

Steerable Thrusters

As part of the UK Space Agency-funded NSTP Grants for Exploratory Ideas, project LIFT ME OFF (LMO) was awarded a grant to develop a steerable gimbal mechanism for chemical thruster applications. The design focused on creating an accurate gimbal with two-axis of rotation for vectoring a 1N rocket engine.

The goal was to make the gimbal accurate, repeatable and with small form factor.

Based on this, a gimbal mechanism was designed which can provide a $\pm 7.5^\circ$ half-cone angle around two axes with high accuracy and minimal repeatability errors. The gimbal was designed, built and tested in-house by LMO with an eye on minimising cost and lead-time.

The gimbal was successfully tested and characterised at LMO with accurate optical alignment equipment. Based on these results, LMO will be moving from the current TRL-3 status into their engineering model, which will be fully environmentally tested and bring the technology to TRL-5.

Based on the results from the engineering model, the gimbal will be qualified and flown in 2021 on a first propulsion system.

With NSTP funding from the UK Space Agency, LIFT ME OFF was able to increase its internal knowledge on propulsion systems and components. This knowledge enabled them to increase the in-house know-how in the fields of mechanisms for propulsion systems, as well as open new market opportunities and improving its capabilities.

This successful proof-of-concept adds valuable experience to LMO and what it can offer to the current and future space industry.

As part of this activity, LMO was also able to hire a new employee who, in a short turn-around, attended to the design, build and test of propulsion hardware providing a steep learning curve. The funding has provided a pivotal acceleration to LMO's developments which otherwise would not have been possible.

The program success has led to Memorandums of Understanding with customers such as Open Cosmos, partnerships with companies such as Nammo UK and interest by the European Space Agency in LMO's developments.