

RISK MANAGEMENT, MARINE INSURANCE AND CHARTERPARTIES – FORMULATING THE RESEARCH NEEDS FOR AUTONOMOUS VESSELS IN MARITIME UNIVERSITIES

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Abstract:

The article describes work in Finland in forming international research group/network on activities relating to autonomous and remotely operated vessels, which concentrates in tackling marine business related obstacles and solutions especially for risk management, marine insurance and charter parties legal issues. Comparative approach to these issues connects national and international experts to network and future research alliance in MET. The purpose of the activities is to create a network of experts which will seek funding for future work to enhance Nordic model of risk management for autonomous vessels. The Nordic Marine insurance Plan already has a relevant market share in marine insurance worldwide, but the specific research area is promoting applications for research activities which lead to the Nordic solution to be the market leader in marine insurance for autonomous and remotely operated vessels worldwide. The article describes the benefits of this approach in relation to other jurisdictions. This approach will also concentrate on facilitating the maritime transport by renewing the charter party clauses for the benefit of those operators who use the Nordic Marine insurance plan for the basis of their risk management strategy and possibilities to use cost effective Nordic Offshore and Maritime arbitration (NOMA). The article is part of promoting research activities in forming research alliance and networking of experts internationally for international maritime transportation.

Keywords:

autonomous and remotely operated vessel, marine insurance, charterparties, risk management, research in MET.

INTRODUCTION

Nordic countries are leading the technological development of autonomous shipping and they are in forefront of the testing of the commercial solutions. The technology itself is mainly based on existing solutions with new applications for the maritime industry. However these solutions will have a huge impact on maritime industry in future. How this future is formed in different parts of the world depends much on the economical pressure to gain benefits of replacing crew both partly by transferring crew work to technological solution step by step and in some cases

creating vessels which are fully autonomous. For example countries with sheltered waters, like Norway with its fjords and high salary cost have much to gain. Finland with its large archipelago also can benefit fully autonomous vessels to cut cost. Another example in Europe with large archipelago is Croatia. Japan is a good example of a country with ambitious strategy for autonomous vessels due to lack of seafarers and it's policy not import foreign seafarers – They need to invest in technology first to support the crew and then by 2030 to build fully autonomous vessels as the ageing Masters will finally retire.

This article describes work in Finland in forming international research group/network on activities relating to autonomous and remotely operated vessels, which concentrates in tackling marine business related obstacles and solutions especially for risk management, marine insurance and charter parties legal issues. Comparative approach to these issues connects national and international experts to network and future research alliance in MET. The purpose of the activities is to create a network of experts which will seek funding for future work to enhance Nordic model of risk management for autonomous vessels. The Nordic Marine insurance Plan already has a relevant market share in marine insurance worldwide, but the specific research area is promoting applications for research activities which lead to the Nordic solution to be the market leader in marine insurance for autonomous and remotely operated vessels worldwide.

1. DEVELOPMENT OF AUTONOMOUS SHIPPING

The technological development of autonomous shipping in Nordic countries has been fast during the last decade and especially Finland and Norway are in forefront of the testing of the commercial solutions. The projects of fully autonomous ferries have already been introduced in Finland and a commercial cargo vessel will start operating in Norway 2022. Japan invest heavily in replacing crew with already existing technical solutions to minimize crew and to replace the crew entirely in next decade in most new-buildings that carry cargo.

The global regulatory body for shipping - the International Maritime Organization's (IMO's) senior technical body, the Maritime Safety Committee (MSC) has agreed a framework for a regulatory scoping exercises, "Maritime Autonomous Surface Ship (MASS)" to find the solutions how to implement autonomous shipping in IMO instruments. MASS defines a ship which "*to a varying degree, can operate independently of human interaction*". The categories of autonomy in this regulatory exercise are defined as follows:

- Automated processes are used on ship and decision making is supported. Systems and functions are controlled onboard by the ship crews which are sailing with the ship. There are certain operations on the vessel which may be automated.
- Ship is sailing with seafarers onboard, but the vessel is controlled remotely and operated distant from another location.
- Ship is operating without the crew onboard and remotely controlled and operated from another location.
- Ship is operating fully autonomously with the help of operating system which makes decisions and actions by itself.

