AMSAT UK

OSCAR NEWS

The official journal of AMSAT-UK for all users of OSCAR satellites

FUNCube, an RCF funded eductional Satellite to be designed and built by
AMSAT-UK and ISIS - Innovative Solutions In Space BV

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The Radio Amateur Satellite Organisation of the United Kingdom
(Affiliated to the Radio Society of Great Britain)

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THE AMSAT-UK CLUB CALL IS G0AUK

HF Nets operate:

3.780MHz +/- QRM Sundays @ 10.00am local time.

14.280MHz +/- QRM Various in Europe and USA over weekends

i.e. 11am Sat and 7pm Sunday

We have no details of any UK VHF Nets

For all AMSAT UK information see **www.uk.amsat.org**

please email:

g3vzv.at.amsat.org or g4dpz.at.amsat.org

Editors Notes

My sincere apologies for the late arrival of the magazine, especially in view of the news which it contains about FUNCube! I've had a stressfull couple of months losing my data off my MacBook Pro TWICE! (Upgrading to the new Snow Leopard was not a good move) and having significant mail server problems.

Please note that Graham, G3VZV and I are doing this Editorship on a temporary basis and we need some to step forward to take on the role on a permanently.

73 Dave, G4DPZ

FROM THE HON SEC'S KEYBOARD!

FUNCube

Please see elsewhere in this issue of Oscar News for details of this new AMSAT-UK Project. Personally, I find the prospect of a UK owned and operated satellite extremely exciting. This will be the first. Admittedly it has its limitations, eg we don't have a launch, its not HEO, etc. BUT it is achievable because it's modest and uses the KISS principle.

We have established a Project 'Steering Group' which will oversee the management of the project, monitor progress, etc. The members of this group are essentially the AMSAT-UK committee, with a couple of other 'techie' types. I have volunteered to 'chair' this group, and we have agreed some terms of reference for it. We have also established a Technical Team, and are in the process of establishing further groups (eg PR, Education, etc).

We have established a website for the Project at www.funcube.org.uk. This is a public website, and we will be posting updates there as and when they become available.

The Technical Team has already had a preliminary face to face meeting, and is busy defining the basic characteristics of the satellite, eg power output levels, etc etc. BUT, there is plenty of further help required. We are committed to not only designing the satellite itself, but also to designing suitable ground station hardware and software, suitable for use by school teachers in the playground to receive and decode the telemetry.

We have also been asked by the Radio Communications Foundation to do as much PR/Outreach as possible on behalf of Amateur Radio.

So we need help from people who are involved in science teaching, PR, Graphics Design, Media, etc etc. So if you are interested in helping make the project a success, then please get in contact. Also if you wish to influence the design, then please make your comments known NOW, later may be too late!

COLLOQUIUM 2010

Following from the success of this year's event, we have booked the Holiday Inn at Guildford for our 2010 event (which will be our 25th Colloquium!). The dates are Sat 31 July to Sun 1 August 2010. These are the days when the 'official' Colloquium programme will run. As there were quite a few people (about 18) who stayed the night on the Friday before this year's event, we have taken a room in the hotel's business suite, and intend to arrange a beginner's session on Friday late afternoon/early evening, and possibility some other social event. Details to follow, meanwhile, please get the dates down in your diaries!

STORES

Ciaran Morgan, M0TXD, has added some items available from the AMSAT-UK shop. Please see the new pages on the web site for details of these. There is more to come, so you may wish to check back frequently! The URL of the shop is http://www.uk.amsat.org/content/view/244/141/.

73 Jim Heck, G3WGM,
Hon Sec AMSAT-UK
16 Sep 2009

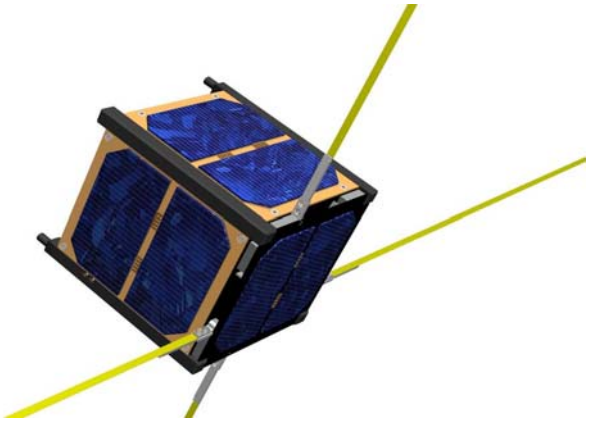
FUNCube project

By

Graham Shirville, G3VZV and Wouter Jan Ubbels, PE4WJ

PREFACE by Jim Heck, G3WGM

Regular Readers of Oscar News will know that the Radio Communications Foundation was left a sum of approximately £40,000 by way of a bequest, limiting the expenditure to a space project, agreed by the AMSAT-UK committee. Over the last couple of years the committee have been soliciting ideas, and the result is a proposal for FUNcube.



The article below is extracted from the formal submission made by AMSAT-UK to the RCF. It highlights the use of the satellite for educational purposes, and this was deliberately done to enable the RCF to accept it as being within their remit. However, readers should note that there is a U/V (mode B) transponder included in the satellite, and from discussions held recently it seems that it might be possible to have both systems running 24/7 simultaneously.

Readers should also note that the project only provides a contribution towards the design, build, and testing of the satellite. To do these tasks will require slightly more that the amount now available from the RCF, and AMSAT-UK will be using some of its reserves to complete the construction of the satellite. Additionally considerable extra funding will be required for items such as a launch, UK Space Act licence, insurance etc. Hopefully resources to cover these will become available over the next year or so.

Interested?

