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HYPERSCOUT : AN IN-ORBIT DEMONSTRATION OF A MINIATURISED HYPERSPECTRAL INSTRUMENT WITH ONBOARD HIGH-LEVEL DATA PROCESSING

Abstract

The first ever miniaturised hyperspectral instrument with onboard analytics was launched on the 2nd of February 2018 as part of a CubeSat mission contracted by the European Space Agency. The instrument named HyperScout operates in the VNIR with unprecedented low mass and volume. A compact fully reflective telescope design has been realised within a 1U CubeSat unit. The large field of view and the onboard intelligence deployed on a CubeSat platform enables a large variety of land and vegetation applications, for which cost efficiency and timeliness are of foremost importance.

A novel approach to the bandwidth limitation on small platforms is taken, namely that L2 data is processed onboard. This is particularly advantageous due to the large volume of raw hyperspectral data produced in each acquisition, which can be efficiently compressed in an application-specific manner into the required geophysical parameters. A heavily optimised L2 processing chain has been developed specifically for the available hardware. By providing L2 data on board, the system can be reconfigured in orbit to serve different applications.

The launch took place on the 2nd of February 2018. The aim of the demonstration mission was to assess the quality of the data acquired and the consequent suitability for the intended applications. Furthermore, the functionalities of the instrument as well as the onboard processing of L1 and L2 data in real time have been demonstrated.

The presentation will cover the first block of in-orbit operations, instrument performance and data collected.