



ANNUAL REPORT 2016

Kotka Maritime Research Association





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1. FOREWORD



KMRC skill survey – basis for targeted improvements

Implementation of the new strategy, published in 2015, started with redefining the role and tasks of the Kotka Maritime Research Centre (KMRC) having a more active manner.

The KMRC skill survey has been a tool for an internal basic level discussion about the new joint aims. Based on the skill survey we agreed that there are four core skills and several critical skills which describe the abilities inside the KMRC.

The KMRC core skills are strong interdisciplinary scientific knowledge, ability to perform relevant research for decision making processes, ability to maintain communication between science, authorities, business life and other relevant stakeholders. Finally, the final core skill is the ability to produce relevant project applications which utilize the joint understanding of KMRC actors and to perform professional project management.

The basic structure of the KMRC creates good possibilities to integrate competences on technics, social science, economics and environmental science to reach our target: increase maritime safety and the status of marine environment. The KMRC co-operation network already includes engineers, statisticians, social scientist, limnologists, ecologists, fishery scientists, environmental scientists, geological scientists, geographers and master mariners. This combination of skills is quite unique in the scientific community, especially within the Baltic Sea area.

The KMRC has extensive experience with multi- and interdisciplinary research activities, linked to policy-relevant development in a wide inter-national network. We are able to use effective tools, e.g. interdisciplinary models, which can gather and analyze information from various sources.

The strategy work will continue strong this year. We also wish to hear the viewpoints and hopes for our work from our stakeholders. Through active dialogue we will get a solid direction on how to move towards a more sustainable maritime transport in today's complex environment.



Anna Kiiski

Executive Director

The Kotka Maritime Research Centre



2. SHORT HISTORY OF KMRC



The Kotka Maritime Research Centre was established in 2005. The main need for a maritime research center was strongly affected by the 'Kotka maritime cluster' which is based on marine operators and activities in the City of Kotka. These are the Port of HaminaKotka, the biggest universal export port in Finland, the long history of maritime education in the Kymenlaakso University of Applied Sciences and the Etelä-Kymenlaakso Vocational College and the marine cultural attractions, the Maritime Centre Vellamo and the aquarium Maretarium.

The strong interest in the city of Kotka started the process towards wide co-operation among the authorities, research institutes and regional developers to jointly establish a maritime research center located in Kotka. Today the Kotka Maritime Research Centre provides high-quality research in the fields of maritime transport, maritime safety and marine environment. The key aim is to understand and develop the functioning and dynamics of ship operations and technology, maritime traffic and policy. Furthermore, research is being aimed to assess the environmental and safety risks related to maritime traffic but also to develop new intelligent tools for management and decision making purposes.

Research in KMRC is currently based on the active collaboration between researchers from the University of Helsinki, the University of Turku, the Aalto University and the Kymenlaakso University of Applied Sciences. Key actors include also the Finnish Environmental Institute, Natural Resources Institute, Finnish Transport Safety Agency and Metsähallitus. A regional perspective is delivered by the development company Cursor Oy. A strong link to the education of mariners is received through the South-Eastern Finland University of Applied Sciences (former Kymenlaakso University of Applied Sciences) and the Etelä-Kymenlaakso Vocational College.

3. RESEARCH IN KMRC



University of Helsinki

The Fisheries and Environmental Management Group (FEM) focuses on the interaction between ecosystems and human society. The research interests include: 1) Decision and risk analysis of renewable resources and biodiversity, 2) Identification and quantification of risks in the use of natural resources and in the various maritime activities, 3) Integrating different sources of data and knowledge: Bayesian analysis, 4) Cross disciplinary modeling of exploitation processes of natural resources in the face of risks and uncertainty in the information. Practically all applications focus either on the fisheries science or on oil spill risk analysis.

The pressures that create main risks in the aquatic ecosystems are usually originating from human activities. Therefore, we need human sciences to solve the problem. In the FEM research projects, there are usually scientists from biology, limnology, fisheries management, geography and sociology involved. Mathematicians and statisticians build decision and risk models from the knowledge of these substance fields.

Bayesian analysis forms the backbone of the environmental modeling approach of the FEM group. It provides an effective tool to learn from various information sources. These sources include data, models and their theoretical background, and expert knowledge. In the models, all uncertain variables have a probability distribution, and it is possible to estimate the uncertainties of all interest variables included in the model. For example, the FEM group has estimated the effectiveness of an oil combating fleet to collect oil from an oil spill. These estimates help to understand how large the spills can be, based on the likely amounts of stranding oil. This analysis included the probabilities of accidents in 5 different areas in the Gulf of Finland.

In the oil spill impact analysis, it is important to develop a methodology, which allows learning from previous accidents. This is important in the sense that uncertainties in impact predictions are high. By creating Bayesian models that can learn from and transfer information from previous accidents, it is possible to decrease uncertainties about future accidents.

The FEM group was established in 2005 and has been steadily growing to a large consortium of collaborating research groups.

This development was made visible in the end of 2016, when the group was split into smaller units. Professor Sakari Kuikka continues to lead the FEM group, whereas the group of professor Samu Mäntyniemi is now known as the Bayesian Environmental Modelling Group (BEM).

