DESIGN AND IMPLEMENTATION OF A MICRO-LAUNCHER ENGINES TEST SITE AT THE ALGUAIRE SPACEPORT

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Abstract: Small-sats are key commercial platforms in the era of the New Space Economy. This leads to an increased interest in dedicated Micro-launchers, capable of avoiding the drawbacks of shared piggyback missions, especially in terms of orbit selection and launch flexibility. Several space companies and startups are currently developing such launchers in Europe, creating a demand for rocket engine test sites able to meet their needs and provide a flexible, agile and cost-effective service.
In this sense, the Government of Catalonia is implementing the NewSpace Strategy to promote the local space ecosystem and attract investment and talent to the region[1]. One of the main initiatives of this strategy is the development of facilities to test rocket engines at the Alguaire SpacePort, which is currently an EASA certified commercial airport (ICAO LEDA, IATA ILD) successfully specialized as a platform to test, develop and showcase state-of-the-art projects of aviation and aerospace industries.
Starting from an existing dedicated test bed able to handle up to 2 kN engines, the project is currently at the design phase, covering the required technical, legal and market studies to upgrade the current facilities. The final version of the test site will be rated to handle up to 400 kN of thrust and will be able to accommodate a variety of liquid, hybrid and solid rocket engines. The facility will handle and store cryogenic propellant, provide feeding systems and a range of sensors capable of measuring heat generation, temperatures, pressures, thrust, and additional relevant parameters. The working principles of the test site will be focused on assuring a flexible and agile operation, adapted to the LEAN model of start-ups in the NewSpace sector. Last but not least, the facility will increase the testing infrastructure in Europe for methane applications, complementing DLR Lampoldshausen and Vernon facilities.
In this paper, the main requirements, general layout and commercial plan of the test site are described. In addition, the different phases of the development of the facilities are detailed. These phases will allow it to start operating with an upgraded version of the current test bed at the beginning of 2023, to end up deploying its optimal operation in 2024. Once fully operative, the micro-launcher engines test site at the Alguaire SpacePort aims to become one of the key facilities in the space propulsion business chain in Europe.

References:
1. 2020, *https://politiquesdigitals.gencat.cat/ca/tic/estrategia-new-space-de-catalunya/index.html*, Generalitat de Catalunya, accessed on the 27th June 2022.