SPACE PROPULSION SYMPOSIUM (C4)
Electric Propulsion (4)

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CURRENT STATUS OF NASA'S NEXT-C ION PROPULSION SYSTEM DEVELOPMENT PROJECT

Abstract

The NASA's Evolutionary Xenon Thruster (NEXT) ion propulsion technology was developed by the NASA In-Space Propulsion Technology Project, within the Science Mission Directorate (SMD) for a variety of planetary science missions, including Discovery, New Frontiers and Flagship-class missions. Because NEXT has a very high specific impulse and flexible operations, it makes it well suited for many other commercial and defense-related applications, as well.

The NEXT technology project was initiated in 2002 after the successful first flight of the NASA Solar Technology Application Readiness (NSTAR) ion propulsion system aboard the Deep Space 1 (DS-1) mission from 1998 to 2001. The project was led by NASA Glenn Research Center (GRC), and supported by the Jet Propulsion Laboratory (JPL) and other partners. The goal of the project was to develop a next generation of ion propulsion system with both higher specific impulse and higher thrust than the NSTAR system. The project developed, to varying levels of technology readiness, all of the major components needed for a high-performance ion propulsion system: ion thruster, Power Processing Unit (PPU), Propellant Management System (PMS), gimbal, and a simulated Digital Control Interface Unit (DCIU).

The NEXT - Commercial (NEXT - C) project is a follow-on to the NEXT technology development effort. The project is focused on developing flight-qualified NEXT hardware through a contract with Aerojet Rocketdyne and its principal subcontractor, ZIN Technologies. A main goal of the project is to infuse NEXT technology into industry, and have it available for future NASA and commercial applications. In 2014, NASA GRC released a solicitation for the design, test, and manufacture of two thrusters and two PPUs. In early 2015, the contract was awarded to Aerojet Rocketdyne with ZIN Technologies as its principal subcontractor. Aerojet Rocketdyne is responsible for the overall project management, systems engineering, development test and fabrication/assembly of the thrusters, along with overall integrated system testing. ZIN Technologies is responsible for the development, fabrication/assembly, and test of the PPUs.

This paper addresses the capabilities of the NEXT-C system, status of the NEXT-C project, and the forward plan to final hardware build, test, and delivery of flight hardware. It also discusses some of the potential missions that could utilize the hardware developed by the project.