

EARTH OBSERVATION SYMPOSIUM (B1)
Future Earth Observation Systems (2)

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CHANGING THE RADAR PARADIGM - THE NOVASAR CONSTELLATION

Abstract

Small satellites are playing an increasing role in addressing applications in Earth Observation for scientific, civil and military applications. With all optical systems, this leads to some obvious limitations to the time of day targets can be imaged, which geographic latitudes can be covered, and to a dependency on cloud cover. For some applications this limits the utility of space systems unless low-light and through-cloud imaging information can be obtained in a timely fashion by other cost-effective means. Typically, space based radar systems are significantly more complex, more expensive, and data is more difficult to utilise than equivalent optical systems. Existing radar satellite systems therefore predominantly address scientific and military needs, leaving room for smallsat systems that address commercial needs, maritime security, and disaster monitoring.

Advances in new technologies now have permitted a step performance improvement in radar systems, which will now be implemented in the NovaSAR mission which is under construction at SSTL. Gallium Nitride RF transistors enable high efficiency power amplifiers to be employed, reducing the power demand from solar panels, thus enabling a smaller radar satellite to be constructed. System innovations are also included to facilitate satellite operation in constellations, and in orbits other than the traditional dawn-dusk orbits. The spacecraft will also include an operational mode to operate in a maritime detection mode instead of imaging mode.

In November 2011 the UK government announced that they are investing in the first satellite in a NovaSAR radar constellation, allowing the construction of the first 400kg satellite to commence to be ready for launch in 2014. SSTL will be working with international partners to launch this first satellite in orbit, and for developing further spacecraft. This paper will provide details on the satellite and payload design trades, results from airborne trials of the payload, and provides an overview of the planned mission applications.