

STEM Outreach - Engaging 8th Graders with Astronauts through the ARISS Program

Markus R. Murdy¹ and John B. Alcorn²
University of Alabama in Huntsville, Alabama, United States, 35805

Mark Becnel³
University of Alabama in Huntsville, Alabama, United States, 35805

The UAH Space Hardware Club is an engineering organization that designs and builds high altitude balloons, rockets, and orbital satellites. To share these experiences with younger students and to support the Science Technology Engineering and Mathematics fields, the Space Hardware Club is participating in the Amateur Radio on the International Space Station (ARISS) program. ARISS is a joint program with NASA Johnson Space Center, the Amateur Radio Relay League (ARRL), and AMSAT. The authors will present on the proposal process, the development of a curriculum, the results of the curriculum in the classroom, and the event preparations for the astronaut contact. Authors will share the program design used, and show how other student groups are able to deploy this plan around the country. Finally, the authors will share the success of the program and impact this had with the students of each classroom.

I. ARISS Proposal Process

The ARISS program is a joint endeavor of the ARRL¹, AMSAT, NASA, and other international space agencies. Entities such as student organizations, amateur radio clubs, and elementary schools may apply to conduct an ARISS event through the ARRL.

II. Curriculum Development and Classroom Results

Prior to the ARISS radio contact, elementary school students will learn about the International Space Station and its objectives. The program will include in-classroom activities, the setup of informational posters in school hallways, and engaging students in basic discussion of the station. An additional objective will be to introduce amateur radio to the students and use the technology with the students to engage them in radio usage. They will be provided with the opportunity to engage in radio experiments by participating in the SHC BalloonSat high altitude ballooning program. This will familiarize students with how the radios work and how to receive telemetry data. The students will also discuss what questions they may want to ask the crew on the ISS so that they will be prepared for the ARISS event.

III. ISS Contact Program Design

The ARISS radio contact will occur at the UAHuntsville Space Communications Lab. The Space Communications Lab is the Space Hardware Club's mission control center for the ChargerSat1 orbital satellite, and BalloonSat, a high-altitude balloon research and testing platform. The lab is equipped with a high-gain antenna array with antennas in the 2M, 70cm, 900 MHz, and 1.2 GHz bands and a wide-band discone static antenna which allows payload tracking and command-and-control. The ARISS contact will be managed by an experienced team familiar with satellite and balloon communications including at least 5 student amateur radio operators. Students from the middle schools involved will be brought to the communications lab several hours prior to ISS contact to practice their questions for the astronaut/cosmonaut and become familiar with the equipment used.

¹ Student, UAHuntsville Space Hardware Club ARISS Team, AIAA Student Member, markus.murdy@uah.edu.

² Student, UAHuntsville Space Hardware Club ARISS Team, AIAA Student Member, john.alcorn@uah.edu.

³ Graduate Student, UAH Space Hardware Club ARISS Team Lead, AIAA Student Member, mark.becnel@uah.edu.

IV. Conclusions

The ARISS event at UAHuntsville is expected to take place the week of March 18th. Classroom outreach and preparations for student involvement in the ISS contact are currently underway. The event will be held prior to the conference, and results will be presented. However results will not be available until after the paper submission deadline.

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References

- ¹ “American Radio Relay League”, URL: <http://www.arrl.org/amateur-radio-on-the-international-space-station>.