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

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Report: ARISS Activity for July 2004 to December 2004

Highlights: SSTV on the ISS is closer to reality and so are 1) a new short-term ham satellite in a space suit to be tossed overboard in 2005 by astronauts, 2) a ham station on the European ISS module *Columbus* for 2006, and 3) ARISS involvement in President Bush's vision for NASA: *Moon, Mars and Beyond*.

Hardware and On-the-Air Operations

New Hardware

SSTV: The ARISS Team is working the 2005 launch manifest timeline, and hopes to deliver to the ISS the SSTV hardware, Yaesu radio and tuner, and a new headset. All must be ready and in Russia a month prior to a launch. A Progress rocket launch in May would be timely -- prior to Cosmonaut Krikalev, U5MIR, leaving the ISS. Outgassing tests of the SSTV hardware have to be run; other certification tests are done.

SuitSat: Sergej Samburov worked with spacewalk specialists to review spacewalks for launching SuitSat -- maybe in September. The ARISS Team would have to finish and send SuitSat to Russia in early August. A Progress rocket could deliver the suit to the ISS for U5MIR to throw overboard. We may use two cameras installed at 90 degrees from one another because the visor doesn't allow for a 180-degree field. The cameras could alternately take photos of earth and space. Last fall, the team purchased (with NASA funds) 5 Kenwood VC-H1 Visual Communicators for R&D. We are building a controller for SuitSat. We may use the same housing as the SAREX packet module, and the same power converter, since both are already space certified. Sergej met with groups about telemetry transmission -- temperature and pressure data from inside the suit. A team member developed a telemetry unit that we may use. We need a fan; humidity may fog the camera. The suit's cooling system will be turned off to conserve power, lengthening the suit's life. There would be oxygen partially pressurizing the suit, but it will leak -- so to give the suit a human shape, we may stuff it with foam. We may put

temperature sensors on the hardware, the window, the suit's surface and where air passes. There's a door in the spacesuit where the battery and transmitter may go; 2-meter and 70-cm antennas can go in the sleeves and pants where there is no metal and RF transparent. For a block diagram of SuitSat, send a request to Rosalie.

Miscellaneous: The team successfully tested the Kenwood repeater mode in August, and cross-band repeater operations began. ARRL is receiving many QSLs for repeater mode from hams. The downlink for this mode is 145.80 MHz and the new uplink is 437.80 MHz. The ARISS Team hopes to have a new computer onboard strictly for ARISS hardware; Sergej got approval to use an A21, and is writing a document on its usage. After May 2005, once shuttles are flying again, Bob Bruninga's 2-meter pc-sat payload should be launched.

Work Behind the Scenes – the ARISS International Team

Frank Bauer went to a NASA meeting with attendees from space agencies around the world, to discuss the US president's new NASA initiative: *Moon, Mars and Beyond*. All international agencies are interested in the initiative, particularly robotics and sample return missions. NASA is constantly evaluating its programs and accompanying budget. Due to the president's new vision, the agency regularly asks the ARISS Team to compile statistics and outcomes, besides writing our weekly report. Frank and Rosalie do this work. We have been asked to NASA Hq to talk about outcomes and budget.

In October, ARISS delegates met at an ARISS-international meeting in Virginia hosted by AMSAT. Delegates once again nominated and voted for Rosalie to be the ARISS international secretary-treasurer, and she was honored by AMSAT for her ARISS work with a silver pin and certificate. Frank Bauer was voted in again as chairman, and Gaston Bertels as vice chairman. Rosalie and others prepared reports on all aspects of ARISS; she helped Frank give the US team's report, and she composed the minutes of the three-day meeting.

ARISS worldwide delegates meet monthly by phone (at NASA expense). Each ARISS committee (such as the education committee chaired by Rosalie) holds regular teleconferences. Rosalie sets up, moderates and prepares minutes for the education committee.

Rosalie networked with Chris Imlay about third party for a new Belgian ground station and on 3rd party issues. We may need to do more as Expedition 11 nears, if the US crewmember is still not licensed.

PR, Education, and Crew Enthusiasm for Amateur Radio

This fall, in the last two months of Mike Fincke's (KE5AIT) Expedition 9 on the ISS, he became enamored with hamming. The ARISS Team was very pleased! Also, Gennady

Padalka, RN3DT, began doing school QSOs (with European schools) more than any other cosmonaut. In earlier months, we weren't lucky enough to average our usual high number of school QSOs; orbits weren't workable for US school hours, so we scheduled overseas schools. The US school list is quite long, but we have several plans that may help with this. Mike asked about Worked All Continents. Rosalie researched it, and when he returned to earth, we awarded his WAC certificate during a NASA debrief.

In October, Leroy Chiao, KE5BRW, became commander of Expedition 10, working with Flight Engineer Salizhan Sharipov. Leroy had earned his license in June while training for his ISS mission. As of January, he had done a number of school QSOs.

In mid-November, the ARISS team assisted a large group of astronauts (and one spouse) in earning a ham license: Satoshi Furukawa, KE5DAW; Taichi Yamazaki , KE5DBO; Naoko Yamazaki, KE5DAS; Dorothy Metcalf-Lindenburger, KE5DAT; Richard Arnold, KE5DAU; Jose. Hernandez, KE5DAV; and Joseph Acaba, KE5DAR. Sergej trained cosmonauts on the SSTV system

The US crewmember for Expedition 11 was not interested in getting his ham license, but is now considering it. The ARISS team showed him how the radios work, and are hoping he will complete his studies so US schools can be scheduled during his stint.

Each ARISS QSO continues to result in good media coverage and goodwill for ham radio. Some included attendance at QSO events by the Quebec prime minister's wife and Brazilian Army generals. Of course, NASA's biggest interest is in educational activities.

Summary

The ARISS International Team has worked on new equipment, new thoughts on school activity, and much more. NASA is changing to be in lockstep with President Bush's vision for its future -- the *Moon, Mars and Beyond* initiative. ARISS is planning changes we hope will ensure our future. NASA Hq Education Office staff has requested a number of reports and evaluations -- they invited us to think with them as they review their education programs. We may be asked to go to NASA facilities. After several years of not doing so, and what with employee turnover, there is a need to educate such staffs as crew support, program office and crews. Also, we should meet with the group that is planning for *Moon, Mars and Beyond*. NASA hopes to have shuttles flying in May 2005.

The ARISS European team continues to eke out donations for an Amateur Radio Station on its new ISS module, *Columbus* -- ESA pledged half the cost (50,000 Euros), and European hams are stepping up to find the rest. The ARISS Team heartily thanks the ARRL Foundation for its $5,000 donation!

The ARISS Team must always plan for the future to ensure long-term support from NASA. President Bush's vision for NASA's new initiative, Mo*on, Mars and Beyond*,

will bring challenges for the team, but we will strive together to do the best we can for Amateur Radio and our three sponsors, NASA, ARRL and AMSAT!