We (AMSAT-UK) have approached ISIS - Innovative Solutions In Space BV to provide some of the hardware and to manage the integration and verification of the completed satellite, and a contract is at an advanced stage of negotiation. Additionally we have established a number of teams to carry out the project; these are Steering Group, Technical Team, Educational Team and a PR Team. Other groups may be added when a requirement is identified. Additionally, So if you feel you have something to offer by way of expertise or resources, please make contact. Initially you should email me or Graham Shirville (G3VZV).

More information will be provided as the project progresses but the intention is to have the spacecraft completed and tested by October 2010. To keep in touch with the project, so to www.funcube.org.uk.

Space is FUN!

Overview

FUNcube is an educational project with the goal of enthusing and educating youngsters about radio, space, physics and electronics, by constructing and launching a small satellite, based on the CubeSat standard. The target audience consists of primary and secondary school pupils. It will serve to provide an in-orbit counterpart to GB4FUN. The satellite will be built by an experienced team of radio amateurs and space engineering professionals, using off the shelf, space qualified, components and subsystems, thereby reducing project risk, schedule and cost.

The primary objective is to provide an in-orbit tool for science education outreach and

hands-on training in space, science and radio. This would be done through the provision of a telemetry system that is suitable for easy reception by school children using extremely simple hand held VHF receive equipment connected to the USB port or soundcard of a computer or net/laptop. Furthermore, the satellite contains a materials science experiment, from which the school children can receive telemetry data which they can compare to the results they obtained from similar reference experiments in the classroom.

Its secondary objective is to provide a linear amateur radio UHF to VHF transponder which can be used by radio amateurs worldwide and can be used to demonstrate radio communications to schoolchildren and students of all ages. Additionally the satellite will be available for use by GB4FUN for satellite communication, telemetry and command demonstrations.

Introduction

Presently, interest in science and technology is declining among young people. This is quite in contrast with the proliferation of electronic communications, such as cell phones, the internet etc. One of the key elements in today's information age is communication based on electromagnetic waves, i.e. radio. Most young people nowadays use radio in one of its many applications (often without knowing that they are actually using radio), but only a handful actually know about the physical fundamentals. These young people represent tomorrow's workforce, therefore, there exists an urgent need to spark interest among young people about science and technology. The GB4FUN vehicle is an excellent example of providing this type of outreach; this proposal takes this concept even one step further, and into space.

The proposed project is to develop an amateur satellite, based on the popular CubeSat standard. This satellite will serve to provide an in-orbit counterpart to GB4FUN. The satellite will be largely built using off the shelf, space qualified, components and subsystems, reducing project risk, schedule and cost. The primary objective is to provide an in-orbit tool for science education outreach and hands-on training through the provision of a telemetry system that is suitable for easy reception using extremely simple hand held equipment connected to the USB port or soundcard of a computer or net/laptop. The target audience consists of primary and secondary school pupils.

Its secondary objective is to provide a linear amateur radio transponder which can be used by radio amateurs worldwide and can be used to demonstrate radio communications to schoolchildren and students of all ages. Additionally the satellite will be available for use by GB4FUN for satellite communication, telemetry and command demonstrations. The use of VHF for the space to Earth link, combined with approximately 1 watt RF output for the transmitter, and the use of forward error correction for the telemetry encoding will provide a strong, robust and easy to receive signal on the ground.

The proposal is to build the satellite, test and validate it for suitability for a number of different launch vehicles so that any available launch opportunity can be used at short notice.

Project objectives

Primary objective

The project's primary objective is to provide an in-orbit tool for science education outreach and hands-on training through the provision of a telemetry system that is suitable for easy reception using extremely simple hand held VHF equipment connected to the USB port or soundcard of a computer or net/laptop. This telemetry system also provides a means to send received telemetry to an on-line database, which allows school children and other enthusiasts to review telemetry via the Internet.

Furthermore, since the satellite uses a low data rate beacon (which is perfectly audible by ear), simple demonstrations of Doppler shift are possible, which can serve as an

excellent tool for explaining radio waves and orbital mechanics.

Educational outreach

The educational outreach opportunities created by satellites are not just restricted to universities and agencies, who might be involved in their construction, but they can also be extremely valuable for secondary and primary school age students. The size of the satellite is not the issue because it does not matter. The whole satellite project from the development and building through the launch and the operation of the satellite can provide a wide range of interesting educational experiments. The ability to track, receive telemetry information and communicate with the satellite allows for hands-on experience that will sow the seeds for a continued interest all STEM subjects (Science Technology Engineering and Mathematics). The reason is quite simple, what we term a satellite, the educational establishment and students think of as a space craft and the fascination that this holds is worth every hour of effort.

Lesson plans with suitable graphics and videos could be drafted to help understand everything from the orbital mechanics involved and the construction techniques and materials that are required to achieve longevity in orbit. Likewise the issues of launch location and simple orbital dynamics can make for interesting course work. The learning opportunities that are generated can easily extend way beyond that of the project team, allowing students of all ages to come into contact with space hardware and have a better understanding of the challenges that are faced.

Figure 1 Students receiving real time telemetry

The current LEO satellites allow some of this research but they generally miss out on the how it got there and what effort was required. If on the other hand the whole thing is built on an educational footing the whole project from the early designs through to launch and commissioning would provide an invaluable insight into satellites and a wide range of related technologies. The use of the transponder would also enable the *continued access from the educational world* through projects like GB4FUN for many years after launch. Furthermore, contrary to the current LEO satellites, the FUNcube satellite will include a dedicated payload (see the section below on the materials science payload) which can be used during physics courses.

The proposal includes for simplified models of the satellite to be made available for demonstrations at schools, and can include the provision of kits for building receivers to be used for telemetry reception and designs for suitable simple hand held antennas.

The excellent work already done by GB4FUN, and the resulting good contacts with schools and teachers, will be of great value to help promote the project to schools in the United Kingdom. The FUNcube satellite could also encourage the development of GB4FUN-like projects in other European countries.

