

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!)

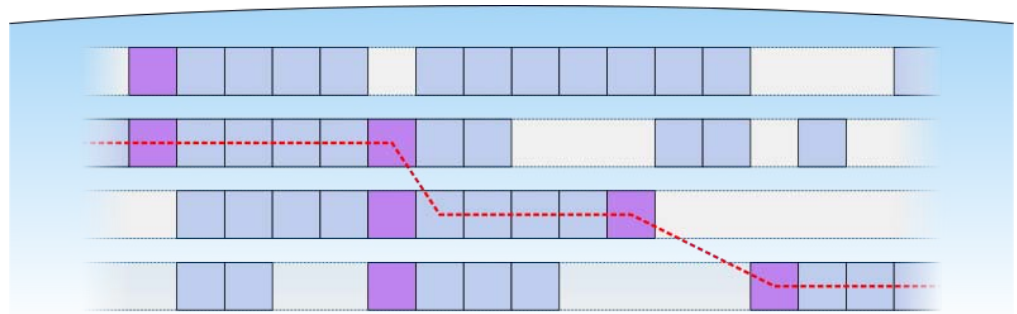
Ground Station Co-operation

- 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

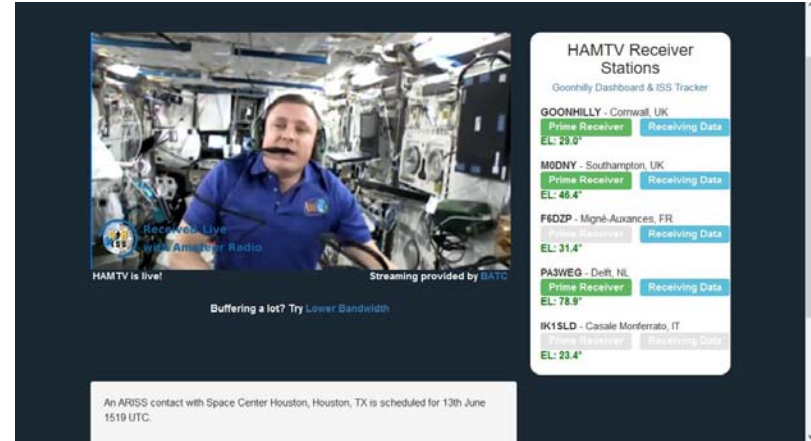


The screenshot shows the ARISS website interface. At the top, there is a navigation bar with links for "Live Webcast", "ISS Dashboard", "HAMTV Receivers", and "ISS TLE". The main content area is divided into two sections. On the left, there is a video player area with a dark background and a central logo featuring the Earth and the text "ARISS Amateur Radio on the International Space Station". Above the video player, there is a text prompt: "This is the HAMTV video downlink only, [click here](#) for the Live Event Webcast." Below the video player, there are two status messages: "Standing by for HAMTV.." and "Buffering a lot? Try Lower Bandwidth". On the right side, there is a section titled "HAMTV Receiver Stations" with a sub-header "Europe - Australia - Japan". Below this, there is a list of receiver stations, each with its call sign, location, and reception status. The stations listed are: GOONHILLY - Cornwall, UK; PA3WEG - Delft, NL; IK1SLD - Casale Monferrato, IT; OK2UUJ - Olomouc, CZ; SP3QFE - Kolo, PL; F6DZP - Migné-Auxances, FR; MOEYT - Dorset, UK; and VK5EI - Adelaide, AUS. Each station entry includes "Prime Receiver", "Rate", and "EL" (Elevation) information.

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

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