

SPACE PROPULSION SYMPOSIUM (C4)
Propulsion Technology (3)

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MEMS BASED CHEMICAL PROPULSION

Abstract

Investigation on miniaturized propulsion concepts gets gradually growing importance due to the current evolution of the design philosophy of the flight structures. Initialized by continuous miniaturization of mechanical and electronic components and supported by the new available launching options, an increasing trend towards compact systems is observable. Besides the requirements for exact and highly dynamic positioning of small spacecrafts parameters such as adequate specific impulse, specific thrust to weight and thrust to power ratios should be optimized for required life cycles of flight vehicles within the available energy budgets. Due to technological restrictions the state of the arte manufacturing methods for chemical propulsion are limited for systems with thrust ranges below 50mN. New approaches using MEMS based technologies could break through the engineered barrier. Within the initial development steps cold gas propulsion systems will be investigated whereas some concepts already achieve high TRL levels. A monopropellant hydrazine system would be the next technology step improving available MEMS cold gas propulsion concepts as well as system specific parameters. ASTRIUM Space Transportation as a leading European developer and manufacturer of satellite chemical propulsion systems is currently investigating this concept. The paper will present the latest development status and roadmap within ASTRIUM Space Transportation for chemical micro propulsion.