

Warwick – Aston – Birmingham – Cranfield – Keele – Leicester – Loughborough – Nottingham

WUSAT Progress!

2022 Achievements and 2023 Developments!

WUSAT-4

Having acquired our WUSAT polo shirts we were able to have a photo shoot with the current 2022-23 team who are working on WUSAT-4. They are,

Back L-R: Dr Bill Crofts (WUSAT Director), Pritesh Shah, Seb Fieldhouse, Joshua Wong.

Front L-R: Adam Rich, Zitai Jin, Harvey Holliday-Williams.

The team are busy working on a number of aspects to define the requirements of the WUSAT-4 payload and the overall mission to deliver it to a Low Earth Orbit demonstration. They are also working on early-stage designs of key sub-systems including RF communications, the satellite chassis structure, and initial plans for the Concept of Operations (ConOps), etc. The latter being important in determining what telemetry control signals and what sort of payload data downlinks might be required, etc.

To this end, we have also been involved with two important developments that will assist WUSAT-4 teams and potentially determine our route to launch. These are a visit to our Airbus partners at Stevenage and a WUSAT-4 submission to the European Space Agency. (see following pages)



AIRBUS Visit

Wed 23rd Nov 2022 – The WUSAT team, plus a 3rd Yr group that we hope will become the nucleus for WUSAT 2023-24, made a visit to Airbus at Stevenage. The day was organised with Bill by Airbus employees Michael Skreta, Alex Bolland and Tahrim Uddin. Interestingly, these last two guys are ex-WUSAT who joined Airbus last year, so great to see them there and to see the progress they are making.

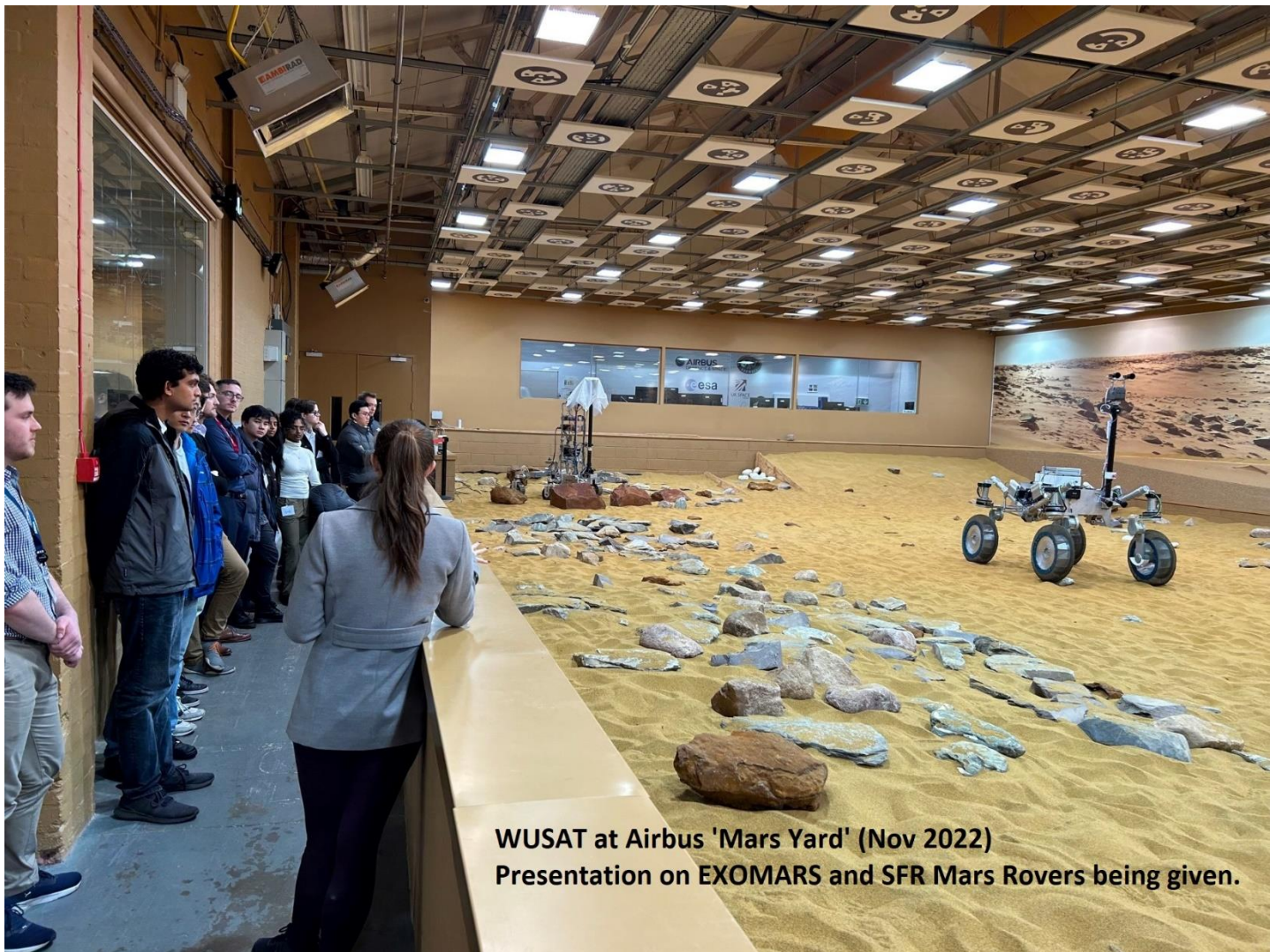


**WUSAT Team ++ at Airbus, Stevenage
(Nov 2022)**

WUSAT team, plus potential members of WUSAT 2023-24 team!