PICTURES Kuikka, Mäntyniemi & researchers

Aalto University

Marine safety research is focused on developing concepts, methods and frameworks for creating safe technological and socio-technological systems for maritime operations, and for managing their risks. These advances to the foundations of Risk Analysis and Safety Science are applied to specific problems in the maritime application area. Thus, this serves society by increasing understanding of how maritime safety is created and maintained, and how maritime risks can be effectively managed.

Safety as such is a multidisciplinary science, which requires systems-theoretic accident models, a critical but constructive attitude to improve state-of-the-art, both in terms of foundations and applications, cross-disciplinary interaction, statistical techniques (Bayesian Networks, Generalized Linear Models), data analysis and modeling, as well as expert elicitation procedures.

Advanced ships such as large cruise ships require new and improved situational awareness and a decision support system (DSS) for flooding-related ship survivability assessments. These systems should integrate real-time operational data from traffic management systems (AIS, radar, environmental conditions, etc.) and on-board



Pentti Kujala

surveillance activities, collision and grounding damage models, progressive flooding models, evacuation models and models accounting for the effects of risk mitigating technologies. Researchers at the School of Engineering have several fields of interest on these topics, especially the re-search groups of advanced structures and marine hydrodynamics are actively working on the damage models and flooding simulations.

University of Turku

The Centre for Maritime Studies (CMS) is an international education and research centre. CMS offers diverse research agenda in the fields of maritime industries and logistics for public and private sector organizations.

In 2016, the CMS team located in Kotka included three full-time researchers: researchers Olli-Pekka Brunila and Vappu Kunnaala-Hyrkki and research director Professor Tommi Inkinen, who is also the deputy director of the Brahea-Centre of the University of Turku.

The main objective is to conduct high quality research that has both academic significance as well as applications. The research focuses both on academic (basic) and applied research that is linked with practice. The scientific research is multidisciplinary, combining business studies and economics together with environmental and social sciences. The CMS research agenda also highlights the role of a research integrator in maritime research. CMS applies its extensive collaboration network to support both national and international networks and partnerships.

CMS has three main fields of research:

- 1) Shipping and maritime logistics, including: Maritime transport and infrastructure; Port networks and port operations; Maritime safety studies; pilotage operations; National security of supply
- 2) Maritime cluster, including: Development of marine industries; Cluster dynamics and economic impacts; Corporate social responsibility in shipping operations together with studies focusing on Blue Growth
- 3) Marine environment and spatial planning, including: Efficiency and impacts of environmental regulations in shipping; Environmental status of ports; Marine spatial planning; Shipping and offshore activities in the Arctic; Performance and impact of the European ports system; Integrated knowledge base and management system for ports

Another active research area is ship-ice interaction, which is of crucial importance in understanding both the resistance of ships in ice and ice-induced loads on ships in ice. In this area, extensive experiments are conducted with models and in full scale, including simultaneous ice thickness and ice load measurements on board a ship in ice-covered waters. The aim is to improve the understanding of the strong stochastic nature of ice-induced loads together with ship navigation through dynamics ice fields which have crucial importance for the safety of ships.

The key personnel in this group are: professor Pentti Kujala, Post Doc Floris Goerlandt, Post doc Otto Sormunen and doctoral student Osiris Valdez Banda.



Kyminlaakso University of Applied Sciences Kyamk

(from 1.1.2017 renamed as Southeastern University of Applied Sciences Xamk)

Kyamk's applied research focuses on maritime safety and security and managing environmental risks related to the maritime operations. Main research topics include pollution prevention and spill response management, maritime emergency response and distress operations as well as energy efficiency in port operations and shipping, sustainable fuels and ship emission measurements. Research projects on the logistics aim to develop green and efficient transportation corridors, innovate logistics business concepts and processes and promote operational networking of logistics hubs and clusters.

In the year 2016 Kyamk's maritime research activities focused on two main sectors: developing oil spill response management and improving maritime competencies and education. The development of oil spill response capacity was carried out within four projects, SÖKÖSaimaa, Älykö, SCAROIL and SCAROIL Simulators, as well as two expert services, one for voluntary oil spill response organizations and other for the Finnish Environment Institute concerning oil spill response tactics and BORIS 2.0 information and situation awareness system training. Maritime education was developed in the Meri-ERKO project within the collaboration network of the main maritime education providers in Finland. The aim is to create a joint specialization education for seafarers and other actors thorough the maritime cluster. Kyamk's role has been to offer expertise in cyber security in order to improve recognition of cyber and information threats to ports and merchant vessels. Integration of Kyamk's security expertise into maritime specialization contributed to establishing a new field of research. The further increasing digitalization both on board and in ports emphasizes the relevance of maritime cyber security development, as well as simulations and ICT solutions for port and maritime operations, which Kyamk offers. Kyamk's research projects are need-based, and carried out in close cooperation with end-users providing practical, ready-to-use research results.