Materials Science payload

Besides the aforementioned objectives, the satellite will also include a simple but

appealing payload. The objective of this materials science payload is to demonstrate the loss of heat energy by radiation from two materials with differing surface finishes. This educational experiment will be implemented by anodising or coating two of the outer structural rails of the satellite with surface finishes that have very different thermal radiation qualities, e.g. black / white / ‘silver’. Temperature sensors mounted at the mid-point of the rails will detect the reduction in temperature during eclipse and these data will be downlinked as part of the FUNcube telemetry. This experiment is usually carried out in classroom using an apparatus called Leslie’s cube, but results are always compromised by convection currents and thermal conduction within the air next to the surface of the cube. However, in space the vacuum eliminates the errors due to conduction and convection of air, leaving radiation as the primary method of loss of heat energy.

In practice, as FUNcube passes through the illuminated sector of its orbit, its surfaces will absorb energy from the sun. The amount of energy absorbed and the specific areas which experience the greatest temperature rise will depend on the surface coating but also the satellites attitude and spin rate. When the satellite passes into eclipse all of its surfaces will be in darkness and energy will be lost primarily due to the surface coatings. Therefore the most accurate results from this experiment will be achieved as FUNcube passes from eclipse through its ‘sunrise’ into full illumination.

In the UK, convection conduction and radiation are part of the Key Stage 4 science syllabus at GCSE level. The materials science experiment on board FUNcube will provide a “proof of the pudding”, showing real world physics to the school children in the classroom. Reference experiments can be set up by the school children on the ground which they can use to compare the results they received from the FUNcube satellite in orbit.

Secondary objective

The secondary objective of the FUNcube project is to provide a linear UHF up and VHF down amateur radio transponder which can be used by radio amateurs worldwide and can be used to demonstrate radio communications to schoolchildren and students of all ages. Providing a linear transponder will provide a valuable and much appreciated resource for radio amateurs worldwide. They will form a distributed groundstation network and they will be able to join the GENSO worldwide network of ground stations which is currently being developed by ESA (www.genso.org). Many radio amateurs are willing to and capable of being involved in the educational outreach activities as well, FUNcube can provide them which such an opportunity, where they can use FUNcube to demonstrate (amateur) radio to schoolchildren and other audiences.

Implementation plan

The FUNcube satellite will be built by an experienced team of professionals and radio amateurs. Since the majority of the components are available off the shelf, building the satellite requires a relatively limited amount of development. The satellite can be considered in two parts;the satellite bus incorporating all vital components essential for the mission, and the educational payload.

The bus will be built using off-the shelf, qualified parts, thereby reducing technical and schedule risk. The goal is to keep the satellite as simple as possible, therefore (and because it is not necessary in order to perform the mission) it will not require a dedicated on-board computer. Industrial grade microcontrollers will be used for controlling the satellite, which is an approach proven by many previous CubeSat projects. The satellite will include a command uplink receiver for remotely controlling the satellite; the uplink channel includes measures to prevent unauthorized users to control the satellite. Furthermore, by including a command receiver, the satellite will comply with the ITU requirement that cessation of transmission be possible at

all times.

The payload, which is a custom design, will be built by experienced radio amateurs.

Since there is a large amount of design heritage for similar components within the amateur radio community, this can be done on a short schedule and relatively low budget. The payload consists of the linear transponder and a number of sensors which will measure voltages, currents, temperatures and other information.

Since the satellite is built using off-the-shelf electronic components, satellite lifetime is mostly dictated by radiation damage, which is dependent on the orbit. Generally, CubeSats and similar amateur satellites like FUNcube have all been launched into similar Low Earth Orbits, well below the high radiation regions of the Van Allen Belts. These satellites have shown lifetimes of typically well over 3-5 years. A similar lifetime is foreseen for the FUNcube satellite, giving plenty of time to actually incorporate the educational goals into course material, to ensure continuity in achieving the educational objectives.

payload. The ground segment includes the GB4FUN vehicle and radio amateurs worldwide. Furthermore, telemetry kits and associated software are part of the ground segment. Note that this proposal does not cover the development of receiver kits, as these are available off the shelf through ISIS. Furthermore the costs of these kits are not included in this proposal since these largely depend on the actual quantity. The development of telemetry decoding and displaying software is included in the proposal however. Finally, the development of course material is not included in the proposal, since this is an activity which is best done together with other parties with the required expertise. The project partners would be glad to assist in the development of course material however.

The satellite bus will be built from off the shelf components from ISIS. Radio amateurs from AMSAT-UK will perform the development of the educational payload and telemetry decoding software. ISIS will provide assistance during integration of the satellite, and will furthermore arrange environmental testing so that the satellite is qualified to fly on several eligible launch vehicles.

