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zum Vortrag von Herrn

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über

**“Fuel Cells in Aircraft and Maritime
Applications”**

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“Fuel Cells in Aircraft and Maritime Applications”

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A number of studies and projects investigating the applications of fuel cells (FC) onboard ships have been performed in the past. Maritime applications have always been an issue of the recent FC development worldwide. The main FC types of interest are currently Polymer Electrolyte Fuel Cells (PEFC), Molten Carbonate Fuel Cells (MCFC), and Solid Oxide Fuel Cells (SOFC). Different fuels have been considered as e.g. hydrogen, natural gas (liquefied or pressurized), LPG, methanol, and maritime diesel.

Future commercial applications of FC are still mainly focused on onboard power generation however propulsion is the long term target. Anyway the first maritime FC application was propulsion of boats fuelled with hydrogen. The types of ships being considered are reaching from sailing and other leisure boats to ferries, naval surface ships, submarines, and special underwater vehicles as used for research or for military applications. However civil utilisation of FCs gets an increasing importance the naval developments are the clear technology drivers. First commercial applications are already available for submarine propulsion.

The interest of the navies in all electric ship configurations is a strong motivation for these projects and programs. The motivation of using FCs onboard ships has thus been also accompanied by the development of electric ships and the commercialisation of certain of its components is an already ongoing process. The pod drive e.g. as a propulsion system is today already commercial available. FCs are thus a technology that matches very well the general trend of ship architecture development because they directly supply a high amount of electrical power. The better flexibility of electric driven pod systems is an interesting motivation for merchant ships as well however military applications were promoting electrical applications strongly.

Currently about 500 kW FC units are seen as basic elements for onboard power generation but also for distributed electric power generators for propulsion. A similar size of power generators based on SOFC is under development for aircraft applications, where similar developments lead to more electric aircraft concepts. The need of using maritime diesel fuel led to R&D activities regarding fuel desulphurisation, fuel processing but also sulphur tolerant and direct anodes within navy programs in the U.S. and EU. Recently MCFC have been the most favoured type but on a longer term SOFC are seen as a probably more interesting option