



Chances for the maritime sector: Utilization of global data streams

DATA ANALYSIS MADE EASY FOR SHIP MANAGERS AND SHIP BUILDING SUPPLIERS

The integration of physical and digital realms has already provided significant benefits to many industrial sectors. Therefore the ongoing digitalization aboard and the improvement of the ship-to-shore connectivity will increasingly shape the services offered by the maritime industry.

While the technological possibilities are developing rapidly, the maritime industry falls short of capturing the full potential of the fourth industrial revolution.

The Fraunhofer CML is doing research on methods for efficient connections, processing and analyses of big and heterogeneous amounts of data. They are used to support shipping companies and maritime suppliers in making optimized decisions and increasing the efficiency of processes aboard and ashore.

DIGITALIZED MAINTENANCE AND REPAIR

The condition-based & predictive maintenance is one research focus of the Fraunhofer CML. Whilst vessels and their subsystems are still maintained in regular time intervals to a great extent, condition-based maintenance procedures enable the planning and optimization of maintenance schemes that are subject to the present and expected condition.

In order to use these potentials, the Fraunhofer CML is developing innovative forecasting methods to be used for predicting conditions, failures and the remaining lifetime of selected technical systems aboard. The approach adopted takes extensive sensor, operational and maintenance data into consideration.

The prediction results ensure a better identification and optimal inclusion of the necessary maintenance activities in the ship operation. This will enable a reduction of the main-

tenance and breakdown costs of a ship.

INCREASE OF AVAILABILITY

Companies of the maritime supply industry, too, face a challenge in handling increasingly large amounts of data created throughout the operational life of a vessel. The conversion of data into valuable information allows to manage customer services more efficiently – a process that is supported by the Fraunhofer CML in the form of joint projects with the industry.

In this process various analysis methods are used from the fields of stochastic, optimization and simulation, which convert the data into information and finally into an optimal decision. This is the basis for the discovery and utilization of hidden potentials for optimizing processes in the after-sales service. Examples of this are the spare parts management and the service network design.

FOREWORD



Dear readers,

As digitization is on the rise, the CML, too, is doing research on more and more processes and technologies that offer chances for new business models in the course of this development. In this newsletter we introduce the use of focused data analyses in maintenance schemes for cargo vessels to our readers.

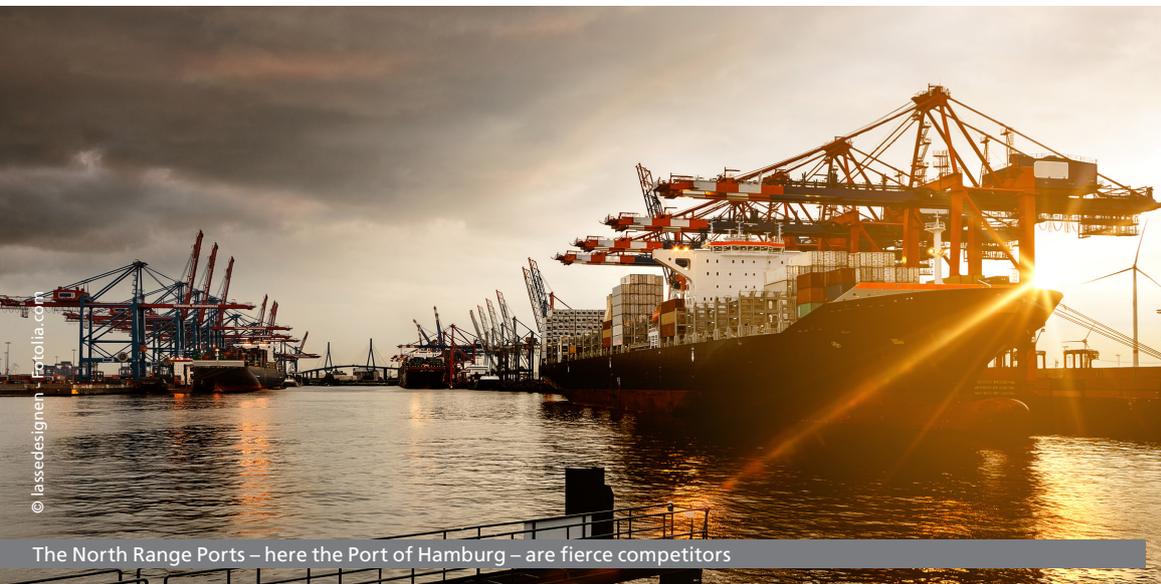
In addition to that you will read about new chances for investigating and visualizing flows of goods. The CML is developing a model that calculates a change of infrastructure loads as a result of changes in the traffic volume. Infrastructures can be planned with the help of this so-called European Freight Model in the shortest possible time.

