

# ARISS HamTV Status & TS Merger

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# HamTV

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# HamTV Technical Overview

- S- & L-band Antennas mounted to ESA Columbus Module – Launched 2008
- HamTV Transmitter built & certified for ARISS by Kayser Italia
- Transmitter upmassed to Columbus Module in 2013
- NTSC Composite & Audio Input
- DVB-S, 2.0MS/s, 2395MHz, 10W EIRP
  - MPEG-2 Video @ ~900kbps
  - MP2 Audio @ 256kbps
- S-Band patch antenna on Columbus Module exterior



# HamTV in Contacts

- Normally camera is disconnected, transmits a black screen with audio system hiss.
- Astronaut plugs in Camera for ARISS Contact passes
- Can give live demonstrations, and wave!



# HamTV Current Status

- Aug 2017 – VHF Radio Failure in Columbus
  - Kenwood D710 planned to be upmassed before end of 2018
- April 2018 – HamTV Transmitter malfunction, no RF Heard.
  - Reconfiguration today at 1725 – 1755 UTC
  - Watch for received Signal on <https://live.ariss.org/hamtv/>
- If no success – Transmitter planned to be repaired on the Ground and then returned to the module, hopefully no re-certification so quick (in manned-spaceflight terms!)

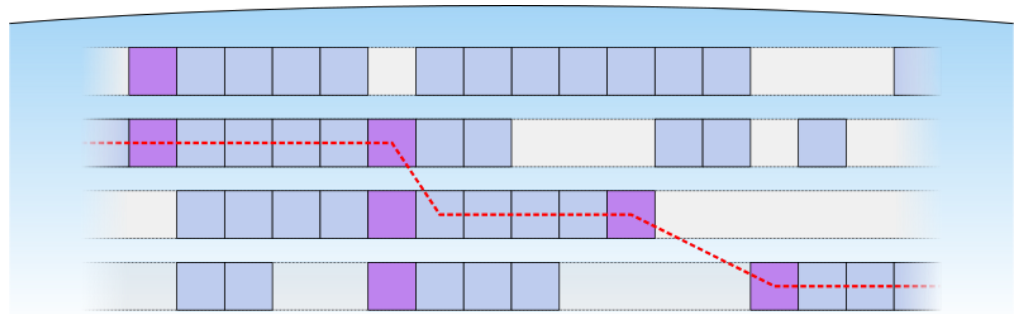
# Ground Station Co-operation

- Reception of moving station presents several challenges
  - Tracking Accuracy
  - Local Interference
  - Local obstructions
  - Space Station obstructions
- Multiple geographically-spaced ground stations
- One feed to School / Venue



# TS Merger System

- MPEG-TS is packetised
  - 188 Byte Packets
  - Some packets have PCR timestamp ( $\sim 1/50$ )
- PCR is used to synchronise ground station feeds
- 100ms delay to aggregate data from stations
- Most complete segment is copied to output buffer



# TS Merger Inputs & Outputs

- Input: MPEG-TS over UDP
  - live.ariss.org port 5678
- Output: MPEG-TS over TCP
  - live.ariss.org port 5679
- Public Webpage Viewer
  - <https://live.ariss.org/hamtv/>
  - HTML5 Live Stream
  - Live Ground Station Status



The screenshot shows the ARISS website interface. At the top, there is a navigation bar with links for "Live Webcast", "ISS Dashboard", "HAMTV Receivers", and "ISS TLE". The main content area is titled "HAMTV Receiver Stations" and includes a sub-header "Europe - Australia - Japan". Below this, a list of receiver stations is displayed, each with its call sign, location, and coordinates. The stations listed are:

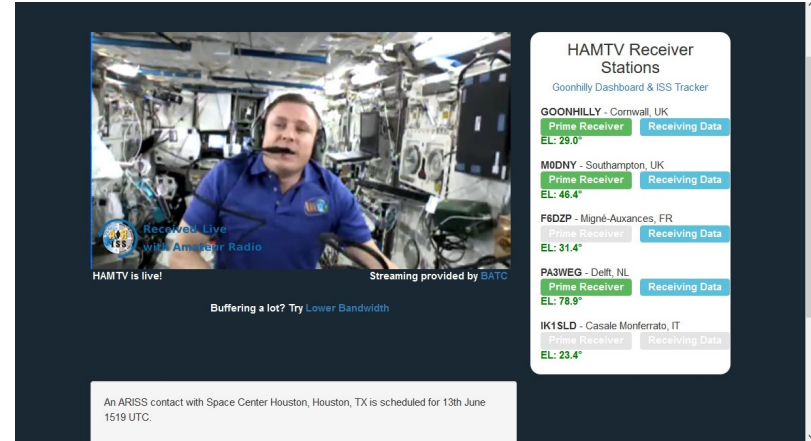
Call Sign	Location	Prime Receiver	Rate	EL
GOONHILLY	Cornwall, UK	Prime Receiver	0.00kpps	-38.8°
PA3WEG	Delft, NL	Prime Receiver	0.00kpps	-40.2°
IK1SLD	Casale Monferrato, IT	Prime Receiver	0.00kpps	-44.0°
OK2UUJ	Olomouc, CZ	Prime Receiver	0.00kpps	-43.7°
SP3QFE	Kolo, PL	Prime Receiver	0.00kpps	-42.7°
F6DZP	Migné-Auxances, FR	Prime Receiver	0.00kpps	-41.5°
MOEYT	Dorset, UK	Prime Receiver	0.00kpps	-39.3°
VK5EI	Adelaide, AUS	Prime Receiver	0.00kpps	-54.8°

At the bottom of the page, there is a status bar with the text "Standing by for HAMTV.." and "Buffering a lot? Try Lower Bandwidth".



# TS Merger in Contacts

- Developed during Tim Peake's
- Used for as Backup & Primary
  - Thomas Pesquet
  - Paulo Nespoli
  - Jack Fischer





Any Questions?

[github.com/ariss-uk/tsmerge](https://github.com/ariss-uk/tsmerge)