



AMSAT-UK

Spectrum Forum Meeting – Saturday 5th November 2011

Spectrum Report – Amateur-Satellite Service

The past year has seen AMSAT-UK working on two satellite projects FUNcube and UKube-1.

FUNcube Satellite

The AMSAT-UK FUNcube satellite has the primary goal of enthusing and educating young people about radio, space, physics and electronics. It is designed to support the educational Science, Technology, Engineering and Maths (STEM) initiatives and provide an additional resource for the GB4FUN Mobile Communications Centre. FUNcube will carry a 1200 bps BPSK telemetry beacon and a 435/145 MHz linear transponder for SSB/CW communications. It is hoped to obtain a launch for the second half of 2012.

Work has continued on the satellite during 2011. In July members of AMSAT-UK performed vibration testing and thermo vac testing of the FUNcube satellite. The boards tested were the Engineering Models (EMs) which are just about identical to those that will fly.

The facilities to do this were very kindly offered by the Assembly, Integration and Verification (AIV) facility at the Rutherford Appleton Laboratories, at Harwell, near Oxford. AMSAT-UK is extremely grateful to them for their help and advice.

<http://www.FUNcube.org.uk/>

FUNcube Boards on UKube-1 Satellite

AMSAT-UK was approached by the UK Space Agency with a view to providing a set of FUNcube boards for use in their first satellite UKube-1.

AMSAT-UK has agreed to supply a set of boards which will provide a 1200 bps BPSK telemetry beacon with FEC and a 435/145 MHz linear transponder.

<http://ukspaceagency.bis.gov.uk/News-and-Events/News/21973.aspx>

FUNcube Dongle SDR

The FUNcube Dongle (FCD) SDR is the "ground segment", or a radio receiver designed to allow anyone to try their hand at reception of satellites like FUNcube anywhere on Earth as part of a global educational collaboration project collecting information from space. However with almost continuous coverage of 64 MHz through to 1700 MHz the FUNcube has found many alternative applications and more than 3,000 have been sold since January this year (a contribution to AMSAT-UK launch funds is made from each sale).

It is planned to make available a lower cost educational version of the FCD for use in schools.

<http://www.FUNcubeDongle.com/>

Spectrum Availability

The IARU document 'Spectrum Requirements for the Amateur and Amateur-Satellite Services' was issued in August 2011. http://www.iaru.org/IARU_Spectrum_Requirements_2011.pdf

It contained these proposals for Amateur-Satellite Service spectrum:

18 MHz - Expansion to 250 kHz

24 MHz - Expansion to 250 kHz

50 MHz - New allocation

435 MHz - Notes that it is desirable to study expansion of the band

1260 MHz - Deletion of the "Earth to Space only" restriction

2400 MHz – Notes that our allocation *"is increasingly congested by (unlicensed) low-power devices such as radio local area networks (RLANs) creating significant interference levels. Substitute spectrum for the Amateur-Satellite Service, which is restricted to the ISM segment, is therefore sought."*

3400 MHz – Notes that IMT devices pose an additional difficulty in achieving improvement in the band 3400-3410 MHz with respect to upgrading the allocation in Region 1.

The document does not propose any changes to Amateur-Satellite allocations at 5 & 10 GHz.

The European Common Frequency Allocation Table Footnote EU17 says:

"In the sub-bands 3400-3410MHz, 5660-5670MHz, 10.36-10.37GHz, 10.45-10.46GHz the amateur service operates on a secondary basis. In making assignments to other services, CEPT administrations are requested wherever possible to maintain these sub-bands in such a way as to facilitate the reception of amateur emissions with minimal power flux densities."

Of those four sub-bands only 10.45-10.46 MHz is allocated to the Amateur-Satellite Service for both Earth to Space and Space to Earth communications.

The Amateur-Satellite Service is a "weak-signal" service; as such it is desirable that it gains access to both the EU17 3400 MHz and 10.36 GHz segments and the removal of the "Earth to Space only" restriction on 5650-5670 MHz.

International Space Station

Toward the end of 2010 Astronaut Doug Wheelock KF5BOC made a 20 minute video about the ISS amateur radio station that showed what it's like to operate amateur radio from space. It can be seen on YouTube at <http://www.youtube.com/watch?v=h73EYcyszf8>

In April, 2011, a second ARISS amateur radio station was installed in ISS Columbus Module by Catherine Coleman KC5ZTH and was connected to a 2 m/70 cm antenna installed last year during an EVA. Paolo Nespoli IZ0JPA checked out the equipment's audio for proper functioning by talking to other radio amateurs on the ground.

Like the other station located in the Zvezda Service Module the Columbus equipment is also QRP with just 5 watts output.

AMSAT-Italy is involved in the development of a 2.4 GHz DVB-S amateur television transmitter for the space station.

Interference

The Amateur-Satellite Service, like the Amateur Service, suffers interference from both unlicensed users and licensed users unaware of the band plan.

Of particular concern has been the proliferation of Italian FM and D-STAR repeater outputs in the 145.8-146.0 MHz satellite segment.

AMSAT-UK welcomes moves made at the IARU Region 1 Sun City conference to address this issue.

Annual Colloquium

AMSAT-UK's 2011 Colloquium was again held at the Holiday Inn, Guildford. It attracted a high proportion of overseas visitors from North America and across Europe.

During the two day event, presentations were made on a variety of amateur satellite related projects and technical discussions between amateur satellite builders and users continued late into the evening.

The Radio Society of Great Britain (RSGB) supported the event by providing the new GB4FUN Radio Communications Demonstration Centre that proved popular with attendees.

Once again thanks to the British Amateur Television Club (BATC) the event was webcast live to a world-wide audience.

Video of the presentations are available on the web, see <http://www.uk.amsat.org/2011/08/17/amsat-uk-international-space-colloquium-videos/>

RSGB Convention

AMSAT-UK had a stand at the convention and those running it were kept busy answering questions about satellites and space communications from a steady stream of visitors during the two day event. In the lecture streams Graham Shirville G3VZV spoke about AMSAT-UK's new FUNcube satellite and Howard Long G6LVB gave a presentation on the FUNcube dongle software defined radio. Both presentations were well attended.

UK Space Conference

AMSAT-UK attended the UK Space Conference in Coventry that was opened by the Minister for Universities and Science, David Willetts MP. A presentation about FUNcube was given in the CubeSat stream. <http://www.intellectuk.org/uk-space-2011-programme>

Other Activities

On Christmas Eve 2010, John Heaton, G1YYH, passed away aged 57. He was an active AMSAT-UK committee member running the website and putting in much work behind the scenes at the Annual Colloquium. Since then a new website has been developed thanks to Dominic Hawken G6NQO and we have a new webmaster Rob Styles M0TFO.

Rob was responsible for establishing the successful AMSAT-UK FUNcube Yahoo Group that has attracted over 2300 members. He also runs the AMSAT-UK Facebook and Twitter accounts.

AMSAT-UK hosts the Amateur Satellite Frequency Coordination pages for the IARU. It gives details of the many Amateur Radio satellite projects under development. <http://www.amsat.org.uk/iaru/>

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