The total budget of Kyamk maritime RDI projects and Merikotka related projects was 3,28 million EUR in 2016 with +63% annual increase. The maritime RDI activities were conducted in close cooperation with authorities, companies, organizations and public sector agencies. Maritime and logistics research in the Merikotka context was led by Maritime Research Manager Justiina Halonen, Logistics Research Manager Teija Suoknuuti and Research Director Mervi Nurminen.

The past year of 2016 was the last in the history of Kyamk, as the new university was formed in the beginning of 2017 when Kyamk and Mikkeli Universities merged into South-Eastern Finland University of Applied Sciences (Xamk). Merger enables extended RDI capacity and thus contributes to the maritime research within the Merikotka network.

4. DOCTORAL DISSERTATIONS



Otto Sormunen, Aalto University

Uncertainty is an integral part of risk itself, affecting e.g. to what extent and how risk analysis results can be used in decision making. Despite this, the uncertainty in maritime risk analysis is rarely discussed or analyzed. This thesis addresses this uncertainty as well as selected aspects of quantitative grounding and collision consequence analysis. The thesis links these results with general risk theory through uncertainty and its effects on risk management.

The spill frequency and sizes of chemical tankers sailing in the Gulf of Finland are modeled. As the current level of understanding is lower for modeling groundings than collisions the former is investigated more in depth: Grounding damage models are investigated both on a general level and in depth in regards to the effects on the grounding damage, depending on the rock model and its differences from real sea floor data. One of the key uncertainty issues is the actual sea floor shape. Currently, the rock models used for this purpose are idealized basic geometrical shapes such as cones and polynomials. Their actual similarity to real sea floor shapes is unknown but is presumed to be low. This means that the uncertainty regarding the results of such analysis is high. The same can be said of many other aspects of quantitative maritime risk analysis.

This thesis introduces a systematic approach to mathematical modeling the sea floor. The rock model damage results are compared to results obtained using the real sea floor shape. The results were inconsistent in terms of equal damage using the sea floor data and the model results, even with statistically well-fitting models. This currently makes grounding models that require precise input regarding sea floor shape uncertain to use. Regional grounding damage modeling is still possible with models that do not need this input but these models lose some precision compared to the more detailed methods.

Furthermore, the uncertainty of all the models utilized in the thesis is shown to be medium to high. This affects the usability of such risk analysis results in risk management. Further recommendations for future research include i.e. more in-depth sea floor shape analysis.



Riikka Venesjärvi, University of Helsinki

The results of her thesis, partly carried out in the former OILRISK project, demonstrate that environmental risk assessment models can be used to structure problems, integrate knowledge and uncertainty, and persuade decision-makers by visualizing the results. Since the objective of risk assessment is to synthesize information for environmental management and policy design, which should rely on the extensive use of scientific evidence, communication between academia and decision-makers is of great importance.

The main findings are, that in oil spill risk management, the marine ecosystem should be prioritized based on its conservation value, recovery potential and protection effectiveness. Secondly, because preventive measures against oil accidents are considered cost-effective, maritime safety should be increased, with stricter and regional ship inspection practices. The effects of policy innovations should be assessed using probabilistic policy-support tools.

"Oil spill risk management, the marine ecosystem should be prioritized based on its conservation value, recovery potential and protection effectiveness."

"Uncertainty should be systematically analyzed and explicitly communicated in maritime risk studies."



Jouni Lappalainen

**Jouni Lappalainen,
University of Turku**

The purpose of this thesis is to explore Finnish maritime personnel's conceptions of safety management and its relationship with the concept of safety culture. In addition, the aim is to evaluate the impact of the ISM Code on the prevailing safety culture in the Finnish shipping business. A total of 94 interviewees and seven Finnish shipping companies were

involved in this study. Thematic interviews were applied as the main research method for the study. The results were analyzed qualitatively.

