



AMSAT-UK

Spectrum Forum Meeting – Saturday 30th November 2019

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.

The FUNcube project



On November 21, 2019 the FUNcube-1 spacecraft celebrated 6 years of successful operation in space.

In September **Paulo PV8DX** contacted the AMSAT-UK FUNcube team and asked if a special 'Fitter' message could be transmitted from the FUNcube-1 (AO-73) satellite to a Science Fair being held at Gonçalves Dias School in Brazil on October 16, 2019. AMSAT-UK arranged this and the message from space was successfully received by students at the school.

Paulo's presentation to the students about FUNcube-1 and the other amateur satellites was well received. Students were able to build their own antennas and make contacts via the amateur satellites.

Jordan's JY1SAT, carrying the FUNcube-6 payload was launched December 3, 2018. It transmits digital images to amateurs in the 145 MHz band using the Slow Scan Digital Video (SSDV) mode. This facility has been well received by amateurs and the images have been widely shared on social media.

The European Student Earth Orbiter (ESEO) satellite with the AMSAT-UK FUNcube-4 payload that included a 1260 MHz to 145 MHz FM transponder was launched on December 3, 2018. It is one of a number of satellites currently in orbit that carry payloads utilising the important 1260-1270 MHz Amateur-Satellite Service allocation.

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 nominal 250 kHz bandwidth linear transponder for narrowband SSB and CW communications and an 8 MHz wide transponder for Digital ATV.

The coverage of this spacecraft is constrained by the radiation pattern of the antennas being used for the uplink and

downlink. Coverage extends from Brazil in the west to Thailand in the east.

AMSAT-DL has developed a ground station for use in Antarctica and amateur operation is expected from the Neumayer-III research station in Queen Maud Land.

This satellite has enabled the use of the microwaves in Countries and Territories that previous had little or no microwave activity. It has also highlighted some unexpected challenges involved in microwave operation in some parts of the world. In one Territory due to political sensitivity the Administrative Authority did not look favourably on the use of Dish antennas resulting in one new amateur on the satellite having to re-engineer their station.

In other countries there has been the desire to protect licence exempt WiFi, amateurs have been subject to power restrictions in 2.4 GHz, e.g. 100-milliwatt limit in Sweden or an outright ban on all 2.4 GHz operation. Eire is one country that had banned amateurs from 2.4 GHz, fortunately special permits are now available which allow up to 25 watts output for amateur satellite use. Several other countries have adopted the special permit approach although this has the drawback of additional bureaucratic hurdles and cost.

AMSAT-UK and BATC collaborated 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.

Amateur Radio on the International Space Station (ARISS)

The InterOperable Radio System (IORS) is designed to replace the current amateur radio equipment located in the ISS Russian Service module and Columbus module.

The ARISS team is now assembling the actual flight units, after that, abbreviated tests for EMI/EMC and acoustics will be done at NASA Johnson Space Center for final certification.

On October 8, AMSAT-UK members supported an ARISS contact between students at Bampton School in Devon using GB4BPS and astronaut **Drew Morgan KI5AAA** operating NA1SS on the ISS.

A parent of a student at the school, **Nick Bull M7BUL**, had the idea of arranging a school contact and worked closely with school staff for over a year to bring it to a successful conclusion.

HuskySat-1 to utilise 24 GHz band

The HuskySat-1 CubeSat is currently attached to the Cygnus cargo vessel docked at the International Space Station and is expected to be deployed into a higher 500 km orbit in mid-January 2020.

Developed by AMSAT and students at the University of Washington it will be the first satellite to provide a telemetry downlink in the 24 GHz band. In addition, it carries a 145 to 435 MHz 30 kHz bandwidth linear transponder for SSB/CW communications.

Spectrum

AMSAT-UK welcomes the ongoing work by IARU volunteers involved with WRC-19 in defence of the key Amateur and Amateur-Satellite Service allocations at 1240-1300 MHz and higher bands.

As we have noted in our RSGB Spectrum Forum reports going back to 2009, the regulatory threat posed by the 1260-1300 MHz downlink of the Galileo GNSS constellation is of great concern. We also note with concern that Japan's Quasi-Zenith (QZSS) GNSS, expected to become fully operational in 2023, also uses 1260-1300 MHz.

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, **3400-3410 MHz**, **5660-5670 MHz** and **10360-10370 MHz** along with **50-51 MHz** and a new 10 MHz wide L-band segment become available to the Amateur-Satellite Service for both Earth-to-Space and Space-to-Earth communications.

Annual Colloquium

AMSAT-UK's 2019 Colloquium was held as part of the RSGB Convention. The British Amateur Television Club (BATC) provided a webcast live to a world-wide audience. Videos of the presentations are available on the [AMSAT-UK YouTube Channel](#).

Other Activities

On October 16, 2019 the AMSAT-UK [FUNcube Yahoo Group](#) had 3,793 members, the [Twitter Account](#) 9,757 followers and the [AMSAT-UK Facebook Page](#) 4,230 follows.

Following the recent changes to Yahoo Groups, AMSAT-UK, like many other organisations, is in the process of transitioning to Groups.io

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.

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<http://www.amsat-uk.org/>

