



Cubesat Proximity Operations Demonstration (CPOD)

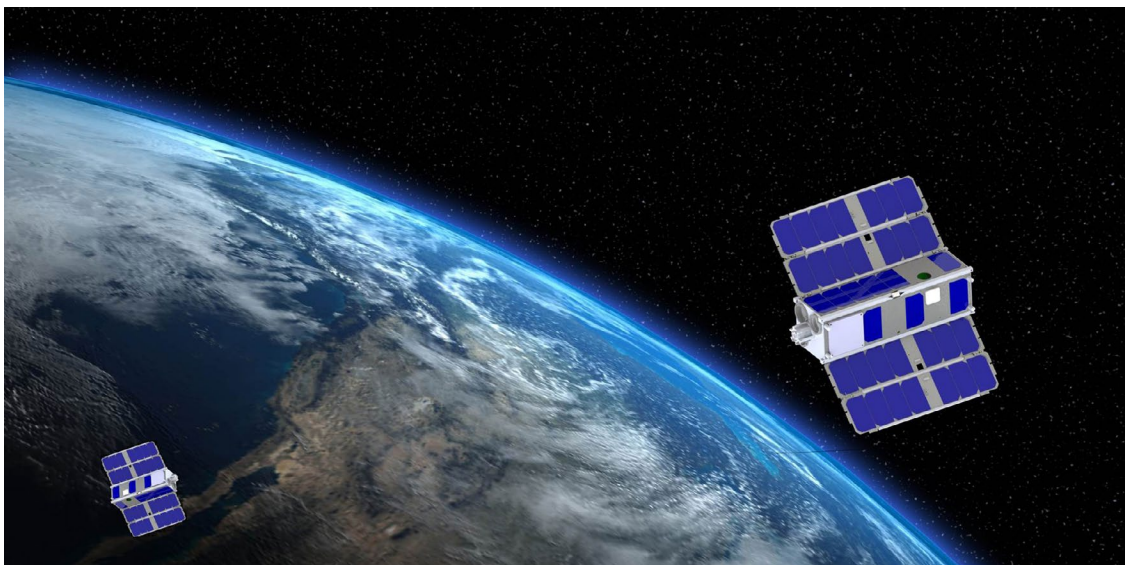
On-Orbit Demonstration of Rendezvous, Proximity Operations and Docking of Two 3U Cubesats

The Cubesat Proximity Operations Demonstration (CPOD) project will demonstrate rendezvous, proximity operations and docking (RPOD) using two three-unit (3U) cubesats. This flight demonstration will validate and characterize many new miniature low power RPOD technologies applicable to future NASA programs. The CPOD project is being led by Tyvak Nano-Satellite Systems, LLC, of Irvine, California with funding from the Small Spacecraft Technology Program (SSTP) within NASA's Space Technology Mission Directorate.

CPOD will demonstrate the ability of the two spacecraft to remain at determined points relative to each other (called relative station-keeping), as well as precision circumnavigation and docking. Docking will employ the use of a novel universal docking device, imaging sensors, and a multi-thruster cold gas propulsion system.

Many of the RPOD test scenarios will be performed autonomously using a system of high performance on-board processors and flight software. The miniature spacecraft leverages existing and next generation high performance cubesat technologies and systems, including sensors and flight software for guidance, navigation and control.

The cubesats will be released simultaneously into a common orbit, and initially undergo a series of check-out steps to ensure proper operation and maneuvering capability. The space-to-ground data link will enable the transmission of images of the other cubesat. An inter-satellite link will share GPS, as well as other data between the two spacecraft. Using on-board navigation systems, one cubesat will perform a series of circumnavigation maneuvers relative to the second cubesat in order to validate and characterize the new



The Tyvak Nano-Satellite Systems LLC designed CPOD 3U cubesat incorporates a suite of rendezvous, proximity operations and docking (RPOD) sensors, high performance low power processors, modular flight software, and an advanced control system that includes a multi-thruster propulsion system.

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miniature sensors. The miniature RPOD subsystem has direct application to several future NASA missions.

The CPOD mission was recently selected for a flight opportunity as part of the CubeSat Launch Initiative in NASA's Human Exploration and Operations Mission Directorate. CPOD's two 3U cubesats will be launched and deployed as auxiliary spacecraft on a rideshare mission arranged by the Launch Services Program at NASA's Kennedy Space Center. These miniature spacecraft will be launched to low Earth orbit between 2015 and 2016.

