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HIGH-RESOLUTION OPERATIONAL EARTH OBSERVATION FROM A 6U SMALL SATELLITE

Abstract

In recent years CubeSats have transcended their original purpose of being an educational and technology platform only. It has now brought in reach affordable yet state-of-the-art Earth observation missions to academia, governments, and private industry. ISISpace has taken up its share by supporting this Earth observation trend with the launch of NAPA-1 in September 2020, it being the first Earth Observation CubeSat of the Royal Thai Airforce. Successful commissioning and the transfer of operations to the customer has led to valuable feedback and lessons learnt. These have been directly put to use during the design and development of its successor NAPA-2. NAPA-2 takes small satellite Earth observation up a notch thanks to its multispectral imager: the Simera MultiScape100 CIS. This not only means an upgrade from NAPA-1's 50-meter ground sampling distance (GSD) to a stunning 5-meter GSD but also being able to scan the surface in up to 7 spectral bands at the same time. Implications of this, however, are stricter platform requirements to meet optical performance and the need for dedicated on-ground image processing capability. The latter is achieved by the inclusion of Pinkmatter Solutions' FarEarth application. While images and satellite data obtained and lessons learnt throughout the NAPA-1 commissioning period will be shared, this paper will focus on the improvements made and the resulting differences with the next generation satellite NAPA-2. Insight into its design and in-orbit performance will be provided. On top of that, the assembly, integration, and verification phase will be elaborated on. It will also include details on the on ground optical verification of the MultiScape100 CIS, showing how verification before and after, for example, environmental testing was achieved. Finally, an outlook will be given to show the next steps in the coming years at ISISpace regarding small satellite Earth observation and image processing.