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International cooperation in using space for sustainable development: The "Space2030" agenda (1)

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STRENGTHENING THE ROLE OF THE SPACE SECTOR AS A MAJOR DRIVER OF SUSTAINABLE DEVELOPMENT:

AN INVESTIGATION OF THE ESA BUSINESS APPLICATION PROGRAMME

Abstract

The first overarching objective of the Space Agenda 2030 is to strengthen the role of the space sector as a major driver of sustainable development. To achieve this objective, the European Space Agency launched already 10+ years ago the ESA Business Applications programme to foster the adoption of space technologies in non-space sectors, promoting the development of commercial satellite-based projects (i.e., projects developing business applications based on satellite technologies and data) and contributing to achieving Sustainable Development Goals (SDGs).

Despite the clear societal benefits of space technologies, professionals and academics lack a holistic view of the current development of commercial satellite-based projects in supporting the achievement of SDGs. Our research aims at clarifying the status quo of commercial satellite-based applications, their direct and indirect impacts on SDGs, and their features contributing to achieving the SDGs.

We develop a taxonomy of the ESA Business Applications programme portfolio, analysing 999 commercial satellite-based applications developed between 2014 and 2022 across 31 variables (including SDGs directly or indirectly impacted), sourced from the program's web pages. We perform descriptive statistics and exploratory data analysis to present the status quo of commercial satellite-based applications, and their direct or indirect impact on the 169 SDG targets. Finally, we describe the features of commercial satellite-based projects (e.g., geographical scope, satellite technology adopted, non-space domains of application) contributing to the SDGs' achievement.

Our results show that 603 commercial satellite-based applications impact at least one SDG. Overall, SGD3 is the most impacted (136, 22%), followed by SDG11 (105, 17%) and SDG2 (78, 12%). 257 Earth Observation-based applications mostly impact SDG2 (58, 23%), SDG15 (38, 15%) and SDG11 (34, 13%). 230 Satellite Navigation-based applications mostly impact SDG3 (68, 30%), SDG11 (52, 23%) and SDG6

(22, 10%). 116 Satellite communication-based applications mostly impact SDG3 (33, 28%), SDG11 (16, 14%) and SDG4 (15, 13%). Moreover, we identify 14 application domains, and for each of them, we investigate their impact on SDGs. The applications domains that mainly impact SDGs are Health (91, 16%), Food and Agriculture (85,15%), and Energy (51, 9%).

Our research demonstrates and strengthens the space sector's role as a major driver of sustainable development. We offer an instrument to managers and agency officers to spot the gaps and identify the existing opportunities to achieve SDGs through commercial satellite-based applications in several non-space domains. Researchers may adopt the methodology in other contexts overcoming the geographical and data accessibility limitation of our research.