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UKUBE-1 PLANNING AND OPERATIONS

**Abstract**

UKube-1 is the UK Space Agency's first cubesat and it is a 3-unit cubesat with six payloads. It was launched on 8 July 2014, and operations have been conducted since then using the Ground Station at Chilbolton Observatory, and a custom-built Ground Segment. It uses UHF for uplink and VHF for downlink. The cubesat is a technology demonstrator and the needs of the six payloads are very different, with two payloads demonstrating communications (S-band patch antenna and FUNcube), two with novel hardware from industrial groups and two with hardware for scientific applications from university groups. The Ground Segment allows the needs of the different payloads to be addressed, commanding to be pre-planned and tested using a software simulator, and some processing (and checking) of the data and housekeeping is performed before the data is distributed to the payload providers. The flexibility provided by the custom-built Ground Segment proved invaluable, since its modular design meant that an alternative method of communicating with the satellite could be inserted into the system when the original system was found to have problems, and as new methods of operation were designed they could be included in the command uplink and downlink chain. It was also possible to uplink new procedures onto the cubesat providing payloads with alternative methods of operation. These showed that the approach adopted here could be extended to future cubesats without affecting platform and payload selection.