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Enabling safe commercial spaceflight: vehicles and spaceports (3)

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SPACEPORTS SELECTION AND OUTFITTING: A CHALLENGE FOR PROVIDING WIDE RANGE OPPORTUNITIES AND OPERATING SERVICES TO COMMERCIAL SPACE ACTIVITIES

Abstract

The emerging new space economy and commercial spaceflight have to rely on suitable Spaceports featuring the proper assets and infrastructures to support the ground and flight operations of the involved platforms. Selecting and outfitting a spaceport is a challenging process that involves investigations and analyses to evaluate the capabilities of specific sites, the compliance to the applicable requirements and the possible resulting infrastructural improvements to be implemented. This paper presents an assessment of the various operational aspects that have to be considered in selecting and outfitting a spaceport, including the proper operating processes and infrastructures that allow the achievement of maximum flexibility in accommodating different types of sustainable activities. In the presented approach, the spaceport is regarded as instrument to achieve at the best different objectives and to fulfill various relevant stakeholder needs and elicited requirements and constraints. Thus, the approach suggested for the selection of a suitable Spaceport does not focus on a specific mission but it considers a wide range of operating scenarios, such as suborbital flights, near space operations, small satellites launch as well as suborbital and orbital missions considered test bed for technologies development. Thanks to a Systems Engineering approach, the major functions required are identified together with technologies and skills that will progressively enable the Spaceport towards delivering effective services allowing over time growth of the business with spinoff to the industry and other areas such as research and development, education, training. Special attention is also devoted to ground infrastructures, processes and support activities that a Spaceport must feature to support the execution of the planned operations, such as tracking ground stations, control centers, operators processes for coordination with Air Traffic Control and compatibility with existing Air Traffic Management. This paper also provides an assessment of the main Safety guidelines, capabilities and processes whose analysis and implementation are imperative across all the Spaceport functions and in particular in case of commercial human spaceflight. Approaches to Spaceport business models are also evaluated, aimed at attracting investors and operators since the initial setup and, over the long haul, at conducting sustainable activities with evident advantages to economy and employment.