

IAF SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Upper Stages, Space Transfer, Entry & Landing Systems (3)

Author: Mr. Fabio Caramelli
European Space Agency (ESA), Italy, fabio.caramelli@esa.int

ESA SPACE RIDER LEADING THE NEW FRONTIER WITH UNMANNED VEHICLES

Abstract

This paper is dedicated to exploring the multifaceted landscape of unmanned vehicles and their pivotal role in driving resource utilization, technological advancement, and infrastructural development within the rapidly evolving "new space" industry. Unmanned vehicles, by introducing a new dimension of Responsibility, expand upon the traditional 3R's of space—Return, Reload, Relaunch—and are poised to shape a sustainable marketplace for space activities. While the International Space Station (ISS) has been instrumental in pioneering technical advancements, its relatively limited capacity for commercial operations underscores the need for alternative solutions. The Space Rider System (SRS) emerges as a response to this gap, offering affordable return capabilities for a diverse array of payloads, thus opening new avenues for commercial ventures in Low Earth Orbit (LEO). ESA's strategic vision is centred on ensuring the commercial scalability and sustainability of SRS, thereby fostering growth and innovation within the European space industry. To this end, four key Pillars have been identified:

Pillar I - Engagement: Developing an advocacy approach to actively involve stakeholders in the success of the emerging space ecosystem, including the exploration of new business models tailored to terrestrial end-user engagement.

Pillar II - Interoperability: Recognizing the complexity of the space landscape, ESA is committed to fostering collaboration among various initiatives through the development of enabling technologies and the establishment of interoperable standards to facilitate seamless interaction among different entities.

Pillar III - Scalability: With the impending deorbit of the ISS, there is a growing need for expanded space infrastructure to accommodate increased research, development, and manufacturing activities. SRS, Europe's first space factory, is positioned to meet this demand by offering a unique unmanned configuration that accelerates autonomous manufacturing processes and supports a wide range of activities previously hindered by human presence.

Pillar IV - Partnership: In light of the diverse range of public and private initiatives in the space sector, ESA aims to proactively initiate partnerships among stakeholders to maximize the utility of unmanned platforms. Through strategic collaborations and joint mission efforts, SRS will serve as a focal point for fostering a new paradigm of mixed institutional and private partnerships aimed at driving innovation and growth in the space industry.

By integrating technical innovation with strategic partnerships and a commitment to sustainability, ESA is laying the groundwork for a vibrant and resilient ecosystem in Low Earth Orbit that will support continued exploration and commercialization of space activities for years to come.