



Dear Readers,

As leading international forum for the maritime industry, the SMM provides us with the ideal platform for the presentation of our research projects and innovative technologies.

This year at the SMM, the CML will present its newest developments in concert with six other Fraunhofer Institutes.

This newsletter focuses entirely on this important event. Below, we introduce to you a few select exhibits and research projects:

Our research project MITIGATE analyzes security issues in the IT infrastructures along the maritime supply chain. The EU research project STM develops a concept for the European Sea Traffic Management.

The Crew Compliance Optimizer offers an innovative solution for the personnel and resource planning of naval enterprises. An advanced shore control center can take control of otherwise autonomously traveling ships if needed.

Enjoy your Newsletter!

We are looking forward to seeing you,

Your Fraunhofer CML

FRAUNHOFER WATERBORNE INNOVATIONS IN THE APPLIED SCIENCES

The Fraunhofer Waterborne Group consists of Fraunhofer Institutes performing research on behalf of the maritime industry. All these institutes are part of the **Fraunhofer Transport Alliance**. This alliance inspires joint developments of the member institutes and supports their implementation and distribution. At the SMM 2016, six Fraunhofer Institutes will introduce the following new developments for the maritime industry in **Hall B6, Booth 319** of the Fraunhofer Transport Alliance:

The **Fraunhofer CML** introduces

the Shore Control Center SCC as standby guidance system for autonomous ships. The researchers also show an innovative personnel planning solution for the compliance conform staffing of ships.

The **Fraunhofer IDMT** shows an online training platform to help multilingual crews to communicate effectively.

The **Fraunhofer LBF** develops modules, which generate or suppress rotary oscillations in rotating systems. In propulsion chains, these modules reduce unwanted vibrations to name just one example.

The **Fraunhofer FHR** presents its innovative ship radar with electronically scanned antenna arrays. This technology became available for commercial naval operations only recently.

The ‚Maritime Graphics‘ Department of the **Fraunhofer IGD** will impress with its platform for the three-dimensional visualization of ship models.

The **Fraunhofer AGP** proposes digitalization processes to facilitate the information exchange between employees and their managers in the ship building industry.

COMPLEXITIES IN CREW MANAGEMENT EVALUATION OF THE CREW PLANNING TOOL

The crew requirement and assignment planning (i.e. the crew management) is a highly complex task for ship-owning companies. For every ship, the managers must determine the number of needed crewmembers and their qualifications. This requires setting up and updating work plans before and during the trip and creating the proper reports for inspections and internal audits in regular intervals. Quick adaptation to changing conditions and unexpected events is also of the essence.

The Fraunhofer CML developed a software tool dubbed ‚Crew Compliance Optimizer CCO‘ to meet the large number of requirements and to use the capabilities of the crewmembers wisely.

The CCO consists of three modules. The **Office Module** supports the personnel assignments for all navigation-related details such as the navigation safety, regular maintenance and similar tasks. The scientists spent time onboard to chart the individual work areas while profiting from the insights of crewmembers. The module uses these empirical data to calculate the proper number of positions and create detailed

work plans for every crewmember.

The **Onboard Module** enables the ship officers to respond properly to changing conditions en route and to update the work plans as needed. It may happen that a ship remains docked longer than planned. In such a case, the tool assists the captain in coordinating guard duties while at the same complying with the prescribed worktime regulations.

The **Reporting Module** reduces the administrative effort involved in documenting the work and rest times. Tedious entries are no longer

necessary. With hardly any effort, the system creates reports for internal audits and external inspections electronically.

The personnel planning tool ‚Crew Compliance Optimizer‘ proved successful and in compliance with guidelines of the German Flag in May 2016.



Presentation of the Fraunhofer CML in Hall B6, Booth 319 on the SMM 2016.

+SMM DATES+

The Fraunhofer CML and the VDMA (Verband Deutscher Maschinen- und Anlagenbau, Mechanical Engineering Industry Association) perform the study **„Aftersales Services as Critical Success Factor (Erfolgsfaktor After Sales Services)“**. On **September 06, 2016, at 2 PM, and on September 07, at 3 PM**, they will present the results of this study at the central VDMA exhibit in Hall 1, Booth 518. In this study, the researchers had a look at the maritime supply industry.

As part of the **VESTVIND Project**, the Fraunhofer CML, the TRENZ AG and the DVV Media Group hold two workshops on the topic **„The Determination of Ship Arrival Times“**. The workshops will take place on **September 07, 2016, between 1:15 PM and 2:45 PM and between 3:15 PM and 4:45 PM in Hall B5, Room 4**. The organizers will present the prototype of a new online tool for the real-time ETA determination.

On **September 08, 2016, between 1 and 3 PM**, the German Maritime Lunch Forum on the topic **„Remote Monitoring and Control Systems in the Maritime Industry“** will take place in Hall 4, St. Petersburg Room.

In the **Offshore Dialogue** of the SMM Conference Program, the Fraunhofer CML will talk about **„Logistics Optimization for Offshore Wind Parks Using Simulations Based on Real-time Data“**. Listen to this presentation on **September 08, 2016, at 2:45 PM in the „Chicago Conference Room“** in Hall A1.

COMMUNICATION AND DATA EXCHANGE: CLOUD-SOLUTIONS FOR THE MARITIME TRANSPORT

As in other parts of the economy, the digitalization of the maritime industry does not only have benefits, it also carries risks. At the SMM, the Fraunhofer CML introduces two current research projects offering security improvements in maritime transportation by way of cloud solutions:



In the project **„Sea Traffic Management Validation STM“**, the researchers develop a European sea traffic management concept. The standardized information exchange between the participants in maritime transportation is at the core of the European STM with the **„Maritime Cloud“** forming the infrastructural basis. To validate the concept, 300 ships, ten ports and five shore centers are involved in simulations.

You find further information at www.stmvalidation.eu



The research project **MITIGATE** investigates the security of the IT infrastructure along the maritime supply chain. The objective is the development of a cloud-based platform for the discovery of security gaps in the employed hardware and software. The open simulation environment enables the participating companies to collaborate on spotting and analyzing risk scenarios. This enables the parties to predict and avoid security risks.

Further information at www.mitigateproject.eu.

AUTONOMOUS SHIP NAVIGATION BUT NOT WITHOUT LAND-BASED CONTROL

Currently, driver-less cars, aerial drones and drone ships are front and center in the traffic system development. Will technological progress combined with modern data transmission and data transfer also bring us unmanned subways and unmanned commercial cargo ships?

In recent years, the Fraunhofer CML took a strong interest first in the EU-funded research project **MUNIN** (Maritime Unmanned Navigation through Intelligence in Networks) and then in solutions for autonomously cruising commercial ships. The Fraunhofer researchers pursue

the latter solutions in collaboration with the South Korean shipbuilder DSME.

Today, many operations on commercial ships no longer require a crew. To keep some hands-on control over huge investment objects like cargo ships and their loads, the ship-owners may use control stations on land such as the Shore Control Center SCC developed by the Fraunhofer CML.

The SCC will observe and will be able to control a fleet of autonomously navigating ships if a situation requires it. In regular operations, these

ships do not require external controls. The Shore Control Center is able to intervene quickly in the event the embedded electronic systems onboard cannot handle a situation. We are unable to predict when unmanned ships will cross oceans without a crew. There is however no doubt that already developed components for the observation and control of vessels at sea exist to support the work of the crew. These components have proven to be important solutions and may also be of particular help for providers of Vessel Traffic Services VTS.

IMPRESSUM

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Evasive maneuver of an unmanned ship as visualized in the Shore Control Center SCC.