

25th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)
Small Earth Observation Missions (4)

Author: Dr. Kimberley Clayfield
CSIRO, Australia

Dr. Alex Held
CSIRO, Australia
Dr. Sarah Pearce
CSIRO, Australia

DEVELOPING NATIONAL EARTH OBSERVATION CAPABILITIES FOR AUSTRALIA WITH
SMALL SATELLITES

Abstract

Australia has world-leading capabilities in Earth observation data analytics, applications development, and satellite data calibration and validation. However, until now, Australia has not owned or operated its own Earth observation satellites. The Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia's national science agency, has recently initiated a Space Research Program to develop additional capability in space platforms, focussing on small satellites. Capability will be developed through two complimentary approaches: partnership in an international consortium which owns and operates a sophisticated UK-built micro-satellite, NovaSAR-S, and Australian design and construction of a lower-cost CubeSat.

In 2017 CSIRO acquired a 10 per cent share of 'tasking and acquisition' time on the NovaSAR S-band Synthetic Aperture Radar satellite. This enables CSIRO to direct the satellite's activity over Australia, download and process data, and make these data available to the wider research community. With NovaSAR scheduled to be launched by mid-2018, CSIRO will commence its own satellite ground operations at this time, and will manage its share of NovaSAR operations as a national research facility.

At the same time, CSIRO will also commence a project to design and construct its own 3U CubeSat with infrared sensor, in partnership with Australian industry. The research focus for this CubeSat capability will be primarily on characterising and learning from using this space-borne instrument and platform, as well as solving miniaturisation challenges and developing in-flight re-programming methods, automatic detection algorithms, and data correction techniques for rapid on-board data processing that can serve future near-real-time applications. This CubeSat will also provide the opportunity to support Australian companies to gain flight heritage for Australian-manufactured satellite components, and help build Australia's advanced manufacturing capabilities.

Key applications for both S-band SAR and infrared Earth observation data will include agricultural mapping (e.g. crop health and plant biomass) and disaster and hazard monitoring (e.g. floods and fires). Both satellites will give Australian scientists direct control over which data are collected over the Australian region, and enhance Australia's sovereign Earth observation capability. This paper discusses in more detail these missions, their technologies and applications, and the national development opportunities arising from them.