

SPACE PROPULSION SYMPOSIUM (C4)
Interactive Presentations (IP)

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DEVELOPMENT OF A CRYOGENIC ROCKET ENGINE AT DELFT AEROSPACE ROCKET
ENGINEERING**Abstract**

The paper describes the detailed design of a cryogenic 3 kN LOX/Methane battleship engine and its test setup. It is undertaken by the authors, performed on a project basis with fellow aerospace engineering students under the auspices of DARE (Delft Aerospace Rocket Engineering).

A 3 kN battleship engine is being developed as an intermediate step for an intended 10 kN engine. It will provide the required experience and knowledge to develop large scale liquid rocket engines. The battleship engine is regeneratively cooled using the liquid methane fuel. After passing the coolant channels, the methane is injected into the combustion chamber in a gaseous state together with the liquid oxygen in a co-axial manner. The engine is ignited by a pyrotechnic igniter using an ammonium perchlorate based propellant. During a test sequence, the propellants are stored in insulated run-tanks, pressurized using helium.

This paper touches upon the requirements, the engine development, and the design considerations and calculations as they were performed. Furthermore, the paper presents hot-fire test results of the pyrotechnic igniter and cold flow tests of the run-tanks, feed system and injector.