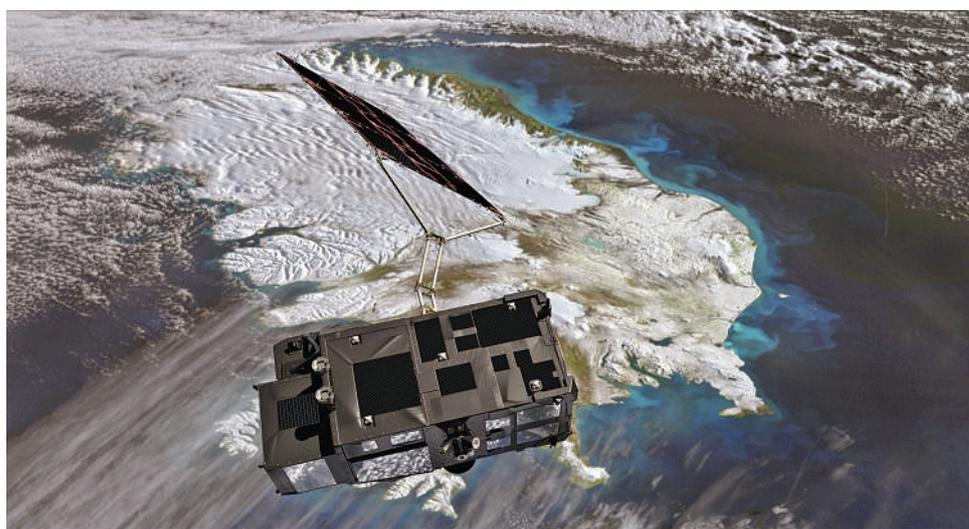




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Earth Observation in the 21st Century

Terri Freemantle and Steve Spittle explore factors that are shaping the Earth Observation sector and their potential economic impact



The volume of data is rising rapidly and 'Big Data' acts as the oil in the supply chain for many industries. In the next five years, ESA spacecraft alone will obtain approximately 25 petabytes of Earth Observation (EO) data as a result of the Copernicus environmental EO programme. Pictured above: at the time of going to press, the latest satellite for this programme (Sentinel-3) had left France bound for the Plesetsk launch site in Russia and a launch in late December. Photo: © ESA/ATG medialab

The satellite industry as a whole, and specifically the Earth Observation (EO) sector, has always lagged behind terrestrial information technology innovations. This was exemplified by the delayed technology take-up from the cloud revolution in the mid-2000s led by organisations such as Amazon, Apple and Microsoft. Cloud was not considered by the EO community for another five years.

Ten years on and this technology has hit the mainstream, transforming the way the industry accesses and exploits geospatial data. Applications that were once performed by EO specialists are now being pushed to a cloud-based environment, such as the Google Earth Engine or Amazon S3. But why is it important? And where is it heading?

Data Explosion

There has never been such a diverse range of EO satellites orbiting the globe, capturing information on the Earth's chemical, biological and physical parameters. This increase in satellite momentum has resulted from several different socio-political and technological factors. They range from the miniaturisation and standardisation of electronics to the relaxation of U.S. rules governing the sale of high resolution satellite imagery. Another factor is "access to space" ... one that continues to be achievable, at a lower cost, for new industry entrants.

These trends have seen the emergence of innovative companies such as Planet Labs and Spire, launching constellations of micro and cube satellites with the aim of revolutionising the term "high

temporal imaging". At the same time, the larger players are launching ever more sophisticated platforms, and public initiatives such as the European Space Agency's (ESA) Copernicus Programme is creating an era of unprecedented data volumes.

Never has access to large quantities of temporally and spatially relevant satellite imagery been so easy, whether by applications developers or the general public. The rising volume of data has also made good use of cloud-based storage. Great news for those who once relied on inefficient local storage via laptops and commercial workstations.

Good News

Cloud computing has facilitated a paradigm shift in distributing, processing and sharing big data, and in creating platforms that drive innovation and growth in user applications. So what does this actually mean? The barriers that once

prevented the mass market uptake of satellite imagery are rapidly being broken down, and the Satellite Applications Catapult is at the forefront of facilitating this movement.

What this and other transitions within the sector have made possible through the integration of terrestrial and space-borne technology, is the ease of access to which non-specialists can enter the industry. This will lead to an explosion of downstream applications and be a key factor in driving growth within the space economy. Ultimately, it will create more jobs and, importantly, inspire a new generation of entrepreneurs.

The Catapult is working closely with the European Space Agency (ESA) on EO21, a collaborative project whose objective is to provide a unifying context and strategy within which to identify, analyse and capitalise on key technological opportunities affecting the EO sector in the emerging data economy.

To find out more about these trends, and how the Catapult and ESA, in consultation with the wider European EO community, are future-proofing the industry, visit the EO21 website: <http://www.eo21.org>.

