Paper ID: 45800
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IAF EARTH OBSERVATION SYMPOSIUM (B1)
International Cooperation in Earth Observation Missions (1)

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SCALABLE CUBESAT EARTH OBSERVATION PAYLOADS, BORN FROM INTERNATIONAL COLLABORATION

Abstract

In 2017 the "Gecko" imaging payload first flew as a technology demonstrator on nSight-1 as part of the EU-funded QB50 project. Since then, in what has already become a successful international collaboration between South Africa and the Netherlands, Space Advisory Company (SAC) and ISISpace engaged to package the Gecko imager as a standalone RGB imaging payload for closely integrated small CubeSats. The first of these commercialized Gecko imagers is scheduled for launch in 2018.

The Gecko compact imager was designed from its initiation to be scalable to bigger high-performance missions on larger CubeSats and even microsatellites. The newest product to come out of this engineering philosophy is the Chameleon imager. Through sharing the same underlying image plane as the Gecko and mated with more capable optics, the Chameleon imager delivers high (sub-10m) resolution and multispectral imaging in a 2U form factor.

With a particular focus on the interfacing between the camera and the bus, the ISISpace-SAC joint development is able to bring down satellite platform lead times, while still retaining the capability to tune the satellite's EO performance to client need and the budget. Using standardized add-on hardware, the agility of the satellite, availability of the camera, and ultimately number of images downloaded per day can be optimized.

The scalability offered by shared image plane technology and interfaces across a range of CubeSat imagers lead to a faster and more intuitive way op setting up EO missions. The high-resolution Chameleon imager, for example, may be combined with either a basic 3U platform with RGB matrix sensor, or a more capable 6U platform that supports multispectral line scan imaging with custom spectral bands. Further extensions to this platform will bring larger imagers for the 12U CubeSat standard.

Our paper presents the advantages of this new scalable EO platform and its potential applications to bigger platforms with resolutions down to 1m.