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GOMX-5 – THE ENABLER OF TOMORROW'S CONSTELLATIONS

Abstract

Due to their high level of miniaturisation, integration and modularity, CubeSat may serve several objectives: education, in-orbit demonstration for technologies and operational concepts, multiple in-situ measurements and provision of high system performance achievable with distributed satellite system architectures. The deployment and operation of constellations of CubeSats for providing applications or services to end-users, particularly those with high revisit rate and low-data latency requirements relies upon numerous miniaturised technologies. New technology developments including compact payloads such as RF transceivers and optical instruments capable to acquire and/or relay data of interest to end users, on-board propulsion providing high total ΔV (i.e. higher than 500 m/s), inter-satellite links for rapid in-plane relay of acquired data over long range from the payload to the user and GNSS precise position pointing for increasing operational capability, are key elements to enable next generation of constellations. In addition, the lack of in-orbit reliability and availability of CubeSat constellations can impact mission success. In order to mitigate such uncertainty, common strategy involve launching more spacecraft than what are actually needed to fulfil a specific mission with obvious clear impact on general mission cost. The objective of the GOMX-5 mission is to flight demonstrate the above-mentioned next generation of nanosatellite constellation related technologies in two large CubeSat platforms based on GomSpace product development. The dual spacecraft will be launched in 2021. This paper will describe the mission and the main trade-off considered, leading to a detailed definition of the system and concept of operations for the tandem spacecraft to further advance the boundaries of CubeSat technologies and safely open new and commercially-interesting orbital regions for CubeSat. The GOMX-5 project is developed as cooperation between the European Space Agency and GomSpace.