

PRESS RELEASE

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ONERA, ThrustMe, and Airbus Defence and Space Explore Iodine-Based Propulsion for Large Satellites

ONERA, ThrustMe, and Airbus Defence and Space have initiated the IPISC project (Iodine Propulsion Interaction with Satellites and Components), supported by ESA and CNES. This project aims to evaluate the potential of iodine as a new propellant for satellites weighing over 500 kg, focusing on the interaction between iodine propulsion systems and a range of satellite materials and components. Iodine-based propulsion offers an alternative to noble gases like xenon.

The IPISC project aims to ensure that iodine can meet the demands of larger, more complex, and longer-duration missions, whether in Low Earth Orbit (LEO), Medium Earth Orbit (MEO), Geostationary Earth Orbit (GEO), or for interplanetary missions. The French team, led by ONERA, includes ThrustMe, a French SME that designs electric propulsion systems and pioneers the use of iodine in electric propulsion, and Airbus Defence and Space, a specialist in designing space platforms. Airbus will assess iodine's impact on various satellite surface materials. ONERA will contribute expertise in material resilience to the space environment, using advanced experimental and simulation capabilities to evaluate iodine's effect on satellite surface materials. ThrustMe's iodine propulsion expertise will be essential in achieving representative experimental conditions.

A Strategic Challenge

Using iodine for satellite propulsion is a strategic priority for Europe. Current propellants, such as xenon and krypton, are increasingly expensive and scarce. Worldwide, researchers are exploring iodine, as it is the only alternative capable of delivering comparable or even superior performance to noble gases in electric propulsion. ThrustMe was the first to demonstrate the effectiveness of iodine-based propulsion in space. Several of its systems are currently operational on small satellites in orbit, confirming the maturity of this innovative technology. The next frontier is larger satellites, like Airbus's over-500 kg models, which have significantly higher propellant needs and mission lifespans exceeding ten years.

Iodine is chemically reactive, and its use on satellites could impact all surface materials (e.g., solar panels, thermal coatings, optics). This study aims to assess this impact and estimate its implications for platform design and propulsion integration for satellites across different orbits.

"After our first world demonstration of iodine propulsion in space and its rapid industrialization, established industry players are now exploring it and trying to make it work - this is great news for us. We are now moving forward, enabling this technology to be used on larger platforms, for missions in low orbit, geostationary orbit, and possibly even deep space. Our

ONERA and Airbus partners will bring crucial expertise in materials science, physics, and space platform engineering, while our pioneering knowledge in iodine propulsion will be essential for achieving representative experimental conditions," said Dr. Dmytro Rafalskyi, Co-Founder and CTO of ThrustMe.

Jean-Marc Charbonnier, Space Program Director at ONERA, stated, "ONERA, as France's aerospace science institution, brings its unique expertise to the IPISC project, aligning with strategic priorities in the French space sector by strengthening the competitiveness of satellite electric propulsion and French equipment providers like ThrustMe. This project will benefit from a new, unparalleled experimental resource, PICOMAX (Ion Spraying and Contamination of Space Materials). Funded by ONERA with a €1.2 million grant from the DGA, this facility will evaluate the impact of plasma propulsion (not only iodine-based) and molecular contamination on space materials."

About ONERA, the French Aerospace Research Center

ONERA, a central player in aeronautics and space research, employs around 2,000 people. Under the Ministry of the Armed Forces, it has a budget of €289 million (2023), with over half from commercial contracts. A state expert, ONERA prepares for tomorrow's defense, addresses future aerospace challenges, and supports the competitiveness of the aerospace industry. Its expertise spans all aerospace disciplines and technologies. Major civil and military aerospace programs in France and Europe carry ONERA's DNA: Ariane, Airbus, Falcon, Rafale, missiles, helicopters, engines, radars... Recognized internationally and often awarded, its researchers train many Ph.D. students.

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About ThrustMe:

Founded in 2017, ThrustMe's mission is to build a sustainable future for the space industry. The company develops, produces, and provides propulsion systems and services that enable satellites to maneuver in space. In 2020, ThrustMe made history by demonstrating the first iodine-powered electric propulsion system in space, realizing an industry dream over 60 years old. Since then, ThrustMe continues to innovate, positioning itself as a pioneer in the next era of the space industry: the industrial era of space.

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