

Announcement of Opportunity

Onboard Experiment on DST Micro Satellite

Summary

A 70kg micro satellite is presently being developed in Stellenbosch, and will be ready for launch by December 2006. Examine www.eng.sun.ac.za/satellite for general information on the project, which is being supported by the Department of Science and Technology (DST) of the South African Government.

Provision has been made for a small experimental research payload in the satellite. Researchers interested in proposing, or providing part (or all) of the payload are invited to immediately provide the project team with an expression of interest. An Experiment Proposal Spreadsheet is available on the above web site, and is distributed with this document. Interested researchers should make proposals as indicated on the spreadsheet.

Background

The Department of Science and Technology of the SA Government has contracted Stellenbosch University to supervise procurement, launch, and commissioning of a micro satellite. The satellite is being produced by Sun Space & Information Systems Pty Ltd, a spin-off company of the University, and follows their MMSat design (see URL's later).

The satellite will be launched into a 500 - 650km altitude, circular, polar orbit around the earth, possibly as soon as December 2006. The local time underneath the satellite will be about 10h00 for day passes, and 22h00 for night passes. The satellite will be above the horizon for about ten minutes per pass.

The satellite will contain a high resolution multi-spectral imager, and know its position and orientation with high precision. A large volume of data can be stored on-board and down-linked.

Later announcements will cover opportunities for graduate research and for use of the imager data. ***This Announcement only addresses matters relevant to the on-board experimental payload.***

Experimental payload

The prime role of the satellite is high resolution multi-band imaging. Support of this role drives the satellite design, and absorbs the majority of power and mass resources. The experimental payload will have to comply with restrictions imposed by the prime satellite role and design approach.

The experimental payload is expected to comprise one or more science or engineering experiments, housed in an Aluminium electronics unit, together with a limited number of antennas or sensors mounted on the exterior of the satellite. The total payload mass is limited to 2kg, and its average power consumption over any 100 minute orbit must be less than 2.4 Watts (solar energy limit). Higher peak consumption can be provided from the spacecraft batteries. The payload will be powered from the 28V satellite supply, and control and data interfaces will be by a specific protocol on a CAN bus.

A full ICD (Interface Control Document) will be available from SunSpace, as indicated in the web links listed at the end of this document.

Flight model acceptance tests of the satellite are presently scheduled to occur in June 2006. The payload will consequently have to meet the following schedule milestones.

- Interface finalisation by February 2006
- Delivery of flight-like versions of any appendages to the satellite by March 2006
- Availability of electrically equivalent version of payload for electrical & software integration tests in April 2006

- Delivery of the final flight model of payload in June 2006.

Staff in the Electronic Systems Laboratory at Stellenbosch University have experience in design, integration, and testing of satellite componentry, and can assist in creation of the payload.

Preliminary design studies suggest that the payload could include a standard SunSpace satellite computer with proven control, data, and software interfaces to the satellite. This (single board) computer can run Linux, and provide interfaces to other experiment electronics via its data bus and serial ports.

Payload selection criteria

The following criteria are likely to be applied in selecting possible experiments.

1. Ability to meet delivery milestones for satellite integration, qualification, and flight model delivery.
2. Ability for researcher and limited project funds to cover costs
3. Science & Engineering research value
4. Value to the community

Funding

The Satellite project budget has an allocation of roughly R200 000 for provision of the experimental payload, including environmental tests and integration with the flight model satellite.

Schedule

- The application spreadsheet should be completed and emailed as instructed by 1st December 2005. Late applications will be considered if opportunities remain after the initial assessment. Researchers should make every attempt to meet the 1st December deadline, even if only incomplete information can be provided.
- The project team will review applications as received, and make immediate contact with the proposers.
- In the first weeks of December, recommendations on the payload will be made to the Department of Science and Technology, which will make the final decision on the payload.
- Once approved by the Steering Committee and the DST, arrangements will be finalised with the approved project leaders.

Related Web Links

- www.eng.sun.ac.za/satellite - Temporary satellite web site
- www.sun.ac.za – Minister and Rector’s announcement
- www.eng.sun.ac.za – Engineering Faculty web site
- esl.ee.sun.ac.za – Electronic Systems Laboratory (SUNSAT project)
- www.sunspace.co.za – SunSpace web site. Follow links to *Products* and then *MMSat* for the MMSat data sheet
- www.sunspace.co.za/PF - Interface Control Document

Contact Person:

Mzukisi Mazula,

Project Manager

Faculty of Engineering

University of Stellenbosch

Email: mazulam@sun.ac.za