

# INTERNATIONAL SPACE STATION (IIS)

## SLOW SCAN TV BROADCAST (SSTV)

2021

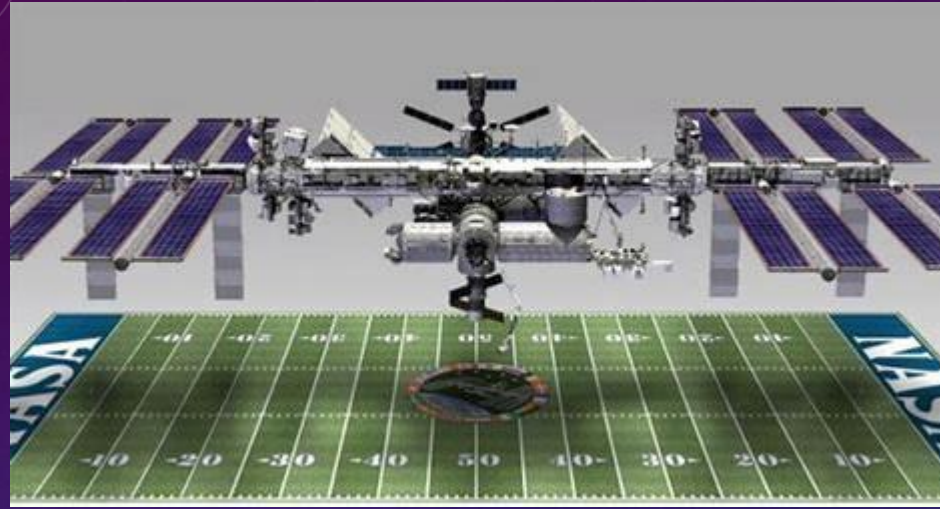
4 JAN 22

BY ED OTTO KC3RFX



# FACTOIDS

- Size of a Football field
- 1<sup>st</sup> ISS component launched 1998
  - 22+ years of continuous human occupation
- ~261 miles above the Earth – 93 min orbit
  - Low compared to Geostationary satellites ~ 22,000 miles
- Living area about the size of a 6-bedroom house
- 3<sup>rd</sup> brightest object in the night sky
- Easy to spot and track at night
  - Location and altitude vary





# ISS RADIO

- ISS Broadcast 12 SSTV images
  - From the Russian module
  - Usually over Christmas week
  - Frequency for SSTV 145.800 MHz
  - 2 Minutes per image 1 Minute rest
- ISS has many radios and modes
  - FM U/V Repeater, APRS etc
- ISS radios are not always on – Check first
  - Turned off when docking etc
- Check websites:
  - [Current Status of ISS Stations – ARISS](https://www.ariss.org/current-status-of-iss-stations.html)
  - [AMSAT OSCAR Satellite Status](#)
  - Many Satellites not just ISS

https://www.ariss.org/current-status-of-iss-stations.html

## Current Status of ISS Stations

as of December 29, 2021

**Columbus Module radios:**

- IORS (Kenwood D710GA) – **STATUS - Configured**. Current mode set to packet operation (145.825 MHz up & down). Next mode change to support cross band repeater (145.990 MHz up {PL 67} & 437.800 MHz down) targeting Jan 4.
- Power down Jan 6 for COL experiment support. **OFF** Jan 6 at 10:10 UTC. **ON** Jan 6 at 12:10 UTC.
- Power down Jan 19 for Russian EVA.
- Supporting USOS scheduled voice contacts, packet and voice repeater ops.

**Service Module radios:**

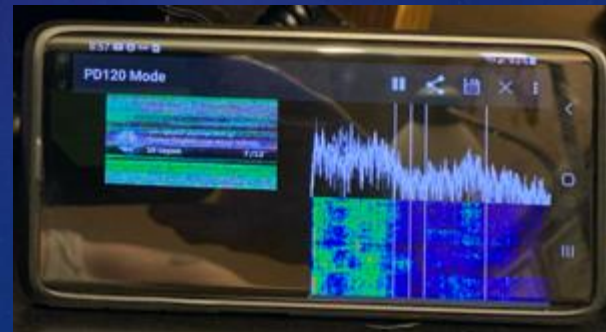
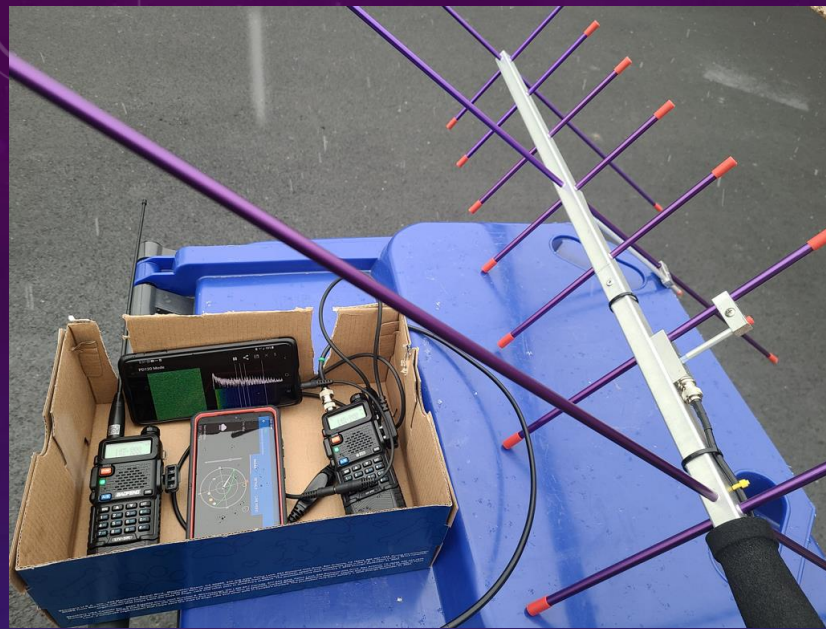
- Kenwood D710E – **STATUS** - Radio usually off.
- SSTV activation planned for Dec 26-31. Details at [ariss-sstv.blogspot.com/](https://ariss-sstv.blogspot.com/)
- Power down Jan 19 for Russian EVA.
- Supporting ROS scheduled voice contacts and SSTV.

