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Program – Abstracts

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September 4, 2018

Autonomous Maritime Systems and Technologies

Lectures and Posters Presentations

13.30

Challenges in Deep-sea System Design

F. Boeck, M. Golz, G. Holbach, S. Ritz - Technische Universität Berlin, Department for Design and Operation of Maritime Systems
W. H. Wehner, N. Richter, T. Voß - thyssenkrupp Marine Systems, Kiel

Demands on suitable deep-sea technology are increasing as the goal of working at ever-greater ocean depths takes on more importance. Collaborating closely with industrial partners, the Design and Operation of Maritime Systems department at Technical University Berlin is researching new options in underwater system design. Two joint research projects, Subsea Monitoring with Intelligent Swarms (SMIS) and Large Modifiable Underwater Mothership (MUM), are currently taking up this challenge. The SMIS project is developing an interactive system comprising autonomous underwater vehicles, an underwater station on the seabed, and an unmanned surface vehicle. They operate by applying the principles of swarm intelligence. The use of a swarm system at depths of up to 6,000 meters makes the SMIS fleet unique.

The MUM project is developing a highly modular, unmanned underwater vehicle for payloads of up to 10 tons. Basic modules are fitted with the functional equipment necessary for almost any underwater mission. Depending on the mission, the quantity and arrangement of these basic modules can be adjusted for combination with specialized payload modules, thus enabling the MUM vehicle to be deployed in a variety of scenarios.

Possible applications for both systems are in deep-sea mining, offshore oil and gas, marine research, hydrography, cable and pipeline inspection, and the monitoring of foundations for offshore wind turbines. Such underwater systems can significantly increase the efficiency of these enterprises and reduce their operational costs due to the lower usage of ships.

14.00

Predictive and Automated Ship Guidance and Motion Control

M. Lutz, Th. Meurer, B. Storr - Christian-Albrechts-Universität zu Kiel, Lehrstuhl für Regelungstechnik

Predictive guidance and motion control is developed for the operation and maneuvering of autonomous vessels in enclosed waters such as harbors.

Based on a mathematical model of ship dynamics, an optimization problem is designed and solved that enables the achievement of either the right maneuvers in terms of time or the best operation of the vessel in terms of costs and energy efficiency.

Maneuvers include docking, departing and collision avoidance in confined environments. Taken into account here are actuating variable restrictions on the propulsion system and the rudder, as well as static and dynamically moving obstacles representing other vessels in the same area. To be able to react in real time to changes in the environment posed by emerging and disappearing obstacles, dynamic optimization is resolved on a receding time horizon, allowing the inclusion of real-time information in solving the problem of guidance and motion control.

Different approaches are evaluated and compared in terms of their real-time capability, which is crucial in view of implementing the resulting algorithms. Various simulation scenarios with challenging guidance and motion control tasks are carried out to evaluate these approaches. They take into consideration static and moving obstacles as well as disturbances caused by winds and currents or by parameter uncertainties. Current work addresses the experimental validation, on a laboratory scale, of the approaches developed for controlling an automated vessel.

15.30

Supporting Maritime Search and Rescue Missions with Unmanned Aerial Systems

Ph. Gorczak - Technische Universität Dortmund; Th. Lübcke - Deutsche Gesellschaft zur Rettung Schiffbrüchiger (DGzRS), Bremen

Maritime search and rescue missions are always time-critical operations and rescue personnel often have to deal with wrong or incomplete information. Efficient decision-making, mission planning, and proper execution are therefore essential for saving lives at sea. While commercial shipping is equipped with communication technologies according to the GMDSS, skippers of pleasure crafts rely increasingly on their smartphones – even though consistent cell reception is not a given. The presentation introduces LARUS, an R&D project that addresses this problem and aims to develop an unmanned aerial system (UAS) that can provide support for maritime search and rescue missions.

The proposed UAS can approach the distress position at high speed and be deployed over shallow waters, mud flats, reed belts or any other areas that are hard for surface rescue units to navigate. Its payload includes a multi-sensor visual system and radio-based localization to increase coverage and shorten the time needed for detection. Once people in distress have been found, the UAS can be used for initiating contact to them through an onboard cellular base station; it can also be deployed for data communication with rescue forces (telemedical services) and for aerial on-scene monitoring.

