

SMALL SATELLITE MISSIONS SYMPOSIUM (B4)
Design and Technology for Small Satellites - Part 2 (6B)

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COOL GAS MICROPROPULSION SYSTEM FOR CUBESATS

Abstract

CubeSats are becoming more mature and many capabilities previously associated with microsatellites and bigger platforms are coming to the CubeSat. Moreover, they are becoming available as commercial off the shelf systems with standardized interfaces. TNO Defence and Security of the Netherlands is in the final stage of development of a Cool Gas Micro Propulsion system and is working with nanosatellite specialist ISIS to make it available as a commercial off the shelf system.

Applications of the system are orbit phasing and it can provide basic maneuvering capability. The system has several unique characteristics because the nitrogen propellant is not stored under pressure, but chemically bound in several small cool gas generators. Its on ground and on orbit storage life, also between maneuvers, can be up to 10 years, as the propellant storage in the gas generators has no leakage. The use of Cool gas Generators also allows a very flexible system: when a performance increase is needed, additional gas generators can be added without modifying the basic system, the so-called “plug-and-play” philosophy.

The paper provides a system description of the development and testing of the qualification model. This qualification model is specifically aimed for a flight demonstration of the propulsion system on board of the Delfi N3Xt satellite, planned in 2010.

The paper concludes with an analysis of expected performance for different types of CubeSats based on the present system and possible extensions of the present system using the fact that it is built up from standard modules.