

FedSat: Australian Space Science and Technology in Action

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Abstract

At the time of its launch in December 2002, FedSat attracted significant public and media attention principally for being the first Australian satellite in over 30 years. The engineering achievements made in the process of completing, testing and launching FedSat were significant in the context of building an Australian capacity to deliver space technology into orbit. Of equal significance, however, is the fact that FedSat carries a range of payloads, developed in Australia with international collaborations and partnerships, placing FedSat among the most sophisticated small satellites in orbit today. These payloads are conducting space science experiments and demonstrating new space technologies, and have achieved major successes in the period since launch.

The FedSat payloads were developed by teams led by the partners of the Cooperative Research Centre for Satellite Systems, and continue to be used in the research and development programs of the Centre. These research programs include:

- Space science research, focusing on magnetic field measurements using the NewMag magnetometer payload on a 2.5m boom, aimed at modeling space weather effects and providing data for models of the Earth's environment.
- Reconfigurable space computing, overcoming traditional conservatism in the design of satellite computers by demonstrating autonomous self-healing capability.
- Ka-band communications, using the world's first microsatellite transponder in this band, aimed at measuring propagation characteristics with the aid of the system's unique tracking ground station.
- Bidirectional store-and-forward communications, aimed at remote recovery of data from ground terminals which can be polled and programmed by the satellite.
- Satellite attitude and orbital position determination using an on-board GPS receiver, the signals from which are also analysed to provide information on ionospheric state and precipitable water content of the lower atmosphere.
- Studies of satellite operational data for system modeling, satellite operational management and the development of design tools for small satellite platforms.

This paper will describe the FedSat mission status, concentrating on the current scientific and engineering research, highlighting the successes to date and outlining the remaining mission activities due for completion by the end of 2005.