This approach to developing the LARUS system focuses on four aspects: protection against harsh weather conditions; technical and regulatory measures for automated operation; reliable long-range communications; and mission-specific sensors and data processing. The presentation introduces the project in depth and reports on its progress so far – halfway through its three-year duration.

16.00

SCAS Systems and Components for Autonomous Ships

R. Henking - EurA AG, Hamburg

The SCAS network has set itself the goal of implementing systems, components, sensors, communication services and technologies for partially or fully autonomous ships. The network's focus is not only on completely autonomous vessels but on technologies that can be used on semi-autonomous ships, such as nautical assistance systems for automated docking. Its focus is also on systems that make autonomous ship operation possible in the first place.

The network's objective is to build bridges between technology providers and technology users, making it possible to quickly and purposefully launch innovations in the maritime industry. Bringing together a wide range of expertise, the network is particularly interesting as a collaborator with shipping companies, shipyards and logistics companies. Partners from research and industry work together to achieve common goals in research and development projects; the network encompasses eleven SMEs and four research institutions.

The presentation illustrates the importance of subsystems for operational and system autonomy in terms of an Autonomous Harbor Ferry pilot project. This project addresses navigation and collision avoidance, near-field detection, demand-driven services, remote monitoring and control, remote and predictive maintenance, and cyber security. The overall concept is expressed in parallel systems, real and virtual, to be tested as hardware in the loop or service in the loop. Of great importance here is the transferability of expected results to other local conditions and applications.

September 5, 2018

Shipping / Maritime Logistics

Lectures and Poster Presentations

10.30

Motorways of the Sea

J.-M. Laurens, P.-M. Guilcher, Ch. Jochum - ENSTA Bretagne, Brest

The goal of the study is to trace the recent history of actions by different governments to encourage the Motorways of the Sea (MoS) plan. The European Union has launched several funding programs to support MoS. The presentation provides an overview of the situation, focusing on the examples of the Saint-Nazaire / Gijón and Saint-Nazaire / Vigo links. It proposes a solution which uses six newly designed Ro-Ro vessels capable of transporting 110 semi-trailers each. The proposed logistics system implies that tractor units would not be transported on board. Rather, specialized Ro-Ro tractors would handle the installation of semi-trailers on board, while tractor units would be either coupled to newly arrived semi-trailers or returned to their base

to fetch other semi-trailers. Six vessels are needed to ensure three departures per day from each port. A complete ship design loop has been performed to prove the feasibility of the project. The vessels satisfy the rules and regulations of the IMO. The proposed twin-screw propulsion would run on LNG and allow the vessels to travel at 19 knots in sea states up to 5 in order to deal with winter conditions in the Bay of Biscay.

11.00

Simulation-based Systems to Support Decision-making in Maritime Logistics

M. Dreyer, H. Schuett - Institut für Seeverkehrswirtschaft und Logisitik, Bremen/ Bremerhaven

Maritime Simulation, one of five areas of competence pursued at the Institute of Shipping Economics and Logistics, has been working for nearly 40 years in supporting port authorities and the maritime industry with simulation-based systems to assist their decision-making. The presentation will discuss two applications of this technology: vessel traffic in ports and seaport container terminals.

The design and dimensioning of the vessel traffic network in a port is optimized based on forecasts of annual cargo throughput, the vessel types serving the port, and terminal capacity. Tidal restrictions and traffic regulations in certain areas of a port also influence the results of simulation. By adding ecological parameters to vessel databases, models are able to calculate and forecast the pollutants emitted by maritime traffic in the port. In this way, the positive effects of reduction technologies (relating both to vessels and the port) can be evaluated.

Various simulation modules concentrate on processes in container terminals at different levels of detail. Separate applications calculate terminal capacity, the dimensioning of terminals, the visualization of current yard utilization, and start-up and strategy optimization, all supporting the optimization of day-to-day operations. These modules are used in projects for terminal operators and planners, as well as for port authorities.