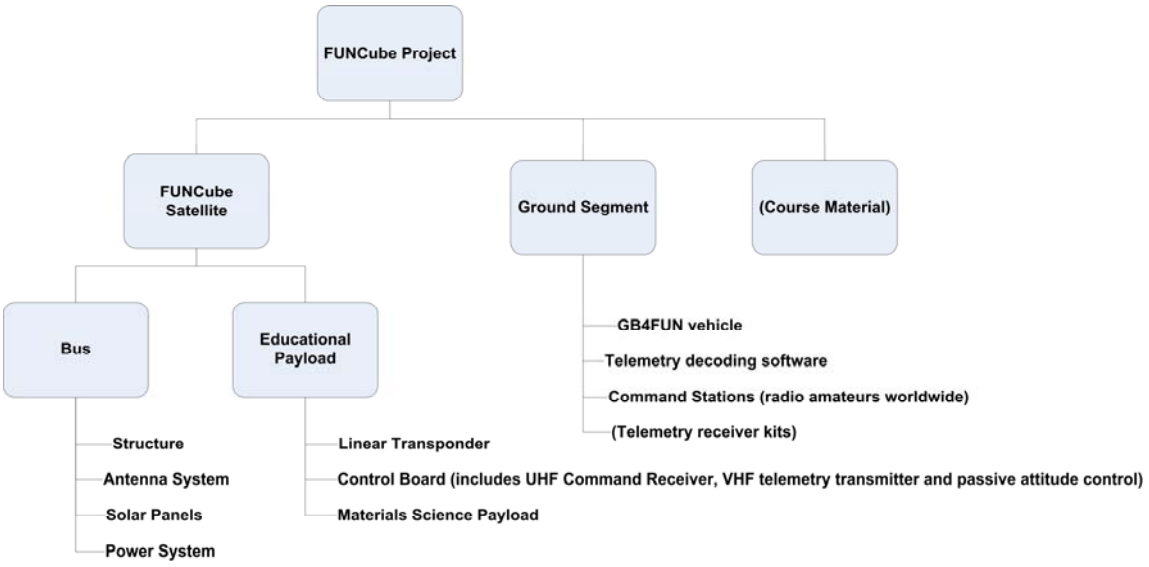


Figure 2 FUNcube Project Outline

Project Outline

The FUNcube project itself can be divided into a space segment (i.e. the satellite) and a ground segment. The satellite itself consists of several subsystems, which are split up between the bus and the educational

Project Planning & Organization

The project is split up into several phases, as depicted in Figure 3. For all off the shelf items, no breadboards will have to be made since these have been qualified and tested

already. For the custom parts (the educational payload), a breadboard will be made, which can later be transformed into a representative satellite breadboard, which can then be used as a demonstration model and reference experiment for the materials science payload for use in GB4FUN.

After this a flight model of the educational payload will be produced, which will then be integrated with the off-the-shelf bus items. After satellite integration, the satellite will be acceptance tested by environmental (vibration, shock and thermal vacuum testing. The satellite will be tested to levels representing the available launch vehicles

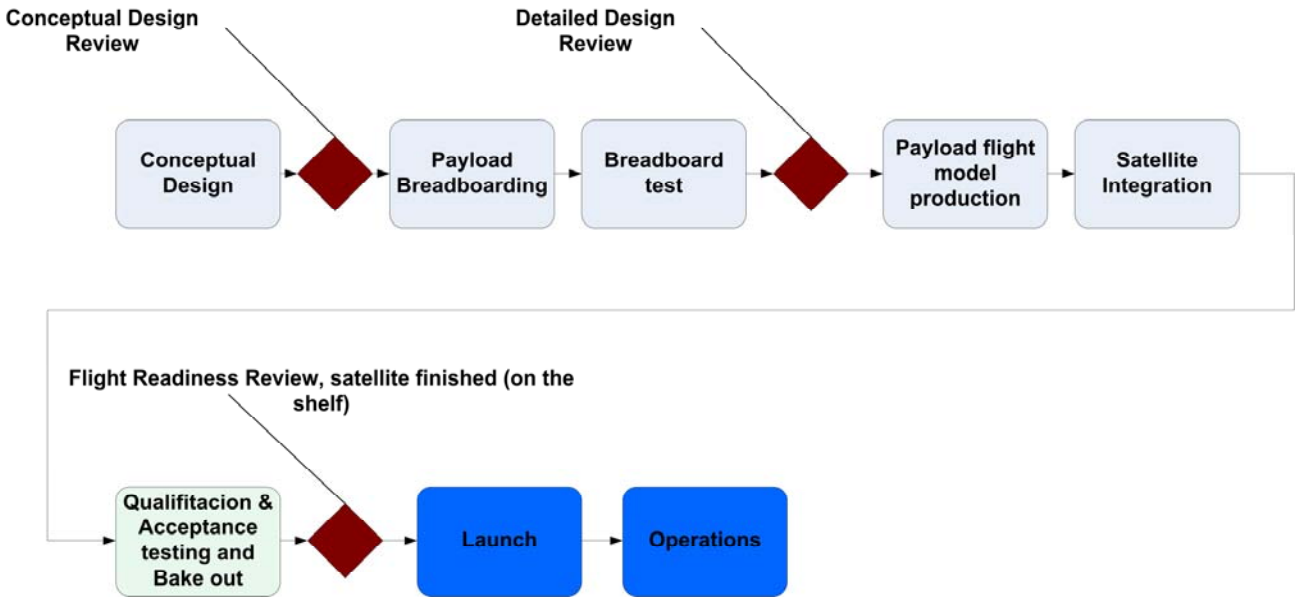


Figure 3 FUNcube Project Flow

(presently and in the near future) for CubeSats. Finally, the satellite will be stored in a transport container on the shelf to await a suitable launch opportunity.

After this a flight model of the educational

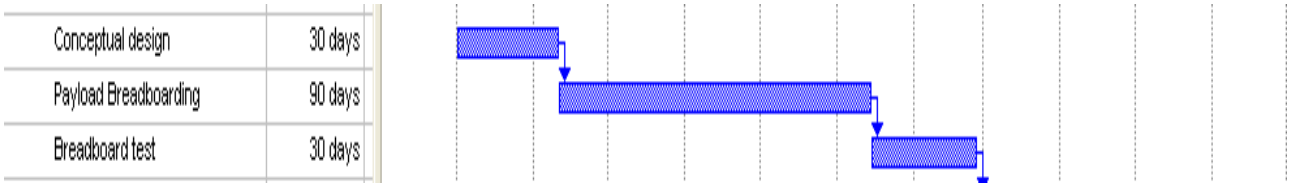


Figure 4 FUNcube Project Planning

payload will be produced, which will then be integrated with the off-the-shelf bus items. After satellite integration, the satellite will be acceptance tested by environmental (vibration, shock and thermal vacuum testing. The satellite will be tested to levels representing the available launch vehicles (presently and in the near future) for CubeSats. Finally, the satellite will be stored in a transport container on the shelf to await a suitable launch opportunity.

