

Satellite Applications

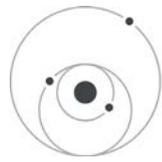
SME Case Study

Astrosat

Award-winning monitoring and measurement technology

We work with
Innovate UK

CATAPULT



The Company

Company Name	Stevenson Astrosat
Managing Director	Steve Lee
No. of Employees	14
Launched	April 2012
Location	Edinburgh, Scotland
Sector	Space services and management

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Stevenson Astrosat believes: 'Any problem has a Space solution'.

Winner of both the European Satellite Navigation and Copernicus Masters Competitions.

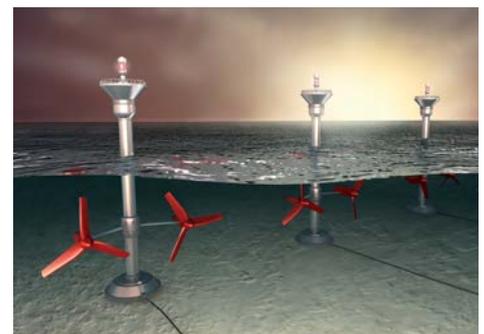
Overview

Based in Scotland, Stevenson Astrosat prides itself on proving that 'Any problem has a Space solution'. Since its formation in 2012, it has developed a stream of award-winning platforms based on Earth observation and radar satellite data for monitoring and measuring a diverse range of issues, as well as offering consultancy services. It is now looking forward to bring to fruition a major venture in the disaster recovery arena as well as moving into Space hardware.

- Winner of European Space Agency (ESA) Copernicus Masters award three years in a row.
- First company to win both a Copernicus Masters award and the European Satellite Navigation Competition in the same year.
- Development contracts awarded from ESA, UK Space Agency and UK and foreign governments.

A Winning Formula for Satellite Data Applications

Edinburgh-based Stevenson Astrosat may only have been in existence since 2012 but already it is a record-breaker. In that short period it has become the only company to win an ESA Copernicus Masters award three years in a row and was the first company to win both a Copernicus Masters award and the European Satellite Navigation Competition (ESNC) in the same year.



WaveCERT – supporting wave and tidal power

The company is passionate about the possibilities offered by satellite data. "Letting people know what they can do is important, as is letting them know that we can provide information they can actually use," says Alan McLarney, Chief Technology Officer. "It's not all Hollywood or NASA level stuff – they can use it as well. They just need to understand the concept that it can improve what you do and it is affordable."

The first of Astrosat's Copernicus prizes – the DLR Environmental Challenge award – came just six months after the company launched in April 2012, since when it has developed a broad range of space-driven applications, as well as offering consultancy services. The award was for ThermCERT, which promotes thermal efficiency by scanning buildings and larger areas by both satellite and ground-based means. This is now at the demonstration and refinement stage. On



Hostile environments, including the Arctic, have become a theme within Astrosat's work.

RAPID is targeted at disaster management and providing greater resilience to such disasters.

average around 65-70% of the data is satellite derived, so Astrosat is now gathering the ground-based scans, pulling the data together and allowing end-users to evaluate it and give feedback. All the reaction so far has been very positive. More recently it has been awarded Future Cities funding by ESA to extend this platform.

In 2013, Astrosat was again successful in the Copernicus Masters, winning the Astrium Radar Challenge Award for WaveCERT. The focus for this project was on tidal and wave movements, using synthetic aperture radar (SAR) satellites and radar altimetry to monitor and survey changes, thereby providing modelling and prediction data for the emerging wave and tidal power industry.

Also in development is the winner of its second award in 2013 – WinterVision, which won the ESNC Metaio Special Prize. This will employ positional data from Galileo combined with a heads-up display in a vehicle to show the edges of a road where the road itself is obscured, for example by heavy snow.

Making Hostile Environments Less Hostile

Hostile environments, and especially cold ones, seem to have become a theme within Astrosat's work. Since late 2012 Astrosat has been a team member of an ESA ARTES project called Arctic IAP which is developing a 'situational awareness' programme specifically for the Arctic.



Polar explorer Craig Mathieson

The company has also worked closely with the Royal Scottish Geographical Society's Explorer in Residence, Craig Mathieson, on two other projects relating to the Arctic. In the first, Astrosat is supporting a charitable venture of Mathieson's where underprivileged children are taken on an Arctic expedition. Ice samples taken by the children will be analysed and compared with satellite scans to determine if the latter can distinguish between salt and fresh water ice, as these have different properties and hence it can be beneficial to map them for travelling in the region.