The presentation will explain the technology used and show the findings of projects to illustrate the variety of fields of application.

11.30

Efficient Ship Crew Scheduling complying with Resting Hours Regulations

A. Rizvanolli, O. John - Fraunhofer-Center für Maritime Logistik und Dienstleistungen, CML, Hamburg

To ensure safe and efficient ship operations, crew tasks need to be properly scheduled. This encompasses setting up a work plan for the crew, whose members should also be appropriately qualified seafarers in order to ensure compliance with the rules of the Maritime Labour Convention (MLC). An optimized crew schedule can reduce crew costs for shipping companies and also help to avoid expensive ship detentions ordered by port authorities due to non-compliance in the crew's work plan. The

presentation shows a mathematical model for crew scheduling, which is subject to a complex set of rules for determining work and rest hours. In this model, the main input parameters are the mandatory tasks for safe ship operation and the crew qualification requirements for these tasks. They depend on such variables as ship type and route, and may differ substantially. The model also takes into consideration common watch-keeping patterns and special constraints on mandatory tasks. The model and efficient problem-specific algorithms are implemented in a program which is currently being used by a shipping company in its office and on board its ships. The decision-making support provided by mathematical calculations assists in demand planning and daily scheduling on board. With optimized results, shipping companies can improve safety, save costs, and contribute to higher employee satisfaction.

14.30

MCTAS: Cooperative Collision Avoidance at Sea Based on E-navigation

A. S. Feuerstack - Offis, B. Weinert - Carl von Ossietzky Universität Oldenburg

Recent accident statistics have shown a continuous increase in serious and very serious accidents at sea from year to year. Ever higher traffic density is expected in the near future, further contributing to this problem. In the three-year MTCAS project, partners from industry and academia are contributing to accident reduction by developing a system for proactive, predictive and cooperative collision avoidance based on e-navigation. MTCAS stands for maritime traffic alert and collision avoidance system; it builds on the basic idea underlying the aviation traffic alert and collision avoidance systems (TCAS) that implement ACAS (airborne collision avoidance system) standards. However, the operational principle behind MTCAS is to support the officer of the watch on a ship's navigational bridge in detecting and resolving conflicts with other ships, taking into consideration the environment and prevailing maritime traffic conditions, but also relevant rules and regulations, bathymetry, as well as vessel traffic services (VTS). In contrast to TCAS, MTCAS does not automatically intervene in terms of issuing steering commands, but supports seafarers in finding safe and efficient maneuvers cooperatively, a completely different and innovative approach compared to the basic purpose of TCAS. The presentation will provide insight on how MTCAS improves alerts with prediction technology and reduces misunderstandings by negotiating cooperative maneuvers.

15.00

Financing Green Shipping: Addressing the Challenges with Pragmatism

O. Schinas - Hamburg School of Business Administration

The presentation discusses research conducted at the Hamburg School of Business Administration that has already been published or is now in the final reviewing stage; this research

reflects both operational pragmatism and fact-based findings. The talk begins by outlining the challenges posed by innovative technology that face those parties involved in financing ships. The analysis briefly explores the availability of ship finance, a segment of the maritime industry which is currently experiencing economic and disruptive challenges; it also examines the impact of the premium associated with the purchase price of ships using innovative technology on the financial life-cycle assessment of the asset.

To address this financial burden, the option of using export credit facilities is taken into consideration, as this is closely associated with state interests and knowledge transfer through the construction of vessels. Leasing schemes are also examined as possible solutions, although this method of financing generally has higher costs of capital. Additionally, a pay-as-you-save model is discussed that focuses in particular on wind-assisted propulsion and in general on power- boosting technologies. The presentation concludes with details on some challenges related to LNG-fueled ships and highly automated and autonomous ships, as these vessels demand thorough risk assessment and financial engineering.