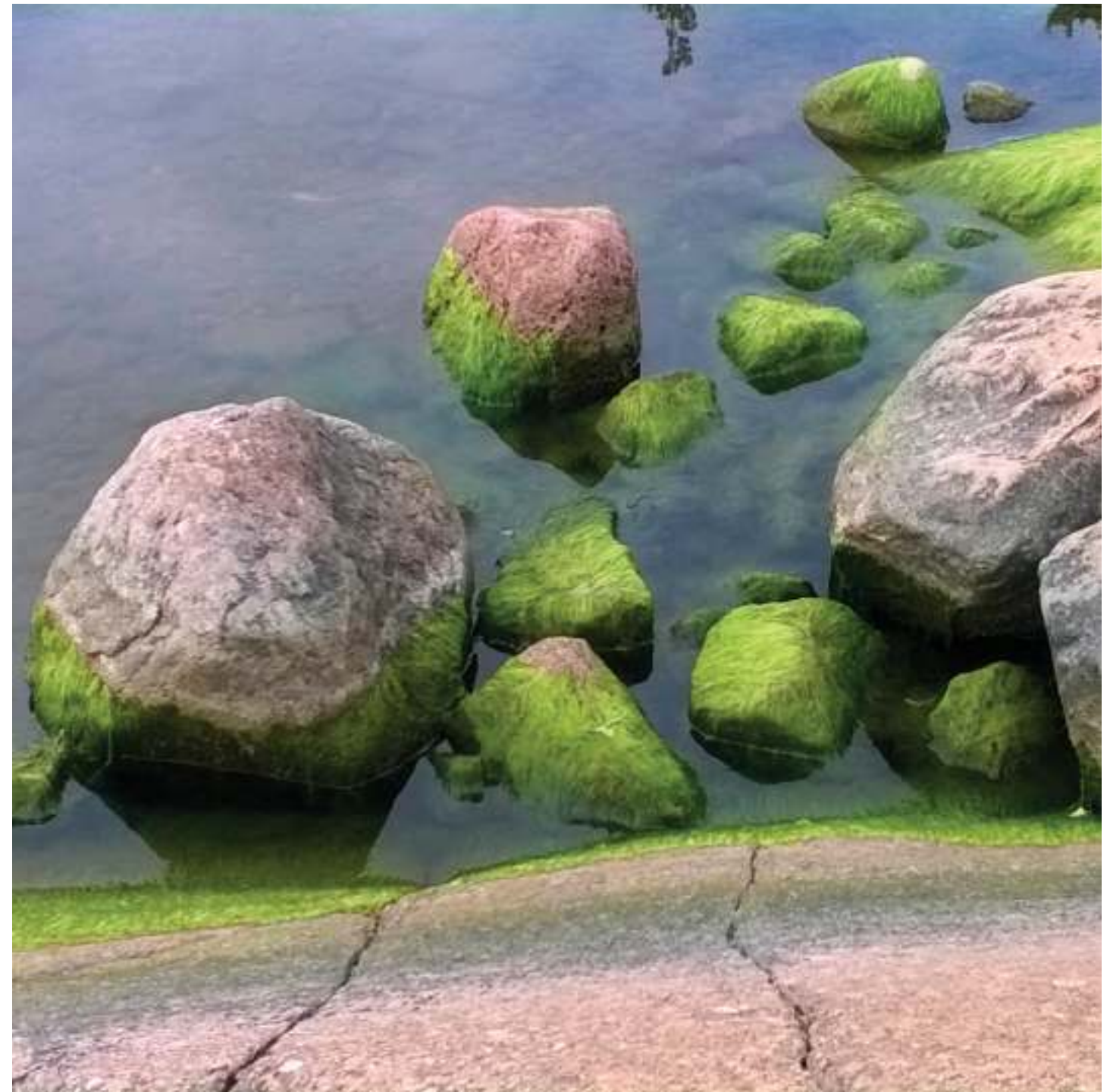
The results indicate that the maritime safety culture can simultaneously demonstrate features of integration, differentiation and ambiguity. Basically, maritime personnel have a positive attitude towards safety management systems since they consider safety management beneficial and essential in general. However, the study also found considerable criticism among the interviewees. The interviewed maritime personnel did not criticize the ISM Code as such, yet they criticized the way the ISM Code has been applied in practice.

In order to understand the multiple perspectives of safety culture more comprehensively, multiple theoretical perspectives and methodological approaches are needed. This study indicates that safety culture and the impacts of the ISM Code should not be unambiguously studied solely through using quantitative methods or qualitative methods. By examining safety culture from several methodological and theoretical perspectives, one may gain a more versatile and holistic over-view of safety culture.

"In order to understand the multiple perspectives of safety culture more comprehensively, multiple theoretical perspectives and methodological approaches are needed."

Rüdiger von Bock und Polach, Aalto University

The increasing levels of transportation and exploratory activities in the High North increase the significance of ice-capable ship designs, and the demand for them. This demand covers a wide range of ship types; such as tugs, vessels for search and rescue (SAR), patrol boats, military vessels, cruise ships, and merchant ships. Both the economically driven preference for operations in the Arctic over operations in a warmer climate, and the safety of these operations, require adequate performance prediction methods. The capability of model-scale ice and its availability and advantages in handling compared to sea ice spurred on the decision to investigate its material behavior to develop a numerical model. This model serves as a cornerstone towards a numerical ice tank and provides insight into the mechanical behavior of model-scale ice.





5. TOP PROJECT: 30MILES



30 Miles

The project 30MILES (Small port every 30 miles apart – Development of services for lively water tourism in the Eastern Gulf of Finland) aims at improving the overall service level and safety in small ports enough and the waterfront. The noticed problem is that there is no network of small ports with a good service level and piers for leisure boaters to visit. As better small ports increase the attractiveness of the region, the project's idea is to organize small ports into a cooperating network in the distance of every 30 miles.

In practice the project establishes a ring of ports around the Eastern Gulf of Finland to focus on joint development of sustainable and safe port services and marketing activities. Joint efforts are made to improve the services offered in small ports and help them receive better visibility from the potential visitors. Effective marketing is implemented to inform the visitors and to create sustainability for the local businesses.

As a result, the project service level increases in 12 small ports in the Eastern Gulf of Finland. The new ring of ports creates an attractive entity which is in the best interest of boaters. The information about the services of the ports and accessibility is clearly presented. The improvements attract new businesses and investors, which in turn attract more visitors to the area.



