio in the classroom.

Students at the US Naval Academy, in collaboration with the Department of Defense and ARISS, and under the direction of Bob Bruninga, WB4APR, designed and built PCSAT2. This payload will be carried on a Materials International Space Station Experiment, and includes APRS packet, an FM voice repeater, and a 10-meter PSK-31 transponder. Once the payload is on the ISS, it will be deployed during a space walk and installed as an external payload on an outside truss of the ISS.

Rosalie assisted a teacher whose school had a SAREX QSO years ago, with ideas on a presentation for 107 students at an event sponsored by IEEE. The teacher reported much interest by the students.

US astronaut Leroy Chiao set a record number of school QSOs (23) that have ever been made by an astronaut during a single ISS increment. ARRL awarded him with a plaque during his NASA debrief, which gained us some publicity, in particular, in front of NASA staff.

A school that had one of the first-ever ARISS QSOs reports that many students now have licenses and do public service communications for local “fun runs,” and they put on ham radio exhibits.

Crew Enthusiasm

US astronaut Leroy Chiao enjoyed his school QSOs so much that he decided to do two of them, instead of one, during each of his last two weeks in space.

John Phillips, KE5DRY, and Sergei Krikalev, U5MIR, the current crew aboard the ISS made QSOs (25 by John) for several passes during Field Day, thrilling operators.

Six of the seven crew members on the Return to Flight space shuttle mission are licensed ham radio operators. We wish them Godspeed and the best of everything, in particular, a nominal flight!

Summary

I would like to apologize for the lateness and the lengthiness of this report. With the Return to Flight space shuttle mission taking place during the writing of this report, many ARISS-related activities are coming to a head. You have seen these described in this report, and it is a very exciting time to be part of the ARISS Team.

Everything with ARISS is going right except for the funding provided by NASA. What we normally have gotten in past years is being siphoned off for President Bush's Exploration initiative. And so, we are wiggling our way into NASA Exploration programs for 2006. Meantime, we expect to have some very lean months near the end of 2005, and are trying to shore up this weakness by applying for NASA grants. We are planning changes we hope will ensure our future, and figuring that we will have to visit Johnson Space Center to meet with the group that is planning for *Moon, Mars and Beyond*. NASA Hq has requested a number of reports and evaluations, but they have done this for all other programs, as well.

The ARISS European team continues to eke out donations for an Amateur Radio Station on its new ISS module, *Columbus*. Delegates and volunteers from all ARISS regions around the world are always planning for our future. We pull together to do our best for our beloved Amateur Radio. The US ARISS Team strives hard to showcase our three sponsors, NASA, ARRL and AMSAT!

Respectfully submitted,
Rosalie White, K1STO
ARISS International Secretary-Treasurer