

# U.S. Team Status Report



*ARISS International  
Meeting  
NASA GSFC  
December 5, 2002*

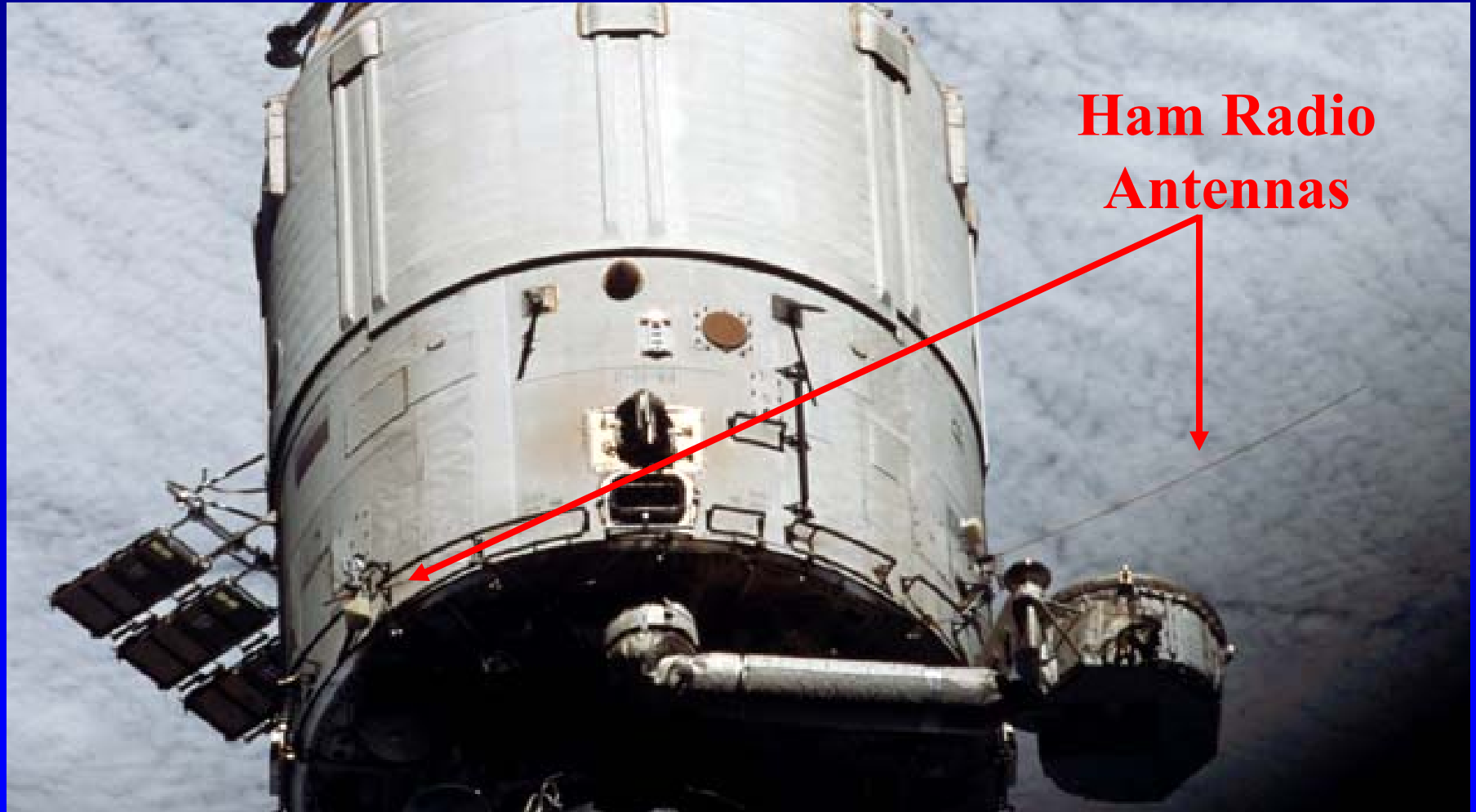
Frank H. Bauer, [ka3hdo@amsat.org](mailto:ka3hdo@amsat.org)

