



Doc # 19

Amateur Radio on the International Space Station

Committee Report to the ARRL Board of Directors

July 2021

Submitted by:

**The 2021 ARRL ARISS Committee,
VD Tharp, Chairman**

ARISS Program Summary

Amateur Radio on the International Space Station (ARISS) project is a well-known international partnership that promotes STEM education and Amateur Radio. The ARRL CEO in 1996 tasked ARRL Headquarters staff to meet NASA's challenge to set up one worldwide ISS ham radio team, so the staff, working with AMSAT-NA, set about doing that. The ARRL has been an ARISS sponsor since 1996. The ARRL-led parts of the project successfully include leadership roles, advice to ARISS leaders on items related to FCC regs, and Public Relations support for the project in addition to education activities related to school contacts and many events. The ARRL ARISS Committee was tasked in January 2019 with improving the ARRL support-part of the project. Last year, the ARISS team in the US began the process to set up ARISS-USA as a 501(c)3 group and that was finished in March 2021. The Committee has continued to work quite well with ARISS during the transition, benefiting both organizations.

Since 1983, international amateur radio organizations have worked with space agencies to fly Amateur Radio to support educational and ham radio activities on Space Shuttle (SAREX), Mir (Mirex) and ISS (ARISS). Each year, astronauts on the ISS make hundreds of school contacts because of ARISS. The educational activity alone puts Amateur Radio in the lives of students, educators, media, communities, and political leaders. Hams have made thousands of Amateur Radio contacts using ARISS packet and FM voice on the new crossband repeater.

Authorizing Board Motion to Establish the ARRL ARISS Committee, Minute 27, January 2019

Be it therefore resolved: A permanent ARISS committee is created by the Board to develop an interactive relationship with ARISS. Said committee should consist of three members of the Board, with assistance of the ARRL Lifelong Learning Manager and the ARRL Communications Manager as consultants, all to be appointed by the ARRL President. The committee will recommend the framework under which the ARRL will support ARISS to include recommendation of the ARRL representative to ARISS, standardized mission support, operational needs, ongoing mentoring and assistance to local Amateur Radio clubs in support of ARISS contacts, and a standardized set of Public Relations messages to ensure consistency of the ARRL message to ARISS, local Amateur Radio groups and the public at large.

ARRL ARISS Committee Members for 2021

Vice Director Tharp (Chair)

Vice Director Schilling

Vice Director Nelson

Vice Director Temples

Mr. Kris Bickell (staff member - Lifelong Learning Manager)

Ms. Rosalie White, K1STO (Consultant - ARRL representative to ARISS)

ARRL ARISS Committee Activities from January 1 to June 30 2021:

The ARRL ARISS Committee did business through exchanging many emails in the first half of 2021 as Covid continued. The Committee met twice via ZOOM, in February and June.

Ms. White shared with the Committee in 2020 that the ARISS-US team was forming as an independent entity. This step would allow ARISS to apply for IRS 501(c)(3) status to receive donations directly for the costs of day-to-day operations, hardware and other items. The IRS worked through its Covid-backlog and in March 2021, ARISS learned that 501(c)3 status was granted on ARISS-USA; Ms. White informed the Committee. ARISS distributed a news release in April about the good news.

With Covid preventing most in-person ARISS school contacts in 2021, the *Multipoint Telebridge Contact via Amateur Radio* continued to be the choice of many schools and groups for ARISS contacts. The Committee notes that some people are still not understanding that this method uses Amateur Radio on the ISS and on the ground. The classroom is linked via audio (and often video) to ARISS ground radio station volunteers operating their radio(s). These students still learn a great deal about Amateur Radio and take part in social-distanced hands-on radio activities.

The Committee appreciates that Ms. White continues to notify Directors, Vice Directors, and Section Managers in the respective divisions and sections where ARISS contacts take place. She shares what STEM- and ham-related activities each school plans to do, and many schools have established student ham clubs.

New ARISS Ground station is on-line

ARRL ARISS welcomed a new volunteer as an ARISS ground station, David Payne, NA7V from Portland, OR. He filled a void after a ham station in a California college closed due to Covid. In Spring 2021 David's home sustained major damage from trees falling in a bad storm, his station was off the air, he is having a new home built, and aims to return as an ARISS ground station.