Small port every 30 miles apart – Development of services for lively water tourism in the Eastern Gulf of Finland

Consortium

Lead partner: Kotka Maritime Research Association.
Other partners: Southeast Finland University of Applied Science, University of Helsinki, Cursor Ltd and Posintra Ltd. The partners in Estonia are Ida-Viru Enterprise Centre, Reconstruction and Operation of Eisma Port, Viimsi municipality, Estonian Maritime Museum, Narva Department for City Development and Economy and Narva-Jõesuu municipality.

Implementation period:

1.9.2015–31.5.2018

Total budget:

3,3 M EUR

Funding:

Interreg Central Baltic 2014-2020 Programme, Regional Council of South-west Finland and participating organizations both in Finland and Estonia.

Working for safer sailing in the Eastern Gulf of Finland

Tomi Oravasaari,

South-East Finland University of Applied Sciences

The 30MILES project was initiated to facilitate tourism by developing the safety of small harbors in Finland and Estonia. The safety work includes elements visible to the common boater and elements that improve the safety behind the scenes.

The aim of the project is to attract new visitors to the 30MILES ports and thus it is important that boaters can feel confident enough to take a journey by sea to a new destination. To facilitate the journey planning, the project has produced detailed approach videos for every 30MILES port.

In some cases the approach is pretty straightforward, but especially in Finland, the fragmented archipelago can make the approach a bit more challenging.

The Approach videos easily point out important sea and land marks and show how they look like in place. Although it is very common to use electronic navigation devices it is important to note that the GPS location accuracy can vary from 5–10 meters, which is sometimes too much in the Finnish archipelago. Electronic navigation does not replace visual navigation.

All routes will be available as electronic files, which can be downloaded and viewed in the boater's own route planning software or electronic navigation device. These routes will be also presented on a map.

A route risk analysis was conducted to examine the possible risks related to sailing in the Eastern Gulf of Finland. The route risk analysis was conducted by interviewing 19 professionals from different sectors including public authorities, commercial operators and associations. Based on the analysis the key risk factors are related to the safety consciousness and boaters attitudes towards safety. It is important that boaters invest time in route planning and also report the planned sailing route and changes to the sailing route to others. Weather conditions need sufficient advance preparation; eg. water is relatively cold for the whole sailing season in the Eastern Gulf of Finland.



Tomi Oravasaari

To improve harbor safety all harbors will be safety audited during spring 2017. Based on a preliminary port safety review, the project has acquired a defibrillator for cardiac arrest situations to eight out of twelve harbors.

The main goal of the safety work is to improve the safety in 30MILES harbors and routes, but it is evident that our work will have an even wider beneficial effect for sailing and port safety. We hope that eg. the route risk analysis, the port safety auditing model and the online course on port safety will be useful not only for 30MILES ports but also for other small harbors in Finland.

30MILES initiator of new co-operation

From co-operator Topi Haapanen, Posintra Oy

The development of guest harbors in the Eastern Gulf of Finland has gained speed from the 30MILES -project. Work is conducted in the chosen guest harbors according to their needs and following the project plans, while also supporting the development plans of each marina in question. The development companies Posintra Oy and Cursor Oy are in charge of the project execution in the Finnish guest harbors.

During the project new sorts of co-operation has developed between new partners and interest groups. To support the conducting of the harbor sites, the 30MILES -project has formed local expert groups. These so called harbor work groups have enriched the planning process and enabled the participation of different parties in the joint development efforts. Sustainable guest harbor activity is based on multi-aspect planning. The harbors cannot be sustained only through the renting of pier spots, the operator must build their overall services from multiple parts. In harbor work groups boaters, service providers, travel professionals, city planners and researchers have gathered their know-how and experience together and so strengthened the development work.

Also the international facet of the 30MILES-project together with harbor sites in Estonia has also opened a wider view on the free-time boating on the whole Eastern Gulf Finland as a whole.

The differing backgrounds and working environments of guest harbors in Finland and Estonia have an effect on the realization of the project, where the project experience of the main partner is emphasized. The Merikotka lead 30MILES project has created co-operation that hasn't existed before.



Topi Haapanen



6. OTHER ONGOING RESEARCH PROJECTS

The LRF research center of excellence for Arctic shipping and operations (CEARCTIC)

Pentti Kujala, Mihkel Kõrgesaar, Mikko Suominen, Mikko Kotilainen and Roman Repin, Aalto University

Aalto University is chairing the new centre to cover all the important topics crucial for the risk-based design of ships, shipping and other Arctic operations. The challenging targets for the LRF-CEARCTIC are planned to be achieved e.g. by the careful planning of the activities among the participating universities. In total 17 doctoral students are at least partly funded by LRF-CEARCTIC. In addition, 10 senior researchers will take part in LRF-CEARCTIC activities. Three doctoral candidates in Aalto University are concentrating on the studies related to the ship-ice interaction, the definition of ice-induced loads and how to link the loads to the prevailing ice conditions and ships main particulars. In addition one post doc is working to analyze the ultimate strength of ship shell structures under ice loading. The LRF Annual Assembly was organized as part of SMM in Hamburg on the 9th of September 2016. During 2016, 12 journal articles were accepted and 5 were submitted.

