

SPACE PROPULSION SYMPOSIUM (C4)  
Propulsion Technology (3)

Author: Mr. Alessandro Migliaccio  
Alten Sud Ouest, France, amigliaccio.space@gmail.com

Mr. Barry Zandbergen  
Delft University of Technology (TU Delft), The Netherlands, B.T.C.Zandbergen@tudelft.nl

Ms. Flavia Tata Nardini  
TNO Defence, Security & Safety , The Netherlands, flavia.tatanardini@tno.nl

Mr. Marcus Louwerse  
University of Twente, The Netherlands, m.c.louwerse@ewi.utwente.nl

VACUUM TESTING OF A MICROPROPULSION SYSTEM BASED ON SOLID PROPELLANT COOL  
GAS GENERATORS**Abstract**

The number of micro and nano satellite projects is expanding. Main focus is on providing these small satellites with the same capabilities as today's larger satellites. In the field of propulsion, efforts are on miniaturization of the on-board propulsion system. This though presents major challenges to the designers. TNO Defence, Security and Safety, Delft University of Technology and Universiteit Twente have faced those challenges, developing a commercial off-the-shelf cold gas micro-propulsion system, the T3 $\mu$ PS capable of providing a pre-set thrust level in the range 1 – 100 mN. It is based on a highly integrated feeding and thruster system and cool gas generators, which contain nitrogen stored in solid form.

The Delfi-n3xt triple unit cubesat, scheduled for launch in 2011/12, has been chosen as platform to test the capabilities of the T3 $\mu$ PS. To satisfy the Delfi-n3xt requirements the T3 $\mu$ PS is designed to provide a thrust of maximum 6 mN, minimum impulse bit less than 0.1 mNs and a total impulse of 0.7 Ns. To qualify the T3 $\mu$ PS and verify that it meets the requirements, an extensive test campaign has been devised by TNO. This paper describes the requirements generated, the performance qualification test campaign conducted at Delft University of Technology, the test setup, the used instrumentation and the results obtained. A comparison with theoretical results is also presented.