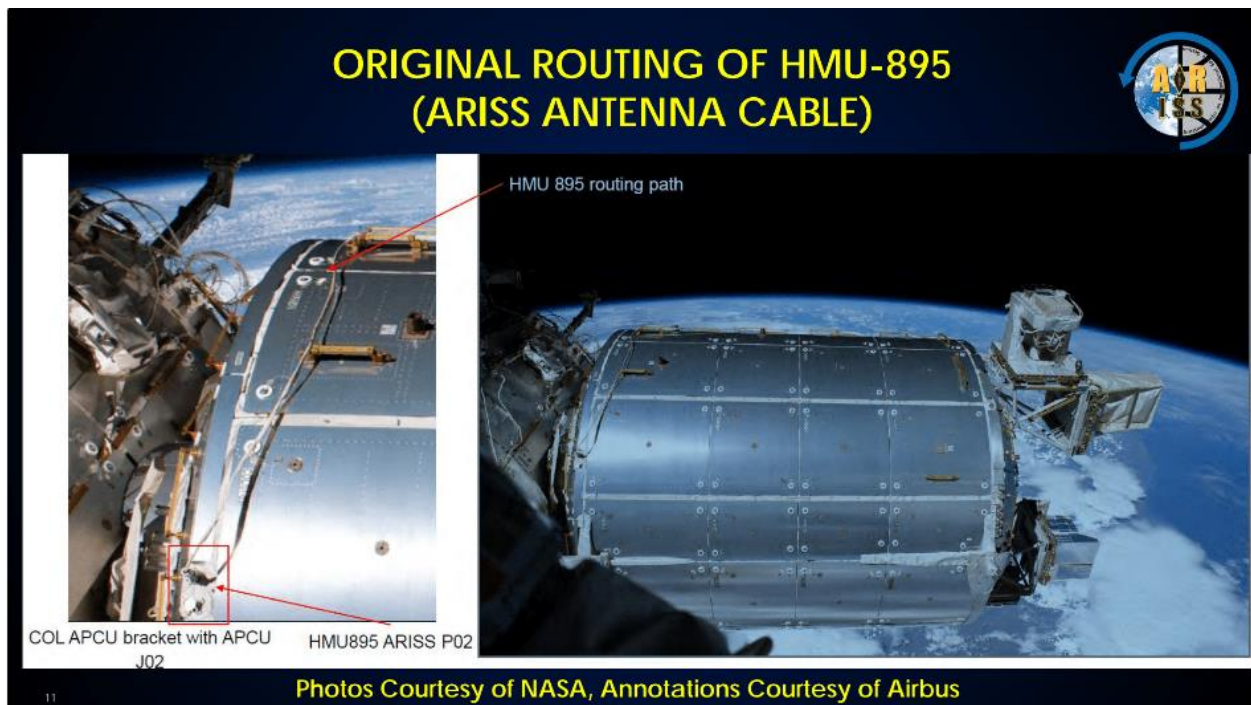
ARRL ARISS Station on the ISS Experienced a Problem Due to Space Walk

The ISS crew continued to operate the new InterOperable Radio Station in 2021, a heavily modified (per NASA test requirements) Kenwood D710GA and an ARISS custom-built multi-voltage power supply. Operations were flawless for ARISS school contacts and for tens of thousands of hams who enjoyed crossband-repeater and packet contacts and downloading SSTV images. On January 27, 2021, Airbus sponsored a spacewalk for astronauts to ready its new external platform, including replacement of the ARISS antenna cable with a new Airbus cable that accommodated ARISS and three Airbus customers. ARISS had worked with Airbus several years to ensure they understood how important ARISS is and that Airbus would build and test

the cable. After the spacewalk, the ARISS radio wasn't heard. An ARISS school contact, later that day, was attempted and unsuccessful. ARRL Vice Director Grady wrote: "I have to applaud and give kudos to how amazing the YouTube live broadcast was when attempting the ARISS contact. The way the ARISS process was introduced, coupled with an amazing production video, gave the viewers a First Class experience. Great work by the entire team. By no means is this a full failure, but an amazing opportunity to leverage all the things that went well." ARISS, NASA, ESA, and Airbus worked to schedule tests to determine what the problem was; it was the cable. ARISS began scheduling ARISS school contacts to be done on the old Kenwood radio in the Russian module. ARISS set up a world news conference to discuss the issue. For the next spacewalk (in Feb.), ESA said any time remaining after tasks were performed could be used to un-install the new cable and re-install the old cable. The crew did not finish their required spacewalk tasks, so ESA scheduled time during the next spacewalk (March 15). Success! The radio system was functional again. Photos of the new cable, minus its protective sleeve, inside view of the main connector, and location of part of the cable system on the spacecraft are below.

