25th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)
Small Satellite Operations (3)

Author: Dr. Ben Taylor
Surrey Space Centre, University of Surrey, United Kingdom, b.taylor@surrey.ac.uk

Mr. Richard Duke
Surrey Space Centre - University of Surrey, United Kingdom, r.duke@surrey.ac.uk
Mr. Brian Stewart
Surrey Space Centre - University of Surrey, United Kingdom, b.stewart@surrey.ac.uk
Dr. Christopher P. Bridges
Surrey Space Centre, University of Surrey, United Kingdom, c.p.bridges@surrey.ac.uk
Mr. Simon Fellowes
University of Surrey, United Kingdom, s.fellowes@surrey.ac.uk
Prof.Dr. Guglielmo Aglietti
Surrey Space Centre, University of Surrey, United Kingdom, g.aglietti@surrey.ac.uk
Mr. Abdelmadjid Lassakeur
Surrey Space Centre - University of Surrey, United Kingdom, a.lassakeur@surrey.ac.uk
Mr. Fawzi Djamane
Agence Spatiale Algérienne (ASAL), Algeria, fdjamane@cds.asal.dz
Mr. Mohammed Amine Ouis
Agence Spatiale Algérienne (ASAL), Algeria, maouis@cds.asal.dz
Mr. Mohammed Cherif Ladjouze
Agence Spatiale Algérienne (ASAL), Algeria, mcladjouze@cds.asal.dz
Mr. Khalid Meftah
Agence Spatiale Algérienne (ASAL), Algeria, kmeftah@cds.asal.dz
Mr. Smail Abed
Agence Spatiale Algérienne (ASAL), Algeria, sabed@cds.asal.dz

# ALSAT-NANO: FACILITATING SUCCESS WITH MISSION OPERATIONS.

**Abstract**

In 2012-13, the UK Space Agency (UKSA) and the Algerian Space Agency (ASAL) agreed a MoU to strengthen collaboration between the two countries and to carry out a Joint Space Programme of training underpinned by the cooperative development and execution of small satellite mission, AlSat-Nano. The UK programme is being delivered by the Surrey Space Centre of the University of Surrey, funded and steered by UKSA.

The programme involves a number of Algerian graduate students hosted at the Surrey Space Centre and focused on the development and operation of a Nanosatellite as a hands-on learning exercise for the students and ASAL staff, to demonstrate the practical implementation of this type of low cost space technology. Graduate students are enrolled on courses related to key areas of satellite technology. Additional focused training programmes were delivered to ASAL staff in the areas of AIT, environmental testing and spacecraft operations. Preparation for mission operations involved the definition, implementation and testing of a full nanosatellite groundstation at the ASAL CDS facility.

The AlSat-1N Nanosatellite hosts payloads supplied by the UK industry and academy, performing a

technology demonstration mission. These payloads occupy approximately half of the spacecraft volume. The AlSat-1N spacecraft was designed, integrated and tested by University of Surrey with hands-on participation by ASAL students. The AlSat-1N spacecraft went from design to delivery in 18 months. The satellite was launched in September 2016, with key mission success criteria delivered in early 2017. In late 2017 a software update was uploaded to the spacecraft to enhance payload operations and achieve full mission success, anticipated mid-2018.

This paper provides an overview of the in-orbit engineering activities of the programme. It focuses on operational aspects and teams integration to support day-to-day operations from satellite launch to end of nominal mission. We explore how the design of the spacecraft successfully facilitated recovery from various anomalous states encountered during nearly 2 years of operations. Lessons learnt, both positive and negative are presented to help inform future projects.