Launch

CubeSats are generally launched as secondary payloads. An increasing number of opportunities and launch vehicles are becoming available for launching CubeSats. At this moment, a specific launch has not been planned. The satellite would be completely built and tested, after which it can be put on the shelf waiting for the first launch opportunity to become available. Due to the flexible design of the satellite, it can operate in any high inclination Low Earth Orbit between 400- 1000km so there are no strict requirements on the orbit. Most CubeSat launches go to Sun Synchronous Low Earth Orbits, typically in the 600-700km range. In these orbits, the satellite passes over Europe approximately 3 times in the morning, and 3 in the evening, every day. This would be very suitable for FUNcube as the satellite can be used for demonstrations by GB4FUN in the morning, and used by radio amateurs during the evening passes. The launch itself would be a big event, and it would be perfectly suited for

media involvement.

Figure 5 Polar Satellite Launch Vehicle Upper stage showing CubeSat deployers (picture courtesy of ISRO)

Operations

For satellite control and operations no dedicated groundstation will be required. A worldwide team of individual experienced volunteer radio amateurs will be responsible for this function. Additionally the equipment already installed in the GB4FUN trailer is well suited to demonstrate these functions.

The satellite will be designed such that it has a large degree of autonomy requiring minimum operator intervention from the ground.

PR / media plan

There will be a requirement for an "outreach" team to be created to ensure the widest possible coverage and general publicity for the project; especially around the time of launch and during early operations. From the experience gained by AMSAT-UK whilst working on the SSETI-Express project we know that mainstream media will be interested in the project and we have recently been approached by the BBC "Blue Peter" researchers who have expressed an interest in working in this area

AMSAT-UK have worked with the RSGB in supporting the ARISS (Amateur Radio on the International Space Station) school contacts, where schoolchildren can talk live to astronauts aboard the ISS via amateur radio and we will need to further develop these relationships with the education world.

During the launch phase we envisage the provision of real time launch videos, interviews, demonstrations of ground receivers by school children etc together, of course, the capture of initial telemetry using the GB4FUN trailer from a suitable location.

Figure 6 ARISS school contact at Budbrooke School

SUMBANDILASAT SUCCESSFULLY LAUNCHED

Third time lucky! SumbandilaSat was successfully launched on September 17 at 15:55:09 GMT after the launch had to be postponed twice, once due to heavy winds and the second attempt due to the fuel pressure in the feed line which was four times too low and thus caused the fueling process to take too long to be completed in time for launch.

The satellite was released from the rocket while over the Antarctic and accessed by the ground station at the Stellenbosch University ten minutes later when the first command was sent to “wake up” the satellites. Despite the low elevation orbit of less than 10 degrees SumbandilaSat responded well with its first telemetry

Earlier in September a team of SunSpace Engineers unpacked the satellite at the Baikonur launch facility in Kazakhstan and carried out a full systems test. All systems performed to specification. The amateur radio payload was tested from a little distance to check radio signal levels. All three systems, the voice beacon, the parrot repeater and the VHF/UHF FM repeater performed flawlessly.

Next SumbandilaSat was integrated on the launch platform and made ready for launch. Prior to the assembly being transported to the launch platform, the batteries were given their last top-up.

An intensive period of payload qualification will now follow during which each system will be tested. This is expected to take up to 3 months after which the command will shift to the CSIR’s Satellite Application Centre at Hartebeeshoek, north of Pretoria.

During the commissioning period telemetry will only be heard whilst in contact with the groundstation at Stellenbosch South Africa and NOT on the amateur frequencies. There are a number of hams involved in the project so rest assured the amateur payloads will be supported as soon as practical and safe.

Trevor
M0AKA

AMSAT-UK “Satellite Weekend”

The 24th AMSAT-UK “Satellite Weekend” was held at the Holiday Inn hotel at Guildford from Saturday 25th until Sunday 26th July 2009. Radio Amateurs from around the world attended the event and it was said that this years was the ‘best yet’.

The presentations were again webcast and attracted a significant audience. This was organised by the British Amateur Television Club (BATC) with AMSAT-UK members **Graham Shirville G3VZV** and **Ivo Klinkert PA1IVO** assisting. BATC also provided a ‘Live Chat’ web page that enabled web viewers to submit questions to the presenters during the question and answer sessions. After the event BATC Chairman **Trevor Brown G8CJS** spent many hours editing more than 14 hours of presentations.

The keynote presenter this year was **Dr Andreas Mogense** who is from Denmark and who had recently been selected from 8000 applicants to join the European Space Agency (ESA) astronaut training programme. He described the various stages of the selection process and the barrage of tests they had to go through. Andreas is now commencing his 4 year training programme and will hopefully embark on his first space mission in the 2014-2020 timeframe.

Amongst the other presentations that were made, we had **Ed Moore M0TEK** and **Fergus Noble M0NBL** of Cambridge University (CU) Spaceflight who gave an enthralling presentation on “Electronics and Teddy Bears: A Near-Space Adventure". This told of their experiments in launching camera equipped high altitude balloons to the edge of space. This resulted in the successful ‘Space Teddies’ mission where four teddy bears in space suits, designed by school children from Parkside and Colleridge schools, were sent up to an altitude of 30 km enduring temperatures as low as –53 degrees. The pictures taken on this mission were quite spectacular and the

event achieved widespread media interest.

The eventual aim of the group is to launch a rocket from a high altitude balloon to travel into space.

CU Spaceflight have been to encourage young people to learn more about space and the possibilities for space exploration. They give talks in schools and have helped children to build their own small rocket and launch it.

Peter Guelzow DB2OS from AMSAT-DL gave an update on the eagerly awaited P3E and the Amateur Radio MARS orbiter P5A. Peter, like most of the presenters spent many hours outside the formal presentations answering detailed questions from attendees about these two spacecraft that promise to revolutionise Amateur Satellite communications.

