NTU Singapore Launches 3 New Satellites

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Image credit: ntu.edu.sg

Nanyang Technological University, Singapore (NTU Singapore) has successfully launched three new satellites into orbit. The satellites, named VELOX-AM, ARCADE, and SCOOB-II, will be used to conduct orbital experiments on a variety of topics, including 3D-printed materials, atmospheric science, and new space materials.

VELOX-AM is a micro-satellite that tests the use of 3D-printed parts in space. The satellite features a 3D-printed main structure panel and a functionally tested module that houses a phase-change material for thermal control. VELOX-AM is also carrying out

experiments on shape memory polymers, which are materials that can return to their original shape after being deformed.

ARCADE is an experimental satellite that is measuring data for atmospheric coupling studies. The satellite carries four instruments: an imager for atmospheric gravity waves, a plasma probe for measuring ionospheric plasma density and velocity, an atomic oxygen instrument to study atomic oxygen degradation of materials at low Earth orbit, and an optical imager for Earth imaging.

SCOOB-II is a shoebox-sized satellite that is designed and built by NTU students. The satellite carries a payload that demonstrates advanced electronics test operations in space. SCOOB-II also features an improved attitude determination control system that helps the spacecraft point at the sun to absorb maximum solar energy to charge its onboard battery.

The launch of these three satellites is a significant milestone for NTU Singapore's space programme. The satellites will provide valuable data and insights on a variety of topics that are important for the advancement of space science and technology. The launch also demonstrates NTU Singapore's capabilities in satellite engineering and undergraduate space engineer training.

In addition, a microsatellite featuring a cutting-edge propulsion engine from NTU spin-off Aliena was successfully launched in addition to the three NTU satellites. The ORB-12 STRIDER will use the first multi-modal all-electric propulsion engine in the world to showcase cutting-edge propulsion technologies.

Besides, the multi-stage-ignition compact (MUSIC) Hall thruster is the centrepiece of this engine and is unique in that it was created

locally in Singapore. When compared to conventional engines, the thruster utilises a small fraction of the power since it accelerates ions from the propellant using an electric field.

The successful launch of these satellites is a testament to the growing capabilities of Singapore's space industry. NTU Singapore is committed to playing a leading role in this growing industry, and the launch of these satellites is a significant step forward in that mission.

Further, Singapore believes that using satellites for groundbreaking orbital experiments offers several advantages. Firstly, it provides a real-world testing environment, allowing researchers to conduct experiments in the actual space environment and gather authentic data. This validation of theoretical models is crucial for advancing scientific knowledge and technology.

Secondly, using satellites is cost-effective compared to individual missions. Multiple experiments can be conducted simultaneously on a single satellite, reducing the overall expenses associated with space research.

Satellites offer a multitude of advantages, including access to remote and inaccessible sites, enabling researchers to study specific phenomena or regions of interest that are otherwise challenging to observe from the ground.

The stable and controlled conditions in space make satellites ideal for experiments requiring highly sensitive equipment, as there are no disruptive factors like wind or rain. This stability allows researchers to study intricate behaviours, such as subatomic particles' actions or the faint light emitted by distant stars, pushing the boundaries of scientific exploration and discovery.