

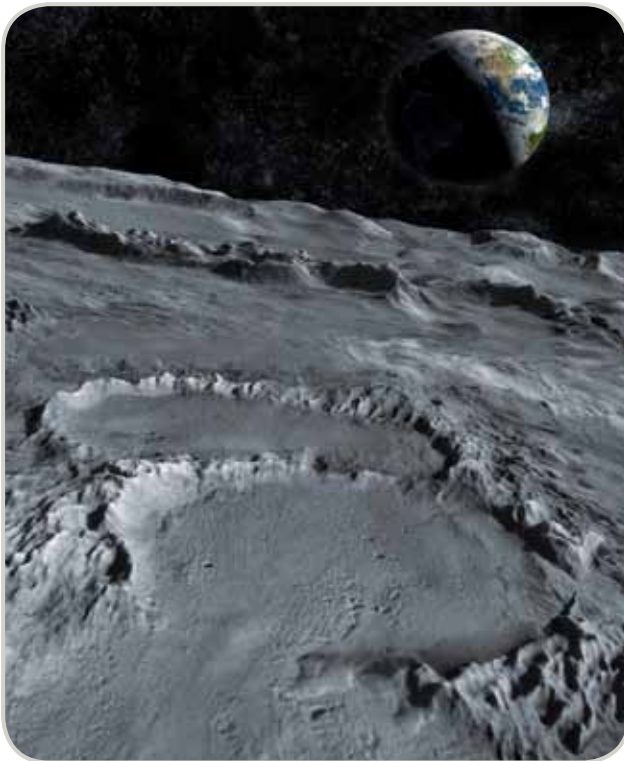
MicroThrust

MEMS-Based Electric Micropropulsion for Small Spacecraft to Enable Robotic Space Exploration and Space Science

SMALL SIZE MOON FLIGHTS

Believing that less is more, the MicroThrust project is set to develop new ways to reach into space with smaller and less expensive means, lowering the stakes should a failure occur.

Since the beginning of the space age, space exploration has been undertaken by the privileged few. Associated with national prestige, major powers have reached into space, deployed thousands of satellites, and engaged in expensive, audacious and high stakes space exploration missions to the Moon and even beyond our solar system. Whilst the risks that a generation of explorers have taken in space have been fascinating, high cost and high risks have limited the scope of space exploration activities. Indeed, in order to take the space age to its next stage, and share the endless possibilities that space offers with more actors, new systems are needed that make space missions cheaper, and thereby allow for many more missions that will be smaller but high-risk.

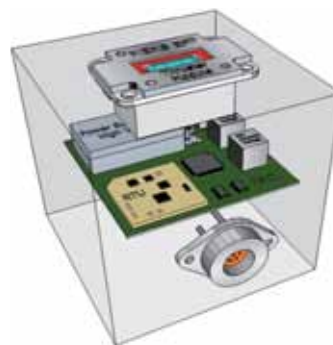


moon surface © innovari - Fotolia.com

MicroThrust will develop a low-cost miniaturized electric propulsion system for small-scale exploration missions.

The MicroThrust project responds to this need for more lower-cost space exploration missions, as it sets out to design a very small, yet highly performant electrical propulsion system. The MicroThrust system would be able to propel small micro and nano-satellites to any location between Earth and the Moon, and even beyond to nearby planets and asteroids. Small-size missions would cost a fraction of current conventional missions, and carry as little as a single instrument, thereby limiting the negative impact if a failure occurs.

The MicroThrust concept involves a microfabricated colloid thruster with a high degree of subsystem integration: all elements are co-designed to allow for the highest level of miniaturization and efficiency. Using micromachining technology, the thruster head can be shrunk to the size of a postage stamp. The project works towards the ultimate goal of developing a 'thruster-on-a-chip' for the smallest and most flexible missions imaginable.



Monolithic InP-HBV chip mounted in a waveguide block © MicroThrust



HERBERT SHEA
IS PROJECT COORDINATOR

QUESTIONS & ANSWERS

What do you want to achieve with this project?

We will develop a miniaturized propulsion system to allow small satellites to accomplish missions till now unimaginable. Debris cleanup, going from Earth orbit to lunar orbit or to a Lagrange point become possible for the first time at low cost for satellites weighing 1-100 kg.

Why is this project important for Europe?

Our miniaturized highly efficient thruster will allow Europe to independently and rapidly develop new missions based on constellations of small satellites. Europe will not rely on any specific launch vehicle, and will be free to lead novel exploration missions at very low cost.

How does your work benefit European citizens?

By making it possible for a few small European countries to build ambitious science missions, MicroThrust allows many more European citizens to be directly involved in space exploration. More missions mean more exciting science data, and a deeper understanding of our universe.

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LIST OF PARTNERS

- Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland
- Queen Mary and Westfield College, University of London, United Kingdom
- Nederlandse Organisatie Voor Toegepast Natuurwetenschappelijk Onderzoek – TNO, The Netherlands
- Nanospace AB, Sweden
- SystematIC design bv, The Netherlands

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PROJECT INFORMATION

MEMS-Based Electric Micropropulsion for Small
Spacecraft to Enable Robotic Space Exploration and
Space Science (MicroThrust)

Contract no: 263035

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Duration: 36 months

EU Contribution: € 1.992.906

Estimated total cost: € 2.842.535

