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THE DELFI-N3XT NANOSATELLITE: SPACE WEATHER RESEARCH AND QUALIFICATION OF
MICROTECHNOLOGY**Abstract**

The Delfi-C³ nanosatellite successor, Delfi-n3Xt, is currently under development at Delft University of Technology and scheduled for launch in the first half of 2010. This improved three-unit CubeSat platform allows novel technology qualification for future small satellites and innovative scientific research. The platform is improved by implementing a high-speed downlink, three-axis stabilization and a single-point-of-failure free implementation of batteries in the electrical power subsystem. Apart from giving a description of the three main advancements, this paper also gives an overview of the five payloads.

The first payload is a microsystem technology based cold gas micropropulsion module. This micropropulsion module for small satellites will be qualified and the performance will be analysed. The second payload is a multifunctional particle spectrometer that is able to identify different types of highly energetic particles while measuring their energy and angle of incidence. Besides qualification, this payload will produce scientific data for research into the space weather during the coming period of high solar activity. The third payload is a set of hydrogenated amorphous silicon solar cells. Degradation measurements will be performed on these solar cells to improve and verify models of lab research. The fourth payload is an efficient transceiver module for nanosatellites which is equipped with a switched mode power amplifier. The fifth payload is a proof of concept of a secure low-cost data storage solution using commercial-off-the-shelf flash memory cards with dedicated latch-up protection for these particular CMOS chips.

Although the accommodation of the five payloads in a nanosatellite of only (30 x 10 x 10) cm is ambitious, the paper shows the feasibility of this and proves that nanosatellites are powerful instruments for the qualification of novel technology and innovative scientific research.