

The project was first initiated by students and graduates from the National University of Singapore and is supported by NUS Enterprise Start-up Incubator

Big plans for the launch sector

Equatorial Space Industries is a Singapore-based satellite launch company looking to begin test launches in 2019. Currently developing one of the smallest launchers ever envisioned, the 4.6-tonne Volans will be capable of launching a 50kg payload into a variety of orbits from the South China Sea. Amy Saunders spoke with Simon Gwozdz, CEO at Equatorial Space Industries to find out more about the company's capabilities and plans for the launch sector.

Question: What can you tell us about Equatorial Space Industries' vision?

Simon Gwozdz: We have started off in 2017 after a few years of considering an appropriate project to enter in the space industry. To date, we have developed some basic prototypes, with more sophisticated hardware, inclusive of an engine using liquid oxygen (LOX), coming our way over the next few months. It sure is an exciting time for our team!

We see the problems that nanosatellite operators face in terms of appropriate launch choices - the matrix of orbital and scheduling flexibility is now severely impeding constellation deployment, and using a larger number of smaller, dedicated launchers will be necessary to distribute the payloads into a variety of orbital planes and phases, rapidly.

Question: Can you tell us a bit more about the technology and launch plans?

Simon Gwozdz: We are currently betting on the hybrid technology - LOX and a proprietary solid propellant for both stages with potential multi-restartability of the upper stage. In the first iteration of the Volans, the Block I, we aim at 35-70kg payloads to low Earth orbit (LEO). We are exploring modularity of our design, to allow multi-core configuration, in the near future.

We are in early stage talks with some regional authorities about a few prospective launch sites, each covering broad azimuth between equatorial and polar. Our ideal launch site, however, would be from South China Sea in direct vicinity of our industrial base in Singapore.

To cover the multi-hundred satellite

constellation market properly, we are looking at a very high cadence, our initial target being 150 in a year - and we will take it from there.

Question: How does the cost structure look? What kind of prices can satellite operators expect?

Simon Gwozdz: Our target is to reduce the cost per launch down to \$500,000, although our aim in the first year is a million dollars for each dedicated mission.

Question: What kind of interest have you had from satellite operators to date?

Simon Gwozdz: We have seen some cautious optimism from many - after all, we are admittedly fresh in the game and the attrition rate in the small launcher business is notorious - but we have

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Simon Gwozdz, CEO at Equatorial Space Industries



I believe the next boomtown after the nanosatellite market will be in space tourism, which will greatly benefit from the availability of the newly established launch technology. Simultaneously, we still see much potential in GEO, albeit more with satellite servicing than replacement.

Question: How will Equatorial Space Industries set itself apart from other small satellite launchers in the market?

Simon Gwozdz: Diversity of azimuths from a single location is our inherent advantage. Once we secure our ideal launch area, we could conduct our operations with great logistical savings as the sailing time between our integration base and the launch zone would be measured in hours.

Simultaneously, we are one of the fewer small launchers optimized to send a few nanosatellites at a time in its basic configuration, making it perfect for distributed deployment specifically for applications such as Internet of Things (IoT) networks.

Using hybrid propulsion will allow great savings in manufacturing and operating costs which we will then be able to transfer to our clients.

Question: What are your expectations for the next couple of years? Which milestones do you expect to achieve?

Simon Gwozdz: We hope to conduct the first suborbital flight by the year's end - at which point we will proceed with the orbital launcher which we hope to fly before the end of 2019 and begin full-scale commercial operations by the end of 2020.

We are exploring various diversification options for the near future. GEO launches are our natural

secured some strong business contacts and tentative agreements with a number of operators. We hope to begin signing contracts soon after our suborbital mission which we plan for later this year.

Question: What's your impression of the launch market as a whole? Where do you see the biggest opportunities, and what do you expect from it in the years to come?

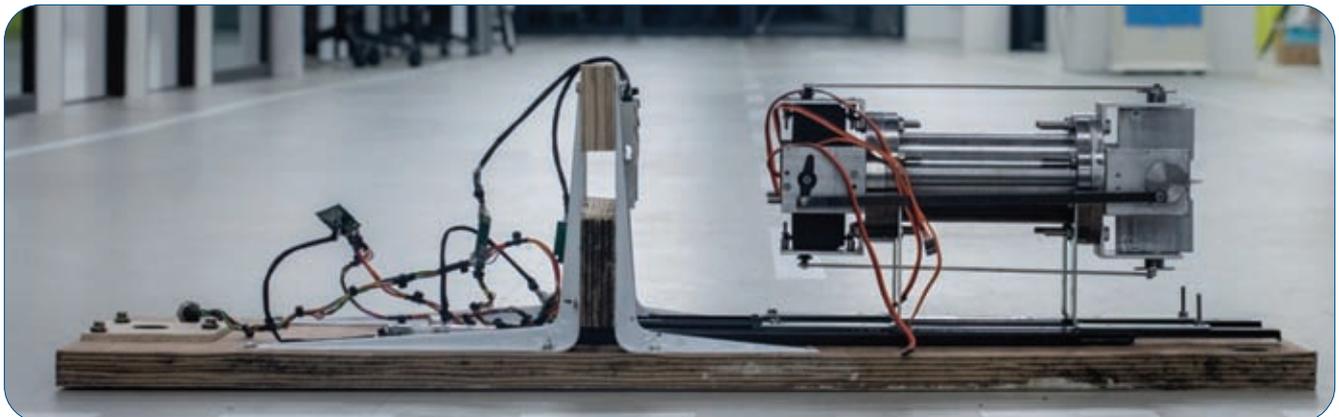
Simon Gwozdz: Nanosatellite LEO constellations are a logical and relatively risk-free chance to enter the industry for new players - it offers a chance to prove our technology with pretty compact hardware before moving on to larger launch vehicles. What we do not know yet, and follow very closely, is how much the new nanosatellite propulsion systems will affect the optimum payload size per launch.

An up-and-coming market will certainly be in the replenishment of mega-constellations such as Starlink and OneWeb, which is something future generations of Volans will be capable of doing.

The Volans Block 1 is slated to carry between 35-70kg of payload into a variety of inclinations from 2020 onwards



progression thanks to our equatorial location. We do fantasize of developing crew-rated vehicles, but we'll take it step by step! ■



The Singapore-based start-up has been developing hybrid engine prototypes, aiming for a suborbital flight in late 2018

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