IAF SPACE SYSTEMS SYMPOSIUM (D1)
Innovative and Visionary Space Systems (1)

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IPERDRONE ROADMAP FOR NEW ON ORBIT SERVICES PERFORMED BY SPACE DRONES

Abstract

Since the late 1950's, when the first artificial satellite was launched into space there has been an interest to inspect the spacecrafts. From simple inspection of non cooperative vehicles to debris damage repair, commercial spacecraft life extension, space tug service of cooperative vehicles, the studies performed so far are many but for a variety of reasons, these systems have failed so far to come to fruition. One of the greatest challenges was the level of maturity of the technologies required, casting doubt on the economic viability and clear industrial need. In this context, the Italian Space Agency is promoting a roadmap for the design, manufacturing and operation of a new space re-entry drone. The IPERDRONE program will consist of a series of missions characterized by incremental objectives, aiming at qualifying new type of missions and related technologies. The program include, as first steps, the design of inspection services for

spacecrafts and manned vehicles to reduce the EVA missions of astronauts and the retrieval of payloads and their re-entry on ground. In particular the requirement on the mass of the vehicle, only 20kg for the first mission, will make it competitive with the heavier existing technology. The design of the vehicle will take into account the safety requirements of the International Space Station in order to be as more flexible as it is possible to enable the largest variety of missions. The paper will present the scenarios of application of this drone and the status of development of the first mission, DAVID, based on a 6U cubesat architecture. The mission will demonstrate the system's capabilities such as proximity operations, inspection and interaction with a target, including a close rendez-vous demonstration.