A second project inspired by Mathieson is looking at the possibility of a wearable beacon which can not only constantly transmit a person's location but also their vital life signs, allowing people in remote locations – such as the Arctic – to be tracked and, if they fail to respond when life signs appear abnormal, rescued. Called Expedite, this propelled Astrosat onto the UK finalists list for the 2014 ESNC competition.

In 2014, the company was both a finalist and a winner in the Copernicus Masters, with its RoofWatch system being beaten by its own Transport Sentry platform. The latter uses SAR data from Sentinel-1 and optical satellite data to examine previously identified 'at-risk' road and rail links, and quickly report any damage caused by extreme weather back to a transport infrastructure operator. This could be particularly helpful in large countries with low density populations.

The Future

Alongside its development work on existing platforms, Astrosat has two ventures that it is now focussing on: RAPID (the Recovery and Protection in Disaster system) and, in a move away from data-based solutions, space hardware.

RAPID is the logical conclusion of everything in the Earth observation realm that Astrosat has been working on since the company was founded. It is targeted at the "long-tail of disaster management", says Alan, but with the potential to provide greater resilience to such disasters. RAPID aims to provide "real knowledge of what's going on, not just data and maps". It is, in effect, a managed service that requires no data expertise in the host country.

Several countries in the South Asian Association for Regional Cooperation (SAARC) region have already signed up, along with others in South East Asia, and Astrosat is looking to extend its reach into the Middle East, Africa and South America. Users will be able to choose from a range of applications, features and data from Astrosat and other suppliers. Astrosat is also looking at

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providing hardware that will ensure continued access to the data even if local communications are cut.

At the same time, Astrosat is venturing into the space hardware market, with plans to work with partners to develop satellite sensors and also a solution to the issue of space debris. When satellites fail it can be very difficult to track them from the ground. Therefore Astrosat is developing a very lower power beacon which is totally independent of all other systems on the satellite, so that you can identify the satellite's position and track it, even if you can't see it with radar or optically.

Astrosat's plans may deny Sandra Bullock the opportunity to appear in Gravity 2, but many of the company's solutions could play vital roles in real-life, natural events on Earth in the very near future. The company is well on its way to proving its motto that 'Any problem has a Space solution'.

Case Study:

Coastal Sentry

According to the Government, an estimated 200 homes in England are at risk of being completely lost due to coastal erosion over the next 20 years and a further 2,000 could become at risk¹. Some experts fear it could be much higher than that.



Coastal Sentry monitors coastal erosion

In 2014, with funding from the Space for Smarter Government programme (SSGP), Astrosat started working with local councils in South East England to use the concepts behind Transport Sentry to develop a coastal monitoring system called Coastal Sentry.

Astrosat uses satellite-based radar to monitor coastal erosion and stability, including erosion patterns. This means the council teams do not have to keep going out, sometimes in very bad weather, but can instead make decisions based on satellite data.

Coastal Sentry will focus on pre-identified areas of risk, tasking satellites to examine these areas after severe weather events to look for erosion, landslides or significant cracking. Using radar satellites will allow monitoring to be done in any weather and at any time of day over very wide areas, and offer fast response in the case of unpredicted collapses or movement. It can also be set up to integrate with existing 'supply chains' such as environmental agencies, the Coastguard and the Met Office.

Astrosat is now awaiting the next phase from SSGP to set the platform live and is looking forward to expanding the system abroad. Coastal Sentry will also be an option in Astrosat's upcoming RAPID project.

Catapult Support

“The Catapult has been very good at promoting us, encouraging partnerships and knowledge exchange,” says Alan. “They have really helped with connections, informing us who we should talk to and promoting us to the right people.”

“The best thing they did, as far as we're concerned at least, was to set up the Centres of Excellence,” Alan adds. “We are connected to the ones in Glasgow and the North-East of England simply because they are closer to us than Harwell. We visit them regularly, attending events and networking. And it has also been a fantastic way to hook into inter-Catapult communications.”

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Source

1. Flood and Coastal Erosion Risk Management Evidence Plan; March 2013; Department for Environment, Food & Rural Affairs