L-R (not in WUSAT shirts!) – Matthew Kho, Natasha Galpayage Dona, Santhiya Chandrakumar, Edoardo Taricco, Thomas Dupont and Tanner Hatzmann.

Airbus put on an excellent day, that included talks, team exercises linked to satellite design scenarios and a tour of the Stevenage facilities that included a visit to the 'Mars Yard' where Mars Rovers are developed and tested (see image below). We continue to benefit enormously from our links with Airbus and they will continue to collaborate on our Progress Meetings and occasional WUSAT-4 review exercises.



European Space Agency (ESA) Submission

WUSAT have responded to a call from ESA for team submissions to a Concurrent Engineering training programme to be held at ESA's ESEC Galaxia facility in Belgium. It seems likely that this submission is part of a process leading to the next ESA FYS Launch programme call, hence it was very important that we made a strong submission to this call.

Bill completed and submitted a general team submission document for WUSAT-4. This highlighted the concept of WUSAT-4 and estimated plans for its development. Individual team members were also required to make separate submissions to be considered for a place on the training programme (to be held in Feb 2023).

Concurrent Engineering is an important methodology for developing satellites (and many other areas of complex engineering), so if our submission is accepted it will not only be an important stepping stone to a launch, but will also give an excellent educational opportunity to any WUSAT team members selected to attend.

We highly value our strong connections to ESA and the benefits it brings to our students.

Dr Bill Crofts & Prof Julia Hunter-Anderson, Co-Directors of the WUSAT Programme, www.warwick.ac.uk/cubesat

Human Space Physiology - ESA

WUSAT continues to offer spin-off benefits of our connections to ESA and Space technology in many interesting ways. Earlier this academic year we were very pleased to link with Warwick Medical School on the subject of Human Space Physiology.

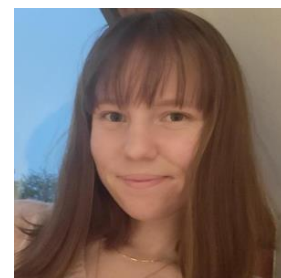
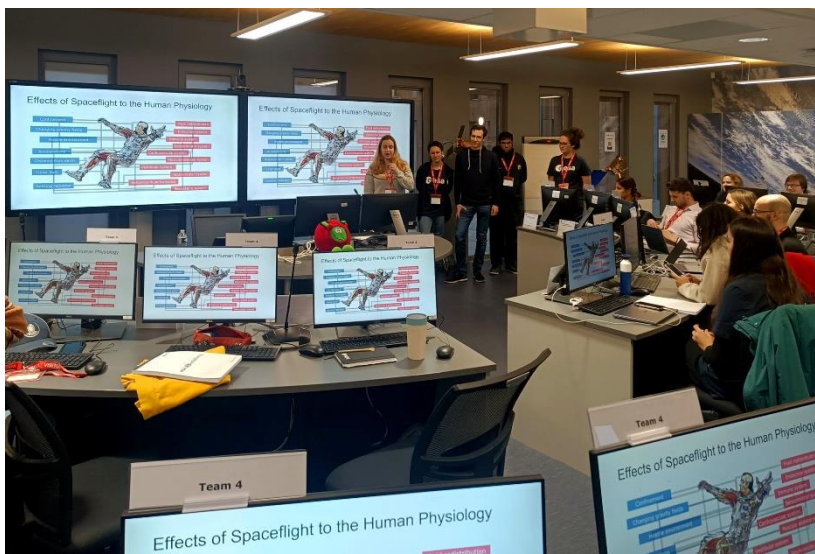
Human Space Physiology is concerned with how the human body reacts to being in Space over a period of time and what can be done to alleviate unwanted or dangerous effects.

The European Space Agency were planning a training programme on this topic to be held at their training and learning facility, ESEC Galaxia, Belgium in November 2022. As they were aiming this at medical students, Bill approached Warwick Medical School to determine the interest from their students. Eventually with the help of Kelly Coles, WMS Careers Officer, Bill was able to hold an online seminar with a number of WMS students. They were guided through the application process with the support of advice and a reference letter from WUSAT. As a result, one student, **Izzy Bowen-Lowe**, was accepted onto the course and found it a very rewarding experience.



2023 ESA Human Space
Physiology Training Cohort

It was very rewarding for WUSAT to have such a productive link to Warwick Medical School, and it also gives Kelly and WMS students generally, the possibility of considering Human Space Physiology as a potential career choice in the future!



Izzy Bowen-Lowe

Students presenting the final
results of their group project.