A link to the YouTube press conference is here:

<https://www.youtube.com/watch?v=7hm4h4rBE9k&list=PLc1rdbzW0KQI14x5GsQLvxQ06SF4I8reE&index=3>





Budgeting

Mr. Tharp, Ms. Middleton, Ms. White, and Mr. Bauer worked together the first days of January to complete a proposed 2021 budget. Discussions about it had been held with the Committee. In spring 2021, ARISS provided financial reports as required, and for the A&F Committee.

ARRL and ARISS Publicity

The Committee continues cooperation between ARRL and ARISS on ham radio PR. Ms. White forwards ARISS media hits to Mr. Inderbitzen who can post them on the ARRL web. From January to June, Ms. White forwarded 29 media hits, some from major markets, and a big increase over 19 hits the previous 6 months. The list of 29 media hits are in Appendix A.

Mr. Inderbitzen continues to be a large asset to the committee and as stated in prior reports; his assistance and efforts should be noted as being exemplary.

Ms. White forwards all ARISS news releases and other interesting facts to the Committee and Mr. Inderbitzen. News releases covered these topics: scheduled ARISS SSTV events, dates for mode changes made to the ARISS radio (packet, crossband repeater), upcoming school contacts, and more. ARRL chooses which news releases can interest ARRL members and Mr. Inderbitzen facilitates the running of ARRL web stories with fact-checks by Ms. White. These stories also run in *The ARRL Letter* and many in *QST*. Examples of ARRL stories prepared from ARISS news releases and news sent to the Committee include:

- ARRL Web items posted about the Airbus cable replacement that took out ARISS's new radio, and then the successful spacewalk to re-install the original ARISS cable
- ARISS SSTV Sessions so popular with ARRL members, SWLers, and space enthusiasts who download anywhere from 900 to 12,000 images.
- Story on interview hosted by ARRL on SciFi thriller movie tied to ARISS: "Ham Radio's SuitSat Returns in Short Horror Film, DECOMMISSIONED." The interview was posted on ARRL Facebook and in a YouTube. Stats follow:
 - * Facebook Engagement (Feb 27-Mar 7): 15,248 People Reached and 2,141 Engagements,
 - * YouTube, Behind the Scenes: 2,588 Views and 103.1 watch hours
- *QST* "Happenings" item on ham-licensed crew members doing ARISS activities, such as ARISS SSTV sessions.

Image: One of the ARISS SSTV certificate



The ARISS school contact news releases were emailed to the Committee, so they could watch the livestreams. ARRL continued to experiment with posting the livestream URL and even the video on ARRL Facebook and Twitter, garnering large Reaches, Engagements, Shares and Post Clicks.

Two more cooperative items included Mr. Bickell requesting that Ms. White assist with writing the ARISS section for the *ARRL Annual Report*. Also, Ms. White was asked to review the ARISS section that will be in the *2022 ARRL Handbook*.

More Ways the Committee helped ARRL and ARISS Work Together on Outreach

The Committee facilitated other ARRL-ARISS networking; here are some examples.

- Mr. Bickell shared with Ms. Flynn the ARISS news on soliciting education proposals for future ARISS contacts; she forwarded it to her teacher list.
- Ms. White forwarded the news release on soliciting education proposals to Mr. Ewald to share with SMs to tell their youth and education coordinators.

ARISS Contacts in the US in July-December

US ARISS contacts made during the period in addition to other countries were:

Maine Regional Schools – Kennebunk, ME
Sterling Middle School – Ashburn VA
Red Hill Lutheran School – Tustin CA
Bishop Guertin High School – Nashua NH
John F. Kennedy High School – Denver CO
Estes Park Elementary School – Estes Park CO
Oakwood School – Morgan Hill CA

Green Bank Elementary Middle School – Green Bank WV
Next event: YOTA Region 2 – Cincinnati OH

Other Events:

Savannah River Academy, ham-learning activity – Grovetown GA
Forest Edge Elementary School, ham-learning activity – Reston VA

Recent ARISS schools that have set up ham clubs are: Green Bank (WV) Elementary Middle School, Newcastle (WY) High School, Bishop Guertin (NH) High School, and Tecumseh (OK) High School.

