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The HERCULES Project: A major R&D effort for marine engines of high efficiency and low emissions.

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Abstract: The HERCULES Project (High Efficiency R&D on Combustion with Ultra Low Emissions for Ships) is a large scale cooperative R&D project supported by the European Commission and the Swiss federal Government.

The HERCULES I.P. is developing new technologies to drastically reduce gaseous and particulate emissions from marine engines and concurrently increase engine efficiency and reliability, hence reduce specific fuel consumption, CO2 emissions and engine lifecycle costs.

These objectives are attained through interrelated developments in thermodynamics and mechanics of “extreme” parameter engines, advanced combustion concepts, multistage intelligent turbocharging, “hot” engines with energy recovery and compounding, internal emission reduction methods and advanced aftertreatment techniques, new sensors for emissions and performance monitoring, adaptive control for intelligent engines. Advanced process models and engineering software tools have been developed, to assist in component design. Prototype components have been manufactured and rig-tested. Engine experimental designs have been assessed on testbeds to validate the new technologies and confirm the achieved objectives. Fullscale shipboard testing of chosen systems will demonstrate the potential benefits of next-generation marine engines.

The work is structured in 9 Workpackages and 54 Subprojects. The Consortium consists of 41 partners led by the major engine maker groups MAN and Wartsila and includes component suppliers, equipment manufacturers, universities, research institutions and shipping companies. The industrial partners hold 80% of the world market in marine engines and hence are the keepers of today’s best-available-technology.

The project started in 2004 and will run for 3 years. A description of the structure and selected results from the project will be presented.