AUTOSHIP
Autonomous Shipping Initiative for European Waters

The second AUTOSHIP newsletter deals with the role played by the research organizations involved in the project. Short interviews have been made to researchers coming from SINTEF and the UNIVERSITY OF STRATHCLYDE in order to further explore their work in the frame of the activities performed in AUTOSHIP.

Moreover, in this issue we could not forget about the latest press events that have seen AUTOSHIP under the spotlight! You will also find the interviews released by Kongsberg Maritime and Blue Line Logistics to HORIZON: The Research & Innovation Magazine and to the BBC World Business Report!

The AUTOSHIP Industry and Research Partners Perspectives

The AUTOSHIP project will develop test methods and development principles to create a manageable framework for development and qualification of sensors and control systems. Traditional control systems still rely on humans to perform perception and navigation and it is mostly this field that will require AI/Deep Learning technologies.

AUTOSHIP wants to set up a complete set of Key-Enabling Technologies (KET), which will include on-board autonomous machineries and autonomous navigation systems. Key features will be developed far beyond current availabilities with a focus on main challenges enabling the automation leap in:

- navigation, awareness and control challenges,
- sensors, detection, predictive maintenance and safety challenges,
- connection and communication with onshore infrastructures.

KETs will also include the integration of Data Analytical and Simulation Centers with the purpose of developing and optimizing the A.I. solutions (e.g. Machine Learning algorithms, Health and Energy Management solutions) and a Digital Twin simulation model respectively. All systems will be integrated into one or several Digital Platforms, which will provide access to advanced data analytics and machine learning tools and methods that can be utilized by applications that are built.

AI and Machine Learning algorithms are all based on the concept of learning from data. As the vessels travel along their routes, they will record sensor data, which will be used to train and improve the vessel's autonomous capabilities. The project will identify which kinds of data are necessary to train and verify the models, so that the vessel will operate safely under given conditions (for example night vs. day or clear vs. foggy.). As more data is a gathered, it will be possible to deploy improved models to the vessel with new "learning" that enhances the vessel capabilities. Use of a simulator may enable us to shorten this cycle, enabling accelerated learning and verification of new models.

While developing IP protected technologies, AUTOSHIP wants to set up common tools that will support the scientific community to approach the design of next generation autonomous ships! The project partners leading this task are SINTEF OCEAN AS, UNIVERSITY OF STRATHCLYDE (Naval Architecture, Ocean & Marine Engineering, NAOME Department), their research and investigations will allow generating and evolving common assets like simulators, Support Decision Tools for techno-economic analysis, training protocols and legal and insurance frameworks. On the other hand, BUREAU VERITAS will provide the right support to build the regulatory framework.
Let's get to know them down below!

SINTEF Ocean AS

SINTEF Ocean AS is a company constituted by the Norwegian Marine Technology Research Institute, SINTEF Fisheries and Aquaculture and the department for environmental technology in SINTEF Materials and Chemistry, which merged together on 1st January 2017. In the framework of the project, SINTEF Ocean will be leader for WP3 Common challenges, methodologies, standards and tools, WP6 Autonomous Ships public awareness and stakeholder engagement and WP8 Business perspective, Roadmapping and international shipping scale-up requirements. It will also take part as partner or task leader in several of the other WPs. It will be both a relevant asset and know-how provider complementing the Industrial Partners and the Liaison Officer with the SAG (Stakeholder Advisory Group).

The researchers primarily responsible for carrying out the research and/or innovation activities are:

Ørnulf Jan Rødseth is a Senior Scientist at SINTEF Ocean and is the manager of Norwegian Forum for Autonomous Ships, with more than 25 years' experience in maritime information and communication technology. In the last years, he has worked mainly with autonomous ship technology and maritime digitalization.
"AUTOSHIP has a dedicated work package on public awareness and stakeholder engagement. SINTEF Ocean is leading this activity and we are making active use of the international networks we and the project partners have established through more than eight years activities in

the area of autonomous ships. This includes the liaison to our strategic advisory board, work in international standardisation and dissemination towards important public authorities such as IMO, EU, EMSA, UNECE, CCRN and others. An important objective of the project is to contribute to the rapid adoption of autonomous ship technology by disseminating technical knowledge and specifications as well as ensuring the public that the technology is safe, contributes to sustainability goals and will be crucially important for the future European transport system."