NASA's new Space Technology Mission Directorate was formed as a catalyst for the creation of technologies and innovation needed to maintain NASA leadership in space, while also benefiting America's economy. To develop these cross-cutting, advanced and pioneering new technologies needed for NASA's current and future missions, the SSTP was created to develop and

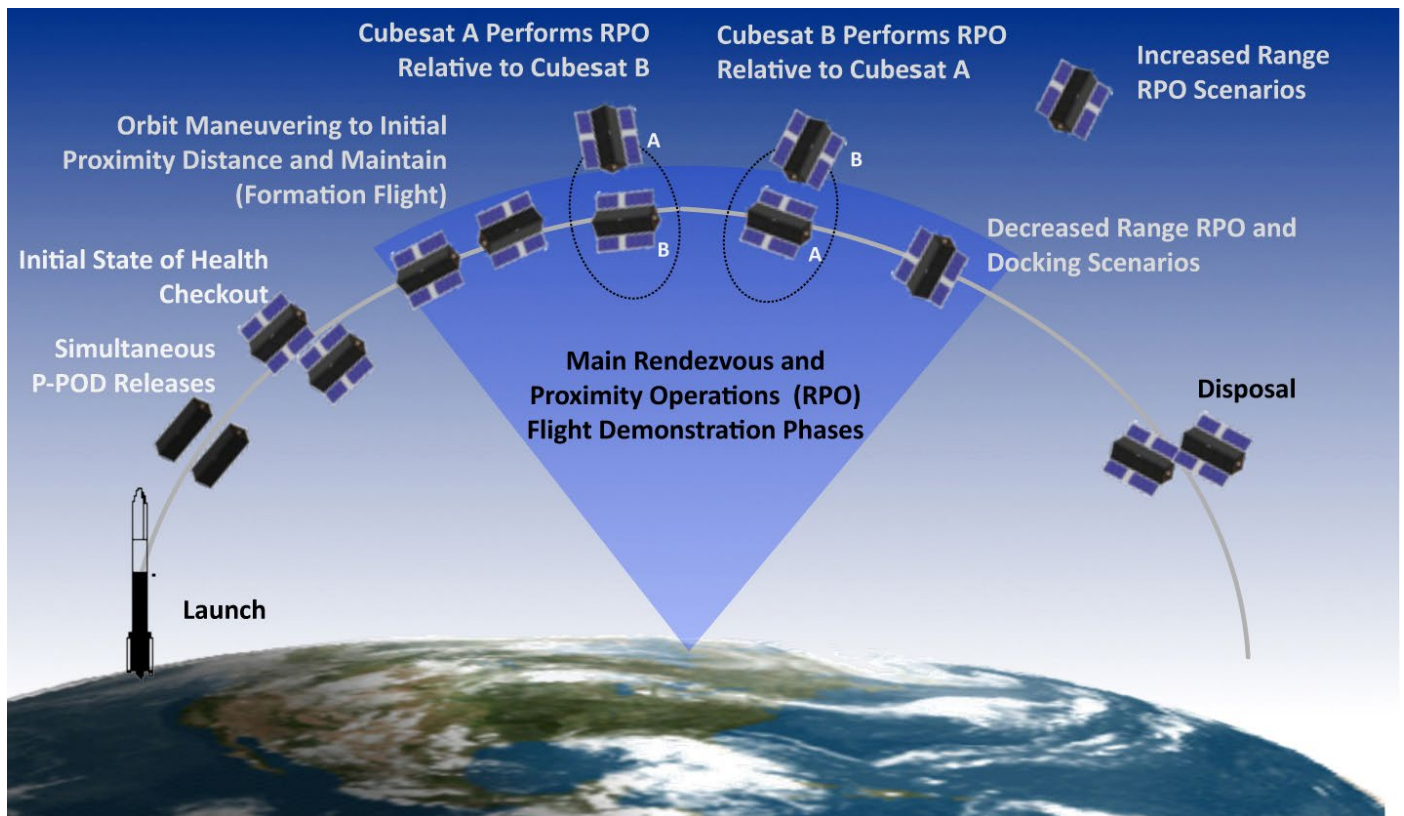
demonstrate new technologies and capabilities for small spacecraft.

Partners with Tyvak Nano-Satellite Systems LLC on the CPOD project include Applied Defense Solutions Inc. of Columbia, MD., 406 Aerospace LLC of Bozeman, Montana., and California Polytechnic State University, San Luis Obispo.

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The CPOD mission utilizes several mission phases to demonstrate a range of rendezvous, proximity operations and docking scenarios in order to validate and characterize the low power miniature systems for application to future NASA missions.

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