At most ARISS contacts, some students are at school and most are home watching the livestream (usually 1,000 to 4,000 live views). Ms. White asks ARISS mentors to urge schools to show the ARRL video produced by Tom Delaney. Also, exhibit items at most ARISS contacts display the ARRL diamond.

ARRL Learning Network Webinar

The Committee had considered a goal of shooting an ARISS video, but with Covid, that couldn't be done. Mr. Bickell thought an ARRL Learning Network Webinar on ARISS could meet the goal. He suggested an ARISS teacher explaining ARISS's effect on students, educators, and mentoring ham clubs. Ms. White offered a thank you and suggested ARISS educator Diane Warner, KE8HLD, who prepared her program with advice from Ms. White. Mr. Bickell and his team took it from there and on March 5, Ms. Warner presented her webinar. Mr. Bickell has asked her to give her webinar at the upcoming July 2021 Teachers Institute and offered that she could attend the entire TI. In addition to her being a VE and an ARES leader, she is *very* excited to attend TI.

ARRL ARISS Committee Travel Budget for ARISS at Conventions, Conferences

ARRISS has been making plans to use budget monies provided by the ARRL for travel to conferences and conventions. The ARISS team is going to Huntsville Hamfest, rented a booth, and has garnered forum time. The ARISS roll-up banner that the ARRL funded for ARISS will be employed at the ARISS Huntsville booth. ARISS volunteers hope to meet ARRL officials at the show.

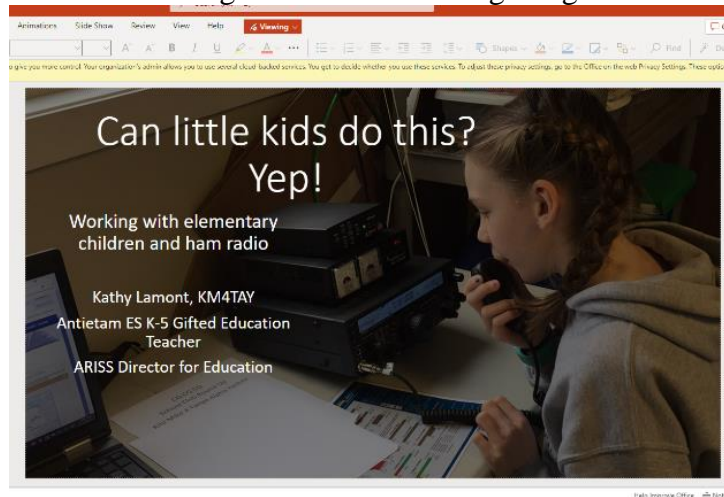
In January through June 2021, ARISS took part in these virtual outreach events, some due to ARRL suggestions:

- User Advisory group Education Committee/National Space Council *sanctioned by the White House*, a presentation
- ARRL Virginia Section Convention, panel talk including 2 ARISS speakers
- 4 national-level space educator conferences, presentations
- 3 Orlando HamCation presentations
- 2 QSO Today Ham Radio presentations
- Winterfest 2021 presentation

- 4 area ham club talks
- 1 Women in Aviation presentation

Some events had over 2,000 attendees while others had 20.

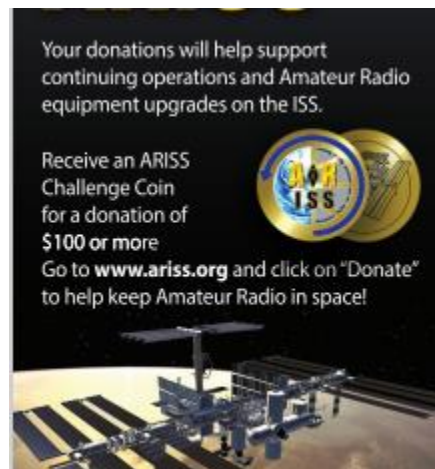
Chart from ARISS talk at ARRL Virginia Convention on getting kids in ham radio via ARISS



Ms. White invited VD Tharp to attend the world team ARISS-International Annual Meeting (virtual, 3 hours on 4 mornings), and shared the agenda. Morning meetings with a 3-hour time-zone difference for him made this difficult. (meetings start at 1100 UTC) Reports are online for those interested. Attending were 40 people from 14 states and 12 countries. Ms. White prepared an ARISS-US Region Report covering successes of the past 12 months.