# 2002 Accomplishments

## Hardware Development & Deployment

- Remaining Phase 1 hardware developments (SSTV, speaker system and cable) nearly complete. Working towards March 03 on-orbit delivery
- Phase 2 hardware design development well underway. Russian and U.S. team's hardware roles defined and system interfaces developed. Roll-out of design specifics to be accomplished at this meeting
- 3 antenna EVA's (14 Jan, 25 Jan, 26 Aug) successfully completed and all 4 antennas deployed. Tremendous international teamwork

# WA3 and WA4 Antennas on Service Module



# **2002 Accomplishments (Continued)**

## **Educational Outreach**

- **38 school contacts performed in 2002—more internationally balanced**
- **Operations team (Charlie, AJ9N) developed statistics for school group successes**
- **Summer teacher developed ARISS educational lesson plans for future use by teachers and educators**

## **General Operations**

- **Worked with Russian team to install and checkout improved packet module**
  - **Supports “Instant messenger”-type APRS operations and Packet Mailbox functions**
- **Developed procedures and supported the initiation of the APRS “double hop” experiment**
- **Very balanced operations in 2002 (School contacts, General QSOs & Experimentation)**

# Mark Shuttleworth School Group



# Expedition 4 Crew

## December 5, 2001-June 7 2002



- EVAs--External antennas on Service Module
- 2nd packet module RS0ISS
- Lots of school contacts

