Motion based simulator for Dutch Navy – "FS³"

A two-year project is underway which will lead to the development of a Fast Small Ship Simulator.

Driving a small, fast navy boat in heavy seas can be a real challenge! Effects of broaching, surfing, capsizing risk, slamming and planing put severe demands on the crew and the boat handling. It requires a well developed skillset to safely navigate under various operational circumstances.

With these challenges in mind, a two-year project has just started to develop a dedicated training tool, which is currently known as the Fast Small Ship Simulator (FSSS) or FS³. MARIN is working together with the Defence Materiel Organisation (DMO), Cruden and TreeC.

The FSSS is equipped with a heavy-duty hexapod motion base. There is space for two operators and possibly one more for monitoring and instructional tasks. The design of the mock-up will fit a steering wheel, throttle and navigating equipment and the unit is equipped with a 3D visual display system providing realistic visualisation of the scenery.

Under Phase 1, learning objectives have been developed directly from the Training Needs Analysis (TNA) conducted by the Royal Netherlands Navy, particularly the Surface Assault Training Group and the 'Defensievaarschool'.

During Phase 2 all new functionality is developed and design decisions are taken concerning the exact controls, console and display system. One interesting aspect of the functionality aspects concerns the development of a 6 DOF hydrodynamic model of the small ship, which has the capability to navigate in displacement and planing mode. This task closely relates to existing research programmes of both DMO and MARIN. And for the purpose of the FS³ the new mathematical model will need to meet the constraints that apply in real-time simulations.

Other anticipated new developments relate to cues for the human operators to improve the experience and enhance realism such as extra visual, motion and audio cues. Phase 3 will address all testing activities and there are a specific number of case-based scenarios that form part of this phase.
Navy personnel are involved throughout the project, which will conclude with the development of a fully operational prototype of the FS³.

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