Research project and supervisor team

Supervisory Team	Dr. Kean-How Cheah Dr. Yong Ren Dr. ChungKet Thein
Short introduction & description of research project	Nanosatellites (< 10 kg) have gained much attention among the space community as a rapid and cost-effective platform to demonstrate new technologies in outer space. However, most of the nanosatellites have no onboard propulsion system due to the limited spatial volume and electrical power. The need of propulsive capability for the nanosatellites to perform more complex mission has prompted an intensive research and development in the area of micropropulsion systems. Using microelectromechanical system (MEMS) technology, the existing chemical propulsion systems have been miniaturized significantly. Unfortunately, the high thermal conductivity of silicon has resulted in a low system efficiency as a result of enhanced heat loss at micro-scale. In addition, the further integration of liquid chemical micropropulsion system into nanosatellite is limited by the heavy and bulky air pressurized fluid handling system. This project aims to address these issues by studying the solid sublimation at reduced pressure and subsequently implement it into the development of a space micropropulsion system. Additive manufacturing technology (3D printing) will be used to fabricate a ceramic based prototype with an axisymmetric conical micronozzle. Performance of the prototype will be evaluated through a series of experiments using an in-house built torsional micronewton thrust stand. Upon completion of the project, a new and highly compact micropropulsion system which uses green solid propellant will be demonstrated.
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