

SOUTH AFRICA: University satellite launched

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20 September 2009

Issue: 0093

South Africa's horizons in space were expanded last week with the launch of the country's second - and government's first - satellite. SumbandilaSat took off from Kazakhstan aboard a Soyuz rocket. It was designed and developed by staff and students in the engineering faculty at Stellenbosch University, and among other things will be used for experiments.

The R26 million (US\$3.5 million) SumbandilaSat, which in Venda means "lead the way", marks a significant milestone for South Africa. It asserts the country as a viable player in the arena of space technology, and puts it at the forefront of Africa's space capabilities.

"We're raising the ambitions of the whole continent," said Professor Russel Botman, Vice-chancellor of Stellenbosch University, at a conference on Tuesday. "When we raise the water, we raise all the boats."

SumbandilaSat, an 81-kilogram 1x0.5 metre micro-satellite, will orbit 500 kilometres above the equator and pass over South Africa four times a day, producing images for agricultural and environmental use by the government, primarily tracking climate change, human migration and crop estimates. "We'll look back years from now and see that we've helped make the lives of people better and livelihood sustainable," Botman.

The Department of Science and Technology (DST) commissioned the engineering faculty at Stellenbosch to lead the design and development of the satellite, which was built by SunSpace & Information Systems, a specialist micro-satellite company. The university integrated the project into an academic training programme for engineering students.

Stellenbosch was a natural choice to spearhead the project after its success in building and launching SunSat, South Africa and Africa's first satellite, in 1999.

SunSat was a student-built satellite used to collect images for scientific purposes. It fared better than expected, despite having limited capabilities. The satellite was bulky, and the camera system resolution three times lower than that of its successor.

SumbandilaSat uses multi-spectral imaging, which means it captures light invisible to the naked eye. When analysing the image, the light is broken down into different colours, and each coloured wavelength of light gives more detail to the image. The satellite can view objects in great detail, and can take an image of a specific area on the ground.

"You can say, 'I want an image of Cape Town,' and tomorrow you'll have it," said Professor Herman Steyn, systems engineer for the satellite's technical aspects. The satellite will also enable scientists to study changes to areas over time to, for instance, monitor a flood or agricultural crops.

For the first six months the satellite will be controlled and put into operation by Stellenbosch, from the ground station at the Electrical Systems Laboratory in the engineering faculty.

After that control of SumbandilaSat will transfer to the Council for Scientific and Industrial Research's Satellite Application Centre at Hartebeeshoek near Pretoria. Images will be stored on a 24-gigabyte hard drive onboard the satellite, and transmitted to the centre for analysis.

But Stellenbosch, along with the University of KwaZulu-Natal, will be linked to one of the satellite's experimental payloads, which aims to test the behaviour of gravity by measuring the vibration on a string. Other payloads are also geared for science and engineering research, and one is aimed at assisting communication in remote rural areas.

Once images have been downloaded and processed by the centre, they will be distributed to the government or sold to companies to be used primarily for agricultural purposes. The aim is to improve food security and sustainable livelihoods not only for South Africa but for Africa.

"SumbandilaSat doesn't recognise political boundaries," said Derek Hanekom, Deputy Minister of Science and Technology. "It monitors systems that go beyond boundaries."

SumbandilaSat is one of six micro-satellites onboard the Soyuz rocket, which also launched a Russian weather satellite called Meteor from the Baikonur space base in Kazakhstan.

Delays in the launch last week, for weather and technical reasons, were the latest in a string of postponements that dogged SumbandilaSat. The original launch was scheduled for December 2006 from a Russian Navy submarine, but political and technical issues interfered.

With its successful launch last week, SumbandilaSat will do as its name implies and "lead the way" for a new generation of satellites and for a South African space agency, said Khalid Manjoo, head of assembly integration and testing at SunSpace.

Last year cabinet approved legislation for the creation of a space agency that will integrate the country's space observatories and technical facilities and promote the development of scientific, technological and engineering capabilities and research.