



Warwick University Satellite Project: Autumn 2013 Newsletter

New year, new team!

Welcome to the first newsletter of the academic year! The new academic year has brought together a new team of fourth year engineering students who will work on bringing WUSAT2 to fruition.

The team has so far focussed its efforts on picking up from last year's hard work and to adapt it for improved space-worthiness and design. We have also begun collaboration with the Warwick Physics Department to determine a working payload for the CubeSat to carry; the latter being a crucial aspect of the application to REXUS, a European programme for student experiments.

REXUS

The REXUS/BEXUS (Rocket/Balloon Experiments for University Students) programme launches two rockets and two balloons from northern Sweden every year, carrying scientific and technological experiments designed and built by student teams. REXUS experiments are launched on a rocket capable of taking 40kg of experiment modules to an altitude of 80 to 90km.



We are pleased to have been shortlisted for REXUS, and will be sending 5 members of the team to attend the selection workshop

between the 3rd and 5th December 2013 at ESA's Space Research and Technology Centre (ESTEC) in the Netherlands.

If successful, there will be a suborbital rocket launch of WUSAT2 in March 2015, which provides the team with a goal beyond the high-altitude weather balloon launch planned for this year's initial version of WUSAT2.

Progress

Electronics

Taking on board the suggestions made last year regarding the limitations of the ARDUINO microcontroller, the electronics sub-team has been weighing up the pros and cons of various microcontrollers, finally settling on the PIC24.

To effect a significant reduction in power consumption the electronics sub-team has chosen to use on-chip solutions for the sensors, as well as an I²C bus for ease of interface.

The intention is to stream data from the CubeSat during flight, and selection of an appropriate communications system is currently being deliberated.

Mechanical

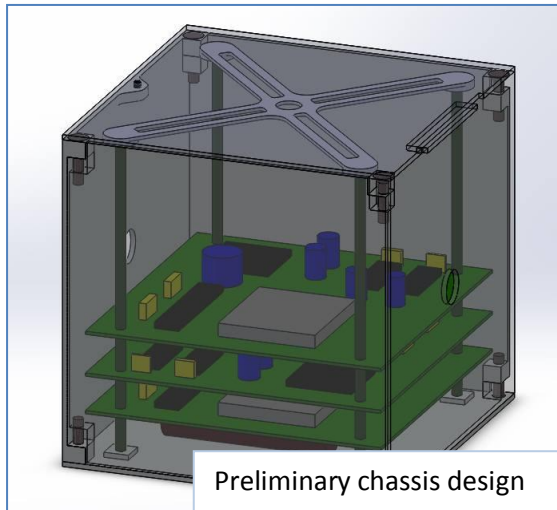
As part of the process to make the chassis more space-worthy, research into radiation shielding has been carried out in order to inform the design process.

The chassis is in the process of being redesigned for greater ease of assembly and disassembly.



Autumn 2013

Thermal analysis is ongoing to try to understand the relationship between the conditions the satellite will be exposed to, and the heat generated by electrical components and potentially by the payload.



Payload

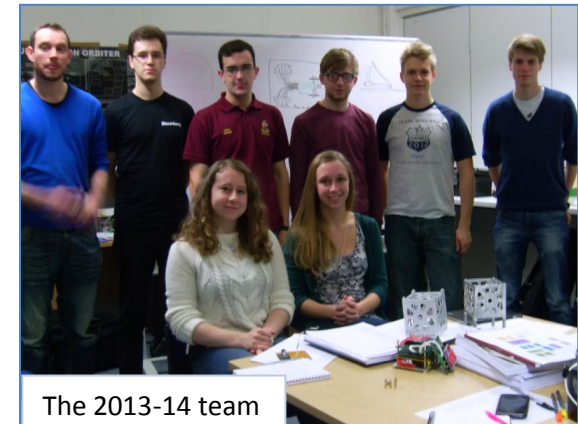
Plans for a working scientific experiment to form the CubeSat's payload have been formed in collaboration with Prof. Don Pollacco of the University of Warwick Department of Physics, a world leader in the in the area of exoplanets, and his PhD student David Armstrong, also a member of the Warwick Astronomy and Astrophysics group.

The aim is to use the transit spectroscopy method to estimate the effects of the Earth's atmosphere on solar emissions, taking measurements of the solar spectrum as the CubeSat descends through the atmosphere. Testing this method in an atmosphere of known composition will allow better predictions of what the expected measurements would be if the experiment were run on an Earth-like exoplanet, and will also provide a demonstration of the method.

The payload design and integration into the CubeSat is still in progress, but is expected to involve piping light into the satellite via optical fibres and onto an array of photodiodes covered in filters corresponding to a carefully chosen range of wavelengths.

Meet the new team!

(l-r, back) Mark, Leo, Oli V, Oli B, Matti, CJ
(l-r, front) Sarah, Jess



Sponsorship

The new team would like to take this opportunity to thank all of our partners for their generous sponsorship and continued support of our satellite project. We are very grateful for all the support we receive and we hope to demonstrate good progress in future editions of our newsletter. In the meantime, it is possible to keep up with what we're up to via our Facebook page or our website.

<https://www.facebook.com/WarwickUniversitySatellite>