15.30

Privatization of Maritime Security

D. Siebels - University of Greenwich, Greenwich Maritime Centre

This presentation is an overview of the privatization of maritime security over the past 15 years and the implications of this development for governments, navies, and other security agencies. Since there is no standard definition of maritime security, strategies have to be designed on the national level that identify aims and objectives for maritime security in the national and regional context. Governments can then decide how to divide tasks among law enforcement agencies, navies, and possibly the private sector or non-governmental organizations. Maritime security is already being privatized in some areas.

Since the introduction of the ISPS Code, security training for shipping companies and port operators has been conducted by private companies, albeit with regulatory oversight from government institutions. More recently, pirate attacks have created a market for private maritime security companies that provide armed security personnel for merchant ships in different parts of the world. Governments in general and navies in particular will be facing important challenges in coming years. Newly available technology enables private companies or even non-profit organizations to conduct surveillance of the maritime environment. This kind of intelligence allows law enforcement agencies in the maritime environment to optimize the use of their resources. Increasing technological changes are also likely to be adopted more rapidly by the private sector than by government institutions with long procurement cycles, creating further incentives to rethink the role of the private sector in terms of maritime security.

Poster Presentations

Predicting the utilization of an empty container depot

O. Rendel - Fraunhofer-Center für Maritime Logistik und Dienstleistungen, CML, Hamburg

European Maritime Simulation Network

S. Shetty, H.-C. Burmeister - Fraunhofer-Center für Maritime Logistik und Dienstleistungen, CML, Hamburg

September 6, 2018

Analysis, Design, and Optimization of Maritime Systems

Lectures and Poster Presentations

10.30

Electric Ship Technologies in Complex Vessels: Technological Advancements and Their Impact on Ship Design

G. Sulligoi, A. Vicenzutti - University of Trieste

Advances in electric ship system technologies help to radically improve environmental performance, increase efficiency, and reduce emissions while simultaneously achieving higher responsiveness from onboard power systems. Innovative technical solutions for integrated power and energy systems (IPES) are continuously being developed with the aim of improving ship capabilities to enable new loads, improve efficiency, reduce technical volumes/weights, maximize payload, minimize costs (CAPEX-OPEX), and much more.

The integrated nature and complexity of modern electric ships, in which IPES solutions directly affect overall ship performance, is a recognized factor in design. The introduction of new technologies (for advanced energy distribution and storage, resilient energy-saving grids, advanced sensors, etc.) therefore has to be planned from the start in the ship design process, otherwise their effectiveness is greatly reduced or their integration even becomes impossible. Consequently, the early design process must be configured to incorporate avant-garde technological advances and enable the full exploitation of all potential environmental and performance gains.

The presentation explains state-of-the-art advances in ship electrical applications, and illustrates design methods and tools. Specifically, it analyzes the availability of electrical solutions, presenting cutting-edge technologies and their use on board. The presentation concludes with a discussion on demonstrating the proof of concept of new electric ship technologies in terms of overall ship performance improvement, focusing on the affordability and impact of future integrated power and energy systems on complex electric ships.

11.00

Prediction of the Power Required for Safe Maneuvering in Waves

A. Cura-Hochbaum, S. Uharek - Technische Universität Berlin, Fachgebiet Dynamik Maritimer Systeme

The Dynamics of Maritime Systems department at Technical University Berlin has developed a numerical method to predict the power required during ship rudder maneuvers in waves. The method is based purely on virtual captive tests performed in advance with Neptuno, the in-house RANS code. These tests include propeller open water tests to determine the body force model used to approximate the propeller effect on the flow, virtual PMM or CPMC tests—including rudder tests—to compute the hydrodynamic forces and moments acting on the ship in calm water, as well as virtual captive tests in regular waves to determine the mean forces and moments due to the waves on the maneuvering ship. After all hydrodynamic coefficients involved have been determined, arbitrary rudder maneuvers can be predicted in negligible computational time.

This method has been refined and validated in diverse national and European research projects over the past five years. Special measuring devices have been developed to validate the body force model in oblique inflow conditions and the hydrodynamic mean forces and moments due to waves. Predicted maneuvers have been compared with measurements recorded at several ship model basins. The results of the method developed are very satisfactory. The ability to quickly simulate maneuvers in different waves can help to identify critical situations and develop new guidelines regarding the power that ships require to maneuver in adverse conditions.