The scoping exercise which is currently ongoing identifies current provisions in a list of IMO instruments, (SOLAS, COLREG, Load Lines, STCW, STCW-F, SAR, Tonnage Convention and special trade passenger ship) and determines how they may or may not be feasible to vessels with various levels of autonomy and of they may prevent MASS operations.ⁱ The IMO legal Committee is finalizing its own scoping exercise on the Conventions under its auspices in its next meeting when the Covid-19 is over. The author nr.1 of this article has been nominated to participate that Legal Committee meeting as a legal expert of the Finnish delegation.

2. RESEARCH NEEDS AND RAAS

Research Alliance for Autonomous Systems (RAAS) has been put up to achieve innovation platform that would be internationally known network for industry, research institutions and educational institutes.

The basic idea according to RAAS internalisation plan is to link RAAS internationalisation activities together with national interests, ecosystems, platforms, testbeds etc. regarding autonomous systems development in selected application domains (drones, mobile work machines, autonomous driving and maritime). For each application domain, the aim is to find 1 - 3 main autonomous innovation ecosystems/entities, where the need and driving force for systemic innovative solution stems from the global market change, which represents a great business opportunity for several Finnish companies. In some cases, a remarkable opportunity to find pathways to make Finnish society more efficient are also created at the same time.

RAAS internationalization activities are linked to boost these innovation ecosystems/entities to build their success story in international markets. RAAS group has been formed to help the parties to find the best international scientific experts, the most skilful company partners, start-ups with the greatest novel ideas and the most innovation-friendly public authorities to get the job done. At the same time, through the preferred Public-Private-People-Partnership (4P) approach, the goal is to greatly improve RAAS community's own scientific excellence and ability to serve the stakeholder groups.ⁱⁱ

RAAS participants have identified several this kind of innovation ecosystems/entities to be used as target innovation efforts for RAAS internationalization planning. None of these entities is ready-made concept to be publicly announced and described in detail, but in several cases some activities are already under way and plans for taking activities into world-class level are under preparation. This is why the innovation ecosystems/entities are described only at general level.

RAAS's internationalization involves building of international joint projects and arranging expert/researcher exchange etc. traditional activities. From strategic point of view, the options are (suitable strategy selected for each ecosystem/entity):

1. *Building multinational autonomous system innovation hub/testbed/platform, which effectively is a network of interconnected national innovation hubs sharing common target. Linking heavily research projects and partners to this hub. (**Multinational Hub strategy**)*
2. *Building innovation hubs/testbeds/platforms with Finnish International Growth Ecosystems. Boosting Invest-In activities (foreign companies investing on development (and production) activities in Finland because of attractive innovation environment) in*

autonomous system development around these hubs. Linking research projects and partners to these hubs. (Invest-In strategy)

3. *Actively networking with and exploiting appropriate existing foreign autonomous systems hubs/testbeds/platforms. Linking research projects and partners to these hubs. (International Hub strategy).ⁱⁱⁱ (RAAS internalisation Plan)*

One of the selected innovation ecosystems/entities in RAAS Maritime: Baltic Sea area as a pioneering area in autonomous shipping and multimodal logistics. This is called “The Sea of Opportunities.” Finland and some other European countries deliver a significant amount of high-technology products to the global marine market. The recent megatrend of increasing ships’ autonomy levels and decreasing their emissions is a historical opportunity for the Finnish industry to secure a strategic position in maritime business – regardless of the country of manufacture for future ships. Technologies related to autonomous and carbon-free ships are scalable like any other areas of digitalisation. This highlights the ability to rapidly expand the target market for Finnish industry.

These opportunities can be fully utilised through collaborative effort that combine companies’ business interests and research organizations’ expertise to national and European sustainable growth strategies. This will require long-term collaboration and commitment of private and public sector actors across national borders.

Developing and taking into use technologies for autonomous and carbon-free shipping for maritime industry and research require real-life test environments. These should include: (1) closed test areas in the national waters, (2) maritime routes between two or more countries, (3) harbours that connect the maritime and land logistics and (4) land-based remote control centers.^{iv} As part of the legal task force Satakunta University of Applied Sciences (SAMK) is leading co-operation between Nordic and European Maritime educational institutions in promoting common syllabus development relating to autonomous shipping in Bachelor level STCW Convention based education. The specific target groups/companions are SIMAC (Danish Maritime Academy with test areas in Denmark) and University of Split in Croatia. Both Institutions have existing research and education in this field and have already shown interest for this co-operation. University of Split has interests to co-operate with Finland specially in relation to developing automated traffic in the Croatian archipelago.

