News

Vivala / *Velox!

Infographics journalists SIMON ANG and FADZIL HAMZAH find out what goes on inside Velox-1, a satellite project spearheaded by Nanyang Te ogical University undergraduates,

set for launch in 2013

The satellite is made of hard anodised

N-SAT

(Nanosatellite)

Weight 3.5kg

Mission life:

24 mths

Science experiment P-Sat will carry a special payload to conduct quantum physics



TripleJunction Callium Arsenide solar cells

Made of precious metals, high-grade cells are used to cover satellite surface to maximise the absorption of solar energy

On-board data handling system P-Sat and N-Sat each comes with a "brain" to help each system onboard talk to each other

Transmills organis to another sabelite and relays images and information to ground station

Lithium ion

battery Recharged by solar energy Vision payload Records images

VELOX-1



casing will extend

VELOX'S ORBIT

Velox-1 is the first Singapore nanosatellite to operate in sunsynchronous Low Earth's Orbit

EXTENSION

the spring-loaded

like a zoom lens



NTU's ground station SINGAPORE The camera can capture one-sixth of Singapore

A narrow-angle camera with

tele-optics is used to capture

high-resolution images and

transmit them back to

The hardest part of this project was managing the students.

Associate Professor Low Kay Soon on the challenges faced building a satellite



GROUND STATION

As satelite passes through the zone at 10-12am and 10-12pm, the collected information is transmitted to ground station at the campus

TIMP PICTURES: SIMON ANG SOURCE: MANYANG TECHNOLOGICAL UNIVE

P-SAT

(Picosatellite) Weight: 1.5kg Mission life: 18 mths

5 Velox-1 will perform earth observation and collect status information for the first six months in orbit. after which P-Sat will detach itself from N-Sat. For the next 18 months, the two satellites will carry out tests on inter-satellite radio link and attitudecontrol algorithms



3 At various altitudes; the different parts of the rocket and fall back into the sea

guidance helps tilt the rocket to the planned

1 Velox-1 way



CROUNDBREAKING: Eleven of the students from the Undergraduate Satellite Programme team, who have been working on the Velox-I. It has been in development since last year.

Over 150 students helped to build it

But only two will be needed to launch the 5kg Velox-I satellite

REPORT: TONG SU YEE sytong@sph.com.sg

ORE than 150 students helped create the Velox-I - Singapore's first student-made Veiox-1 — on-gar-pico/nano satellite pair.

But only two of the students will be there when the 5kg satellite is finally launched into outer space in

The rest would have graduated by then or would not be needed for the launch.

Velox, which means swift in Latin, has been in development since last year and is expected to be completed by next year.

Associate Professor Low Kay Soon from the School of Electrical and Electronic Engineering in Nanyang Technological University (NTU), who is in charge of the project, said: "The satellite is small enough to fit into a hand-carry luggage, so not everybody needs to be there for the launch.

A representative team of 11 NTU students and alumni were also present at the media conference

The students were all part of NTU's Undergraduate Satellite Programme (USP), which includes students from the second to the fourth year.

And they were glowing with pride.

As PhD student Tan Chun Kiat, 25, who worked on the design and structure of the satellite, put it: "It's like helping to give birth to a baby.

"I definitely want to be there to see it launch, but

what's most important is that the satellite works."

Students were tasked to design and build a pico (which weighs about 1kg) and nano (between 1kg and 20kg) satellite pair. (See illustration on facing page.)

They also had to develop a ground station, and design and develop a nano-satellite payload, an application for the satellite.

The Velox-I has two payloads: A camera and quantum physics experiment.

When the satellite is in space, the nanosatellite will capture images of the Earth.

The picosatellite will conduct physics experiments that can be done only in space.

Prof Low is negotiating with overseas companies to find a suitable rocket for the Velox-I to piggyback its

He never envisioned that the student-made satellite would be this big a deal when he first signed up for the programme.

He said: "It's one step closer to becoming a rocket scientist."

PhD student Charlie Soon, 26, who helped with the power subsistence of the Velox-L said: "It's okay if we aren't there for the launch. We need to take care of the ground station in NTU when it launches.

"And we can watch the video of it being launched

Mr Soon is no longer officially attached to the Velox-I project, but he is mentoring the current batch of students working on the satellite.

"When the satellite launches in 2013, it will carry with it the hard work of Prof Low and 150 NTU students, both past and present," he added.

"This is so much bigger than (getting) an A. One day, this will be in the sky," said Mr Soon.