11.30

The HERCULES Program on marine engine R&D (2004-2018)

N. Kyrtatos - National Technical University of Athens

HERCULES has been the largest international research and development program for large engine technologies ever, spanning the years from 2004 to 2018. Comprising four individual consecutive projects and with a combined budget surpassing 100 million euros, it has involved 77 participant organizations. Funding was provided principally by the European Union and the Swiss government. The program was jointly conceived in 2002 by two major engine manufacturer groups, MAN and WÄRTSILÄ, to develop new technologies for marine engines with the overall aim of increasing engine efficiency to reduce fuel consumption and CO2 and other gaseous and particulate emissions, and to increase engine reliability.

The HERCULES-A project began in 2004 as Phase I of the HERCULES R&D program. Phase II, HERCULES-B, ran from 2008 to 2011, and Phase III, HERCULES-C, ran from 2012 to 2015. The HERCULES-2 project (from 2015 to 2018) built upon the achievements of the previous HERCULES projects, going beyond the limits set by the regulatory authorities. This presentation

describes the evolution and interrelations of these four consecutive R&D projects' objectives. They were related to the technical challenges and requirements of the marine industry and took into account the commercial and legal framework which evolved over the 14 years of the HERCULES program. The presentation also provides an overview of the projects' achievements: the technologies and tools developed which are already being used in the design of future engines, and advanced engineering results, some of which have already been incorporated into new engine models now appearing in the market.

14.30

Design-space Dimensionality Reduction Methods for Shape Optimization of Maritime Applications

M. Diez, A. Serani - CNR-INM, Natl. Research Council-Institute of Marine Engineering, Rome, D. D'Agostino - Sapienza University of Rome, Dept. of Computer, Control, and Management Engineering, Rome, E. F. Campana - CNR-DIITET, Natl. Research Council, Dept. of Engineering, ICT and Tech. for Energy and Transportation, Rome

The paradigm of simulation-based design (SBD) optimization has demonstrated the capability to support the process of design decision, not only providing large sets of design options but also assessing design performance for a large number of operating/environmental conditions. The recent development of high-performance computing systems has driven SBD towards integration with global optimization (GO) and uncertainty quantification (UQ) methods, moving the SBD paradigm to automatic deterministic and stochastic SBD optimization (SBDO) possibly aiming at global solutions to the design problem. In shape design, SBDO consists of three main elements: (1) a deterministic or stochastic simulation tool (e.g., integrating computational fluid dynamics with UQ); (2) an optimization algorithm; and (3) a shape modification/automatic meshing tool. In this context, both GO and UQ are affected by the so-called curse of dimensionality as the algorithms' computational cost rapidly increases with the dimension problem.

Therefore, the assessment and breakdown of design-space dimensionality are key elements for the efficiency and affordability of SBDO. The objective of the presentation is to show off-line (pre-optimization) design-space dimensionality reduction methods based on the variability breakdown of shape modification and associated physics-based (pressure, wave elevation, etc.) vectors of maritime applications. The variability breakdown is provided by linear (Karhunen-Loève expansion, proper orthogonal decomposition, or principal component analysis, PCA) and nonlinear (local and kernel PCA and deep autoencoders, DAE) methods. Numerical examples are presented and discussed, including the monohull and multihull optimization of civil and military applications. Experimental results are also presented.

15.00

Experimental and Numerical Investigation of Sloshing

J. Neugebauer, R. Potthoff, W. Liu, B. O. el Moctar - Universität Duisburg-Essen

The University of Duisburg-Essen operates the only six degrees-of-freedom (DoF) sloshing test facility in Germany, a hexapod motion platform with a payload of up to 1.2 tons. Miniature piezoresistive pressure sensors are used to measure impact loads at acquisition rates of up to 100 kHz. A time-resolved stereo particle image velocimetry (PIV) system is available for non-intrusive velocity measurements at a 100 Hz acquisition rate. The two high-speed cameras in the PIV system may also be used to capture videos of free surface elevation, with up to some 150,000 fps. Since 2011, fundamental research and industrial projects have been conducted on impact load assessment, onboard assistance systems, and sloshing in pools on yachts and cruise liners.