Main areas in RAAS Legal task force by SAMK is to form research group/network on legal activities relating to autonomous vessels which concentrates in tackling business related obstacles and solutions especially for risk management, marine insurance and charter parties legal issues. Comparative law approach to these issues connects national and international experts to network and future research alliance. At the starting point where the projects is at the moment SAMK participants are participating, presenting and publishing articles (legal) and promoting RAAS in international conferences while forming the alliance and networking internationally. In order to be attractive concentration for development of autonomous maritime systems for international we need to employ high skilled specialist from the research organizations and the industry to the future projects.

The idea of RAAS is also to build national education network for maritime industry and to combine research activities strongly to the education devilmnt. A part of the activities is Doctoral school which offers a possiblity for craduating Master students to continue to doctoral studies in the network in Aalto University’s doctoral School that has already been established. Main focus however is to serve the maritime industry players through the expert network and to find solutions that enhance the development of autonomous shipping and to tackle the legal barriers for the industry in this development together with the partners and to offer Nordic model as the solution of the problems the industry is facing. In the following chapters we will present some basic features of problems of the industry relating to autonomous vessels and why the Nordic solution is used as a starting point to solve these problems.

3. NORDIC MARINE INSURANCE PLAN

Norwegian/Nordic Marine Insurance Plan (NMIP) has been commercial success in international insurance market since 1996 when the rules were revised broadly. Until 2013 the Plan Rules were known as Norwegian Marine Insurance Plan 1996. The Rules became “Nordic” 2013 when they had been further revised and they had become broadly used in Nordic countries and a consensus was reached in Nordic insurance market that their name would be Nordic Marine Insurance Plan.^v

The Nordic Marine Insurance Plan had practically replaced the national Hull clauses, especially in Sweden and Finland, used before in other Nordic countries as they had been used less and less when Norwegian plan had gained most of their market shares.^{vi} In this article the Rules are referred as Nordic Marine Insurance Plan (later NMIP) even though they have existed as “Nordic” only since 2013.

The Nordic Marine Insurance Plan as all risk cover has gained remarkable market share internationally also outside Nordic countries. It has been estimated in August 2019 that the NMIP-conditions market share is approximately 21 percent worldwide. It gives effective protection and is found to be assured friendly on both “full terms”-insurance cover and limited cover. NMIP is also especially popular on Loss of Hire -insurance market^{vii}. Nordic plan has become more and more popular as a basis for cover since the conditions of cover are quite straightforward and fair for the owners who play fair and maintain their vessels well. Nordic marine Insurance Plan has several benefits and competitive advantages. It is stable when it has been formed on the basis of Norwegian Marine Insurance Plan, which has a legislative history that goes back more than 100 years and case law collected in one single collection from Scandinavian Maritime courts and Arbitration Tribunals. The Nordic Marine insurance is based on the all risks -principle with exceptions listed, which will not be covered. The most important is war risk, which can also be separately covered by taking out a separate war risk insurance under the Nordic Marine Insurance Plan. If the person effecting the insurance has also obtained

such cover, there will be relatively few caps in the shipowner insurances insofar as the perils are concerned.

In principle the Nordic Marine Insurance Plan seems to suit well for remote controlled vessels and autonomous shipping. It is clear, however, that the rules need adjustment at least regarding the Commentary of the conditions to explain clearly the rules and exceptions when applied to remote controlled or autonomous vessels. It is possible, in principle, for the person effecting the insurance and for the insurer to assess the Hull insurance risks in general with the NMIP clauses. The Nordic Plan has detailed rules on causation and duty of disclosure as well as highly developed system of safety regulations, unlike the English system.

The English law on marine insurance is heavily based on case law, such as the Marine Insurance Act 1906 is made on basis of existing case law. The difficulty with remote controlled and autonomous vessels is clear. The existing clauses with named perils were not made with the kind of problems in mind that can arise with such vessels. It is unclear how they would suit the purpose without major changes or additions. A specifically problematic area of English marine insurance law is the warranties and especially warranty of seaworthiness, which will be especially problematic area of law connected to autonomous or remote-controlled vessels. Adjusting existing case law to suit the needs and risks associated with autonomous and remote controlled vessels will be a difficult assignment and it will take some time before the interpretations of courts will be available.

