



Receiving HamTV from the ISS

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HAMTV Receiver Stations
Georhilly Dashboard & ISS Tracker

GOONHILLY - Cornwall, UK	Primary Receiver	Receiving Data
EL: 23.0°		
MOONY - Southampton, UK	Primary Receiver	Receiving Data
EL: 46.4°		
F602P - Migné-Azances, FR	Primary Receiver	Receiving Data
EL: 31.4°		
PA3WEG - Delft, NL	Primary Receiver	Receiving Data
EL: 78.9°		
IK1SLD - Casale Monferrato, IT	Primary Receiver	Receiving Data
EL: 23.4°		

Streaming provided by BATC

Buffering a lot? Try Lower Bandwidth

An ARISST contact with Space Center Houston, Houston, TX is scheduled for 13th June 1519 UTC.







HamTV

-  The original HamTV unit was installed on the ISS in 2013 and commissioned in April 2014
 - used for Tim Peake ARISS contacts in 2016
-  Unit failed in 2019 and was shipped back to Kaiser Italia for repair.



Current status

-  Unit has been repaired and is finally back with NASA awaiting flight back to the ISS
-  Due to fly on Antares NG-19 launch
 - Original plan was April, latest estimate is August
-  Then needs to be installed and commissioned by trained astronaut....
-  But hopefully we can have some fun before the end of 2023
 - Space schedules only ever move to the right!

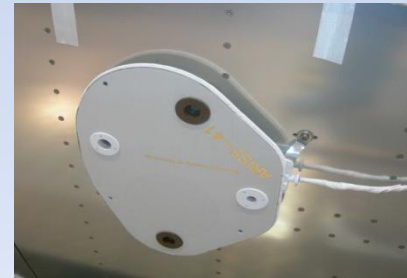
HamTV repairs

- The original unit has been repaired**
 - Not known what the problem was
 - Changes made to correct the DVB service information
- Still running DVB-S MPEG2 on 2395MHz**
 - Not known which camera will be used
- An HDMI test pattern generator has been built but will not be included at this stage**
 - Blank raster will be transmitted when camera not plugged in



HamTV antennas

- HamTV runs 5 watts maximum to a simple patch antenna on the ISS.**
 - This patch antenna is located on the earth side of the ISS but is surrounded by solar panels etc...
- The ISS “flies” slightly nose down to protect the cupola windows from space debris**
- RF performance, particularly when it is rising from the west, is slightly unpredictable.**






How to receive - antennas

- It is possible to receive HamTV on a simple antenna when ISS is overhead
- Higher gain required for more than 5 minutes
- 1.2mt dish is optimum
 - Smaller dishes are easier to track
- Transmissions are Right hand Circular so in theory a POTY may be able to receive the ISS

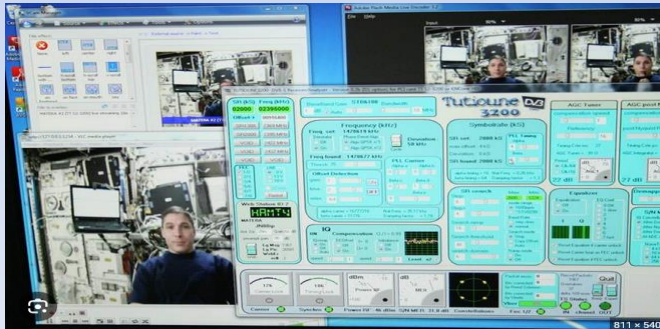




Pre-amp and filter

-  An LNA with a 2395MHz BPF at masthead
-  2395MHz is only 5MHz below the 2.4GHz wifi band!
 - Good filtering required
-  A downconverter will be needed if not using a Serit 4434 NIM

