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ANSER CLUSTER - ACHIEVEMENTS OF A CUBESAT DISTRIBUTED SYSTEM AFTER MORE THAN ONE YEAR IN ORBIT

Abstract

The ANSER cluster, consisting of 3x 3U CubeSats, was launched in October-2023 with the objective of demonstrating state-of-the art technologies, including innovative Formation Flight Control (FFC) methods for controlling the orbital geometry of the cluster based on passive aerodynamic effects (no propulsion) and Inter-Satellite Link (ISL) communications. Unfortunately, one of the satellites was lost due to a failure in the deployment and a new objective was added to the mission: the capacity of showing resilience, reinstating the missing satellite within a year. The new component of the cluster, launched in January-2025, constitutes the accomplishment of that last goal, being this achievemnt the "cherry on the cake" for a mission that, as expected, is proving the extensive capabilities that can be provided by CubeSats clusters, combining the strength and performance that nowadays are offered by small platforms with the flexibility, resilience and adaptation capacity of the CubeSat concept and philosophy. This presentation will detail how, after more than one year in orbit, the ANSER mission has not only demonstrated its expected capabilities (in-track relative distances between satellites finely controlled below 100 km, two-way ISL communications as a key enabler for future autonomous formation flight control, fine attitude control that allows for an efficient operation of the payloads and accurate FFC), but it has also shown the capability of the mission to nimbly and successfully cope with unexpected issues, being the largest of them (but not the only one) the loss of one of the satellites. The future INTA missions within the ANSER programme (ANSER-AT and Q-ANSER) will also be outlined during the presentation.