SMALL SATELLITE MISSIONS SYMPOSIUM (B4)
Small Space Science Missions (2)

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DEVELOPMENT OF A HIGH AGILITY SMALL SATELLITE MISSION

Abstract

Surrey Satellite Technology has recently built the NigeriaSat-2 spacecraft. This is a state of the art small satellite Earth observation mission that will provide high resolution 2.5m imagery of the Earth.

It will launch in 2010 into a low earth sun-synchronous orbit and will be used by the Nigerian government to monitor a number of environmental issues within the country. The key requirements of this mission are to provide highly accurate image targeting and geolocation coupled with agility sufficient to enable a wide range of complex operational modes.

This paper focuses on the challenges associated with designing a spacecraft system that can support both of these things on a satellite that has a mass of less than 300kg.

How the stereo, mosaic and other imaging modes that can be employed using the agility of the spacecraft is described, along with the SSTL sensors and actuators used to create these capabilities. Inertia calibration and on-board navigation techniques used to give the required targeting accuracy are discussed.

The inter-action between the attitude control system and the mechanical design is detailed, in particular the payload isolation system used to ensure image quality and geolocation performance.