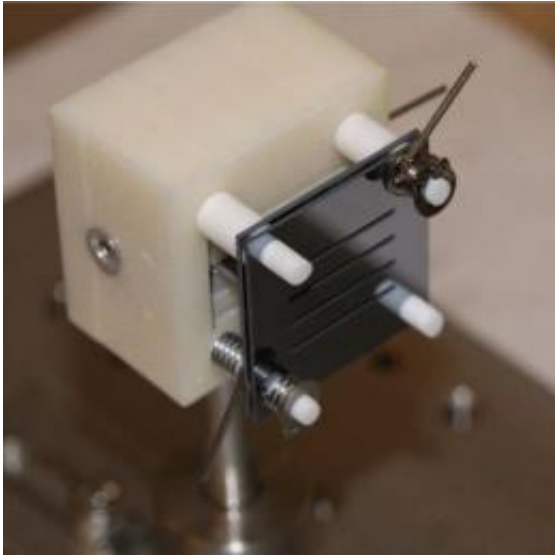


# Air Force eyes mini-thrusters for use in satellite propulsion

3 March 2010



A prototype of a miniature electro-spray thruster with four rows of ion emitters is shown here. The thruster is contained within two black plates each measuring about one square inch. Credit: Dr. Paulo Lozano, MIT

Mini-thrusters or miniature, electric propulsion systems are being developed, which could make it easier for the Air Force's small satellites, including the latest CubeSats, to perform space maneuvers and undertake formidable tasks like searching for planets beyond our solar system.

With Air Force Office of Scientific Research funding, researchers led by Dr. Paulo Lozano at Massachusetts Institute of Technology are considering the advantages of electric [propulsion](#) over more traditional chemical rocketry. As a result, they have discovered "ionic liquid ion sources" which are the core elements of the mini-thruster.

In addition to the benefits anticipated for small satellites, the technology may have applicability in completely different areas.

"Fast-moving ions coming out from the mini-thrusters can be used to etch semiconductors to create patterns in the nanometer scale, to fabricate [computer chips](#) or small mechanical devices," said Lozano.

The team is interested in the properties that allow advances in travel between different orbits in space and the ability for [spacecraft](#) to self-destruct upon controlled re-entry, therefore preventing the creation of additional space debris.

Lozano predicts that he will have a mini-thruster prototype developed in about four or five months and he expects the technology to become a reality in the next two years. He plans to begin measuring the velocity of the ions and their energy as soon as the prototype is ready to determine the thrust and efficiency of the engine. Later this year, the team will begin looking at how to integrate mini-thrusters to flight hardware.

Provided by Air Force Office of Scientific Research

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