

Electric Propulsion at the Jet Propulsion Laboratory

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Electric Propulsion (EP) activities at the Jet Propulsion Laboratory focus on providing advanced propulsion systems for NASA space science missions. In this paper, we present a programmatic overview of ongoing EP work both at JPL and with partners in industry and other NASA centers, the technical details are described in other papers presented at this conference.

The major JPL EP role is to support flight projects by providing experienced discipline experts, program element, and contract technical managers for flight projects. Dawn, a mission to rendezvous with two asteroids is currently JPL's largest flight project using EP. While Dawn will use EP for primary propulsion, there are several approved and planned missions that will use precision electric thrusters for formation flying, including the ST-7 disturbance reduction mission, which will employ colloid thrusters. JPL is also leading the diagnostics package development for the Air Force Research Laboratory's TechSat 21 flight experiment. Other activities provide pre-project planning technology support for future NASA missions.

Because EP systems are typically required to operate for years at low thrust, much of the EP research at JPL centers on propulsion system mission assurance. This work includes failure mode analysis, engine qualification tests, life models, and electric thruster integration issues including plumes, contamination, etc.. The major effort in this area is the record setting Extended Life Test of the NSTAR flight spare thruster, supported by NASA's In-Space Propulsion Program.

JPL participates in several technology development programs focused on meeting future mission needs including the Carbon Based Ion Optics (Boeing led) and NASA Evolutionary Xenon Thruster (NASA/GRC led) for NASA Space Science solar electric missions, and two programs, Nuclear Electric Xenon Ion System Technologies (JPL led), and Very High Isp Anode Layer Thrusters (Stanford University led), to develop advanced electric thrusters for high power electric propulsion missions. JPL also has in-house programs to develop thrusters for precision formation flying and propulsion systems for micro-spacecraft.