Innovations in propulsion technologies are needed to support the Science Mission Directorate (SMD) goals of better understanding the Earth-Sun system, exploring our solar system, and investigating the nature of the universe beyond our solar system. Planetary spacecraft need ever-increasing propulsive performance and flexibility for ambitious missions requiring high duty cycles and years of operation. Satellites and satellite constellations have high-precision propulsion requirements, usually in volume- and power-limited envelopes. Electric propulsion systems also present challenging plasma plume and contamination environments to the host spacecraft and payloads. This subtopic seeks innovations in propulsion technologies to increase the capabilities of SMD spacecraft.

Specifically, technology innovations are sought to improve the capability of low- to medium-power electric propulsion systems, including ion, Hall, and advanced plasma thrusters. Areas where innovations are sought include power processing, long-life, high-efficiency cathodes and neutralizers, electrode-less plasma production, low-erosion materials for ion optics and Hall discharge chambers, high-temperature magnetic circuits, plume mitigation, and next generation thrusters. Innovations sought include, but are not limited to those that improve performance, increase lifetime, reduce mass, decrease cost, and facilitate electric propulsion integration. Improvements are also sought for propellant management system components including storage, distribution, and flow control to support solar electric propulsion applications. Innovations in miniature electrostatic and electromagnetic propulsion devices are sought for miniature (less than 10 kg) spacecraft and for high-precision (impulse bit}