

CHANNELS

C L O S E U P

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The magazine for critical radio system users

Cosmonaut Sergei Y. Treschev uses an M-PA radio donated by M/A-COM in the functional cargo block.

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Susan J. Helms talks to amateur radio operators on Earth from the HAM radio workstation in the Zarya module.



Astronauts "phone home" and chat with school students using M/A-COM radios

All photos: NASA

M/A-COM RADIO TECHNICIAN JAMES ALDERMAN HAS BEEN INVOLVED IN HAM RADIO ALL HIS LIFE. HE RECENTLY SENT US THIS REPORT ON THE USE OF M/A-COM M-PA PORTABLE RADIOS USED ON THE INTERNATIONAL SPACE STATION.

When astronauts aboard the International Space Station want to "phone home" they reach for a M/A-COM radio. As part of the Amateur Radio Experiment on the International Space Station, or ARISS, M/A-COM donated several custom-built M-PA handheld radios to the project. Astronauts routinely use the radios to speak with their families and with school students all over the world.

The Amateur Radio system aboard the ISS serves an important function as a back-up communications system in case the main system goes down, and as a means of keeping crew morale up during long duration space missions. The system truly represents the "fun and adventure" side of space-to-earth communications, allowing astronauts to speak with their families and to excited school students on a regular basis— all without burdening NASA's "official" communications system.

Schools hear voices from space

The primary purpose of the ARISS program is to stimulate interest in space, technology, and science among school students. For a few lucky science teachers around the world, the ham radio system aboard the ISS is a dream come true.

Several times per month, astronauts make pre-scheduled radio contact with school classrooms. Excited students get to "interview" astronauts over the radio during these 10-minute contacts while the station orbits some 230 miles overhead. These events always attract media attention and create lasting memories for all involved. One Texas school was even featured in the IMAX-3D movie "Space Station."

Since the M/A-COM radios have been aboard the ISS, more than 70 school contacts have been conducted, and hundreds of students have asked astronauts questions on every subject from what it feels like to be weightless to how trash is recycled in space.





Astronaut Carl E. Walz works with the WA3 Antenna Assembly used with the M/A-COM radios in the Zvezda Service Module on the International Space Station.

Students, teachers, and parents all go away from an ISS contact changed; forever awed by their wondrous experience made possible by the ARISS program. It's not uncommon for teachers to tell of marginal students who developed a love of science and technology after an ARISS contact. And that's the whole purpose of ARISS—to inspire young minds.

New space station – new radios

Today, NASA considers Amateur Radio to be so important that a permanent ham radio station has been planned for the new International Space Station – complete with its own special storage space for the radios and outdoor antennas for improved performance. For the ISS, a totally new Amateur Radio

A total of six three-member crews have lived aboard the ISS since its launch in 2000.



system has been designed for greater versatility.

The new M/A-COM radios are the workhorses of the system. The ARISS hardware team selected the M-PA radio because of its rugged design, long track record of reliability, and ability to meet stringent emission purity standards.

A total of 12 M-PA radios were built for the ARISS program – 6 VHF and 6 UHF radios. One VHF and one UHF radio, along with their support hardware, constitutes a “set.” One set is presently located aboard the ISS while the others are used for astronaut training here on earth.

In addition to the radios, several pieces of critical support hardware had to be built to make the whole system work. One of the most important items is the custom-built Packet Module which allows astronauts to connect a laptop computer to the radio and operate a sort of “wireless e-mail” system. In this state, the orbiting packet station can even be left unattended. An astronaut may return to find an e-mail from home, or a greeting from a ham on a remote Pacific island. Hams on earth who contact the ISS on packet or voice can receive a special postcard to commemorate the event.

Future ARISS operations

Educational activities are the heart and soul of ARISS, and plans are now underway to expand the capabilities of the ISS ham radio station. ISS has recently been equipped with new multi-band antennas which allow additional operations on two microwave bands (1296 MHz and 2400 MHz), and at least one high-frequency (HF), or “short-wave” band. The HF antenna may soon allow astronauts to communicate with stations on the other side of the world using short-wave signals, which bounce around the earth on upper layers of atmosphere. Additional radio gear is being developed now to do all this, and more. The future of Amateur Radio in space is bright indeed.

The International Space Station is mankind's first step towards exploration of other planets and deep space. Perhaps moon colonies will be established in the coming decades. Many great minds will be needed to make these dreams a reality. Amateur Radio stands ready to inspire them at a young age.

Perhaps one of these students who spoke to an astronaut via ham radio may grow up to be the first human to set foot on Mars. Whatever the future holds for mankind, you can be sure that Amateur Radio, and M/A-COM, will be there, bringing the wonders of space exploration down to earth for all to share. n

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