Cooperating entities: Helsinki University, NTNU, MEMORIAL in Canada and TUHH in Germany

Funding: Lloyd's Register Foundation

More information: cearctic.aalto.fi/en/

Integrated governance of Baltic herring and salmon stocks involving stakeholders (BONUS GOHERR)

Researcher: Suvi Ignatius, University of Helsinki

The aim of BONUS GOHERR is to develop a regionalised governance framework involving stakeholders, and a related decision support tool for the ecosystem-based management of the Baltic herring and salmon stocks. The framework combines biological, public health and social scientific perspectives related to the use and management of these two interrelated keystone fisheries of the Baltic Sea. Thereby it contributes to developing the ecosystem approach to fisheries, which requires holistic thinking and comprehensive representations of the ecosystem, including social

components. Adaptive management and integrated management are seen as tools for responding to the challenge of implementing the ecosystem approach. The following will be analyzed: 1) what are the socio-cultural and political prerequisites for successful regionalised fisheries governance, and what kind of institutional, organizational, structural and attitudinal flexibility is needed, 2) if and how integrated fisheries governance can benefit the sector based management of Baltic herring and salmon stocks, the stakeholders, and eventually consumers, and 3) how governance at the regional level can be linked to governance at the national and international levels.

Funding: Baltic Sea Research and Development Programme BONUS (2015–2018)

More information: goherr.com

Strategic and operational risk management for wintertime maritime transportation systems (STORMWINDS)

Researcher: Osiris Valdez Banda, Aalto University

The STORMWINDS project aims to contribute science-based analyses and practice-oriented tool developments for enhancing maritime safety and accident response, during winter in the northern Baltic Sea. Consequently, regional and sub-regional policies highlight the need for developing preventive measures to improve the safety of navigation in ice conditions. A key aspect is strengthening the cooperation between organizations, facilitating safe navigation, and safety management tools available to these organizations. The first research theme addresses accident prevention through the development and application of systems-theoretical accident theories to the vessel control system. The second development path builds on systems-theoretic accident theories to develop an indicator-based safety management model for Vessel Traffic Services (VTS). A third research theme addresses pollution response in winter conditions. Thus, STORMWINDS aim to advance maritime risk analysis and management, taking an interdisciplinary approach to improve maritime safety.

Funding: Baltic Sea Research and Development Programme BONUS (2015–2017)

More information: stormwinds.aalto.fi

Sustainable growth in the Gulf of Bothnia (SmartSea)

Riikka Venesjärvi from the University of Helsinki works as a researcher in the project

SmartSea is focused on the Gulf of Bothnia as its active maritime sector ensures vast potential for Blue Growth. In addition, it is still relatively untouched compared to the other Baltic Sea areas. Furthermore, climate change will most probably have the most drastic effects in this area. In the future, this helps planners to do decisions that are accepted by society. SmartSea will bring marine spatial planning into marine areas as a tool to ensure efficient resource utilization. This is achieved by tight interactions between scientists and people applying the information. New risk analysis tools and data sets that will be developed to assist the marine spatial planning offer an opportunity to assign value judgments that combine optimally all the different sectors. The University of Helsinki estimates the adverse effects of human actions on the marine ecosystem and develops decision analysis to support the planning process. Further, the integrated value of nature will be assessed and discussed with different stakeholders.

Funding: SmartSea is part of the “*Climate-Neutral and Resource-Scarce Finland*” program, funded by the Strategic Research Council of Academy of Finland

More information: smartsea.fmi.fi/

Simulator Training for Cargo Handling and Oil Recovery (SCAROIL)

