

IAF SPACE PROPULSION SYMPOSIUM (C4)
Electric Propulsion (1) (5)

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STATUS OF THE QUAD CONFINEMENT THRUSTER: CONCEPT, LIMITS, AND POSSIBLE
TECHNOLOGY ADVANCEMENT**Abstract**

The Quad Confinement Thruster (QCT) is a novel, rather young electric propulsion system invented in 2010 at the Surrey Space Center which relies on propelling the spacecraft using electromagnetic acceleration. Inherently similar to Hall Thrusters, the major difference lies in the added advantages it provides in terms of throttleability and thrust vector control. With the increasing need to scale down space components, the reliability and control demand in new missions is also rising, and the QCT could be seen as the prime candidate to satisfy gimbaling needs with a non-mechanical solution. A complete assembly of a prototype of the thruster, the QCT-200, under development by SSTL, Surrey Space Centre (University of Surrey) and Airbus UK, has already been launched with the NOVASAR-1 mission in 2018, with a design lifetime of seven years. Despite the promising returns, there are some major limitations, particularly the low thrust efficiency, which jeopardizes the use of this kind of thruster. To investigate using mathematical models and understanding the implications of altering the design has been the focus of this work. This paper aims to analyze the current technological progress of QCTs and propose possible improvements to enhance the overall performance for use in future space missions.