Lars Andreas Lien Wennersberg is a Research Scientist at SINTEF Ocean in Trondheim, Norway. He has a background from simulator-based testing of maritime control systems and engineering of maritime power, distribution and propulsion systems. His research focuses on design and test methods of autonomous ship systems.

"My role in the AUTOSHIP project is related to development of a design methodology for autonomous ship systems that aims to facilitate cost-efficient and sustainable waterborne transport solutions, safe operations and contribute to standardization and simplification of approval processes."

Håvard Nordahl is a Research Scientist at SINTEF Ocean in Trondheim, Norway. He has a background from simulator-based testing of maritime control systems and offshore modification projects. His research focuses on standardisation of simulations, design and cost evaluations of autonomous ship systems and autonomous shipping in general.

"My role in the AUTOSHIP project is related to the development of a generic business case model and a decision support tool based on this model. The tool will enable companies and authorities to evaluate the economic and environmental impact of investments in new ships, shipping routes or completely new waterborne transport systems."

University of Strathclyde

The University of Strathclyde is a leading international technological institution ranking among the top-20 research-intensive universities in the UK and has received the Entrepreneurial University award for four consecutive years. The Engineering Faculty is one of the largest in the UK and joint research of the Department of NAOME (Naval Architecture, Ocean & Marine Engineering) with the other Faculty's Departments is rated fourth in the UK. In AUTOSHIP, the Maritime Safety Research Centre (MSRC) will play a key-role as a leader of WP2 and WP7 whereas contribute to several tasks. MSRC will have key contribution to the following tasks: the scenarios assessment for the 2 demonstrators, development of the framework for the safety and security assurance in Autonomous Shipping, regulatory framework mapping, development of the proposal

on the required regulatory framework for submissions to IMO, liability analysis, socio-economic assessment of the autonomous shipping, and the scaling up of autonomous shipping in ocean going maritime transport. Through its extensive partners network, MSRC will contribute to the dissemination of the project results, organization of the conferences and publications in scientific journals.

In the framework of the project, *"MSRC coordinates two WPs (WP2 and WP7) of the Autoship project. WP2 focuses on addressing the safety, security (including cyber-security) of the next generation maritime autonomous surface ships (MASS) and includes activities on the supply chain mapping, the regulatory framework analysis, the risk assessments and identification of acceptance criteria for the two AUTOSHIP use cases, the identification of acceptance and operational Key Performance Indicators (KPIs) as well as the development of a holistic safety framework for MASS. WP7 addresses the objective of the regulatory and socio-economic framework for the adaption and acceptance of the next generation MASS and include activities on field surveys, comprehensive analyses of regulatory, liabilities, societal, environmental and economic aspects, the development of the training framework for the operation of next generation MASS, as well as on the complete supply chain and logistics modelling."*

The persons primarily responsible for carrying out the proposed activities are:

Gerasimos Theotokatos is the DNV GL Reader of Safety of Marine Systems at the MSRC, Department of NAOME, University of Strathclyde, Glasgow. His research focuses on the development of scientific approaches to holistically capture the safety, energy and sustainability interplay of the complex marine systems including cyber-physical and autonomous systems by employing advanced model-based methods and tools for their design and optimisation pursuing life-cycle risk and energy management, efficiency improvement, and safety and sustainability enhancement.

Victor Bolbot is a Research Associate at the Maritime Safety Research Centre, Department of Naval Architecture, Ocean and Marine Engineering, University of Strathclyde, Glasgow. His research focuses on safety and cybersecurity of marine autonomous and complex systems. His recent research output includes publications on safety analysis of power systems on cruise ships, scrubber systems, dual-fuel engines and cyber security risk assessments.

