

9. Satellite earth observation

Satellite earth observation (EO) systems are playing an increasingly important role in the global economy. They provide unique capabilities in close association with ground-based sensors to generate the data and information needed to manage and monitor natural resources, land-use and to better understand and cope with major societal issues (pollution, impacts of climate change).

There are currently about 120 operational civil earth observation satellites in orbit (not including weather satellites), and around 40 military satellites. Out of these, more than 50 civilian missions are dedicated to gathering multi-purpose land imagery (CEOS, 2013). The United States, China, India, Europe and France lead the number of ongoing satellite missions. In terms of specific scientific instruments onboard satellites, the United States, China, and France have the most instruments flying (on their national missions and in joint satellite missions). As of late 2013, more than 100 civilian missions are planned or are under consideration until 2030 to monitor land-use and oceans (CEOS, 2013). However, the total number of earth observation satellites could already double by 2021 to more than 300, according to different analyses, as an increasing number of countries are interested in possessing their own remote sensing satellites (e.g. Malaysia, Myanmar, Pakistan). One major earth observation initiative concerns the *International Charter: Space and Major Disasters*, which provides satellite imagery free of charge for disaster response purposes around the world. Initiated in 2000 by the European and French space agencies (ESA and CNES), twelve other organisations joined the Charter and agreed to provide data from their earth observation systems (from Argentina, Brazil, Canada, China, Germany, India, Japan, Korea, Russia, United Kingdom and the United States). This co-ordination mechanism has been activated over 400 times in the past 15 years, providing imagery and maps to disaster-affected countries.

The commercialisation of earth observation data remains a niche area, with relatively few commercial satellite operators (e.g. Airbus' Spot Image, DigitalGlobe, MDA Geospatial Inc.). Their revenues are mainly derived from institutional customers. It is estimated that the security and military sectors account for about two-thirds of the commercial market. One example is the "Enhanced View" contract between DigitalGlobe and the US National Geospatial Agency, which accounted for 60% of the company's revenues in 2012 or about USD 250 million (DigitalGlobe, 2014).

Overall, the commercial satellite earth observation represents a market valued at some USD 1.5 billion in 2013, a doubling of revenues compared to 2008 (Satellite Industry Association, 2014). The share of satellite data sales to private actors is slowly increasing though. According to a survey conducted among European and Canadian earth observation companies, the share of sales directed to private companies has been rising in recent years and accounted for 43% of revenues in 2012 (EARSC, 2013). In that context, US remote sensing companies aim to commercialise higher-definition imagery (better than 50 centimetre spatial resolution), to better compete with international actors and aerial imagery. Finally, several new private initiatives are developing constellations with smaller, low-cost satellites, which may have strong impacts on the earth observation sector over the next decade (see Chapter 1).

