New generation of miniaturised cameras changes the face of the satellite market

Miniaturisation is one of the biggest trends in today's satellite industry. One of the components at its heart is no other than a new camera developed with support under Horizon 2020's SME Instrument.

Founded 6 years ago, SATLANTIS was quick to make a name for itself in the space industry, gaining support from the likes of Telefonica and Everis. The centre of all this attention is iSIM – a 15 kg satellite camera that is up to 10 times smaller, four times more precise and 80% less expensive than its counterparts.

Juan Tomás Hernani, CEO of SATLANTIS, discusses the achievements of the company since it first obtained EU support under phase 1 of the SME Instrument for an idea and a patent that is now worth over EUR 15 million.

What are the main commercial arguments in favour of iSIM?

Juan Tomás Hernani: The camera is not just a component, it is the heart of a mission and determines its entire cost. A miniaturisation of the camera by a factor of 4 to 10 (depending on the competitor you compare it with) provides a saving factor of up to 80% of the total mission cost. This is a real disruption when considering the average launch price of approximately EUR 30 000 per kg.

The second argument in favour of iSIM (Integrated Standard Imager for Earth Observation Microsatellites) is related to electronics and multispectrality. The high throughput of on-board processing capacity delivers native sub-metre resolution to the customer in all multispectral bands (for example, we currently have four bands in RGB and NIR). This contrasts with other missions which also provide multispectral imaging, albeit at a worse spatial resolution than with panchromatic imaging and with a worsening of the spatial resolution as more bands are added. As a consequence, iSIM brings about a four times better precision, in addition to its competitive size.

What do these advances mean for satellite operations concretely? Could you provide one or two examples of use cases?

The main gift for operations is the birth of real-time applications. The fact that one complete satellite may cost a few million euros changes the customer paradigm: from a large CAPEX to be used over many years, to an OPEX in which new satellites are launched periodically with the latest technology available, and with increasing revisit times.
It is now possible to envision a constellation of three satellites only that would be able to cover European needs in terms of border monitoring. This includes for instance revisiting the Mediterranean coastlines every few hours, which is what we propose with the 390MED constellation.

**What are the main difficulties you faced in the development process and how did you overcome them?**

Extreme precision is crucial for a space camera to work at the diffraction limit, as iSIM does. Only 40 nanometres in lenses’ surface roughness can change the camera behaviour. Such a level of precision is a big challenge that SATLANTIS could overcome thanks to the background and experience of its team, composed of space engineers from the best international competence centres in Argentina, France, Germany, Italy and the UK.

Besides, a substantial investment in infrastructure allowed the team to meet this extreme requirement. We established SATLANTIS FACTORY, a key public-private financed initiative, to deliver it.

**What were you able to achieve thanks to EU funding?**

The first EUR 50,000 of the phase 1 SME Instrument arrived when SATLANTIS had a patent, an idea and one employee. Since then, we have developed the business plan and closed the first financial round with very large investors: Telefonica, Everis, Idom, Orza and public institutions like the Spanish government, the Basque government and the Bizkaia government.

The following EUR 1.7 million gave us credibility when facing banks, customers and other institutions to develop a more powerful company that has captured a total of EUR 15 million in 6 years. The contracting of JAXA for iSIM’s in-orbit demonstration, along with the successfully passed reviews with both JAXA and NASA to launch iSIM to the International Space Station (ISS), were the last key milestones of the project and represent the zenith of our aspirations.

We are now a global leader of space cameras for small satellites, thanks to the SME Instrument.

**How had the sector reacted to the emergence of this technology?**

We were absolute pioneers of this disruptive miniaturisation technology, but now we have certain competition, as we initially expected.

The sector allows for the existence of large and small Earth Observation satellites with similar specifications, while the miniaturisation trend has pushed bigger players like Airbus, Thales or Maxar to start substantial corporate acquisitions and mergers.

Nevertheless, the sector is far from being stable. This market disruption is causing repositioning, mergers, etc. In the end, the space sector is a digital business of data, subject to huge competitive pressures and paradigm changes, and this transformation is felt at every single level of the value chain.

**What are your follow-up plans, notably with regards to further EU funding opportunities?**

SATLANTIS has bet on an industrial strategy of components, instead of a traditional space methodology (although inheriting some baseline processes that are necessary to survive in the field).

This concept of ‘product system’ is delivering fast and efficient results into a family of iSIM cameras and satellites, from CubeSats and sub-metre multispectral imaging to high-resolution imaging in the infrared. The SATLANTIS roadmap is more meaningful than ever, moving around three independent axes: higher resolution and more multispectral bands, extended spectrum and satellite integration.

**When do you expect the first satellites equipped with iSIM to be launched?**

On top of the flight financed by the SME Instrument, we have two contracted launches.

The first is a second flight to the ISS in the context of the STP-H7 mission financed by the USA DoD in
collaboration with SCHREC (a USA-based research centre). This mission, expected to fly in spring 2021, will allow us to test a different version of the camera, designed for CubeSats. Then, we have a UK mission for the oil and gas sector, financed by ESA and led by Open Cosmos, for which SATLANTIS supplies the camera. The launch is expected at the end of 2021.

Several commercial opportunities await the in-orbit demonstration results in June 2020, when SATLANTIS expects to end its start-up phase.