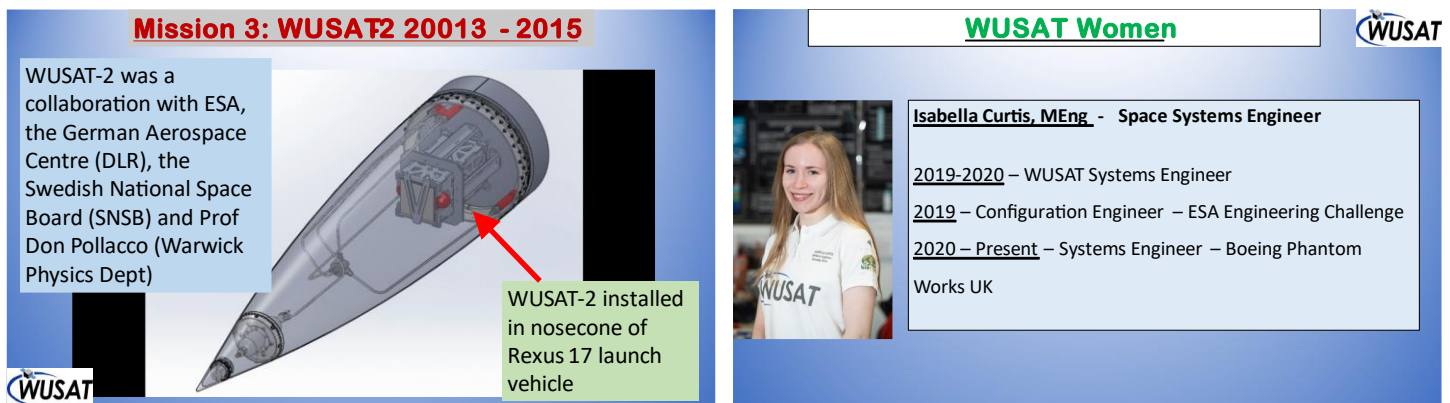
Outreach

Women in Engineering – Supporting the Girls' Day School Trust (GDST) Space Technology Diploma

WUSAT are continuing to assist Sutton High School's Head of Computer Science, **Nicola Jane Buttigieg**, in the development of her Space Technology Diploma programme ([The GDST Space Technology Diploma - Girls' Day School Trust](#))

On 21st November 2022, WUSAT Director, Dr Bill Crofts, gave an online motivational talk to students and staff from a number of GDST schools who have signed up to this Space-related software programming module.

The talk highlighted WUSAT Space missions (see sample slide below), the students who have worked on them, and, in particular, showcased a number of 'WUSAT Women' who have progressed on to impressive careers with the help of their WUSAT experience.



This module is continuing to attract a large number of female school students towards STEM subjects with particular interest in a potential career in Space. The module is supported by both WUSAT and NASA in order to provide Nicola with realistic Space scenarios on which to base programming tasks for the module.

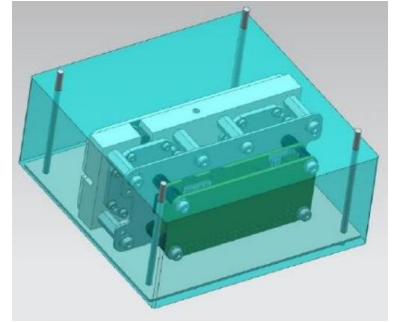
Nicola has done an amazing job in recruiting NASA support, and she has recently been invited to make a presentation to NASA Earth Science Data Systems (NASA Langley Research Centre) during an online conference with NASA HQ in Washington DC. The presentation will focus on the potential for direct integration of NASA satellite data into their Amazon AWS-Cloud Proof-Of-Concept trial facility. This is a wonderful achievement and well deserved. We hope that this will help accelerate the development of this module and be a great inspiration for more young women to follow a Space technology career.

Bill will be giving a further talk to GDST staff and student members on Mon 23rd Jan. The topic will be '**Thinking Like a Space Engineer**', and the talk will be based on the concepts of **controlling Spacecraft orientation in orbit**.

Summary of the WUSAT-4 Mission!

Due to the immediate requirement of submission to ESA's Concurrent Engineering Programme, with expected progression to an ESA launch programme, we had to limit the submission of WUSAT-4 to a single payload based on the Space Biology experiment designed by the University of Exeter and Space Park Leicester.

FDSPP Experiment Unit – includes 'pods' that accommodate the microscopic worms, sealing interface and pod window, and PCBs for internal electronics.



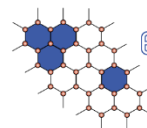
Unfortunately, the beacon transmitter (BEAP) payload for UK Launch Services was not yet developed to a level where the team could integrate it into WUSAT-4. However, if either we don't make it onto the next ESA launch, or we do launch and are ready to commence WUSAT-5, we will hope to incorporate a test/demonstration of the BEAP payload if UK Launch Services still require it.

Our partner companies/organisations



Roke

Part of the
Chemring Group



ESATAN-TMS
thermal modelling suite

Best wishes,

Bill & Julia