Evangelos Boulougouris is the MSRC Director and RCCL Reader of Safety of Maritime Operations, Department of NAOME, University of Strathclyde, Glasgow. His research focuses on the safety of ship operations, holistic design optimization and design for safety. He is RINA Fellow and member of SNAME.

BUREAU VERITAS MARINE & OFFSHORE REGISTRE INTERNATIONAL DE CLASSIFICATION DE NAVIRES ET DE PLATEFORMES OFFSHORE

BUREAU VERITAS MARINE & OFFSHORE - one of the world's leading classification societies and offshore safety and verification bodies, which offers solutions for all types of ships, including Roll-on, roll-off ships, Inland navigation vessels, Container ships, Bulk carriers – is involved in the activities carried out in WP2 and WP7

Jérôme Faivre is Smart Ships Rules Manager in the Development Department of BUREAU VERITAS Marine & Offshore Division. After 22 years as a naval senior surveyor, he has developed a large experience in Marine and Offshore fields and engineering management. His main responsibilities include development of Rules for autonomous and remote-controlled units.

"Bureau Veritas, as classification society, has a key role in WP2, to map and analyze the existing regulations and rules to be considered for the two use cases, also identifying gaps or need for revisions. BV will be involved also in WP7 to assess liability scenarios and in WP8 to identify and formulate potential rules amendments and a proposal of the required regulatory framework for operating the next generation of autonomous ships in national and international waters for submissions to IMO. Finally, it will be responsible for involving class in project activities (WP9). The main expected result of the project is to move from recommendations to requirements, i.e. convert the Guidance Note NI 641 "Guidelines for Autonomous Shipping" into a new "Rules Note for Autonomous Shipping" including specific additional class notations for autonomous ships."

AUTOSHIP ON AIR!

The European autonomous shipping industry is gaining more and more attention week by week, because of its potential to reduce pressure on roads and cut emissions. In this context, the AUTOSHIP project stands out as one of the most promising initiatives, which is attracting the attention of industries, stakeholders and general public. In the past few weeks, in fact, representatives from Kongsberg Maritime and Blue Line Logistics were interviewed to discuss about the project aims and objectives, as well as the results achieved so far.

Kongsberg Maritime interviewed by HORIZON: The EU Research & Innovation Magazine

Moving more goods from road to water is currently held back by labour shortages. "*Automated or semi-automated shipping, which requires fewer people aboard vessels, could help expand the capacity of Europe's shipping industry*". This is the focus of the latest article by HORIZON, which selected AUTOSHIP as a successful story of the European research on automated shipping.
Jason McFarlane, R&I Manager at Kongsberg Maritime, was interviewed to discuss about the automated shipping coming to Europe's waters, the potential of autonomous or semi-autonomous ships and on the benefits that this transformation will bring to the European maritime industry.
In the interview, the technologies, the aims and the goals of the project were described, as well as the benefits that the automated ships will provide: "*One is to increase the attractiveness of water-based transport, [...]. Another is to reduce road traffic and cut emissions. [...]*".
Read the complete article here.

AUTOSHIP on the BBC World Business Report

Shipping has evolved a great deal over the years, so is the next move towards autonomy? Would also smart shipping build a more crisis-resilient (e.g. pandemic-) system?
Antoon Vancoillie, from Blue Line Logistics, and Ann-Margrit Ryste, from Kongsberg Maritime, were interviewed by the BBC to discuss about the role, the potential and the points of attention of autonomous and smart shipping in European waters, taking into account the contribution that the AUTOSHIP project will bring to the autonomous shipping industry.
During the interview, BLL described its firm's Zulu barges, which have the potential to be remote controlled and are already cruising. In addition, Kongsberg Maritime explained why it is important to support the automatization of the maritime industry and its role in AUTOSHIP, the largest EU funded initiative for autonomous ships.
The complete interview is available here.

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