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EXPLORING SPACE BOUNDARIES: ITALY'S LEADERSHIP IN SPACE INNOVATION AND
DOWNSTREAM APPLICATIONS**Abstract**

Italy stands out as a global leader in space exploration, boasting a complete chain of expertise encompassing both the initial stages of development (upstream), operations (midstream) and the final applications (downstream). At the heart of the downstream sector lies a network of small and medium-sized enterprises (SMEs), representing an impressive 80%. The Italian Space Agency (ASI), through the Downstream and Integrated Application Unit, takes a proactive approach to fostering innovation by spearheading programs that translate space data into tangible solutions. One such program is the "Multi-mission

and multi-frequency SAR” (2021-2023) initiative. This program aimed to solidify the expertise of Italian scientific and industrial communities in developing algorithms for existing Synthetic Aperture Radar (SAR) satellites. Similarly, the PRISMA-SCIENZA Program (2022-ongoing) fueled the development of novel services and products derived from the hyperspectral data collected by the PRISMA mission. Both programs promoted the application of advanced technological solutions for extracting valuable insights from space data that led to the development of innovative space-derived products, like 3D deformation reconstructions, agricultural maps, forest monitoring, improved ship detection, urban land-cover and cultural-heritage monitoring. Another important initiative is the development of the CosteLab platform: a prototype of a collaborative environment to foster the RD of applications to support coastal risk management. ASI involved a group of expert users (service developers, institutional users and researchers to investigate potential future use scenarios and areas for system improvement within CosteLab. While the aforementioned programs focus specifically on Earth observation (EO) data, ASI’s I4DP (Innovation for Downstream Preparation) program expands their scope. This program supports the development of new technologies, products, and services by leveraging any combination of space data – Earth observation, satellite navigation (SATNAV), and satellite communication (SATCOM) – while also encouraging the integration of other cutting-edge technologies like artificial intelligence, data analytics, and the Internet of Things (IoT). I4DP features three distinct tracks, each catering to specific user groups: commercial entities, scientific research institutions, and public administrations. These programs emphasize strong user involvement, encouraging not only established SMEs but also startups and scaleups to participate. Ultimately, I4DP aims to nurture the development of high-impact, technologically sophisticated services and products.