The presentation briefly describes the test facility and gives an overview of current projects. One of these concerns the findings from an international benchmark study for comparing and improving model test procedures. Another is a study comparing numerical simulations and model tests, including PIV flow measurements. The presentation also shows the results from tests with an LNG tank, carried out to develop an approach for a sloshing warning system. It concludes with an outline of pool testing.

15.30

RAMSSES: Realization and Demonstration of Advanced Material Solutions for Sustainable and Efficient Ships

M. Krause, F. Roland - Center of Maritime Technologies, Hamburg; C. Cau - Centro per gli Studi di Technica Navale (CETENA), Genua

Innovative materials and their wider use are important for improving the life cycle performance of European-built ships and maritime structures. Lightweight and other advanced materials reduce the environmental footprint, make the industry more competitive at a global scale, and help to create and maintain employment. But their use in the maritime sector is lagging behind their potential. There are manifold and complex reasons for this situation and it would take a comprehensive initiative by a dedicated group to overcome existing barriers.

The RAMSSES project aims to show the benefits of advanced materials in maritime applications by installing 13 market-driven demonstration products throughout the entire process chain and in a wide range of applications (structural components, equipment, ship integration, repair). The installation and assessment of such products on shore and on board will manifest their high level of technology readiness. The test program, based on risk assessment and supervised by rule-making bodies, aims to ensure relevance for commercial approval outside the project. While demonstration products are expected

to support the commercialization of specific products, RAMSSES will also be strategically engaged in enabling more rapid and agile material innovation in the European maritime industry. Here, a key element will be to set up a knowledge repository for test data and best practice procedures, allowing the reuse of information for similar products in the future. Standardized risk scenarios will also help to ease future approval processes, and finally, a new materials innovation platform will enhance continuous technology transfer within the maritime sector and beyond.

Poster Presentations

Cavitation-Induced Erosion

F. Reuter - Universität Duisburg-Essen

Lean Ships – Low Energy and Near to Zero Emission Ships

D. Narayanan - Center of Maritime Technologies, Hamburg

September 7, 2018

Networks and Profiles

Lectures and Poster Presentations

10.30

Studying Blue Sciences at Hochschule Bremen

G. Schellenberger - Hochschule Bremen

Bremen University of Applied Sciences is one of the leading universities of its kind in northern Germany, offering some 8,700 students more than 60 courses of study in bachelor's and master's degree programs in engineering, natural sciences, economics and social sciences. Maritime education has a long tradition in Bremen, rooted in the founding of the Bremen School of Navigation in 1799 and continuing with higher education in naval architecture begun in 1895.

Today the university has a number of diversified programs relevant to the maritime industry and the marine sciences. Under the general heading of Blue Sciences, faculties in three areas of expertise have joined forces to collaborate in teaching and research, in line with the EU's Blue Growth strategy. An interdisciplinary approach is pursued for attaining bachelor's or master's degree courses in naval architecture and ocean engineering, nautical sciences and ship management, shipping and chartering, as well as industrial and environmental biology; students can major or minor in these studies.

The presentation will introduce the collaborative concept of Blue Sciences and offer prospective students the opportunity to learn more about degree programs relevant to the maritime industry and marine sciences.

11.00

Ship Strength Lab at Fachhochschule Kiel

B. Bohlmann - Fachhochschule Kiel

The Kiel University of Applied Sciences operates a strength lab for education and research in naval architecture and related areas such as offshore structures. The lab works mainly on testing fatigue strength, but also tests nominal strength, vibrations and distortion. The lab's experimental backbone is a set of three test rigs for studying the static and dynamic performance of materials. The rigs are suitable for small-scale experiments such as the analysis of cyclic material laws, the testing of semi-complex specimens (such as weld seams) for design details, and the full-scale measurement of components. Mobile equipment is also available for in situ activities.