Graham Shirville G3VZV and **Wouter Jan Ubbels PE4WJ** were able to announce the start of AMSAT-UKs exciting new FUNcube project. They outline the background to the project and outlined the concepts that are expected to be incorporated. *(A full introduction to FUNcube is provided elsewhere in this issue)*

Drew Glasbrenner KO4MA from AMSAT-NA told the audience about the latest attempts by AMSAT-NA to reduce the effects on the Amateur community of the restrictive US ITAR (International Trade in Arms Regulations) rules. The heavy legal sanctions, four figure fines or jail terms, that might be imposed on American radio amateurs under ITAR has had the effect of stopping all collaboration on satellite projects between Amateurs in the US and the rest of the world. It is to be hoped that the AMSAT-NA moves are successful.

Neil Melville PA9N gave a superb presentation on the GENSO project. This aims to provide automatic collection from around the world of the telemetry data from the ever-growing number of Amateur Radio and Educational satellites. He gave a successful live demonstration of the system, proof that all the hard work put in on both the software and hardware side by many university students and amateurs over the last few years has finally come to fruition.

One of the more memorable presentations was ‘Rocket Range Contest - How far will it travel?’ by **David Bowman G0MRF**. David started with some pyrotechnics and then led the audience outside to the ‘rocket range’. There we were each given a plastic coke bottle with a 4 mm hole drilled in the centre of the plastic lid and some alcohol. The participants poured the alcohol into the bottle, replaced the lid and with their finger over the hole shook the bottle vigorously for about 30 seconds to form the alcohol/air vapour.

The residual alcohol was drained away and in turn each rocket was placed on the launch ramp and ignited. The distances achieved varied from about 5 to 10 metres and the event was thoroughly enjoyed by those who took part.

The Saturday evening dinner was well attended and the after dinner auction run by AMSAT-UK secretary **Jim Heck G3WGM** raised a significant sum thanks to the generosity of all those who attended.

The Radio Society of Great Britain (RSGB) demonstrated their new Radio Communications demonstration centre GB4FUN for the weekend. This proved especially popular with the international attendees at the event and was heavily used for the ongoing GENSO development. The many visitors to this impressive communications facility kept the RSGB Amateur Radio Manager **Carlos Eavis G0AKI** very busy during the event.

One of the unscheduled activities at the Colloquium was the remote control helicopter. It attracted a good audience whenever it was flown, even late at night. Several videos of it are now available.

Eighteen videos recorded during the weekend can now be seen at http://www.batc.tv/ Click on the "Film Archive" icon on the left to see all the videos available then select the video you wish to see (they start with 2009 AMSAT) .To see the video full screen click on the icon at the

bottom of the video player.

PDFs of the presentation slides can be found on the AMSAT-UK website at http://www.uk.amsat.org/component/option,com_wrapper/Itemid,278/

Cambridge University Spaceflight

http://www.srcf.ucam.org/~cuspaceflight/

Get into Orbit with AMSAT-DL's P3E-Satellite

http://www.p3e-satellite.org/index.pl?lang=en_EN

GO-Mars with the AMSAT-DL P5A Mission

http://www.ticket-to-mars.org/

73

Trevor
M0AKA

AMSAT-UK Shop

The AMSAT-UK shop is an important source of funds and every purchase from the shop helps to contribute towards the Satellite Building fund.

The shop has had a very successful few months and was present at the AMSAT-UK Colloquium in Guildford. New items have been added and more are on the way – please keep checking the website for details.

The current available stock items available from the shop are:-

- G7HIA Lindenbald Antenna Kit
- G7HIA 2.4GHz Patch Antenna kit
- G0MRF 2.4GHz Signal Sources
- LVB Tracker – Motherboards, USB interface boards, full and partial kits.
- SatPC32 and WiSP Software Licenses.

Full details are now on the AMSAT-UK web site along with prices.

Unfortunately, there are currently no books for sale – we are looking at this but suggestions are always welcome.

Suggestions from AMSAT-UK members are always welcome and a dedicated email address (amsat-uk-shop@amsat.org) is available for contact the shop. Please send the suggestions in and keep checking the website for updates and new items.

Finally, we have several new ideas of our own for inclusion in the shop. As these ideas and any submitted suggestions come to fruition, the web site will be the first to be updated.

73

Ciaran Morgan
M0XTD

HAVEN'T GOT A CALLSIGN? THEN THIS PAGE IS FOR YOU!

At the AMSAT-UK Colloquium there was just one toast after our meal, "To absent friends". Always a sad moment when we remember those who we've known through our hobby, at the Colloquium, heard/worked on the satellites or terrestrial nets. We each have our own memories of those who are no longer with us, too many to even start to list. I guess it's our age group.

I was saddened to see the announcement in August's RadCom that another well know radio amateur and satellite enthusiast, Ken G8VR, had passed away.

KEN WILLIS G8VR SK

Ken Willis, G8VR, died on 24th June 2009 after a short illness, only four weeks after his 90th birthday. He was best known to the general world of amateur radio as the VHF/UHF columnist for RadCom, a post which he held for a number of years.

At an early age, Ken gained his amateur radio licence in 1937. He worked just about every band over the years but as time went on became more and more interested in the higher frequencies used for amateur radio satellites, moonbounce and meteor scatter.

His satellite interests mainly included the linear transponders, and during his time working in USA he made many contacts via OSCAR-8, which he always regarded as 'one of the best'. In OSCAR News February 1996, he took over the 'Mode A & K

Operator's Corner' from Doug G0SYX/KO5I. He continued the column for a further 18 months. He always favoured the simmple approach to satellites and at the 1994 Colloquium presented a lecture 'The Simple Man's View of the Satellite Scene'.