Daniel Bursch, KC5PNU, Yury Onufrienko, KC5TIE, Carl Walz, KC5TIE

# Expedition 5 Crew

## June 7, 2002-Present

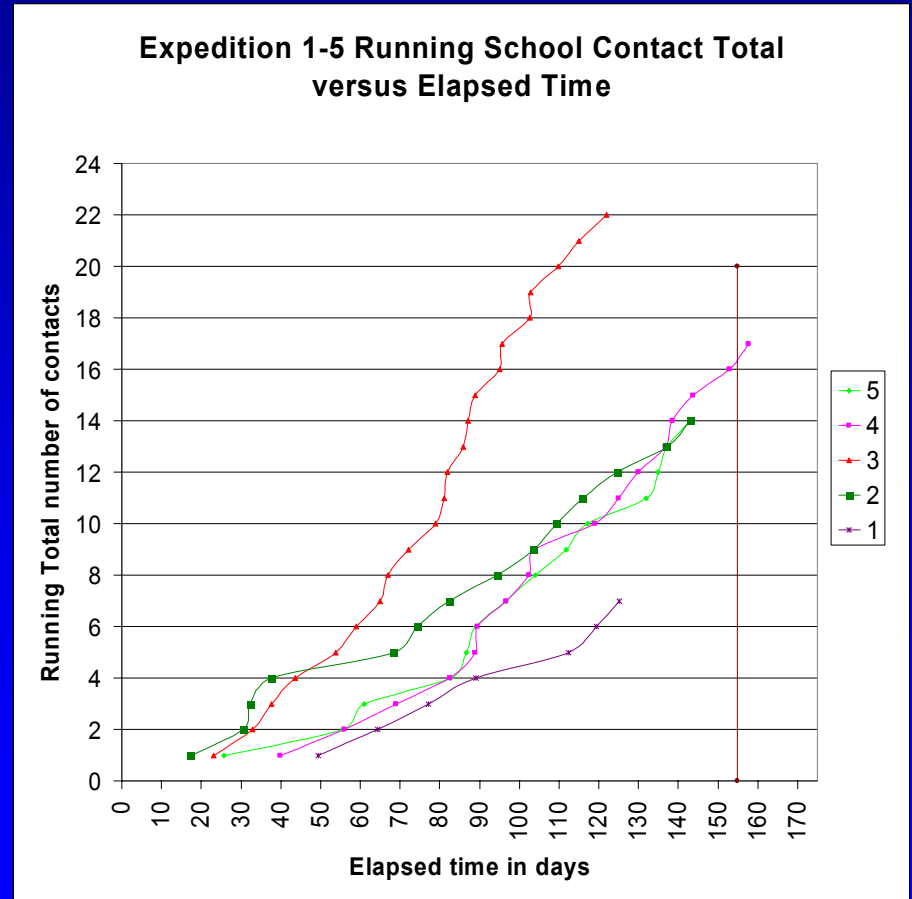


- EVA to install final 2 antennas on Service Module
- Mark Shuttleworth computer interfaced to packet system
- Lots of school contacts, general contacts and packet e-mails
- Field day and JOTA

**Commander Valery Korzun, RZ3FK**

# School Statistics

Crew Expedition	School Contacts
1	7
2	14
3	22
4	17
5	14
Tourists/Taxi Flights	6





# **2002 Accomplishments (Continued)**

## **Training**

- **Supported U.S.-based training of Expedition 5 and 6 team**
- **Supported U.S.-based training of November Taxi flight members (Frank DeWinne and ex-member Lance Bass)**
- **CD's developed for crew to experience on-orbit QSOs and to hear student Q&As**
- **Developing training plans and materials for US-based training**

## **General Outreach/PR**

- **Supported IMAX debut at Air and Space Museum and at Moody Gardens, Galveston**
- **Wrote and presented 2 papers (hardware and educational) for 2002 World Space Congress**

