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Abstract

RODiO is an innovative mission concept devised by the University of Naples Federico II, Italy, and funded by the Italian Space Agency (ASI) in the framework of the ALCOR program. The mission relies on a cluster of 4 CubeSats flying in formation with ASI PLATiNO-1 (PLT-1) SAR mission. The CubeSat cluster flies at a safe distance of tens of km from PLT-1, and formation-flying techniques are used to keep all the CubeSats in the cluster within an overall envelope of a few hundred meters. Each CubeSat embarks a receiving-only X-band SAR instrument able to collect bistatic echoes exploiting PLT-1 as an opportunity illuminator. In addition, one of the CubeSats embarks a novel hybrid rocket propulsion unit that enables high thrust (10 N) orbit reconfiguration. RODiO Phase A ended in December 2023 confirming mission feasibility and proposing solutions for radar antenna and deployment mechanisms, receiver electronics, hybrid propulsion unit and formation flying able to comply with a 16 U CubeSat. A detailed plan to foster and speed up mission design and development in the next phases has been prepared, including some breadboards for the involved low TRL units. The tight implementation of this plan is mandatory to match the strict timeline of RODiO that must be operational in the same time frame of the main PLT-1 mission. The paper reviews the main outcomes of RODiO Phase A and critically review the expected results of the next mission phases.