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Space for Sustainable Development

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The view from space has forever changed our vision on our home planet, revealing its beauty while pointing at the same time to its inherent fragility. This new perspective from above contributed to the emergence of the concept of Sustainable Development (SD), by convincing many of the need to (better) manage our (rapidly depleting) resources in a sustainable manner that would “meet the needs of the present without compromising the ability of future generations to meet their own needs”.

Over the last decades, the principles of SD were progressively adopted by world leaders on the occasion of a series of Earth Summits. One of the key challenges to implement SD however lies in one’s ability to measure it. As stated by Lord Kelvin, “if you cannot measure it, you cannot improve it”. The challenge is further compounded by the inherent global nature of the problem, which calls for global data sets.

Earth Observation (EO) satellites can play a key role to meet this challenge, as they uniquely placed to monitor the state of our environment, in a global and consistent manner, ensuring sufficient resolution to capture the footprint of man-made activities.

The world of EO is rapidly changing driven by very fast advances in sensor and digital technologies. The speed of change has no historical precedent. Recent decades have witnessed extraordinary developments in ICT, including the Internet and cloud computing, and technologies such as Artificial Intelligence (AI), leading to radically new ways to collect, distribute and analyze data about our planet. This digital revolution is also accompanied by a sensing revolution providing an unprecedented amount of data on the state of our planet and its changes.

Europe is leading this sensing revolution in space through the EO missions of the European Space Agency (ESA), a new generation of meteo missions for Eumetsat, and especially the Copernicus initiative led by the European Union (EU). The latter is centered around the development of a family of Sentinel missions by ESA for the EU so as to enable global monitoring of our planet on an operational and sustained basis over the coming decades. In addition, a new trend, referred to as “New Space” in the US or “Space 4.0” in Europe, is now rapidly emerging through the increasing commoditization and commercialization of space. In particular, with the rapidly dropping costs of small sat building, launching and data processing, new EO actors including startups and ICT giants, in particular across the Atlantic, are now massively entering the space business, resulting in new constellations of small-sats delivering a new class of data on our planet with high spatial resolution and increased temporal frequency.

These new global data sets derived from space lead to a far more comprehensive picture of our planet, thereby enabling the monitoring of SD progress. In this context, this talk will briefly present some elements of the ESA EO programmes and missions, and their evolution, highlighting their related scientific and societal applications, in particular regarding how space can help in supporting SD.

Summary

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