

SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)

Ignition - Primary Space Education (1)

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AMATEUR RADIO ON ISS (ARISS) – A STEM ORIENTED EDUCATIONAL OPPORTUNITY

Abstract

Amateur Radio contacts with schools are a constant part of the crew's tasks since launch of the ISS, the history reaches back to former MIR and Space Shuttle missions. Amateur Radio Satellites were launched since 1961, currently more over 70 amateur radio satellites have been launched. In addition, several university satellites, Cubesats and Nanosats are also frequently using amateur radio frequencies. Lots of them are operational, offering voice and digital communication capabilities.

ARISS (Amateur Radio on ISS) is a world-wide volunteer network using amateur radio frequencies to enable contacts between schools and astronauts on the International Space Station (ISS). In addition, ARISS is developing hardware and manages and organizes its use for educational purposes on ISS.

A new experiment is recently installed within the ISS COLUMBUS module, called "HAM Video". Two Patch Antennas on the nadir side of the COLUMBUS module are used to transmit cabin video using standard DVB-S type signals on S-Band towards the earth. These transmissions will extend the current radio-based bi-directional ARISS school "HAM Radio" contacts to a new "HAM TV" service by providing a video signal downlink in parallel to amateur radio voice transmissions.

This paper will describe the possibilities to use the International Space Station and its various amateur radio equipment and transmissions for educational purposes. Starting from prediction of satellite passes to building own reception equipment like antennas and radios to reception and decoding of the signals and measurements using these received signals offers various possibilities for school groups and interested individuals to participate. Technology demonstrators like Ham Video transmissions using DVB-S standard in S-Band offers modern possibilities for interested pupils to design and optimize their receiving station.