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## WinGD collaborates with ETH Zurich in predictive maintenance drive

An advanced and sophisticated algorithm based on a physical and data driven engine model has been developed by leading technical university ETH Zürich and WinGD (Winterthur Gas & Diesel Ltd) to enhance predictive maintenance for marine two-stroke engines.

The solution, which deploys a new hybrid approach to modelling engine behavior, will be further tested and validated to be applied in future versions of the WinGD Integrated Digital Expert (WiDE) engine data analytics system.

WiDE diagnostics are currently being piloted on WinGD engines in operation and were made available for all new WinGD engines ordered as of the beginning of 2018. It uses machine learning and modelling based on performance benchmarking and sensor data to detect and predict failures. The system developed under the project with ETH Zürich uses a new approach to modelling engine behavior that combines this data-driven engine modelling with physical modelling.

While data-driven models use condition monitoring or rules derived from experiments, physical modelling relies on complex simulations that can be time-consuming and costly. To match WiDE's purpose of providing instant, online diagnostics the system will apply a thermodynamic model that takes just milliseconds to calculate.

Hybrid modelling will improve WiDE's ability to predict and prevent engine failures, cutting downtime and maintenance costs for ship owners and operators. ETH Zürich is collaborating with the US space agency NASA to validate the performance of the algorithm on turbofan engines. The algorithms have demonstrated superior performance for the prediction of the remaining useful lifetime compared to pure data-driven approaches.

“Tests with WinGD as well as with NASA's data sets showed that we are more accurate on detecting failures than standard approaches,” said ETH Zürich Researcher Manuel Arias Chao. “Furthermore, we can differentiate between different types of failures.”

Carmelo Cartalemi, General Manager Business Development, WinGD said: “The first iteration of our WiDE system brought remote diagnostics and predictive maintenance to marine two-stroke engines. The project with ETH Zürich will increase the predictive maintenance capability of WiDE to a level not yet seen in our industry.”

The award-winning\* WiDE platform, created in cooperation with software provider Propulsion Analytics and automation and communication specialist Enamor, was introduced last year. In April, WinGD and ExxonMobil announced a project to integrate advanced cylinder condition monitoring into WiDE.

The joint research project has been funded by the Innosuisse – Swiss Innovation Agency. Innosuisse supports science-based innovation projects carried out by Swiss companies in cooperation with research partners.

\*WinGD's project with ship management company Enterprises Shipping & Trading to demonstrate WiDE on the tanker Energy Triumph won the Intelligent Monitoring & Maintenance Award at the Marine Propulsion Awards 2019.

**ENDS**

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**WinGD in brief:**

WinGD (Winterthur Gas & Diesel Ltd.) is a leading developer of two-stroke low-speed gas and diesel engines used for propulsion power in merchant shipping. WinGD sets the industry standard for reliability, safety, efficiency and environmental sustainability. WinGD provides designs, training and technical support to engine manufacturers, shipbuilders, ship operators and owners worldwide. Headquartered in Winterthur, Switzerland, since its inception as the Sulzer Diesel Engine business in 1893, it carries on the legacy of excellence in design. For more information visit: [www.wingd.com](http://www.wingd.com)