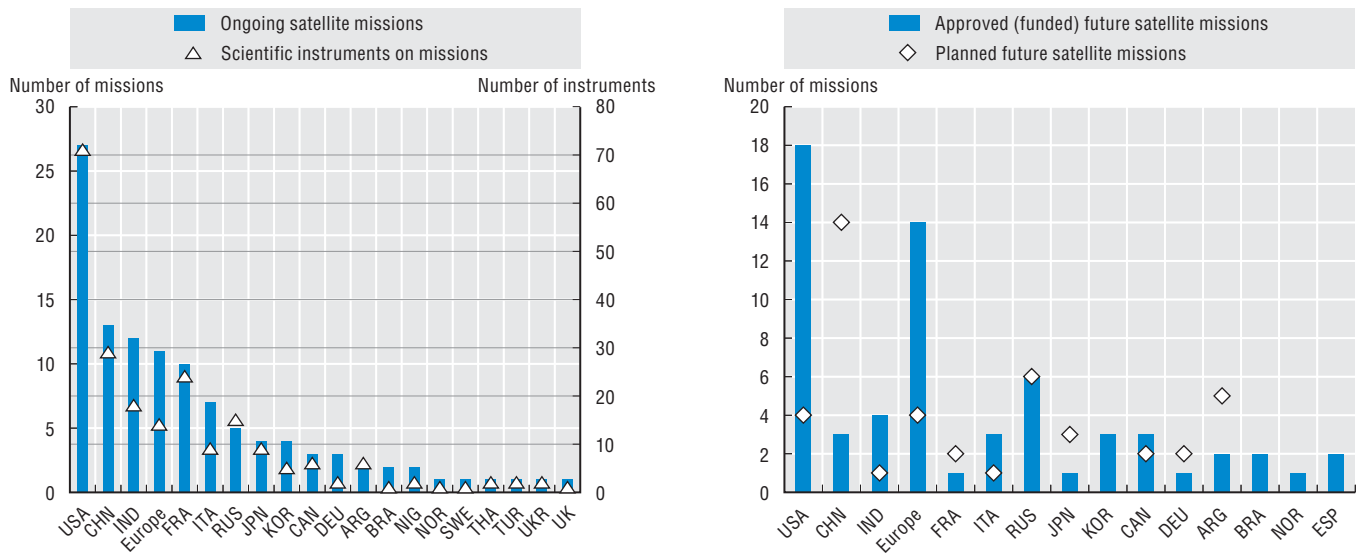
Methodological note

Data are based on the Committee on Earth Observation Satellites (CEOS), a group formed by major space agencies to co-ordinate civilian earth observation missions. A satellite mission usually carries several scientific instruments (its "payload"), some of which have been flying for decades onboard different generation of satellites from diverse countries, allowing essential and sustained data times series (e.g. data used for land use planning).

Sources

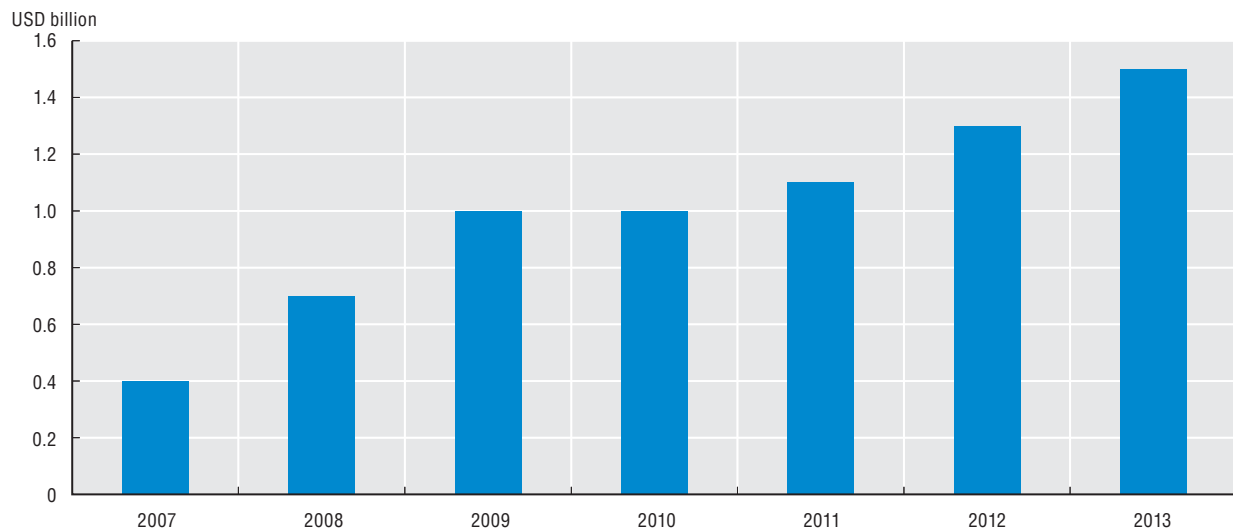
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9.1. Selected ongoing and planned institutional earth observation missions by civilian agencies



Source: OECD calculations based on CEOS, 2013.

9.2. Estimates of commercial remote sensing revenues



Source: Adapted from Satellite Industry Association, 2014.



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