Software for detailed finite element analysis (FEA) computations is utilized for theoretical studies, either stand-alone or to complement experiments. Students benefit from access to numerous educational licenses. Commercial licenses are available on request. Lab projects are carried out in close cooperation with partners from industry, among them shipyards, suppliers, and consultants. The lab contributes to basic research, provides assistance in product development, and performs damage investigations. Project funding can be either public or private.

The lab provides students in naval architecture, offshore system engineering and mechanical engineering programs a wide range of options to complement their theoretical knowledge with practical experiments. Courses of study lead to bachelor's and master's degrees as well as to doctorates. PhD students conduct their research in cooperation with the University of Southern Denmark in Odense, Denmark.

11.45

Boosting Productivity in a Vessel's Life Cycle with Digital Assistance Systems

H. Loedding, A. Friedewald - Technische Universität Hamburg

To stay competitive, the maritime industry must continuously improve its production and service processes. In this context, digitization offers great potential. Shipbuilding in Germany and Europe is characterized by custom production, making manual processes in production and work preparation particularly important. As extensive productivity analyses at shipyards and suppliers have shown, digital assistance systems can directly simplify the costly acquisition of information in many areas. Productivity in production planning also increases as the creation of complex 2D assembly drawings becomes unnecessary. Augmented reality systems display the assembly steps a worker needs to know, making it easy to document that an operation has been successfully completed or

that an error has occurred. These systems can also be used in service and maintenance, and depending on their findings, they can clearly show necessary work steps, required special tools, and process parameters such as requisite tightening torques in the real environment. Work steps can also be recorded and transferred to a digital twin of the ship and its facilities, making them available for further evaluation and applications. This digital twin accompanies the entire life cycle of the ship and can be linked to other stationary IT systems or to mobile digital assistance systems in shipyards, thereby increasing the productivity of many processes.

12.15

Green Shipping at Fachhochschule Emden-Leer

R. Doehne, Ch. Schnabel, M. Bentin - Hochschule Emden/Leer

The Maritime Sciences department at Emden/Leer University of Applied Sciences has been active for many years in research and development for sustainable ship design and operation. Navigators, naval architects, engineers, shipping company managers, and others work closely together to turn innovative solutions into practice. Being part of the Green Shipping Competence Center Niedersachsen means there is close networking between research and application. A special focus is on the estimation of savings potential and the design of wind-assisted ship propulsion. The presentation gives an overview of previous and current research projects, highlighting various aspects that characterize the holistic approach to green shipping. The department is currently developing a basic design for an innovative, multifunctional sailing cargo vessel, aiming for nearly zero emissions operation.

Various subprojects in the MariGreen project took on the retrofitting of a Flettner rotor on a multipurpose freighter, the conversion of a ferry to LNG operation, and the building of a prototype green water taxi.

Sustainability is also being pursued in the reuse of offshore structures. The presentation outlines the recently approved international DecomTools project as an example. Because the first offshore wind farms will reach the end of their service lives in the coming year, this project is looking at the logistics chain, from the dismantling of offshore wind farms to the recycling of resources in harbors. Implementing innovative solutions in this process can significantly reduce the carbon footprint and negative impacts on the marine environment.

Poster Presentations

RDI in Maritime Transport funded by the European Commission

F. Roland - Center of Maritime Technologies, Hamburg

Network for Research and Innovation

T. Ketelhohn - Center of Maritime Technologies, Hamburg

Lecture Presentations will take 30 minutes including discussion
Poster Presentations will last the whole day

Deutsches
Maritimes
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We like to inform you about:

Maritime Career Market - The meeting place for talent and careers
September 7, 2018

Hall B4 Ground floor (between Foyer East and Hall B4 Ground Floor)

On the last day of SMM 2018, the third edition of the Maritime Career Market will once again provide numerous companies and visitors with a unique platform for job hunting, careers and professional development.

The event allows companies access to potential employees, while giving job applicants and people looking at their career options the chance to gain fascinating insights into different career opportunities in the maritime industry. The Maritime Career Market also offers the latest information on various training and study programmes and on personal and professional development.

Free admission for students and pupils (accompanied by the teacher).