## **General**

- **Developed draft roles and responsibilities document for US team**

# SPACE STATION 3D

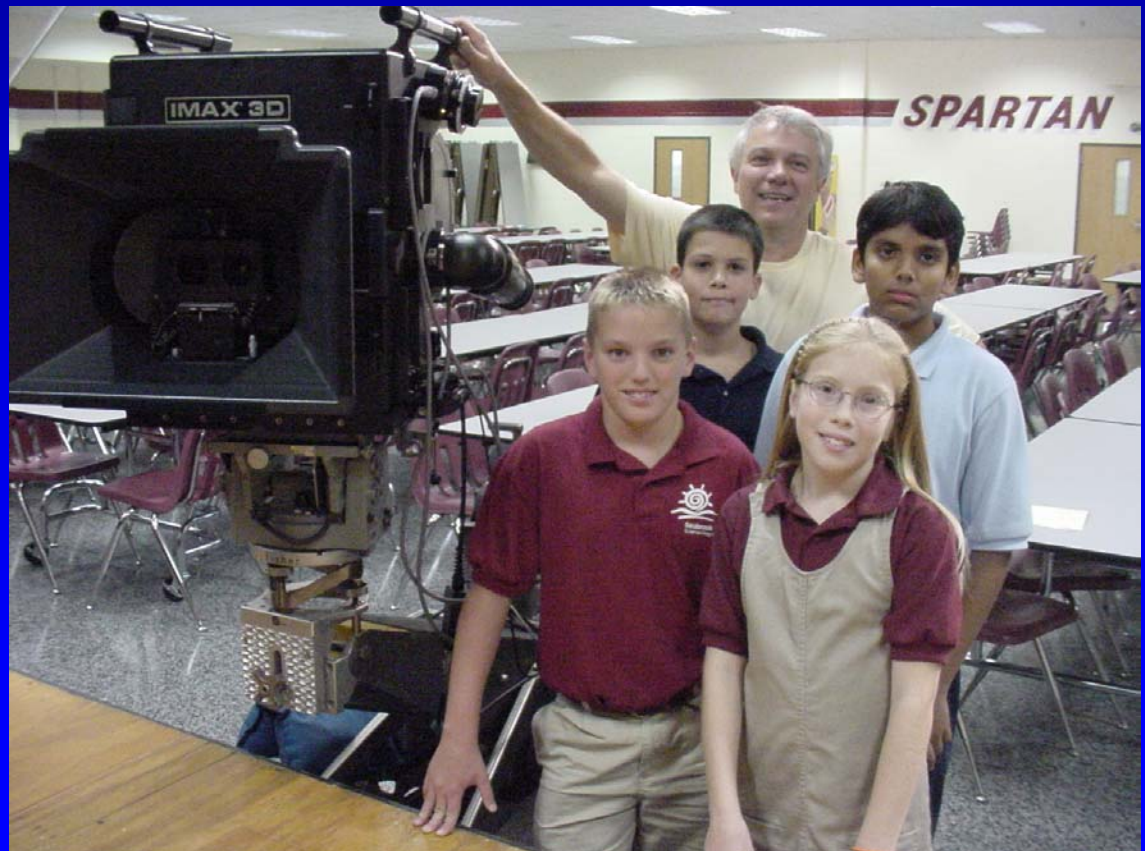
NARRATED BY  
TOM CRUISE



COMING SOON

OPENS 6 JUNE IN SYDNEY  
13 JUNE IN MELBOURNE

## Amateur Radio Debuts on 3D IMAX Film





ARSS provides School Groups an 8 to 10 minute opportunity to talk to the astronauts and cosmonauts on-board ISS. To date, over 50 schools have participated.

**U.S. SPONSORS**

- National Aeronautics and Space Administration (NASA)
- American Radio Relay League (ARRL)
- Department of Education
- Department of Defense
- Department of State
- Department of Commerce
- Department of Energy
- Department of Health and Human Services
- Department of Justice
- Department of Transportation
- Department of the Interior
- Department of Agriculture
- Department of Veterans Affairs
- Department of Housing and Urban Development
- Department of Labor
- Department of the Environment
- Department of the Treasury
- Department of the Army
- Department of the Navy
- Department of the Air Force
- Department of the Coast Guard
- Department of the Marine Corps
- Department of the Space Force

**INTERNATIONAL SPONSORS**

- Canada
- France
- Germany
- Italy
- Japan
- Korea
- Mexico
- Russia
- United Kingdom
- United States
- Australia
- Brazil
- China
- India
- Israel
- South Africa
- Spain
- Sweden
- Switzerland
- Taiwan
- Thailand
- United Arab Emirates
- United Kingdom
- United States
- Australia
- Brazil
- China
- India
- Israel
- South Africa
- Spain
- Sweden
- Switzerland
- Taiwan
- Thailand
- United Arab Emirates

**ARSS PAYLOADS**

- ARSS-1
- ARSS-2
- ARSS-3
- ARSS-4
- ARSS-5
- ARSS-6
- ARSS-7
- ARSS-8
- ARSS-9
- ARSS-10
- ARSS-11
- ARSS-12
- ARSS-13
- ARSS-14
- ARSS-15
- ARSS-16
- ARSS-17
- ARSS-18
- ARSS-19
- ARSS-20

**ARSS CONTACTS**

- ARSS-1: 147.000 MHz
- ARSS-2: 147.000 MHz
- ARSS-3: 147.000 MHz
- ARSS-4: 147.000 MHz
- ARSS-5: 147.000 MHz
- ARSS-6: 147.000 MHz
- ARSS-7: 147.000 MHz
- ARSS-8: 147.000 MHz
- ARSS-9: 147.000 MHz
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**ARSS WEBSITE**

[www.arss.org](http://www.arss.org)

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# ARISS

## Amateur Radio on the International Space Station

### ARISS OVERVIEW

ARISS provides School Groups an 8 to 10 minute opportunity to talk to the astronauts and command on-board ISS. To date, over 50 schools have participated.

