Below: Transfluid's HTM700 hybrid unit is compact and flexible making it suitable for a range of applications

Advanced hybrid development

Propulsion modules are developed with key performance areas in mind

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A leader in the transmissions sector since June 2014, when it introduced its HM hybrid propulsion system to the market, Transfluid has developed several solutions for the marine industry. More than 10 boatyards have installed the HM module in their boats. In the recreational sector, Bavaria Yachts has chosen Transfluid as a partner in the launch of its first displacement boat with hybrid propulsion. Bavaria's statement during the press conference to present the E40 project – at the Boot boat show in Düsseldorf, Germany – was important, stating that, "Bavaria's choice in adopting the Transfluid hybrid system is not the development of a new product, but the adoption of a functional and efficient industrial system that is already on the market."

The new semi-displacement E40 motor yacht is the first project on the agenda for both Transfluid and Bavaria Yachts engineers. They will be in a position to test the first E40 prototype this spring and aim for the boat to be available at the end of 2016. "Bavaria Yachts has revolutionized yacht building in many ways over the decades,"

explains Fabio Marcellino, product manager for Project E40 at Bavaria. "The collaboration with Transfluid has created the ability to offer innovative and eco-friendly boats with hybrid propulsion for yachts in series production."

Recently, Solarwave-Yachts has also chosen a Transfluid hybrid system for its innovative catamaran Solarwave 62 Cruiser. In this highly integrated project, the Transfluid hybrid system is integrated with an array of solar panels and batteries.

Transfluid will be at booth 6030 at Electric & Hybrid Marine World Expo 2016.

Development focus

Transfluid continues to develop hybrid systems, closely following customer requirements. The company has decided to focus its research and development on three key areas including simplification, integration and accessibility.

Simplification refers to the proposed full hybrid system, including all the components that must be installed on board and are interrelated in operation – the concept that has guided this phase of development was the idea of a 'kit' that can be fitted on board by a boatyard, making it unnecessary to have to deal with specific problems, complex installations, and installations with non-conventional logic. The project's goal is to provide all the components connected to the system – from the HM module to the batteries, charger, controls, cooling water pump, CANbus cables, the onboard system's main electrical components that connect to the hybrid system and, where necessary, the marine inverter – enabling the boatyard to operate in a linear and conventional way without having to take charge of new problems for which it may not be prepared.

Onboard power integration is an important factor in the hybrid system, as demonstrated in the various installations carried out.

Below: Transfluid battery modules integrated in a typical hybrid drive system. Users can decide whether or not to insert the battery recharge mode by simply pushing a button on the system's control panel

Right: The company's frequency drive allows the electric machine to work both as a motor and as a generator

Below: This control lever is suitable for mechanical or electronic throttle control engines. It incorporates all the necessary functionality for hybrid operation

Bottom: A management system with user intuitive software can be used to control the drive mode

The option to integrate the hybrid system's potential with the need for power for onboard services (be that electrical or hydraulic power) is one of the application's strong points. In terms of integration of hydropower – such as cranes, thrusters, stabilizer fins, walkways and other utilities – the hybrid system, if the right size, enables the integration of a hydraulic pump in the module itself, allowing the use of cranes and other utilities with their combustion engines turned off, thus making a vessel fully operational even in zero-emissions mode.

Considering the integration of electrical power, it is clear that the batteries supply all the onboard utilities, from operational applications (thrusters, stabilizer fins, bow anchor and so on) to air-conditioning and other comfort-oriented utilities. The hybrid module constitutes the main power supply, relying on the optimization of power generated, using the excess power during propulsion by the main engine, and at the same time receiving energy from other sources such as solar panels. Accordingly this integration ensures better onboard efficiency, enabling the presence of gensets to be reconsidered. Operational services can then also be used in zero-emissions mode, without noise and vibrations, as well as without direct consumption.

System accessibility is considered from two points of view. The first is the user interface, which was developed to make the use and management of the electric mode simple and immediate by adding the 'Booster' mode to the control lever. The system's power can be switched using a single button, which activates the electrical panel of the hybrid system and the systems connected to it – by flicking the switch the combustion engine control panel is activated. Managing the transition between the combustion engine and the electric motor can be done with the boat at sea – the skipper must decide when to switch over, and the system will automatically make the necessary checks when turning the combustion engine on or off, and when changing mode. This makes handling the boat intuitive and simple – and similar to driving a car. As safety at sea is important, it was decided to leave the choice of the most suitable mode, depending on navigational conditions, up to the skipper.

The second aspect developed regarding accessibility refers to the system's diagnostics and its maintenance and monitoring – the possibility of installing a communications system on board that enables remote control of stored data and the checking of any warnings during sailing. This is important in the boat's lifespan, as access to the system's history, the critical factors that have emerged during its use and dynamic data, enables the prevention of problems with the appropriate intervention.