



Midlands Innovation CubeSat Newsletter



June 2021

MISAT-1

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

WUSAT Expands to 'MISAT'

After the most difficult year for everyone, we hope to be emerging with an exciting new development for WUSAT and for the future of CubeSat launch missions in the Midlands!

The **Midlands Innovation Space Group (MISG)** incorporates the eight research-intensive Midlands universities shown above. Each of these universities has extensive capability in Space research and technology. As a partnership we aim to develop a major Midlands-based cluster of collaborative research, training and skills needs for the Space sector.

Please see our Space Expertise Brochure at [Midlands Innovation Space Group](#)

At a recent MISG meeting it was agreed that WUSAT Director, Dr Bill Crofts, would lead a new **Midlands Innovation CubeSat Group (MICG)** with the purpose of providing CubeSat launch missions that would offer opportunities for all eight partners to contribute to research, projects and training opportunities in actual launch development and operation of CubeSat missions now and in the future.

Effectively, due to its structure and 15 years of heritage, WUSAT will be the core of this group. However, through the development of the MICG we hope to offer MISG universities....

- The application of **research** that can be trialled on an actual mission
- Undergraduate or MSc **Projects** that can contribute to CubeSat mission development
- UG and PG student's the opportunity to become part of the **MICG team** as an extension of the WUSAT team – this will provide experience in e.g. progressing a **CubeSat mission design through an ESA-type review process** to achieve flight-model approval and eventual launch.

All MISG universities will be able to gain a level of **ownership and promotional output** from the development of Midlands CubeSat launches, and it is hoped that **funding opportunities** will also be found to support the MICG group and its CubeSat development work.

We will develop a **new logo** to represent the MI CubeSat Group and the eight universities represented, and we are considering a new code name of **MISAT** that will represent group satellite missions.

The European Space Agency has approved this development for application to ESA launch programmes. The MICG group will also be supported by AIRBUS.

AIRBUS Review of WUSAT-3

AIRBUS

A panel of AIRBUS engineers recently completed a review of current designs and procedures for our **current mission WUSAT-3** – a 3-Unit CubeSat designed to evaluate a novel wildlife monitoring technology that would produce smaller, lighter wildlife tags.

This was effectively a form of **Critical Design Review (CDR)** similar to that which the team would have to face in order to progress on a European Space Agency launch programme.



The AIRBUS panel was assembled by **AIRBUS engineer Michael Skreta** who kindly received and disseminated a considerable amount of documentation, ensuring that each panel member received the appropriate bundle of documentation to review.

During the review event, **Dr Bill Crofts** (WUSAT) gave a short introduction to the mission objectives, followed by members of the WUSAT Platform and Payload teams giving a brief overview of their work and current designs.

The AIRBUS members then asked questions and gave detailed feedback on issues they considered worthy of review. A considerable amount of feedback was also received in

writing prior to the event. This was immensely helpful to us, and their comments and advice have been logged as part of the information to be passed on to incoming team members.

The full AIRBUS panel consisted of:

- **Michael Skreta** – Communications Products
- **Javier Eroles** – Hardware Engineer – Telecomms, Digital Processing, Power Systems
- **Steve McLaren** – Mechanical Design Antennas
- **Peter Webster** – RF Antennas
- **Max Ghiglione** – Digital Processing Design, Data Processing

Each of the panel members gave their own time to do this work and to provide their expert analysis. We are – of course – extremely grateful to them.

Research to be Trialled on WUSAT-3



A **novel signal-direction finding technology** developed by our partners, **Roke Manor Research**, will form the payload instrument for WUSAT-3. Working versions of this technology have been developed and tested by Roke, but this mission will give the opportunity to test its performance in locating ground-based RFID signals from Low Earth Orbit (LEO). Successful proof of this concept could lead to smaller, lighter wildlife monitoring tags that would extend the range of species capable of being monitored from Space.



One of the first inputs from our new MI partnership is planned to be the use of experimental **ceramic coatings** on the satellite chassis structure of WUSAT-3. **Prof Gary Critchlow**, Professor of Surface and Interface Science at **Loughborough University** is working with the European Space Agency on the development of such coatings that can have considerable benefits to the protection and thermal properties of metallic structures on the satellite. MISAT-1 will be an ideal opportunity to provide in-flight testing at LEO for these ceramic coatings.

We had previously considered the use of a particular white paint to assist with the thermal control of WUSAT-3 but were concerned about possible flaking and consequent production of space debris. A ceramic coating would be far more desirable for our purposes.

WUSAT / Warwick Aerospace Team ready to launch next month!!



The **Warwick CanSat team** are on the final stage of their preparation to launch their CanSat at the Machrihanish Airbase in Scotland in July. The five-member team led by **Emily Schmitt (Maths)** have performed extremely well to successfully progress their device through the launch review stages held by the programme organisers, **UK Launch Services Ltd** and supported by **Raptor Aerospace**.

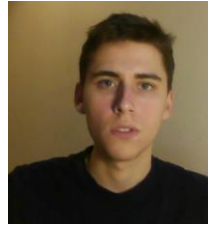
The team includes,



Emily



Mathilde



Robert



Dylan



David



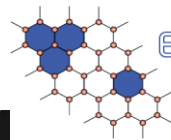
Also travelling to Machrihanish for the launch event will be Warwick student **Safura Colette** who will be testing the **ground station system** that she has designed and built specifically for **UK Launch Services** to use at this event.

As always we are extremely grateful to our **partner companies/organisations** and hope that we will see much more of them in the coming year!!

AIRBUS



HARWIN



ESATAN-TMS
thermal modelling suite

Roke

Part of the
Chemring Group



Lotek
advancing wildlife science



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BLUE-SPACE