PROTON MOTOR
Proton Power Systems plc Group

Press release

Naming of the "FCS Alsterwasser" ZemShip:

Proton Motor supplies hybrid fuel cell drive for the world's first fuel cell-driven passenger ship

Hamburg/Puchheim, 29 August 2008 – Today, Hamburg celebrates a world first. In the presence of Wolfgang Tiefensee, Federal Minister of Transport, Building and Urban Affairs, Hamburg's senator Anja Hajduk names the FCS Alsterwasser, a passenger ship driven by fuel cells. The innovative hybrid fuel cell drive which lies at the heart of the new Alster steamship was produced by Proton Motor, experts in fuel cell and hybrid systems. The ZemShip (Zero Emission Ship), based in Hamburg's port, will transport up to 100 passengers at a time and will do so without producing any emissions.

The ZemShip project is taking Proton Motor into totally new waters in fuel cell ship drive technology. To date, fuel cell systems for marine applications of this performance level have only been developed for submarines used by the military. This makes the ZemShip the world's first project resulting in a fuel cell-driven passenger ship. Proton Motor developed the 48-kW *PM Basic A 50 maritime* fuel cell system for the zero-emission drive and integrated two such systems, along with a lead gel battery, into the ship as a hybrid system. The systems were certified for maritime operations by Germanischer Lloyd. An intelligent energy management system coordinates the division of work between fuel cells and battery. Up to 50 kg of gaseous hydrogen is stored onboard in 350-bar pressurised tanks in order to provide sufficient fuel for around three days of use.

The European Union is funding the ship's line operations on the Alster until 2010. The EU is investing a total of €2.4 million in the project. Now that the ship has gone into actual use, development staff aim to test the zero-emission drive in real operations and to analyse the technology for possible areas of improvements.

"The FCS Alsterwasser is a prime example of innovation and we are very proud of it," says Felix Heidelberg, CTO of Proton Motor, when asked about the ZemShip, which is nearly twice as efficient as a standard diesel ship. "It proves that even today we can make use of future technology in everyday applications. Thanks to our further development of fuel cell technology, a non-polluting and virtually silent drive can now be used on a passenger ship. We are delighted that Alster Touristik GmbH, the operator of the ship, once again has a genuine Alster steamboat up and running and that it's an environmentally friendly one where passengers can enjoy a quiet journey with zero emissions."

The project has received the support of eight other partners alongside Proton Motor. For example, Linde AG has built a hydrogen fuelling station in a side channel of the Alster where the ship can refuel. The project is being coordinated by the city of Hamburg and was launched in November 2006.

Facts about the ZemShip:

Type of ship	Fuel cell passenger ship with port vessel licence and acceptance by Germanischer Lloyd
Capacity	100 passengers
Total length	25.56 m
Total width	5.20 m
Height above the water line	2.65 m (2.30 m when the raisable roof is lowered)
Displacement of water	72 tonnes when laden
Draught with passengers	1.31 m
Max. speed	14 km/h
Material	Steel and aluminium

Type of fuel cell	Proton Motor PM 600, Polymer Electrolyte Membrane (PEM)
Fuel cell system	Proton Motor "PM Basic A 50 maritime"
Number of fuel cell systems on board	2
System power (one fuel cell system)	48 kW
Max. system efficiency	> 50 %
Operating temperature of fuel cells	< 70 °C
Total weight (one fuel cell system)	Around 500 kg
Maximum system dimensions (one fuel cell system)	2200 x 1100 x 900 mm
Battery	Lead gel battery, 560 V (7 x 80 V), 360 Ah
Type of electric motor	Three-phase motor 100 kW
Form of H2 storage	Gaseous (GH2) at 350 bar/15 °C
Storage volume onboard	50 kg
Typical fuelling frequency	Every 2 to 3 days

Proton Motor Fuel Cell GmbH

Proton Motor is an expert in industrial fuel cells, fuel cell and hybrid systems with over 14 years of experience in this sector. The company, whose headquarters are in Puchheim near Munich, is a one-stop shop for complete fuel cell and hybrid systems, covering everything from the development and manufacture to implementation of tailored solutions. The fuel cell experts focus their work on back-to-base applications, for example for fork lift trucks or city buses as well as stationary solutions. Their product range consists of basic fuel cell systems *PM Basic*, standard complete systems *PM Package* e.g. as substitutes for batteries and tailored systems *PM Turnkey*. Proton Motor is a wholly owned subsidiary of Proton Power Systems plc. The company has been listed on the London Stock Market (Code: PPS) since October 2006.

More information and print-quality photographic material available from www.proton-motor.de or:

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