### ARISS OBJECTIVES

- Promote Interest In Amateur Radio
- Spark Student's Interest In Science & Technology
- Human Spaceflight Awareness
- Create Family Contacts
- Experimentation

### ARISS CAPABILITIES

**CURRENT**

**UPCOMING**

**FUTURE**

### INTERNATIONAL PARTNERS

- New International Partners: Spain, Canada, France, Germany, Italy, Netherlands, Japan, Korea, and the U.S.
- MOU - Formed ARISS to Engage Amateur Radio Community to the ISS Program
- Working Together to Develop and Operate Amateur Radio on ISS

### U.S. SPONSORS

National Aeronautics and Space Administration (NASA)

AMSAT - American Radio Amateur Satellite Corporation (AMSAT)

For More Information: [ariss.nasa.gov](http://ariss.nasa.gov)

<http://spaceflight.nasa.gov/mission/reference/radio/index.html>

Equipment on the table includes:

- A laptop computer
- A radio antenna on a tripod
- Various cables and connectors
- Handheld radios
- Other electronic components

AMSAT

AMSAT

AMSAT



## ARISS OVERVIEW



Susan Helms, KC7NHZ, talks to students using ARISS



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- Radio Amateur Satellite Corporation (AMSAT)

### INTERNATIONAL PARTNERS

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# ARISS

## Amateur Radio on the International Space Station

## ARISS OBJECTIVES

Spark Student's Interest In Science & Technology



Promote Interest In Amateur Radio



Human Spaceflight Awareness



Crew Family Contacts



Experimentation



Crew Psychological Ops



## WORLDWIDE TELEBRIDGE FACILITIES

Volunteer telebridge stations enable ARISS contacts to schools that could not guarantee a successful direct contact, due to visibility or technical concerns



## ARISS CAPABILITIES

### CURRENT



Computer-to-Computer Radio Links

2-Way Voice

### FUTURE



Real-Time Experiment & Technology Experiments



Amateur TV



Express Pallet

### UPCOMING



Slow Scan TV



New Antennas



For More Information:  
ariss.gsfc.nasa.gov  
<http://spaceflight.nasa.gov/station/reference/radio/index/html>





# ARRISS

Amateur Radio on the International Space Station



## ARRISS OVERVIEW



ARRISS provides a unique opportunity for students to communicate with the International Space Station (ISS) and other spacecraft in orbit. This program is designed to engage students in hands-on learning and to provide them with a real-world experience in space exploration.

## ARRISS OBJECTIVES



ARRISS objectives include providing students with a hands-on learning experience, promoting teamwork and communication skills, and providing a real-world experience in space exploration. The program is designed to be accessible to students of all ages and backgrounds.

## ARRISS CAPABILITIES



ARRISS capabilities include providing students with a hands-on learning experience, promoting teamwork and communication skills, and providing a real-world experience in space exploration. The program is designed to be accessible to students of all ages and backgrounds.

SATELLITE RECONNAISSANCE



SATELLITE RECONNAISSANCE

3

ARSS CAPABILITIES

CURRENT

FUTURE

UPCOMING

TELEBRIDGE FACILITIES

Telebridge Communications Links

"We've spent billions during the cold war to build up our space... but if nothing else had come from that program except the knowledge that we got from our satellite photography, it would be worth the price to us what the whole program has cost. Because tonight I know how many missiles the enemy has and... our games were way off. And we were doing things that we didn't need to do. We were building things that we didn't need to build. We were burning lives that we didn't need to burn."

President Lyndon B. Johnson, 1967

SECRET EYES IN SPACE

Photographs taken by satellites in orbit... provide a view of the Earth from space that is... completely different from anything we could see from the ground.

AMSAT  
Perry Klein, W3PE

SOYUZ: AFTER THE MOON RACE







Promote Interest In Amateur Radio

ARIS

Computer-to-Computer Radio Links

UPCOMING

2-Way Voice

Star Scan TV

New Antennas

WORLDWIDE TELEBRIDGE FACILITIES

Telebridge Communications Links

Telebridge for ARIS schools that

For more information

ESA



# ARISS OBJECTIVES

Spark Student's Interest In Science & Technology



Promote Interest In Amateur Radio



Human Space Awareness



Experimentation

## INTERNATIONAL PARTNERS

Nine International Partners thus far - Belgium, Canada, France, Germany, Italy, Netherlands, Japan, Russia, and the U.S.  
MOU - Formed ARISS to Represent Amateur Radio Community to the ISS Program  
Working Together to Develop and Operate Amateur Radio on ISS



