



IMPROVEMENT OF CONTAINER INSPECTION USE OF NON-INTRUSIVE TECHNOLOGIES

More than 90 million TEU are handled in European ports every year. In view of this large number of containers, the EU-funded project C-BORD (Effective Container Inspection at Border Control Points) was launched. Since 2016, the project partners have been developing solutions for the non-intrusive inspection (NII) of containers to detect weapons, drugs, dangerous and illegal substances, but also cigarettes and counterfeit products efficiently. Solutions for NII include the use of gas detectors or X-ray systems for containers and the performance of

radiation measurements. This year, the developed solutions will be used and tested at three locations. The ports of Rotterdam and Gdansk as well as the Hungarian border town of Rösztke were selected because the handling and transport structures at the European borders vary broadly. The new investigation technologies are used at these three locations to examine selected containers, and the results are evaluated. Scientists of the CML accompany the integration of the controls into the existing logistic processes.

Another focus of the project is the training of customs and terminal staff. They must interpret the data obtained correctly and also be protected from possible hazards. If the technology tests and their integration are successful, an important step towards improving security in European trade has been taken.

Further information can be found at www.cbord-h2020.eu.

MII - MARITIME INNOVATION INSIGHTS OF THE CML LECTURES ON PORTS AND SHIPPING OF THE FUTURE

The advantages and potential of digitalization seem to be unlimited. It is increasingly permeating all processes, from procurement to management and vessel control. Can the current status of this transformation be determined? Which solutions are already being profitably implemented? And what are the next steps? CML scientists and invited speakers will present answers to these questions on May 3, 2018 on the campus of the Technical University of Hamburg. This year, the MII will focus on the following topics:

of a port and its specific transport chains, simplify complex processes and reduce energy consumption. Exemplary solutions and future requirements are presented.

Optimizing decisions - mathematical methods in use. Digitalization enables comprehensive data acquisition and provision in real time. In combination with mathematical algorithms, decisions can be optimized, for example for crew planning of ship fleets and the control of empty container depots.

lutions for the ship's bridge must meet high safety requirements and also have the confidence of nautical personnel. The influence of the „human factor“ on the development of new technologies is investigated in a virtual simulation environment.

In the **concluding panel discussion**, the role of research for successful start-ups in the maritime sector will be discussed.

Further information on the MII can be found at www.cml.fraunhofer.de

Digitizing seaports - Changing logistical processes. Digital solutions can increase the efficiency

Virtualizing ship management - focus on nautical assistance systems. Semi-autonomous so-

FOREWORD



Dear Readers,

Our first newsletter of the year is dedicated to major EU-funded research projects. In these projects, the research partners work on topics that generally only become operational at a later point in time. We are therefore all the more pleased that the MITIGATE project has developed a prototype for the risk assessment of maritime IT systems, which is to be offered on the market in the near future.

The C-BORD project deals with the physical safety of maritime transport chains. And we inform you about the latest developments in European maritime traffic management, during which we can regularly welcome practical visits to our simulation environment.

We hope you enjoy reading it.

Your Prof. Carlos Jahn
Head of Fraunhofer CML



Nautical traffic simulations: realistic test runs at Fraunhofer CML

REALISTIC NAUTICAL TRAFFIC SIMULATIONS IN ENGLISH CHANNEL AND SOUTHERN BALTIC SEA

Steer a container vessel, bulk carrier or cruise liner in the middle of Harburg in a critical traffic situation in the southern Baltic Sea or through another heavily trafficked sea area - the English Channel: At the CML, such test runs take place regularly as part of the European research project STM Validation. The aim is to improve the exchange of information and optimize the routing of maritime traffic.

Experienced captains, pilots and ship officers participate in the simulation runs and test computer-based navigation scenarios in February, March, June and October 2018. These are carried out by 30 virtual ship bridges in the European Maritime Simulator Network EMSN together with other international institutions for teaching and research. In addition to the actual exercises,

driving on a specific route and carrying out the necessary radio communication with other vessels and the Vessel Traffic Service Center, the human factor is the key aspect for these test runs. This is why the CML is also involved in human factor observation. During each simulation run, the participants document their experiences. At the same time, their behaviour is observed. A researcher from the CML monitors their actions and notes his impressions of communication and stress levels as well as their behaviour in critical situations. The observation of the last simulation runs: „After a short familiarization, the participants steer their virtual vessel professionally and confidently.“ Overall, the observation of the human factor provides valuable information on the nautical situations which are classified as critical

by the participants. This information helps the developers to set meaningful accents in new communication and navigation systems.

The participants in the simulation runs, experienced nautical officers and captains, are consistently impressed by the simulation network: The complex structure of the simulation scenarios is superior to the practice scenarios usual at training centres with almost 30 ships steered by professional navigators. And the test of new digital solutions, such as the route exchange in the Maritime Coordination Platform or the direct visualization of temporary restricted areas in the ECDIS, is as much appreciated by the test persons as the experience of being part of the international STM network.

RISK ASSESSMENT FOR IT INFRASTRUCTURES MARITIME CYBER SECURITY IN FOCUS

Design, development and implementation of a risk assessment and management system for the maritime transport chain in 30 months? In September 2015, 13 European partners set themselves these tasks. Meanwhile, the EU research project MITIGATE has been completed and the ambitious goal has been achieved. At the beginning of the development was the determination of the requirements of the stakeholders. Many companies in the maritime transport industry need support in assessing how well their IT assets (hardware and software components) are protected against attacks and how external and internal cyber attacks can be prevented.

The results of a survey among almost 200 maritime stakeholders

showed that nearly two thirds of the companies responding did not carry out a risk assessment. They also expect a solution like MITIGATE to comply with national and international standards and regulations.

The result of the project work is a software environment that can be used cloudbased, but also locally in the company. It enables companies to map IT assets that support their business processes through data processing and data exchange. These assets are connected along an information chain and can be tested for known weak points and attack potentials. The information chain is connected virtually to the business partners without the assets used being disclosed to each other. Information about new vulnerabilities

and threats is not only collected automatically from databases, but also from social networks and other Internet sources specializing in IT security.

Practical tests and evaluation of the software solution have involved more than 680 representatives of the maritime transport chain at more than 70 events. Test runs with real data and live demonstrations were used to adapt the system to the needs of users. The vast majority assess the system positively and helpful for risk management. Information on the project and the status of commercial implementation can be found at www.mitigate-project.eu.

IN BRIEF

The **Autonomous Ship TECHNOLOGY Symposium 2018** brings together the leading experts on this topic from all over the world in Amsterdam. Shipyards and suppliers, classification societies and maritime research institutes will meet from June 27-29, 2018 and the CML will be represented by a lecture by Hans-Christoph Burmeister on remote-controlled tugs.

The **Hamburg Logistics and Science Forum** will take place on June 7, 2018. Under the motto „Digitisation of Supply Chain Management - Industry-specific opportunities and challenges“, it offers a large number of interesting exhibits and lectures. More than 25 exhibitors will present their latest innovations in the areas of supply chain and logistics. At the same time, two knowledge forums will feature selected lectures from the fields of practice and science on the main topics. The Fraunhofer CML presents new solutions for the digitalization of maritime processes, e.g. in the field of ship management.

+++DATES+++

- **Maritime CIO-Forum**, April 24, 2018, Hamburg
- **spc Themenabend Digitalisierung**, April 26, 2018, Hamburg
- **MII Maritime Innovation Insights - Fraunhofer CML**, May 3, 2018, Hamburg
- **Hamburg Innovation Summit HHIS**, May 17, 2018, Hamburg

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