

IAF SPACE PROPULSION SYMPOSIUM (C4)
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A NEW EUROPEAN APPROACH FOR ELECTRIC PROPULSION ON SMALL SATELLITES:
HIPERLOC-EP

Abstract

In response to the European Union's call for the development of market-disruptive electric propulsion technologies, a consortium was formed between Queen Mary University of London, Airbus, Nanospace and SystematIC, which is now developing such a system. The focus of the project is to develop a low cost electric propulsion system which also achieves the high performance typified by conventional electric propulsion technologies. The project name HiperLoc-EP captures this essence, standing for High performance Low cost Electric Propulsion. In this project we are developing an innovative approach to electrospray colloid electric propulsion (ECEPS) with low cost as a key design driver. The current state-of-art electric propulsion (EP) systems such as ion engines and Hall effect thrusters that have been adopted for medium to large sized space platforms are capable of providing impressive system performance. However, this performance is always associated with both significant volume requirements (not including the propellant) and high direct cost of the EP system itself. These technologies have not been shown to be capable of being effectively scaled down in size, whilst retaining system performance. As a result, such technologies are not available for nano and micro satellites, systems which represent a rapidly increasing share of the market due to the advent of large constellations. The novel design choices and the adopted manufacturing solutions allow for a reduction of the overall system cost by one order of magnitude with respect to standard EP technologies, while retaining high efficiencies at low power ranges. Following market assessment and review the performance requirements specification for

the ECEPS system is targeting a thruster efficiency of 50. This paper presents the overall design of the ECEPS, together with some preliminary test results that have led to the breadboard model that is now undergoing a full test campaign to raise the TRL for this innovative approach to TRL4.