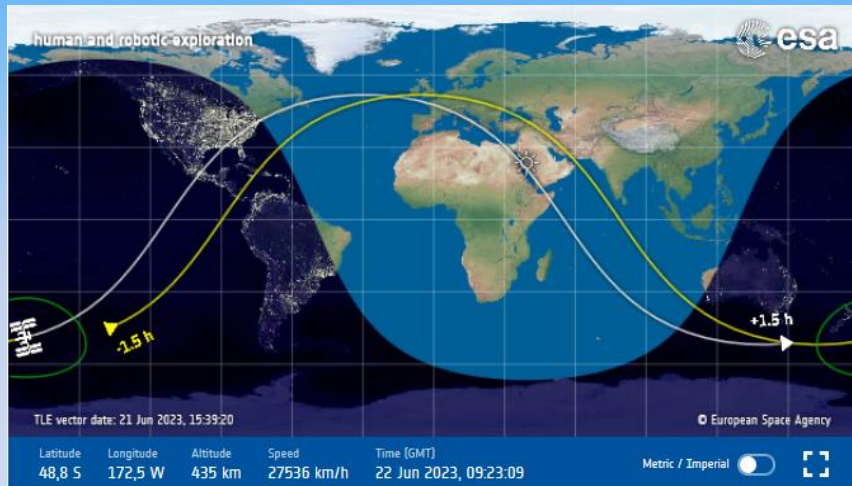
Receivers



- Any DVB-S receiver may work
 - SI error is corrected
- Cannot “scan” for the signal before the pass
- Receiver designed for DATV is best
 - BATC Ryde, Portsdown and Longmynd have been tested and will receive HamTV
 - Minitoune and OpenTuner software

Tracking the ISS

- It's not like QO100!
 - The ISS moves at 27,358 Kilometer per hour!
 - A pass lasts maximum of 11 minutes
- A 1.2 mt has a beam width of approx 6 degrees
- The dish needs to track it very accurately in all planes



Tracking the ISS

- BATC
 Antennas need to be mounted on an X-Y rotator
 - Yaesu GR5600
- BATC
 Computer controlled tracking
 - PST rotator
- BATC
 Track the sun to test your dish system
- BATC
 Use a noise power meter to measure sun noise
 - Portsdownt
 - Minitiouner
- BATC
 Test your receive system with a local signal on 2395MHz



The image shows four windows from a satellite tracking application:





- Satellites Tracking:** Shows radio parameters for tracking the ISS (IZOYA).

Mode	ISS
TX	29.190000
Mode	FM
VFO	IDCA 1X88
Downlink - UpLink (Hz)	145.800.000 FM
Linkage	145.801.110 145.199.800
- Predict:** A table showing predicted passes for ISS (IZOYA).

Date	AOB	LOS	EL	Mag
2015-11-20	09:07:53	09:07:53	15	94.184
2015-11-20	11:02:51	11:02:51	05	7.47024
2015-11-20	12:04:18	13:08:56	23	0.04708
2015-11-20	14:17:10	14:08:18	24	0.04708
2015-11-20	16:01:04	16:01:07	51	1.14708
2015-11-20	17:04:49	17:59:51	22	0.04708
2015-11-21	08:04:08	08:04:09	06	7.47024
2015-11-21	09:01:51	09:01:54	48	0.04708
2015-11-21	11:57:10	12:07:54	94	0.04708
- PaRotator:** Shows a circular display for the rotator's position and various control buttons like 'GO to Location', 'STOP', and 'PARK'.
- Satellites Map:** A world map showing the current location of the ISS (IZOYA) over the Pacific Ocean.



When will HamTV be on?

-  We don't know!
-  In 2016 mainly used for ARISS schools contacts
 - Transmitter was on at other times but no video
-  Once commissioned it will be tested before contacts
-  It will be added to the Amsat status page
 - <https://www.amsat.org/status/>

