



Spectrum Forum Meeting – Saturday 6th November 2021

Spectrum Report – Amateur-Satellite Service

About AMSAT-UK

AMSAT-UK represents the interests of amateur satellite operators in the UK and is at the forefront of amateur satellite construction.

The thrill of communicating via satellites orbiting in space has led amateurs to develop stations for the VHF, UHF and Microwave bands when they may not have otherwise done so. Having established a satellite capable station many have gone on to discover the fascination of terrestrial DX working, so helping generate more activity in these allocations which are sometimes overlooked by amateurs who start out on the HF bands.

Like many other amateur radio specialisms, amateur satellite interest has increased over the past 19 months due to the pandemic, however, the lack of face-to-face meetings has impacted the development of new satellites.

The [AMSAT-NA status page](#) provides up-to-date information on the operational status of the many amateur radio satellites currently in orbit.

The FUNcube project

On November 21, 2021 the first FUNcube spacecraft AO-73 will celebrate 8 years of successful operation in space.

Annual Colloquium

As a result of the continuing pandemic AMSAT-UK's 2021 Colloquium was held online and radio amateurs from around the world were able to participate. As in 2020 the event proved very popular and many stayed on for an open chat session in the evening. The video of the Colloquium is available on the [AMSAT-UK YouTube Channel](#).

Es'hail-2 Geostationary Amateur Transponder Satellite



[Es'hail-2](#) (QO-100), the first geostationary satellite to carry amateur radio transponders, launched on November 15, 2018 into a geostationary slot at 26 degrees East.

There are two 2.4 GHz to 10 GHz transponders; a 500 kHz bandwidth linear transponder for narrowband digital, SSB and CW communications and an 8 MHz wide transponder for Digital ATV.

The coverage of this spacecraft extends from Brazil in the west to Thailand in the east.

There is a QO-100 ground station at the Neumayer-III research station in Queen Maud Land, Antarctica (DPØGVN). Earlier this year the antenna for this satellite was blown away and is due for repair/replacement this Antarctic summer.

The research station also hosts a FUNcube ground station which, due to its location near the South Pole, greatly increases the telemetry data that we receive from FUNcube satellites on almost every orbit.

AMSAT-UK and BATC collaboration continues to provide a WebSDR at the Goonhilly Earth Station in Cornwall, UK. This enables amateurs anywhere in the world to listen to the activity on the 10 GHz narrowband transponder downlink and view activity on the wideband transponder. It also provides a chat facility which is useful as a collaboration tool.

Amateur Radio on the International Space Station (ARISS)

There are two amateur radio stations onboard the ISS. The station in the Russian Service module is used for the very popular Slow Scan TV (SSTV) transmissions as well as FM voice contacts with Russian school students. The other station, in the Columbus module, has the packet radio digipeater and supports school contacts for countries around the world. The ARISS team is working to have a Raspberry Pi installed in the module to support SSTV operations. The HamTV system used to be located in Columbus before it was returned to Earth for repair.

The ARISS InterOperable Radio System (IORS) was installed in the Columbus module in 2020, this has enabled the operation of a VHF to UHF FM repeater.

Frequencies used by ARISS:

144.490 MHz FM Voice Uplink in Regions 2 and 3
145.200 MHz FM Voice Uplink in Region 1
145.800 MHz FM Voice and SSTV Downlink
145.825 MHz FM APRS Digipeater
145.990 MHz FM Repeater Uplink

145 MHz frequencies have a Doppler shift of +/- 3.5 kHz
During a pass the 145.8 downlink can be anywhere between 145.7965 and 145.8035 MHz

437.050 MHz FM CubeSat Relay Uplink
437.525 MHz FM Voice School Contact Downlink
437.550 MHz FM APRS Digipeater
437.800 MHz FM Repeater Downlink

437 MHz frequencies have a Doppler shift of +/- 10.5 kHz

ARISS are also planning an FM Voice Uplink in 23cm.

The ISS HamTV DATV system was returned to Earth for repair and will hopefully be sent back to the ISS during 2022. The downlink frequency used by HamTV is 2395.0 MHz +/- 57 kHz Doppler shift.

AMSAT-UK/ARISS members were involved in the successful contact between students at the Mary Hare School for the deaf in Newbury (GB4MHN) and ISS astronaut Mark Vande Hei KG5GNP / NA1SS on October 12, 2021. In addition to newspaper publicity the contact generated TV interest with reports broadcast on ITV and BBC South. A video of the event is available at <https://www.youtube.com/watch?v=wml3qKZgjJ4>

Spectrum

AMSAT-UK welcomes the ongoing work by IARU volunteers involved with WRC-23 preparatory meetings in defence of the key Amateur and Amateur-Satellite Service allocations.

As stated in previous reports it remains an aspiration that the Amateur-Satellite Service allocations at UHF and Microwaves should align with the weak-signal sections of the bands. In particular it is desirable that the European Common Frequency Allocation Table Footnote EU17 sub-bands, **5660-5670 MHz** and **10360-10370 MHz** along with **50-51 MHz** and new 10 MHz wide L-band and S-band segments become available to the Amateur-Satellite Service for both Earth-to-Space and Space-to-Earth communications.

Other Activities

AMSAT-UK hosts the [Amateur Satellite Frequency Coordination Status](#) pages for the IARU. These pages give details of the many Amateur Radio satellite projects under development.

In addition to the QO-100 ground station already mentioned, through the support of GES (Goonhilly Earth Station Ltd) we also support a Web SDR covering the 144-146 MHz band which is located on the site.

AMSAT-UK November 2021
<http://www.amsat-uk.org/>