Ken was a staunch supporter of the UK Six Metre Group (UKSMG), becoming Chairman and then Vice Chairman in the early nineties. In later years he wrote a very popular series of historical articles for Six News entitled '50 Years of 50MHz', for which he was awarded the first G5KW Memorial Award by the group in 2002.

On a personal level, we exchanged a large number of e-mails about satellite topics such as OSCAR-11 mode-S and decoding telemetry. His location at Broadstairs was of special interest as I had visited the area many times with my late Father.

Being declared unfit for naval service as a telegraphist in 1940, he became a back-room boffin at Woolwich Arsenal, working for the Signals Research Development Establishment on radar development. For a time he was also seconded to the SOE station IX in Welwyn Garden, where he worked on a special UHF set for use on Lysander aircraft on drop runs into occupied territory and on transceivers for the paratroops dropping into Arnhem, even getting to do a training jump at the paras base.

After the war he completed his interrupted Physics degree and, after a short period lecturing in Physics and working at the Fuel Research labs, he moved into the atomic weapons programme with AWRE at Fort Halstead and Aldermaston. This included leading the telemetry team on the 1952 weapon test in the Montebello Islands, where they had to multiplex all the monitoring positions on remote islands back to the main data collection ship.

From 1956 to 1959, as a Principal Scientific Officer, he became a member of the Joint Services Mission based at the British Embassy in Washington DC liasing with US staff on airborne communications, radar, missile guidance and early warning systems.

Being offered similar work on return to the UK he eventually moved to the National Research Development Corporation before transferring to the USA to set up a similar business in the form of the Connecticut Product Development Corporation. He remained there as Executive Director and finished up ghost-writing a book on robotics until he retired back to the UK in 1983.

In his 25-year retirement he managed to spend much of his time on the air when not watching Charlton Athletic or building and changing antennas and kit.

He also took time off to rebuild a number of wall and steeple clocks and to build three scale steam locomotives. Getting his first PC as a 75th birthday present, the world of the internet, e-mail and software opened up whole new areas of interest.

He lived life to the full, with ambitious Christmas holidays & Cruises.

In his last year he had been trying to get a pair of 23 cms Tonna equivalent antennas to work properly and they were finally tested out in January 2009. Unfortunately he was not well enough to ever use them in anger.

Ken was one of the greats of the amateur radio community and a really nice chap as well. He will be missed by family and friends inside and outside the world of amateur radio, but its touching that his personal Journal finishes: 'I will not be dead all the time I am remembered'.

Ken was the youngest and last surviving of seven children. He leaves behind his sons Stephen and Martin, his wife Vera and his companion Margaret.

I am indebted to Chris Deacon, G4IFX, editor of Six News, for permission to include parts of an obituary previously published in Six News, and to Ken's son Steve, for additional background information.

G3CWV's OSCAR-11 WEBSITE & E-MAIL ADDRESS

In July, just before the Colloquium, I was

forced to change my internet service provider (ISP) due to the complete loss of the e-mail service. My ISP, Zetnet had been previously taken over by Breathe Networks, and then put into administration. Breathe applied to be struck off the companies register, and was then subject to a management buyout.

I always aim to reply to all e-mails. If anyone has sent e-mail after mid June, and not had a reply, please accept my apologies and resend to my new address clive@g3cwv.co.uk Currently my AMSAT e-mail reflector g3cwv@amsat.org is not set up for the new address, but I'm hoping it will be set up by the time you read this.

My old website www.users.zetnet.co.uk/clivew is still operational, but will not be updated. However, these websites often remain on the server, sometimes for many years, until someone deletes the files. Please use this site, if available, until the new site is up & running.

My new website which will be www.g3cwv.co.uk , is under construction, and will contain most of the files from the old site. I'll indicate which parts of the new website have been completed.

AMSAT-UK BBC PROGRAM LIBRARY MOVED

In December 2006 the AMSAT BBC library was transferred to Eric Young G4MZX of Roade, Northants. Eric no longer wishes to maintain the library, and has transferred it to Greg Cook of Beckenhan, London. Greg is an enthusiastic BBC Micro user, and also has an interest in satellites. His website is http://homepages.tesco.net/rainstorm

Please contact debounce@yahoo.co.uk for further information. I'm currently helping Greg sort out the disks and documentation.

I am always pleased to receive comments, feedback, and requests for help from readers. Short items for inclusion in these pages are always wanted!

A simple question can often be the basis of an article, which may be of interest to other readers (who didn't like to ask!). Your input can be by letter or e-mail. Please send it to the address below.

73

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GENSO REPORT

The last week of August saw two AMSAT-UK members attending meetings ate ESA's ESTEC facility in the Netherlands. Whilst David Bowman G0MRF was busy in one meeting room working on the ESEO project (see page….), I had been invited at attend a GENSO workshop which was conveniently taking place in the next door meeting room.

G3VZV checking the GENSO GSS with PA9N and students working at the MCC and the AUS in the background

The purpose of the workshop was to make final preparations for a first distribution of the software to a very limited number of Ground stations and Mission Controllers for early beta testing prior to a more general release planned for the beginning of 2010.

To properly complete all the testing needed it was decided to set up a demonstration set of the hardware for the three parts of the system in the large meeting room available. AMSAT-UK had supplied two sets of computer and radio/antenna groundstation equipment last summer – one has already been installed at the International Space

University at Strasbourg and the other set had been in store at ESTEC awaiting the identification of a suitable roof for installation. This was the kit that was used for the workshop.

Luckily the specification for the reference groundstations included three computers, therefore we were able to set up one computer as the “AUS-Authentication Sever”, one as a “MCC-Mission Control Centre” and one as the “GSS-Groundstation”. All three were set up to dual boot between XP and Linux as this is part of the specifications for GENSO compatibility and the software needed to be tested.

In addition to the GSS computer we had the IC910, 9612+ TNC and both Yaesu G5500 rotators and also the 2800 Orions for azimuth and elevation from M^2 .