Transponder/Repeater active	Telemetry/Beacon only	No signal	Conflicting reports	ISS Crew (Voice) Active		
Name	Jun 22	Jun 21	Jun 20	Jun 19	Jun 18	Jun 17
AO-109						
AO-27						
AO-73		11				
AO-7(A)						
AO-7(B)		11	12	1	1	
AO-91	1	1	3	3	2	1
AO-92 U/v			1	4	2	2
CAS-4A						
CAS-4B						
DUCHIFAT3						
EO-88		1	2			
FO-118[V/u FM]						
FO-118[V/u]						
FO-29						
FO-99						
HO-113						
IO-117						
IO-86						
ISS-DATA						
ISS-FM						
JO-97						
LilacSat-2						
LO-19						
NO-44						
PO-101(FM)						
QO-100 NB						
RS-44						
SO-50						
Taurus 4						



TS merger system

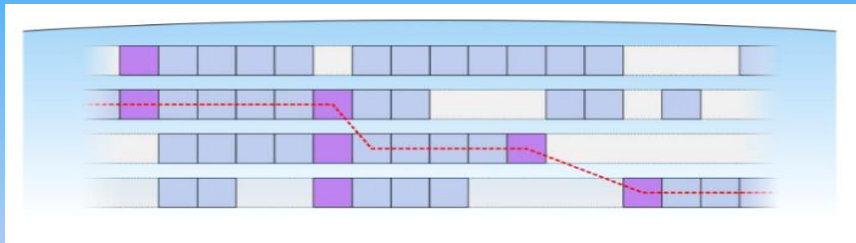
BATC Once HamTV is active from ISS
BATC will be running the TS merger system.

- A server which combines the UDP outputs from several ground stations

BATC Enables continuous video stream from the ISS

- Typically 25 mins over Europe

BATC We will be looking for ground stations to join the network



The screenshot shows the HAMTV Receiver Stations dashboard. On the left, a live video feed shows a man in a blue shirt and headset, with the text "HAMTV is live!" and "Streaming provided by BATC". Below the video, it says "Buffering a lot? Try Lower Bandwidth". On the right, a list of ground stations is shown, each with a "Prime Receiver" status and "Receiving Data" indicator. The stations listed are:


Station	Location	EL	Status
GOONHILLY	Corwall, UK	23.0°	Receiving Data
MODNY	Southampton, UK	46.4°	Receiving Data
F60ZP	Migné-Auxances, FR	31.4°	Receiving Data
PA3WEG	Delft, NL	78.9°	Receiving Data
IK1SLD	Casale Monferrato, IT	23.4°	Receiving Data

At the bottom, a text box states: "An ARIS contact with Space Center Houston, Houston, TX is scheduled for 13th June 1519 UTC."



BATC

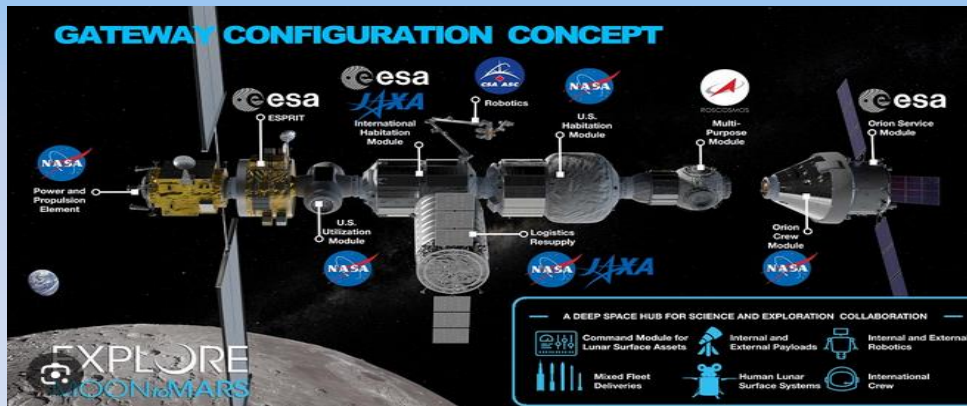
HamTV first live video

 First live video
received by
G4KLB on 13/4/14



Beyond the ISS

- Next project is Lunar Gateway
 - Platform orbiting the moon
- There is an opportunity for amateur capability on the platform
- BATC and ARISS actively looking at digital communication systems to simultaneously transmit data, voice and video in low or high data rates.





Questions?