Astronaut Peggy Whitson, Expedition 5 Flight Engineer, holds one of the Amateur Radio antennas prior to installation on the ISS. The antenna is one of a series of four which were clamped on handrails around the Russian Service Module (Svesda). This was done during two different EVA's conducted by Russian cosmonauts in January and in August 2002.

Transponder/Repeater	active	Telemetry/Beacon only	No signal	Conflicting reports	ISS Crew (Voice) Active	
Name	Dec 31	Dec 30	Dec 29	Dec 28	Dec 27	Dec 26
CUTE-1	1	1	1	1	2	1
LilacSat-2	1	1	1	1	2	1
ES-3	1	1	1	1	1	1
XW-3	1	1	1	1	1	1
[A]_AO-7	1	1	1	1	1	1
[B]_AO-7	1	1	1	1	1	1
XI-V	1	1	1	1	1	1
AO-92 L/V	1	1	1	1	1	1
AO-92 U/V	1	1	1	1	1	1
AO-95 U/V	1	1	1	1	1	1
NO-103	1	1	1	1	1	1
TO-108	1	1	1	1	1	1
AO-109	1	1	1	1	1	1
[B]_UO-11	1	1	1	1	1	1
LO-19	1	1	1	1	1	1
RS-25	1	1	1	1	1	1
IO-26	1	1	1	1	1	1
AO-27	1	1	1	1	1	1
EO-29	1	1	1	1	1	1
XW-2A	1	1	1	1	1	1
XW-2B	1	1	1	1	1	1
XW-2C	1	1	1	1	1	1
XW-2D	1	1	1	1	1	1
XW-2E	1	1	1	1	1	1
XW-2F	1	1	1	1	1	1
CAS-2T	1	1	1	1	1	1
NO-44	1	1	1	1	1	1
RS-44	1	1	1	1	1	1
CAS-4A	1	1	1	1	1	1
CAS-4B	1	1	1	1	1	1
SO-50	1	1	1	1	1	1
AO-73	1	1	1	1	1	1
IO-86	1	1	1	1	1	1
EO-88	1	1	1	1	1	1
AO-91	1	1	1	1	1	1
JO-97	1	1	1	1	1	1
EO-99	1	1	1	1	1	1
UVSQ-SAT	1	1	1	1	1	1
ISS-FM	1	1	1	1	1	1
PO-101[FM]	1	1	1	1	1	1
QO-	1	1	1	1	1	1
100_NB	1	1	1	1	1	1
DUCHIFAT1	1	1	1	1	1	1
ISS-DATA	1	1	1	1	1	1
ISS-DATV	1	1	1	1	1	1
ISS-SSTV	1	1	1	1	1	1