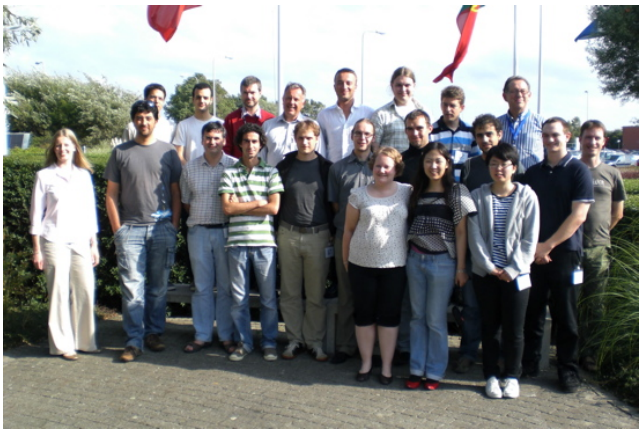
All the radio hardware pretty much worked from switch on but we had a number of wiring issues with 2800 rotators and with the ribbon cable linking the two separate controllers. Suffice to say that the manual stated “install ribbon cable with the red side down” – in reality, to make the system work correctly, it required the ribbon cable to be installed with the red side UP.

Genso ground station setup

When first switched on these rotators would only work in one direction. On removing the covers from the rotators it was discovered that lever which operates the end stop switches had become wedged under the microswitch arm and was effectively stopping the rotation operating in one direction. Surprisingly both rotators were in the same state!

The software developers then had a real station to test their work with using drivers for the various items of hardware that were available.

The test station will remain available at ESTEC for further testing prior to the, hopefully, early installation of an actual reference ground station on the site.



73

Graham Shirville, G3VZV

Welcome to the ZEL
(Zentrales Entwicklungslabor – Central Development Laboratory) of AMSAT-DL.

The previous AMSAT-DL journal contained an extensive article in about the reasons for and the background to, the taking over of the ZEL in Marburg by AMSAT-DL.

After the University of Marburg gave up/vacated the ZEL at the end of last year, these rooms – although a reduced area –are now at the disposal of AMSAT-DL without any restrictions. As probably only very few readers and members (of AMSAT-DL) have had or will have any opportunity to personally visit the Marburg home of AMSAT-DL, we would like to give you an impression of the building work and modifications carried out with the following pictures.

As AMSAT-DL don't need as much space as the University did with several members of staff, several offices and laboratories had to be emptied out, decommissioned and reinstated as per the rental and take over agreements. This resulted in a large amount of bulky waste and electronic scrap which had to be disposed of properly. Thereafter, some rooms had to be prepared for their new use (for instance a small kitchen). At the same time, a total general cleanup took place, which is still ongoing in the workshop area.

AMSAT-DL now have at their disposal – apart from the integration- and preparation room – 4 office workstations, 3 electronic and "measuring (Testbench?)" workspaces, and a small mechanical workshop with a CNC machine for sheet metal work. Additionally, there is a conference / meeting room, a small library area and the small kitchen. Not all the rooms are useable yet. The participants have got through the majority of the work on the way to full utilisation of the ZEL rooms by now though. All helping hands deserve a huge Thank You!

Currently, HS, KM and HW are the regular users of the new AMSAT-DL rooms. The workstations will get progressively busier with the forthcoming integration (assembly?)

Come along on a photographic journey through the rooms of AMSAT-DL.

1. Here at No. 20, Ernst-Giller-Str. in Marburg is the home of AMSAT-DL. All rooms are on the first floor along an L-shaped corridor

2. The AMSAT entrance area in hallway: on the left, the door leading into the Integration room; the satellite leaves the integration area via the large door in the middle, and the door on the right leads to the office and workshop areas.

3. The first thing you see is a 1:3 scale model of the P5 Mars Probe and some measuring instruments

4. Heinz Mölleken (DL3AH) is one of the helpers with the building and modification works. The corridor is filling up with a huge amount of bulky waste.

5. All are in a good mood, including Horst Wagner (DB2ZB).

6. Members of the Amateur Radio Club DARC OV Marburg are busy helping with the renovations, this is Janos Bletterer (DL7AOJ).

7. Heike Straube not only holds all the strings in her hands, she is making space for new things

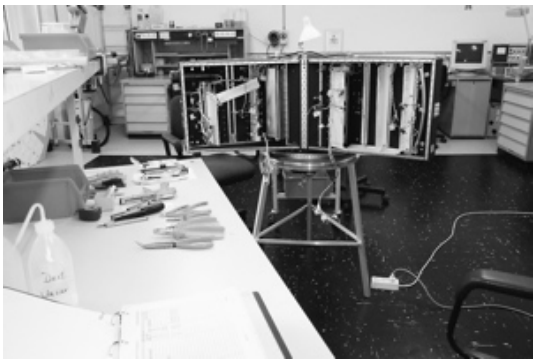
8. The heavy hauling has its first break: the bulky waste is stacked along the pavement, waiting for collection

9. Not much change here: Karl Meinzer (DJ4ZC) in his old – and new – office

10. Heike Strauber has more space in her new office than before: the test bench (??? Messplatz – measuring station) has found a new home next door

11. This is the anteroom to the Integration laboratory; also in the picture is a 1:1 model of the P3E Satellite

12. Inside the Integration room, P3E is "growing" from individual components; here are a few workspaces that (should help with reducing the path of integration and testing?)



13. A current view of the satellite. The cables are drawn (?) connectors (?) are fitted and labelled. Everything is ready doe the installation of the flight modules, some of which are ready and waiting in Marburg

14. A computer station in the office area of the ZEL.

15. Two electric work stations in an office

16. AMSAT-DL has inherited a large cable and component store

17. One side of the materials, components and instrument store

18. The conference/meeting room has space for up to 20 people.