ARISS Ads for QST and ARRL Web pages

ARRL-ARISS Committee had a *QST* ad created in 2020 to help ARISS solicit donations. Committee members discussed whether the 1/3-page ad needed updates and Mr. Bickell suggested working with the design team to create a 1/6-page version to allow more opportunities to insert ads. The ARISS team liked the second ad, too and thanked ARRL. Ads ran 3 times in *QST* in 2021—April, June, and July. Ms. White thanked the Committee and staff.



Last December, the Committee began discussing the creation of a slider ad to run occasionally on the ARRL home web page. This was picked up again in spring 2021. Ms. White submitted suggestions and Mr. Bickell began working the matter. In June 2021, the ad is now ready to run once an open spot is available.



Mr. Bickell asked Ms. White to provide URLs of good ARISS videos in order to update the ARRL ARISS web pages with newer material. She offered two to accommodate this. Mr. Bickell also added the new ARISS-USA donate URL to ARRL web pages.

Other Types of Cooperation between the Committee and ARISS

The Committee facilitates other types of cooperation between ARRL and ARISS. The next paragraphs describe examples.

NASA employees in Houston who are members of Johnson Space Center Amateur Radio Club were not allowed to hold functions at their Johnson Space Center (JSC) club facility due to Covid. The club petitioned to operate the ARISS ground station (due to its importance for ARISS school contacts) while social-distanced and masked. They were rejected. JSC ARC club officers asked in January for a letter of support from ARRL, stressing the need for club members to be allowed to operate the ARISS ground station for school contacts. VD Tharp worked with Ms. White and then ARRL President Roderick. An ARRL letter of support on ARRL letterhead was mailed to the JSC Center Director, the highest-level person at JSC. On June 24, 2021, this email arrived from the JSC ARC's leader: "We received approval yesterday from the JSC Center Director to reactivate the JSC-ARISS ground station. I think that your ARRL letter was very helpful in presenting the case, and the AMSAT letter, too."

Ms. White passes along names of ARISS teachers who are interested in Teachers Institute, after or before their ARISS contacts and related lessons. 6 names and email addresses were shared in February. In April, 14 more names were shared. In turn, Mr. Bickell passes along Teachers Institute who want to know more about ARISS. Two teachers from the Estes Park Elementary School had an ARISS contact in February 2021 and applied for TI. Students and teachers had stated interest in ham radio to their mentoring club, Estes Valley Amateur Radio Club. The club set up a June class for teachers and students to do ham radio activities and learn what's on the

ham radio license test. The following passed their radio exams: five students, two teachers, one IT staffer, and one adjunct educator.

Photo: Estes Park students in class, making QSOs



At times Mr. Bickell receives emails asking about ARISS details, such as about ARISS hardware or history. He forwards these ARRL emails to Ms. White who promptly answers them.

Ms. White provided VD Tharp with notes and photos for use in the ARRL Forum at SEAPAC.

ARRL staff aided Ms. White with facts on ARRL Field Day rules so she could write a news release on ARISS crossband repeater QSOs counting for the satellite contact bonus point.

ARRISS thanked ARRL for the generous funding it has provided for 2021.

Respectively submitted,

Mark J. Tharp, KB7HDX
ARRL ARISS Committee Chair

Rosalie White, K1STO
ARRL ARISS Representative



Appendix A:

ARISS Media Hits Forwarded for Posts on ARRL Web Pages in the Past Six Months:

Story about ham who volunteers his ham station as a ARISS telebridge radio station

https://www.kgw.com/article/news/local/portland-oregon-man-connects-kids-to-international-space-station/283-ec9e7ff2-8eec-411b-a825-866ebbca6e93?fbclid=IwAR3GUPeKiqym_ZmtTkAmc3le4zvjnBC0QSsa5kFG0kQ57TG6HbmHFUKrJzs

KJW-TV, Portland

Item on NASA spacewalk to fix things and replace antenna cable

<https://www.cbsnews.com/news/spacewalk-nasa-astronauts-international-space-station/>

CBS National News

Article on astronauts using ham radio to connect to people and not feel so remote

https://www.smithsonianmag.com/science-nature/how-do-astronauts-spend-their-weekends-space-180977480/?utm_source=pocket-newtab

Smithsonian magazine

Story on Red Hill School's ARISS contact, near Los Angeles CA

<https://abc7.com/international-space-station-red-hill-lutheran-school-tustin-iss/10331003/>

KABC-TV, L.A.

