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HUGIN: AN INNOVATIVE SMALL SPACECRAFT MISSION FOR DEEP-SPACE EXPLORATION TECHNOLOGY DEMONSTRATION

Abstract

HUGIN is a 3U CubeSat nano satellite mission with the goal to test and demonstrate subsystems and capabilities such as electric propulsion, deep-space navigation and broadband communication in and beyond Low Earth Orbit for future small spacecraft deep-space exploration missions.

The HUGIN mission has been initiated by Beyond Atlas AB, a Swedish Stockholm-based New Space start-up, that is developing a commercial micro satellite platform for privately-funded missions to the Moon and Near Earth Asteroids. During the second half of phase A/B the Luleå University of Technology joined Beyond Atlas AB as a partner in the development of the Hugin spacecraft and the technology demonstration mission. Significant work with respect to feasibility, initial spacecraft design and subsystem development and component procurement has been carried out already until the start of the global pandemic. As a first step within this collaboration the focus will be placed on the following elements: the onboard data handling system, the telemetry and broadband telecommunication subsystems, the deep-space navigation, the electric propulsion system as well as the space systems engineering concept, subsystem interface definitions and mission design.

The collaboration will provide students with the opportunity to be involved in such an innovative mission beyond Low Earth Orbit and to explore new ways of cooperation between New Space industry and academic institutions. This paper will present the status of the mission and spacecraft design and development – focusing on the space systems engineering, deep-space navigation and electric propulsion as well as elements of the onboard data handling and telemetry and telecommunications system – towards the preliminary design review.