For more information visit <http://spaceflight.nasa.gov>



# ARISS CAPABILITIES

## CURRENT



Computer-to-Computer Radio Links

## UPCOMING



Slow Scan TV

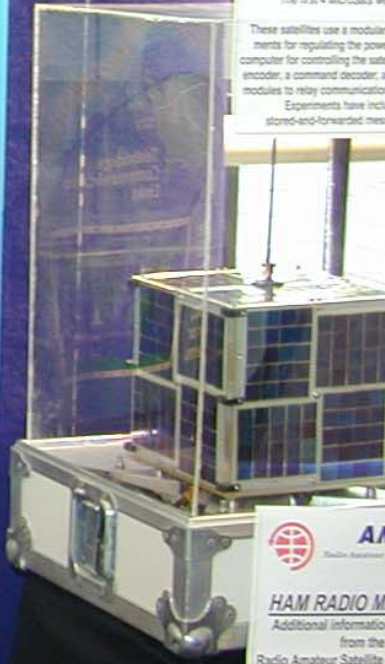
## FUTURE



Real-Time Assessment Technology Experiment



Slow Scan TV



This is a test model of one of a series of satellites built by amateur radio operators for the International Space Station. The first 4 MicroSats were launched in 2000.

These satellites use a modular architecture for regulating the power, a computer for controlling the satellite, an encoder, a command decoder, and modules to relay communications. Experiments have included store-and-forward messaging.

**HAM RADIO MUSEUM**  
Additional information from the Radio Amateur Satellite Office at: [www.amsat.org](http://www.amsat.org)



/radio/index.html

Volunteer telebridge stations enable AMSAT contacts to schools that could not guarantee a successful direct contact, due to visibility or technical concerns

Links

Express Pallet

ILITIES



AMSAT

RADIO MICROSAT

Information is available from the Amateur Satellite Corp. (AMSAT) at [www.amsat.org](http://www.amsat.org)





Interview

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Susan Helms, KC7NHZ, talks to students using ARISS

# ARRISS OBJECTIVES

Spark Student's Interest In Science & Technology



Promote Interest In Amateur Radio



Human Spaceflight Awareness



ITC Re Experimentation

Crew Psy

# ARRISS CAPABILITIES



Computer-to-Computer Radio Links

UPCOMING



FUTURE



# TELEBRIDGE FACILITIES

Telebridge Communications Links



For More Information  
[ariss.gsfc.nasa.gov](http://ariss.gsfc.nasa.gov)  
[www.nasa.gov/stationref](http://www.nasa.gov/stationref)



SOVIET SPACE



THE PEROT



IMAX 3D

A large movie poster for 'IMAX SPACE STATION 3D'. The poster features a close-up of an astronaut's helmet with the Earth visible in the reflection. The text on the poster includes:

**IMAX**  
**SPACE STATION 3D**  
A SELECT FEW HAVE BEEN ABOARD...  
NOW IT'S YOUR TURN!

THE FIRST  
IMAX 3D  
SPACE FILM  
EVER!

Presented by  
**LOCKHEED MARTIN**  
in Collaboration with

**NARRATED BY TOM CRUISE**  
DIRECTED AND FILMED IN SPACE BY THE ASTRONAUTS OF THE INTERNATIONAL SPACE STATION

WWW.IMAX.COM

DAILY DEPARTURES. GET YOUR TICKET.

CAT

# Top-Level Concerns

- Limited opportunities to interact with on-orbit crews when issues or problems arise
- Learning of several hardware development proposals, using ham frequencies, without our knowledge or support
  - Not in the spirit of why ARISS was formed---to be the single focus for all amateur radio development and ops on ISS
- Key volunteers (e.g. School Ops lead, Hardware Lead, etc) susceptible to burnout. Others (PR leadership, etc) non-existent. Need to augment/add support in these areas