On behalf of the Fraunhofer CML I would like to wish you a merry Christmas and a successful new year 2017.

Enjoy reading our Newsletter.

Sincerely,

Prof. Carlos Jahm
Head of Fraunhofer CML



The North Range Ports – here the Port of Hamburg – are fierce competitors

COOPERATION BETWEEN NORTHERN GERMAN PORTS

FRAUNHOFER CML IS INVESTIGATING POTENTIALS

How can the northern German seaports cooperate to utilize location advantages of the ports optimally, compensate the burden on infrastructures and harmonize the procedures in favor of their customers? – This question was interesting for the delegation of ‚Die Linke‘ in the European Parliament. After all, the so-called North Range ports are fierce competitors and the German ports have to prepare themselves against this competition in times of decreasing cargo quantities. Furthermore there are the difficult and expensive – with regard to time and finances – and

still unauthorized projects for deepening the rivers Weser and Elbe. Until their implementation the competitive ports are likely to expand their competitive edge. The answer: There will be no deliberate cooperation between the German North Sea ports on the terminal level including an assignment of transshipment volumes and kinds of load. Such a project cannot be implemented within the given framework conditions of federal port administration and with a view to the European law of competition and state aid. Therefore, as for the future, shipping

companies and their customers will have their goods transhipped in the port that fits best to their individually optimized transport concept. On the other hand, the CML sees chances for a cooperation especially in the collaboration of terminal operators in the form of joint ventures and on the level of the port authorities in case of global marketing activities as well as in the joint representation of political, administrative and ecological interests.

ANALYSIS AND VISUALIZATION OF FREIGHT TRANSPORT

THE EUROPEAN FREIGHT MODEL EFM

Competitive seaports are a prerequisite for the international exchange of goods over sea. Amongst other aspects their competitiveness depends on the capacity of available transport infrastructures in the ports themselves and between ports and their hinterland regions. However, the planning of transport infrastructure is particularly difficult against the backdrop of an ongoing global economic weakness, aging infrastructures and the demographic change. Freight transport models provide an adequate solution for analyzing and evaluating transport

infrastructures. The Fraunhofer CML has developed an innovative instrument for the large-scale modeling of freight transport in PTV Visum – the European Freight Model (EFM). It puts the user in a position to model and assess the hinterland connection of seaport locations and to calculate various scenarios for the development of the hinterland traffic of seaports. The model covers the European transport network and can be adapted quickly to individual customer requirements. Potential users of the model are the providers of infrastructure, ports, forwarders, transport com-

panies and other players in the maritime supply chain. The EFM consists of three models: The network model includes the European transport networks of the various transport modes – road, rail and inland waterways – as well as the seaport and hinterland terminals. The demand model contains demand data for the individual commodities. The traffic assignment model comprises the choice of the means of transport and the route selection, which is based on distance-dependent and time-dependent costs.

IN BRIEF

On November 9, 2016 the **Fraunhofer Forum Waterborne ‚Maritime Industrie 4.0‘** took place in the **Hafen-Klub** at the **St. Pauli Landungsbrücken** of the **Port of Hamburg**. Chances and challenges of an increasing digitalization and networking in the fields of shipbuilding, ship operation and the maritime logistics were discussed with representatives of the maritime industry. Prof. Carlos Jahn, Head of Fraunhofer CML, gave a lecture with the topic of ‚**Digitalization in Shipping and Harbor – Innovations for the Maritime Chain of Transport**‘. In his lecture he introduced current research projects of the CML in the fields of autonomous shipping, staff requirement planning and employment planning, big data and decision support.

The Fraunhofer CML was represented at the **Intermodal Europe 2016 in Rotterdam** from November, 15-17. Apart from the EU Project MITIGATE, in which a cloud-based software for checking the IT safety in the maritime supply chain is being developed, concepts about the port of the future were in the focus of discussion. Katrin Brummerstedt delivered a lecture with the topic of ‚**Performance Analysis Tools for Seaports and their Hinterland Connections**‘.

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- **Digital Ship CIO Forum 2017**
03.05.2017, Hamburg
- **transport logistic 2017**
09.-12.05.2017, Munich

IMPRESSUM

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Visualization of flows of goods throughout Europe is possible by using the European Freight Model