



National Aeronautics and
Space Administration

Amateur Radio on the International Space Station (ARISS)





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ARISS provides students with the unique opportunity to talk by amateur radio with crewmembers on the International Space Station (ISS) while they orbit Earth. With the help of amateur radio operators on the ground, students can contact the crewmembers by voice and packet (computer) radio, and in the future, they will be able to communicate by amateur television. Crewmembers make ham radio contacts with students around the world, sparking their interest in space, science, and technology. The crewmembers also contact their family and friends, as well as individual ham radio operators. When students make radio contact with the crewmembers, they may ask questions about the experiments being conducted on the mission and what it is like living in space. Classes track the ISS's orbit using computer software and "eavesdrop" on ISS communications. When crewmembers are asleep, an automated amateur radio station aboard the ISS is programmed to make contact with hams around the world.

Interested educators can easily introduce ARISS into their schools by developing some ideas for integrating technology into their classrooms. They can also contact the American Radio Relay League (ARRL) for a list of local radio clubs willing to help by setting up radio equipment. Club members may also agree to assist the school in submitting an ARISS application to ARRL for a scheduled radio contact with ISS crewmembers.

ARISS is an international project with U.S. participation from NASA, the American Radio Relay League (ARRL), and the Radio Amateur Satellite Corporation (AMSAT).

For the Classroom

Any educator can access lesson plans developed by NASA for ARISS at <http://spacelink.nasa.gov/products/Amateur.Radio.in.Space>. In addition to enjoying communications that reach into space, amateur radio operators provide communications in times of emergencies and advance the art of radio technology. For additional student projects, teachers can ask their class to research the Amateur Radio Service (see <http://www.arrl.org> and <http://www.amsat.org>), describing some of the activities that ham operators can do on the air once they earn a license. Students can create a chart of the electromagnetic spectrum covering 100 kilohertz (kHz) to 1,000 megahertz (MHz), labeling the HF, VHF, and UHF portions of the spectrum on the diagram. They can locate on their chart at least eight radio services, such as their favorite AM and FM commercial broadcast stations, CB, television, amateur radio, and police.

Many teachers and students own and can bring in shortwave radios to compare types of radio services in the U.S. and around the world. Teams can tune the dials to log the kinds of communications heard, the radio frequency of the stations, how the stations identify, the time of day, and the strength of the same station in the morning versus the afternoon. Students can delve into the world of amateur radio satellites by browsing the AMSAT Web page: <http://www.amsat.org>.

Submit an application to ARRL for your school to be selected to make a radio contact with the astronauts on the ISS. Teachers can find the application at <http://www.arrl.org/ARISS/ariss-ap.html>, and students can explore further at <http://www.arrl.org/ARISS>.

Get Your Own Amateur Radio License and Call Sign

Anyone can be a ham! Contact ARRL to find a local amateur radio club. Ask a club member to visit your classroom to bring and demonstrate an amateur radio. For free information on getting started in amateur radio, write ARRL at the following address:

American Radio Relay League (ARRL)
Field & Educational Services Department (F&ES)
225 Main Street
Newington, CT 06111-1494
E-mail: ead@arrl.org
Phone: 860-594-0200 Fax: 860-594-0259
Internet: <http://www.arrl.org/hamradio.html>

About the Images on the Front

Top left: ISS Expedition Three Commander Frank Culbertson displays a card highlighting the International Space Station's amateur radio call sign—NA1SS. **Top right:** NASA Mission Specialist and ISS Flight Engineer Peggy Whitson is seen working with the ARISS antennas now being used to communicate with students.

Center: The center photo shows the International Space Station. Amateur radio has been a regular payload on the ISS since 2000. **Bottom left:** A student at Lamar Elementary School in Greenville, TX, proudly talks to an astronaut in space. Teachers report that ARISS is a once-in-a-lifetime experience for students and is highly educational and rewarding. **Bottom right:** Students from the Western Albemarle High School in Crozet, VA, excitedly ask questions of the ISS crew as their teacher looks on.