# EQUIPMENT

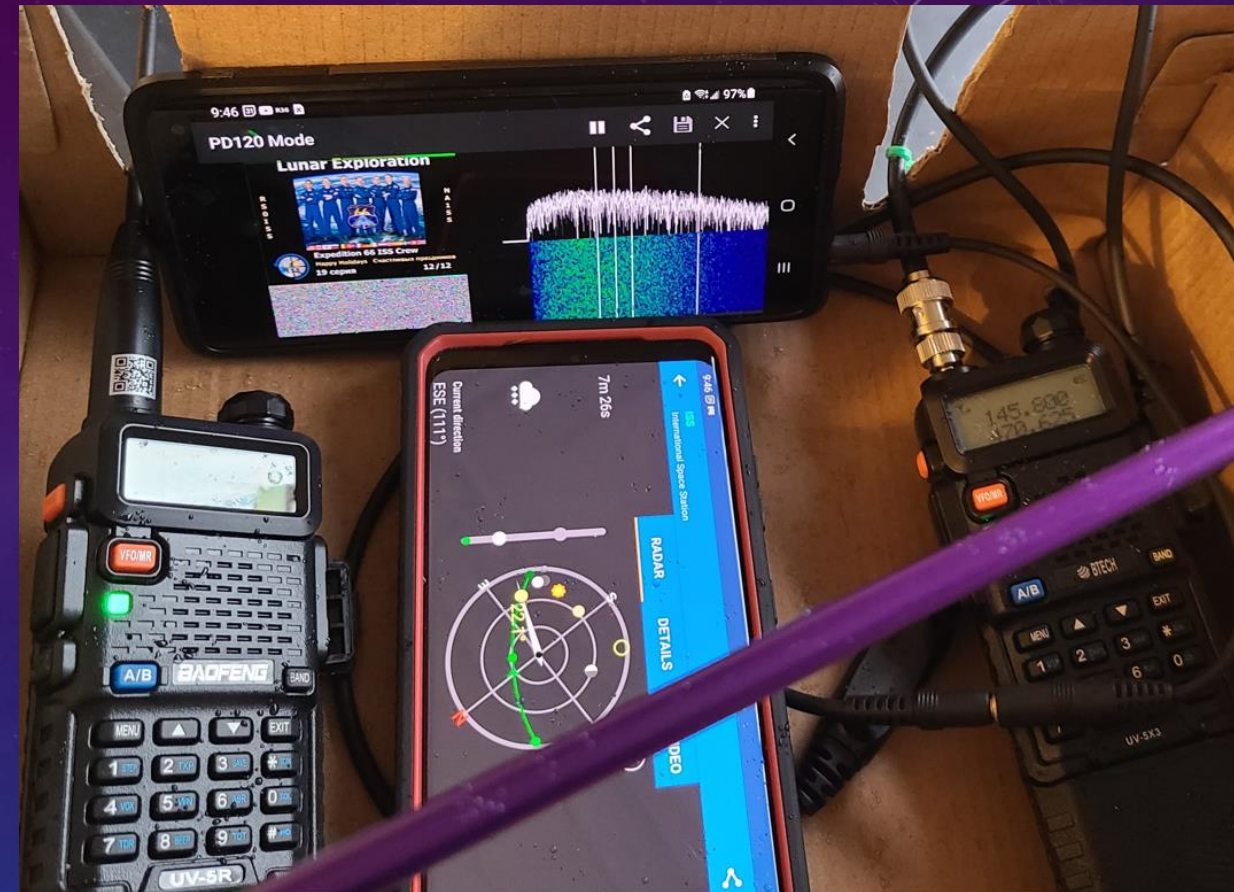
- Baofeng UV-5R HT
- BTECH UV-5x3 HT (need 1)
- Baofeng APRS Audio cable
- Free Android apps:
  - ISS Detector
  - Robot36
- Arrow Handheld UHF VHF Antenna
- 2 Cell phones. Old ones with WiFi okay





# SUCCESSFUL CONNECTIONS

- Connect Audio cable to Android cell phone
- Set Robots36 Mode to the PD-120 Standards Protocol
- Load the ISS Tracking app – look for pass greater than 35 degrees. Higher the better
- Tune to 145.800 MHz (no Doppler adjustments)
- With calibrated phone compass, the tracking app tells you exactly where to point the antenna.
- Once you see the received signal keep the frequency spectrum graph clean and follow track for ~2 minutes to capture the full image.
- If you get only a partial image, wait one minute and another image will start, hit the X Icon to start a new image capture.





# CAPTURED IMAGES OVER MULTIPLE ORBITS





# NOT SO SUCCESSFUL CONNECTIONS & OPTIONS

- Robots36 can use the microphone to receive audio
  - Eliminates need for the Baofeng Audio cable
  - Blurry images resulted in my trials
- Using Shack transceiver with fixed Quarter-Wave VHF antenna
  - Received good signal on high pass (80 deg) but unable to sustain connection.
- Audio can be recorded and played back into the software with less ambient noise
- Can use Rubber Duck or 19" whip antenna.
  - Keep perpendicular to ISS as you track



# AWARD

- Upload Image to website
- Fill out form
- Validated/verified contact
- Emailed award

## Lunar Exploration Исследование Луны



### ARISS SSTV Award

№ 190471

**Edward T. Otto KC3RFX**

Received SSTV images from the ISS commemorating Lunar exploration. The images were sent via an amateur radio system installed on the Russian Segment of the International Space Station.  
Принял SSTV изображения с МКС, посвященные исследованию Луны. Изображения были отправлены через радиоловительскую систему установленную на Российском сегменте Международной космической станции.

**Руководитель Радиоловительской  
Деятельности на МКС**  
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**ARISS SSTV Award Manager**  
Sławomir Szymanowski SQ3DOK



### RSOISS NA1SS

December 26 - 31, 2021

**Amateur Radio on the International Space Station**  
Любительское радио на борту Международной космической станции



QUESTIONS?