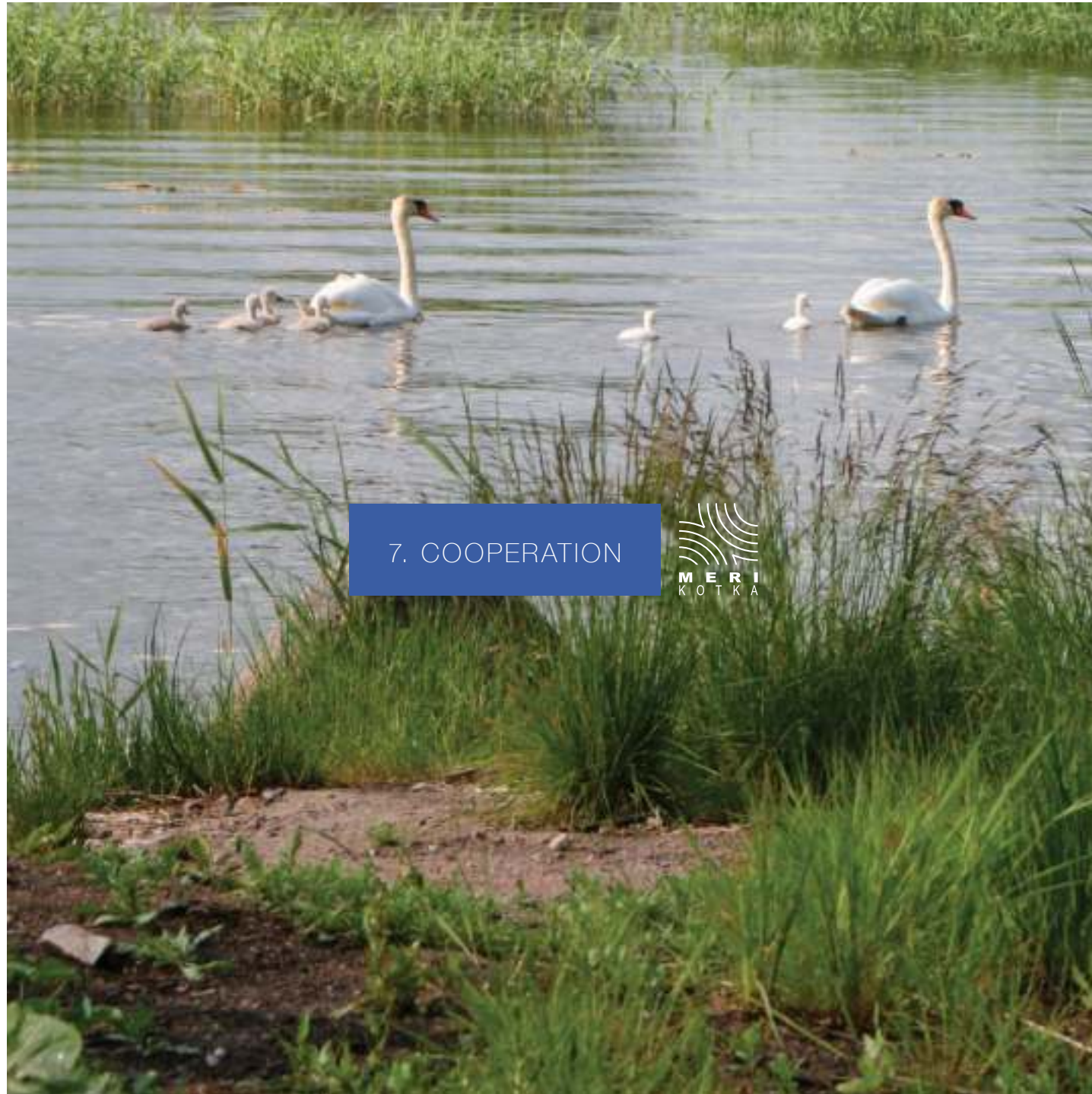
Emmi Rantavuo, Antti Lanki, Perttu Juvonen, South-Eastern Finland University of Applied Sciences & Simo Knutas, Etelä-Kymenlaakso Vocational College Ekami

The SCAROIL project develops oil spill response training for regional fire and rescue services and other response authorities. This oil spill training programme aims to utilize new educational methods; e-learning and simulator based training. In addition to fully exploiting the existing navigational bridge simulators, radio communication simulator and crisis management simulator, an entirely new oil recovery simulator is being developed. This simulator is designed to model the oil recovery process; recovery method, rate and volume in various conditions. The new simulator enables the creation of a comprehensive training programme covering training tasks from a distress call to the completion of an oil spill response operation. Integration of a navigational bridge simulator and the new oil recovery simulator creates a unique learning environment in which the marine oil spill response operations can be demonstrated and new response methods tested. The structure of the training programme, as well as the training objectives, are based on the findings from competence and education surveys. The training programme will be piloted twice during the project, and a shift in competence levels of the participants are evaluated in order to demonstrate the actual efficiency of the training. The project is carried out with Etelä-Kymenlaakso Vocational College Ekami conducting the development of cargo handling simulator training for harbor crane operators. Work-life representatives from shipping companies, harbor operators and rescue and environmental authorities participate in training development.

Funding: European Social Fund ESF, European Regional Development Fund ERDF, Finnish Maritime Foundation, Palosuojelun Edistämissäätiö and William & Ester Otsakorpi Foundation.

More information: <https://www.xamk.fi/scaroil>





7. COOPERATION



The basic structure and activities implemented in KMRC provide a natural base for national and international co-operation. Our aim is to maintain relevant networking and communication between science, authorities, business life, regional development and municipalities in the field of maritime safety and marine environment. The members of KMRC already have an extensive network for maintaining the co-operation and communication between key stakeholders. Natural links to policy implications are sought through collaboration with national authorities, e.g. the Finnish Transport Safety Agency and the Finnish Transport Agency. Cooperation activities will take place at many different levels, regionally, nationally and internationally.

The main pillar of international cooperation is built and maintained via universities and professor-ships. The researchers are part of a broad international network of experts whose existence is necessary for successful international project preparations. International cooperation is focused in the direction of Estonia and Russia, but newly applied large-scale projects have expanded to the Baltic Sea Region countries. KMRC has participated in two of the co-operation events of Kotka city which were organized in St. Petersburg in March and September of 2016.

