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STEP: SPACE TECHNOLOGY DEVELOPMENT PROGRAM FOR FUTURE ASI MISSIONS

Abstract

In order to compete with the increasing competitiveness at international level in the space sector, it is needed a continuous and coordinate effort for technology development. This implies the need to define medium- and long-term roadmaps, shared with the industrial and scientific sectors, in order to guarantee sustainability. To this purpose, Italian Space Agency defined a proper technology program, named STEP, in order to guarantee knowledge increase and acquisition of new enabling technologies, with a technology push and mission pull approach. STEP showcases a diverse array of developments, including innovative propulsion systems, advanced materials and manufacturing techniques, optical and radar payloads, as well as electronic components, on-board and midstream technologies. Strategic initiatives, in the field of artificial intelligence to enhance spacecraft and operations autonomy, orbital and planetary robotic systems, radiation environment, quantum and photonic technologies, are being developed to support the realization of future missions together with partners in areas of national excellence, ASI's actions span the full spectrum of technology development lifecycle, from early-stage disruptive developments to fostering competitiveness in innovation and culminating in in-orbit validation and demonstration activities. This ecosystem engages a diverse range of stakeholders, including start-ups, small and medium enterprises, midcaps, large system integrators, universities, and research centres. Our investments are strategically coordinated at both the national and international levels, including participation to ESA and EU programs, as well as engagement in international initiatives. A multi-step approach has been defined: • STEP.1: development and scouting of innovative and disruptive technologies at low technology readiness level (TRL), generally proposed by academia and research centres. The aim is to guarantee the development of low TRL technologies through an open innovation approach, for future space missions through long term initiatives. • STEP.2: consolidation of strategic technologies to increase competitiveness, developments and products at the state of the art through medium term initiatives for all applicative sectors. • STEP.3: reduction of time-to-market of space products, in-orbit demonstration of technologies with the aim to test in relevant environment critical technologies and increase their reliability and trustworthy. • STEP.4: technology transfer activity in order to take advantage of space technologies in other industrial sectors and vice versa (spin-in, spin-out) as for example medical, automotive, energy though the definition of proof-of-concepts and demonstrators. The full paper will present in details the definition of the technology program of the Italian Space Agency and the more recent results for the different initiatives under implementation.