

# Disrupting Earth Observation Market



Earth Observation (EO) is the science which gathers data of our planet using remote sensing technologies. The information collected contributes to a better understanding and regular monitoring of the Earth and its environment. Because of its importance upon supporting a wide range of applications and providing essential data for geopolitical purposes, it is one of the ESA's main fields of research. Put in figures, in 2006 the 13% of ESA's expenditure was devoted to the EO Programme, representing 324 M€. Today, this percentage has been doubled, but the leverage factor investment is 4.5, hence 1.450 M€.

There has been a paradigm shift during the recent years. Used to place large satellites in high orbits, the tendency is changing. Small satellites closer to the Earth can provide information with high resolution and short revisit time. Also, the reduction of the mass and the lower launch costs, gives an opportunity to new entrants that could provide products or services to overlooked markets or even create new ones.

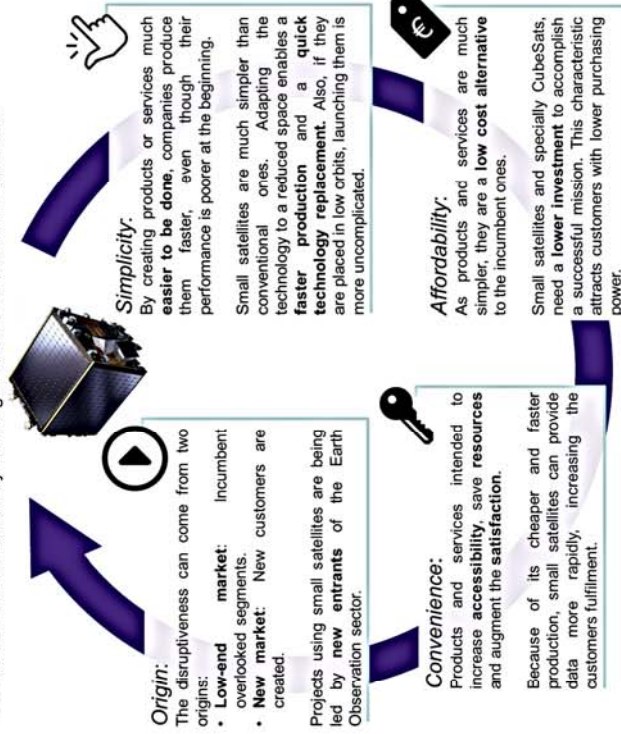
This poster provides an overview of the EO market and the new opportunities that can be created by using small satellites in low orbits. Also, it wonders if this could be considered a disruptive innovation to the space industry.

Header picture: Sentinel2A RD51, Date: 20-06-2018

## Disruptive innovation

The disruptive innovation theory was first coined by Clayton M. Christensen (1995). He researched on the disk-drive industry and its evolution, and in 1997, he published *The Innovator's Dilemma*.

The theory states that disruptive innovation is a process whereby a new product or service is able to successfully challenge established incumbent business.

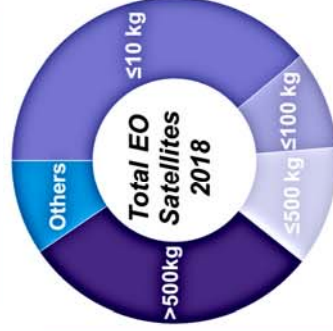


## Earth Observation

The first EO satellite, Explorer 6, was launched on August 1959. More than fifty years later, 1,980 operational satellites are orbiting the Earth, 684 of which are solely focused on acquiring Earth Observation data.

The satellites that have a higher representation when it comes to EO are CubeSats (below 10 kg) with a 39% followed by large satellites (over 500 kg) with a 30%.

Source: Pixalytics, 2018



## Could small satellites in VLEO be a disruptive innovation?

The characteristics needed to fulfil the description of a disruptive innovation are intrinsic in small satellites, namely, CubeSats.

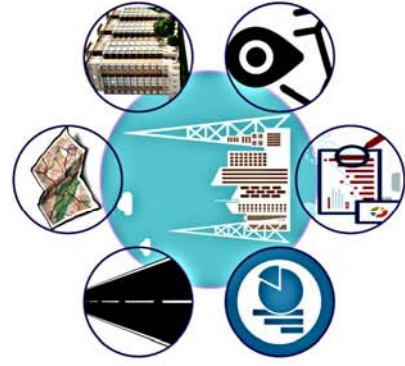
CubeSats began with a threadbare set of capabilities but as technology matures, they are improving. At the same time, they maintain a lower price compared with traditional satellites. Also, they have created new markets; small companies devoted to provide EO data to a wide range of customers. With low budgets but attracted by their simplicity they have taken CubeSats as an opportunity to do their own space missions.

### Origin

The EO market will experience an average annual growth of 12%. The key trends for this development will be: near real time data, data analytics, interconnection between satellites, vertical integration within the industry and data processing onboard satellites.

**Infrastructure and transportation management (CAGR=12%)** is one of the most prominent markets found in EO, and the one which has a higher impact when it comes to value-added services.

The key technologies for this specific market are **passive imagery** (panchromatic and multi-spectral), and **high revisit time**.



### Simplicity & Affordability

The increase of CubeSats is due to the advances in technology miniaturization which have made possible the construction of small, low power and cost satellite with **COTS components**.

### Convenience

High resolution  
**0,3 to 1,5m**

- Passive imagery:
- Panchromatic
- Multi-spectral

Medium resolution:  
**1,5 to 10 m**