KMRA is acting as a coordinator of the Maritime Assembly network, which is a platform for maritime professionals from Finland, Estonia and Russia. It is aimed to support the activities falling under the Baltic Sea Strategy and to create successful cooperation projects between the three countries.

KMRC is a strong international actor in the region of Kymenlaakso. The importance of regional co-operation is also defined in the new strategy. Besides its projects, the Kotka Maritime Research Centre also participates in the implementation of the Kymenlaakso RIS3 strategy and will also act for the benefit of Kotka-Hamina Region. Active co-operation among local RDI- and business networks is considered to be important. The cooperation network is active with other regional key players, e.g. Kymenlaakso Regional Council, FinnHub ry and Kymenlaakso Chamber of Commerce.

KMRC is one of the actors of the Information Centre Vellamo, which is a research and learning centre located at the Maritime Centre Vellamo. Information Centre Vellamo offers a maritime library and also archive services. All publications produced through the KMRC are available also in the library. Several times per year the KMRC researchers present their research topics in the



“Tieto-herkku” events which are held in the Information Centre Vellamo. These events are targeted to the general public interested in the topics falling under the KMRC research agenda. During 2016 two presentations were held by Riikka Venesjärvi and Annukka Lehikoinen.

Members, in addition to the main partners, include a number of public sector organizations, business representatives and associations: the municipalities of Pyhtää, Hamina, Virolahti, Porvoo and Loviisa, the cities of Helsinki, Turku and Espoo, Tampere University, Turku University, Lappeenranta University, Satakunta University, Turku University of Applied Sciences, Novia University of Applied Sciences, the National Emergency Supply Agency, the Finnish Meteorological Institute, VTT Technical Research Centre Ltd, Land Survey of Finland (GTK), the Finnish Port Operators Association (Satamaoperaattorit ry), the Finnish Port Association (Suomen satamaliitto ry), the Finnish Maritime Society (Meriliitto ry), the Finnish Lifeboat Institution (Meripelastusseura ry), the Finnish Boating and Sailing Federation (Suomen purjehdus ja veneily ry) and the Finnish Shipowners Association (Suomen varustamot ry). There is also Arctic expertise related cooperation between the Ministries.

The Kotka Maritime Research Centre aims to also implement a customer-driven business environment, as well as applied and beneficial research. The KMRC is aimed to build up efficient discussion with business life to guarantee the utilization of research results for the benefit of participating companies. Companies will have the opportunity to highlight their needs and influence the direction of project activities. Participating companies can steer project activities considered to be important development targets, as well as receive information on the latest national and international re-search projects. Research co-operation is based on the company members having to pay an annual participation fee or by a project-specific financing agreement.

Kotka Maritime Research Centre was co-sponsored by the following companies: HaminaKotka Satama Oy, Aker Arctic Technology Oy, Arctia Oy and Finnpiilot Pilotage Oy. In addition, the project level collaboration has included: Image Soft Oy, ILS Oy, Aker Arctic Technology Oy Arctia Ice-breaking Ltd, Rolls Royce Hydradynamics R&D, Napa Oy, DNV Certification Oy, Deltamarin Oy Arctia Offshore Oy, Atlas Elektronik Finland Oy, ESL Shipping Oy, Consilium Marine Oy, Iceeye Oy.



Annukka Lehtikainen



Aker Arctic



FINNPILOT



PORT OF HAMINAKOTKA

MERIKOTKA BY NUMBERS		KMRA	Aalto	HY	Kyamk	MH	TY	
		2016	2016	2016	2016	2016	2016	
Operational volume (€)								2 408 594
Personnel								
	in Kotka	4	0	3	2	2	2	13
	elsewhere	0	9	13	0	0	1	23
	person-months	48	102	192	64	48	36	490
Degrees								
	Bachelor's/polytechnic	-	2			-	-	2
	Master's /Graduate engineer/ upper polytechnic	-	10	2		-	2	14
	Doctorate	-	2	1		-	1	4
Publications								
	peer-reviewed scientific articles	-	12	13	0	0	4	29
	conference publications, abstracts, posters	-	12	4	1	0	5	22
	other publications	-		14	10	0	4	28
Projects								
	own, currently running	2	14	1	2	0	3	
	participation in projects by other actors	2	3	5	4	0	4	
	volume (€)	177 502	579 542	798 000	328 437	0	150 113	2 033 594
	submitted applications	5	3	5	3	0	4	
	posit. financing decisions	0	1	1	0	0	1	
Media appearances								
	TV	0	0	0	0	1	0	
	papers and magazines	13	3	3	10	7	0	
	radio	1	1	2	0	1	0	
Seminars								
	Merikotka seminars and events in Kotka	1		1	1	0	1	
	other organized seminars	3		4	9	0	0	
	appearances in external seminars	4		17	16	2	8	
Research co-operation								
	participating companies	6	10		11	0	2	
	company financing (€)	26500	15000		7500	0		49000

THE MEMBERS AND DEPUTIES OF THE KMRA BOARD IN 2016:



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