

HyMar

hybrid marine systems



See us at the Southampton Boat Show, 17, 18 & 19 September
Berth M540

HYBRID PROPULSION FOR SMALL CRAFT

HYMAR is a collaborative research and development project with financial support from the EU's FP7 programme. It started in May 2009 and is due to complete in September 2012. The project's aim has been to develop and demonstrate an optimized hybrid propulsion system for displacement craft such as sailing boats, small ferries or pilot boats.

Now nearing the end of the project, HYMAR is operating a test boat which is effectively a floating laboratory containing all of the technology developed over the last three years. Data is being collected from this boat to validate the operational hybrid system, from propellers to data management, and to learn more about the day to day practicalities of operating a hybrid boat.

Key benefits:

- A reduction in total fuel consumption and the cost of power on board
- Virtually no emissions and no noise in port
- More on board electrical power providing more consumer choice
- Simple and reliable operation
- The opportunity to have a single fuel boat
- Integrated electric motor and generator

HYMAR hybrid marine systems has been developed by a group of experts individually selected in their specific fields

- ICOMIA (BE)
- Energysys (UK)
- Mastervolt (NL)
- Bruntons (UK)
- INSEAN (IT)
- Malo Yachts (SE)
- Triskel Marine (UK)
- ESP (UK)
- Steyr Motors (AT)



Hallberg Rassy 42 "Armored" - the HYMAR test boat and some of her team

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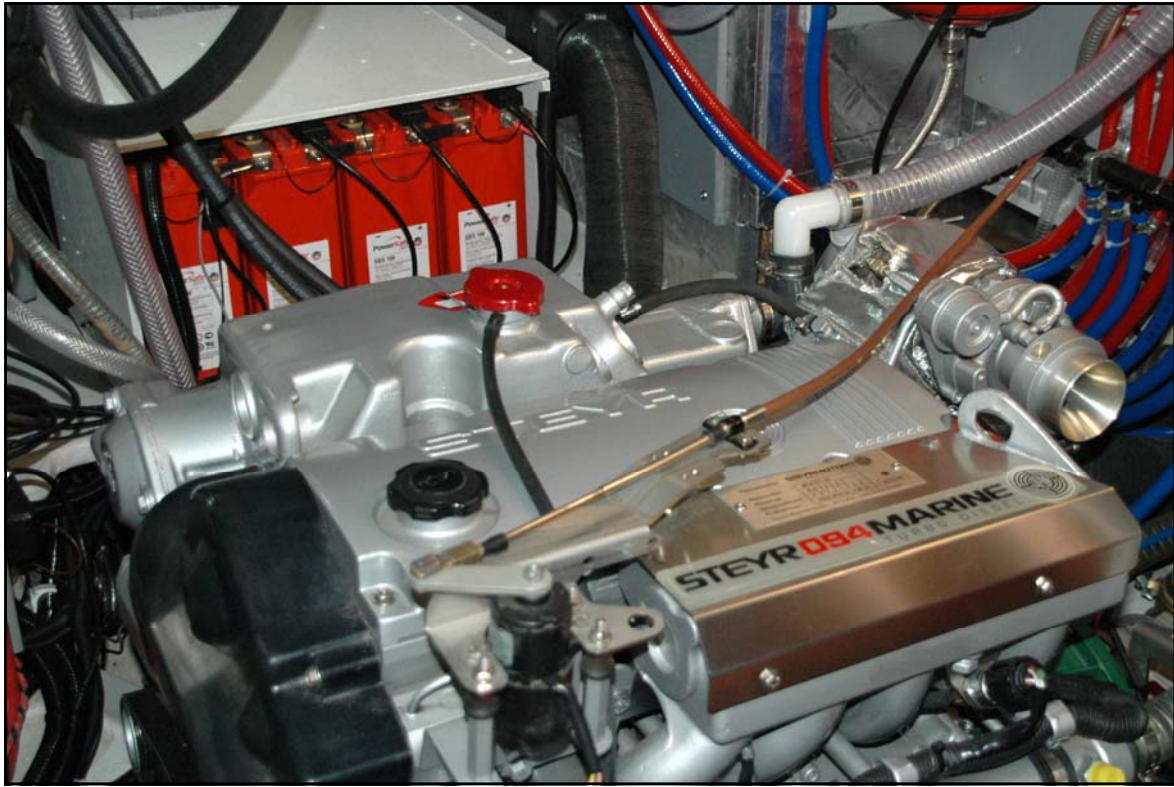
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The engine room of the HYMAR test boat. The Steyr parallel hybrid draws power from two banks of EnerSys TPPL batteries to drive the in line 7kW electric motor. A clutch allows the motor to be disconnected from the diesel engine when operating in electric drive. Under sail or diesel drive, the electric motor becomes a generator to recharge the batteries. Typically the boat will operate using electric propulsion up to about 5.5 knots and diesel above that

KEY elements of the HYMAR system

Energy storage - High power density, durability and affordability are essential features of marine hybrid batteries. EnerSys have developed a new range of long life, deep cycle, thin plate, pure lead (TPPL) batteries for hybrid applications.

Propulsion - Being able to match the propeller to the electric drive motor is critical to achieving maximum power and the best fuel efficiency. Bruntons and INSEAN have produced a computer model of the self pitching Autoprop and used this model to design a unique, new propeller for use with hybrid systems. The new concept propeller is designed to run with the electric motor, the diesel engine and is used as a water turbine to generate power on sailing boats.

Motors and generators - Steyr Motors have carried out further development work on their parallel hybrid system to provide a 66kW diesel and a 7kW motor/generator in a compact package suitable for smaller vessels.

Energy conversion - The HYMAR propulsion system operates at 48 volts DC but other electrical systems within the vessel require different voltages. Mastervolt have provided the energy conversion equipment which allows power to be transferred around the vessel with minimal losses.

Naval architecture and engineering - HYMAR's comprehensive trials programme involved working for 3 years with Malo Yachts in Sweden to adapt the original Malo 46 test boat. Many different configurations were tried in the Malo before the final system testing in the Hallberg Rassy

System Integration and testing - Carrying out trials, specifying common communications protocols for all system components and determining the key operational logic is the main task of ESP.

System control - With so many different elements all interacting, a sophisticated whole boat monitoring and control system is required. Triskel Marine, specialists in marine data management and communications, have developed new electrical sensors plus a comprehensive monitoring system and wi-fi based user interface

Project management - ICOMIA represents marine industry associations from around the world and leads the project. ICOMIA's presence helps to ensure that the data produced is objective and available to the industry as a whole. ICOMIA has also encouraged the use of an open systems architecture and the development of new standards and methods to ensure the safe installation of hybrid systems.

