

SPACE SYSTEMS SYMPOSIUM (D1)  
Innovative and Visionary Space Systems (1)

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## DISCOVERER - RADICAL REDESIGN OF EARTH OBSERVATION SATELLITES FOR SUSTAINED OPERATION AT SIGNIFICANTLY LOW ALTITUDES

### Abstract

DISCOVERER is a new 5.7 million Euro, 4.25 year Horizon 2020 funded project which aims to radically redesign Earth observation satellites for sustained operation at significantly lower altitudes.

The satellite based Earth Observation/remote sensing market is one of the success stories of the space industry having seen significant growth in size and applications in recent times. With global revenues from Earth imagery and data services set to exceed 4 billion Euro by 2024 up from 2 billion Euro in 2014, the market can be said to be booming.

Yet key design parameters for the satellites which provide the data for this market have remained largely unchanged, most noticeably the orbit altitude. Operating satellites at lower altitudes allows them to be smaller, less massive and less expensive whilst achieving the same or even better resolution and data products than current platforms.

However, at reduced orbital altitude the residual atmosphere produces drag which decreases the orbital lifetime, and aerodynamic perturbations challenge the ability of the platform to remain stable affecting image quality. DISCOVERER intends to overcome these challenges by carrying out foundational research in the aerodynamic characterisation of materials, in atmosphere-breathing electric propulsion for drag-compensation, and in active aerodynamic control methods.

In order to put these foundational developments in context, DISCOVERER will also develop advanced commercial and economic models of Earth observation systems which include these newly identified technologies. This will allow the optimum satellite designs for return on investment to be identified. DISCOVERER will also develop roadmaps defining the on-going activities needed to commercialise these new technologies and make very low Earth orbit, Earth observation platforms a reality.

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