3 hits about hams who do balloon launches, including ARISS teachers

https://www.nbcrighnow.com/news/equinox-balloon-launch-connects-educators-around-the-globe/article_2f940e98-8aa5-11eb-9e35-77ce18d4f0f9.html

NBC in Yakima & Richmond WA, picked up by Fox News in Spokane

Video of ARISS on its 20 years of success

https://twitter.com/NASA_Johnson/status/1346562113909579776

NASA Twitter account

5 media hits, Bishop Guertin High School ARISS contact, Nashua NH: Boston's WCVB, *New Hampshire Union Leader*, Nashua's *The Telegraph*, WMUR-TV, New Hampshire NPR

<https://www.wcvb.com/article/new-hampshire-students-chat-with-international-space-station-astronaut/35605567>

<https://www.nhpr.org/post/nashua-students-connect-outer-space-home#stream/0>

https://www.unionleader.com/news/education/nashua-students-chat-with-astronaut-on-space-station/article_aacbe019-0397-569d-b439-4cb60ceaf4ed.html?block_id=868819&fbclid=IwAR11ocp6EOazMgpWp41rWxa6pe31pIYw4GbNZ7RylTe3KhzDbOeqoBZ17YE
<https://youtu.be/B0KtrKoTDjA>

4 media hits, Estes Park (CO) Elementary ARISS contact: Denver CBS, Denver NBC, the *EP Trail Gazette*, school district video
<https://www.youtube.com/watch?v=AnPkH2eJM-A>
<https://m.youtube.com/watch?v=keuMiucgVUk>
<https://denver.cbslocal.com/2021/02/26/shannon-walker-estes-park-elementary-school-students-astronaut>
<https://www.eprail.com/2021/02/24/local-kids-talk-with-members-of-international-space-station/>

3 media hits, Kennebunk (ME) ARISS school: *News Center Maine, Press Herald, Seacoast Online*
<https://www.newscentermaine.com/article/news/education/kennebunk-students-have-an-out-of-this-world-experience-talking-to-an-astronaut-aboard-the-iss/97-1a7a7bb5-19f9-4dbc-b353-e30b13c9f475>
<https://www.pressherald.com/2021/01/22/sea-road-students-chat-long-distance-to-astronaut-on-the-international-space-station/>
<https://www.seacoastonline.com/story/news/local/york-star/2021/01/22/sea-road-school-students-talk-astronaut-space/4175367001/>

ISS National Lab (INL) asked ARISS student to write blog after she earned her ham license
<https://www.issnationallab.org/blog/ariss-lydia-bennett-saint-francis-high-school/>
ISS National Lab blog, "ISS 360"

Photo from ISS National Lab blog: student got ham license, gets free ham club membership



News hit on the Lewis Center for Educational Research, selected for an ARISS contact
<https://www.vvdailynews.com/story/news/2021/05/22/lewis-center-selected-nasa-program-connects-students-international-space-station-astronauts/5225338001/>
Victorville (CA) *Daily Press*

2 hits on Savannah River Academy (GA) and ARISS STEM studies: WRDW-TV and *Augusta Chronicle*

https://www.wrdw.com/2021/05/05/columbia-county-students-launch-weather-balloon/?fbclid=IwAR0px9b-Y3x-rwzkMdxYBduOr5Jmv_k-cN8Z4sr9M_mGxWz4K2ZddvgG6g

4 media hits for Green Bank (WV) Elementary Middle School ARISS contact: Charleston's WDTV, WDBJ-TV, US Senator Manchin's web page, WV Metro News:

<https://www.manchin.senate.gov/newsroom/press-releases/manchin-applauds-pocahontas-county-school-chosen-for-contact-with-international-space-station>

<https://www.wdtv.com/2021/05/07/students-make-contact-with-astronaut/>

<https://www.wdbj7.com/2021/05/07/green-bank-students-talk-to-space-station/>

[Pocahontas County school gets out-of-world opportunity with space chat](#)

Story on Tarwater (AZ) Elementary School's upcoming ARISS contact

<https://santansun.com/2021/06/06/tarwater-students-to-chat-with-astronauts-in-space/>

San Tan Sun News