

SuperMagdrive

National Space Technology Programme

The challenge

Magdrive are an electric propulsion startup founded in 2019. In 2020 they raised Series A investment, aiming for first flight in 2022 to support the Cubesat community with high thrust-to-weight, high efficiency electric propulsion. Dr Thomas Clayson and Mark Stokes of Magdrive's aim to rapidly scale up this approach to support a wider range of small satellites. However generating greater thrust to manoeuvre larger spacecraft requires significant increases in the plasma density and magnetic field strength of the Magdrive thruster.



www.magdrivespace.com



www.cfas.ox.ac.uk

Rocket Engineering's approach

Rocket Engineering introduced Magdrive to the UK Space Agency's National Space Technology Programme (NSTP) in 2020 as a means of leveraging its modest R&D budget, providing additional resource to explore scale up, and supporting knowledge transfer from Oxford University's Department of Materials. We created a consortium with Magdrive and CfAS at Oxford University combining space propulsion and space systems experience with expert knowledge from Professors Chris Grovenor & Susie Speller on superconducting materials.

The consortium submitted a proposal to explore whether superconducting magnets could provide the required performance for space propulsion and identify the engineering challenges of energising such magnets in space. This was reviewed by a panel of Agency experts and selected as one of 5 winners from over 100 applicants in late 2020.

Deliverables & Benefits

In only 5 months the consortium, managed by Dr Adam Baker, derived preliminary requirements, identified the key engineering challenges & supply options for superconductors, and developed a concept design for a superconducting Magdrive, deriving key size, mass and power metrics. Preliminary cryogenic tests were carried out to support modelling. The project also helped Magdrive land their first major investment, and engaged a UK manufacturer of high temperature superconducting magnets with the UK space and propulsion community. The consortium continues to pursue Supermagdrive with new partners including In-Space Missions and Tokamak Energy.

"Rocket Engineering Ltd support was vital to the success of this project and has significantly helped Magdrive's ambitions as a company. Rocket Engineering Ltd have extensive knowledge about both the UK space technology landscape and major players and organizations. They provide a unique blend of project management, technical systems input & bid writing support"

Dr Thomas Clayson, Technology Director, Magdrive

For more information about the UKSA National Space Technology Programme, visit:

<https://www.gov.uk/guidance/apply-for-funding-through-the-national-space-technology-programme>

