

CASE STUDY

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The logo for HUMPHREE, featuring the word "HUMPHREE" in a bold, white, sans-serif font with a registered trademark symbol (®) to the right, all contained within a solid black rectangular background.

Humphree Marine Makes the Right Kind of Waves with Products from ATI and Kvaser

Originally designed for automotive applications, CAN technology has now expanded into virtually every sector including marine, one of the most challenging environment for electronic components. It's also a sector with significant technological advances and exciting growth prospects, as Swedish based Humphree is proving with its innovative work on a range of active boat control systems, aided by CAN specialists Accurate Technologies (ATI) Sweden AB and Kvaser AB.

"Accurate Technologies already has a large amount of experience with marine CANbus applications," says ATI AB's General Manager Martin Sventén, "but we were particularly pleased to be able to support Humphree in what has proven to be an interesting and innovative project that is an ideal showcase for both the hardware and software solutions that our company offers."

Founded in Gothenburg in 2001, Humphree specializes in developing cutting-edge products, designed to realize the true potential of all types of fast marine vessels. In particular Humphree's expertise has focused on solving one of the biggest shortcomings with a planing or semi-planing fast boat – inherently high levels of wave resistance, which constitute roughly 50% of a vessel's total drag. Once a boat has accelerated to its planing speed, this wave resistance can be reduced by decreasing the vessel's longitudinal trim angle, a process which has traditionally been achieved by using hull extensions or mechanically operated trim tabs. "There are electrically driven flaps available as well," says Per Landegren, CEO Humphree "and Volvo Penta has a license from Humphree's patent so they can produce

their smaller interceptors called BTS.” Humphree, however, understood the downside of traditional trim tabs; the fact that they can increase surface friction and weight, compromising fuel economy and ultimate top speed.

Humphree’s team took a fresh look at this problem, combining cutting-edge composite materials with integrated CAN bus electronic control to create a range of ‘Interceptor’ trim systems that allow users to easily optimize a boat’s longitudinal pitch angle at any speed without sacrificing overall performance – something that was previously impossible. The secret to Humphree’s Interceptor trim control system is the composite Interceptor trim tab itself, which is designed to produce pressure underneath the stern of the boat. Pressure is created when the Interceptor’s blade is deployed by just a few millimeters into the water flow underneath the boat’s hull, producing a large lift force that changes the longitudinal trim of

the vessel, lowering its wave resistance. The movement of the trim blades themselves is achieved via Humphree designed electronic actuators that are capable of producing full motion stroke in well less than a second and also accurately positioning the tab at one of a hundred predefined steps, allowing an unprecedented level of control compared to a traditional trim system.



In its most basic format the Interceptor system provides manual operator trim control, but the company also offers Automatic Trim Optimization System (ATOS) which delivers previously unimaginable levels of consistent preset longitudinal pitch management with the touch of a button. Humphree’s technological breakthrough delivers numerous benefits including significantly better fuel economy, lower emissions, superior top speed, improved ride comfort, less wake crash and enhanced safety thanks to greater forward vision from the bridge. Humphree went further to offer the ‘Active’ package to improve occupant comfort by using proprietary control algorithms and incorporating an integral state-of-the-art motion sensing device that measures 3D rate-of-turn, acceleration and the earth’s magnetic field, to provide feedback to an additional ride control unit.

Given the complexity of combining numerous electronic components with a wide variety of external inputs, Humphree incorporated a CAN bus as the open interface to all these other systems and devices. Humphree then had the design freedom to add additional control units and servo motors as needed, as

many as 36 in one system to provide these complicated systems. To develop this sophisticated Interceptor product, Humphree used ATI's CANLab™ Network Analysis Software, as it represents a complete solution for bus communication, data logging and data analysis. "ATI's CANLab™ offered us good value for money at the time and it has proved to be a useful tool for us," Landegren explains. As the development of the Interceptor system progressed, ATI's CANLab™ rapidly became indispensable for Humphree's engineers. "It was used to debug the CAN database initially," Landegren says. "At a later stage we integrated CANLab™ into our HIL platform to simulate external inputs to the system. Now it's an important part of the verification (process) before software releases."

Humphree also uses the Kvaser Leaf is needed for configuration and logging purposes. It is connected with a Y-split cable directly onto our control bus," Landegren comments. Kvaser's Leaf offers the loss free transmission and reception of standard and extended CAN messages at a rate of up to 8000 per second, each time-stamped with 100 microsecond accuracy. A low cost unit that has proven to be the work horse of countless CAN bus systems. "The Kvaser Leaf is very reliable," Landegren confirms.

"We are an agile and innovative company, and it's nice to find suppliers who have the same philosophy. ATI has always been quick to give us the answers we need. We can only say good things about the cooperation," Landegren concludes about the relationship between Humphree and ATI Sweden AB. Humphree's approach to innovation has resulted in the technical and commercial success of the Interceptor system as proven by Humphree's nomination as 'Best Active Stabilization System Supplier' by Work Boat World magazine in 2013 and 2014 as a consequence of its efforts.

To discover more about how ATI's tool chain of software, hardware and support solutions can deliver a successful outcome for your CAN based project please click on www accuratetechnologies.com.