

Next Generation Ion Engines: Mission Performances

Muriel Noca
Jet Propulsion Laboratory,
California Institute of Technology
MS 301-180
4800 Oak Grove Drive, Pasadena, CA 91109
muriel.noca@jpl.nasa.gov

In 2001, NASA released a Research Announcement for the Next Generation of Ion Engine Technology. As specified in this Research Announcement, significant technology advances over the NSTAR DS1 ion engine were sought, especially an increase in specific impulse, total impulse, power and efficiency, and a decrease in propulsion dry mass. Two ion engine designs, one based on a derivative of the NSTAR 30-cm and the other one based on a 40-cm ion engine design, were proposed. This paper summarizes the technology features and characteristics of the three technologies in questions, and their mission performances for Solar System Exploration and Primitive Bodies Exploration missions: Neptune Orbiter, Titan Explorer, Jupiter/Europa mission, Pluto Fly'by, Comet Kopff Rendezvous, Vesta-Ceres Rendezvous, and Comet Nucleus Sample Return. These new mission analyses using the next generation of ion engines show enabling benefits to Discovery type and New Frontiers type missions. This paper also assesses the entry conditions for probes that would be using Aerocapture along with Solar Electric Propulsion (SEP).