AMSAT-UK

Spectrum Forum Meeting – Saturday 27th October 2018

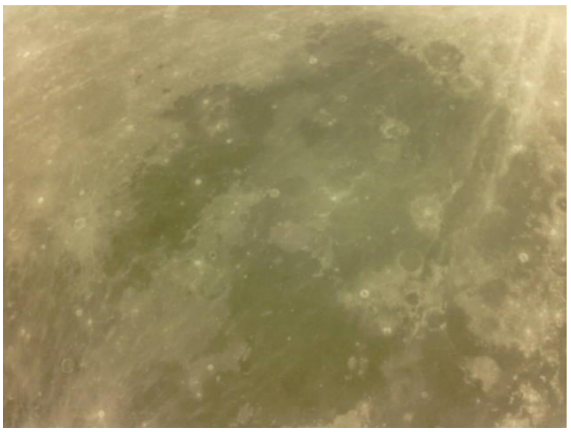
Spectrum Report – Amateur-Satellite Service

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.

Amateur radio orbits the Moon



2018 saw amateur radio in orbit around the Moon for the first time.

Lunar-OSCAR-93 (LO-93 / DSLWP-A) and Lunar-OSCAR-94 (LO-94 / DSLWP-B) were built by students who were members of the Harbin Institute of Technology Amateur Radio Club BY2HIT. Each carries VHF/UHF SDR transceivers producing about 2 watts output.

The spacecraft were launched on May 20, 2018 into a lunar transfer orbit. Telemetry signals were received from both satellites soon after launch, although the signal from LO-93 was lost the following day.

On May 25, LO-94 successfully achieved lunar orbit and the first successful test of the GMSK to WSJT JT4G transponder was made on July 16.

LO-94 carries a camera system developed by the students and images of the Lunar surface are transmitted using the Slow Scan Digital Video (SSDV) mode originally developed by UK radio amateurs for use on 434 MHz High Altitude Balloon flights.

The FUNcube project

On November 21, 2018 the FUNcube-1 spacecraft will have been in space for 5 years and has run pretty well faultlessly since launch.

When the project started in 2009, AMSAT-UK had never developed a complete satellite of its own and had never even considered doing so. We were therefore lucky that the development of CubeSats and some bequest funding, through the RCF, enabled the idea to become a reality.

The initial idea was to produce the simplest possible 1U CubeSat that could be used by schools and colleges for educational STEM outreach and also by radio amateurs for communications through a transponder.

The FUNcube-2 transponder on UKube-1 continues to be in full time transponder mode. There are occasional breaks in service for a few seconds when the OBC reboots and the other onboard transmitter sends its CW beacon.

FUNcube-5/EO88/Nayif-1 continues to perform nominally with high power telemetry when in sunlight and amateur mode when in eclipse.

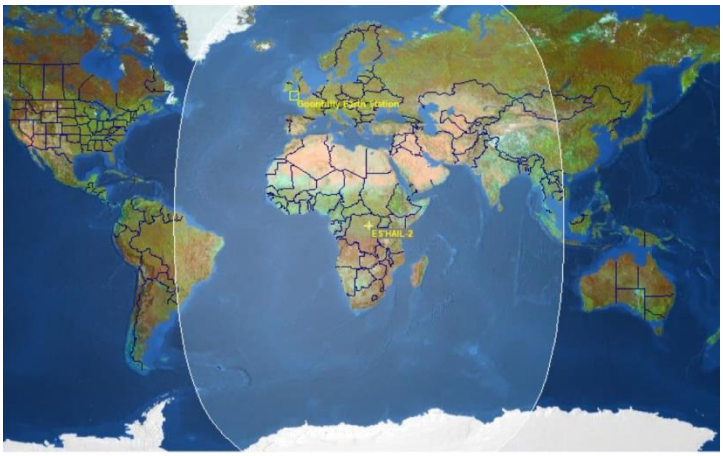
A FUNcube payload has been developed for Jordan's first CubeSat JY1SAT, the name is a tribute to His Majesty the Late King Hussein of Jordan JY1. The payload will provide a linear transponder for SSB/CW communications and a beacon for educational outreach. JY1SAT will also have the capability of transmitting pre-recorded images using the Slow Scan Digital Video (SSDV) mode. The launch may take place in November.

The European Student Earth Orbiter (ESEO) satellite carries the AMSAT-UK FUNcube-4 amateur radio 1260/145 MHz FM transponder.

Over the course of the ESA Education project AMSAT-UK members have worked with students in workshops at participating Universities across Europe.

On September 27 ESEO successfully completed the vibrations test. A launch is expected in the coming weeks.

Es'hail-2 Geostationary Amateur Transponder Satellite



Es'hail-2, the first ever geostationary satellite to carry amateur radio transponders, is expected to launch by the end of 2018 into a geostationary slot at 26 degrees East.

There are two 2.4 GHz to 10 GHz transponders; a 250 kHz bandwidth linear transponder for narrowband SSB and CW communications and a 8 MHz wide transponder for Digital ATV.

The coverage of this spacecraft will be constrained by the radiation pattern of the antennas being used for the uplink and downlink. We understand the coverage should extend as far as Brazil in the west and Thailand in the east.

It will be possible to "see" the transponder passband by the use of a webSDR system that is being established at the Goonhilly Earth Station in Cornwall, UK. This is provided by the BATC and AMSAT-UK. We are most grateful to Goonhilly Earth Station Ltd for their support.

Further information on Es'hail-2 is in the attached annex.

Spectrum

AMSAT-UK welcomed the RSGB response to the Ofcom WRC-19 consultation.

Key points in the RSGB response were the need for protection of our Primary Amateur-Satellite allocations at 24 and 47 GHz from out-of-band emissions from mobile broadband services and highlighting the potential of 50 MHz to serve as a satellite uplink band.

The Galileo positioning system should become fully operational by 2020, only then will we know if there will be action by National Governments to protect Galileo's 1260-1300 MHz downlink from so-called interference from Amateur transmissions. There is concern over the apparent inability of Galileo receivers to work in the presence of "strong" RF signals. During Galileo system testing in Germany 23cm repeaters within 50 km of the test receiver were closed down, this was a worrying development.

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 2018 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 8, 2018 the AMSAT-UK **FUNcube Yahoo Group** had 3,790 members, the **Twitter Account** 8,147 followers and the **AMSAT-UK Facebook Page** 3,780 likes.

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.

AMSAT-UK October 2018
http://www.amsat-uk.org/