The Nordic Marine Insurance Plan has a rule that in order to be covered by the Hull insurance (as well as other shipowner's insurances under the Plan) the assured needs to follow the safety regulations. The system of safety regulations as described in NMIP does not exist in English legal system. In NMIP The assured can risk losing his cover in connection with the breach of safety regulations but since 2007 there is no longer requirement of vessel being seaworthy.

Safety regulations have been described in the clause 3-22 of NMIP. A safety regulation is a rule concerning measures for the prevention of loss issued by public authorities, stipulated in the insurance conditions, prescribed by the insurer pursuant to the insurance contract or issued by the classification society.^{viii} The safety regulation is a flexible requirement as in order for a rule to have the status as of a safety regulation, it only needs to include the purpose to prevent loss, but it does not require that the sole purpose of the regulation is to prevent loss. If the rule has several purposes it is enough that one of the purposes is to mitigate the effect of loss or prevent loss. In relation to autonomous and remote controlled vessels, it is expected that the class rules in the beginning will form an important source of safety regulations and classification societies simulation standards for software will also be crucial for the industry's risk assessment. Therefore these will be important sources of safety regulations for autonomous and remote controlled vessels.

The insurer has a right to inspect the ship when he suspects that safety regulations have not been met. Breach of safety regulation can lead to the insurer not being liable for the casualty

if there is a causal connection between the breach of the safety regulation and the casualty and the breach has been culpable.

Before 2007 NMIP contained a separate clause on unseaworthiness. This clause has been abolished as the rules on safety regulations and unseaworthiness more or less covered the same issues and the Norwegian Seaworthiness Act had also been abolished.^{ix} This abolishment of unseaworthiness rule from the NMIP was already considered when the plan was modified largely in 1996. This development gives a clear benefit for the owners who have good maintenance systems and who follow the safety regulations strictly, as in relation to the insurer there are no grey areas where the insurer, despite the fact that the safety regulations have been followed, can no longer claim the ship being unseaworthy^x. In future, relating to remote controlled and autonomous vessels this can give a clear benefit for the NMIP clauses in relation to the other markets where unseaworthiness in relation to these vessels needs to be determined by courts as there is no existing case law for autonomous vessels in the field.^{xi}

The safety regulation in this respect is a Nordic solution^{xii}. As the safety regulations can be described widely, this gives also flexibility for the insurers to meet the demands of the industry in insuring the vessels with different levels of autonomy. The risk management with safety regulation approach will be much easier considering 4-6 different levels of autonomy in shipping in future. IMO has started its work by using four different categories. It is a demanding task for the industry to create this regulation, but as it will at the same time create the basis for risk evaluation for the insurance industry as safety regulations to be followed, it will give a clear benefit for “the Nordic approach” in relation to the English marine insurance system.

The NMIP rules are easier to be adjusted to autonomous and remote controlled shipping than the common law rules of law. It can therefore be expected that the NMIP and NOMA will be lucrative solution for those shipowners who enter the autonomous and remote controlled shipping market in 2020’s. Several reasons for this development can already be highlighted. The response for insuring autonomous or remotely controlled vessels will be immediate in the industries and maritime clusters which are in forefront of the development. These are at the moment the Nordic countries like Finland and Norway where technology is already highly developed and experiments and prototypes are already being tested. Nordic Marine insurers are expected to have commercial insurance documents based on NMIP conditions in place when the first commercial vessels will be operating in beginning of 2020’s.

Nordic Marine Insurance Plan is already well known to international markets. English market -According to statistics - already offers 30 % of its marine insurances with NMIP when ITCH conditions share in its own market is 56 %. The Market share of NMIP conditions in London has been growing steadily. As the NMIP conditions have a relevant market share also in Far East Asia (15 %) and North America (10 %)^{xiii} it is highly probable that their share of the market will grow when the autonomous and remotely operated solutions will increase also in these markets.

When referring to cost of arbitration in London arbitration and comparing it to ad hoc arbitration cost in Norway during this millennium, it is easy to predict that the vessel owners or operators of future autonomous or remote controlled vessels will look to both cost of arbitration and expertise in the field of this changing field of shipping when they decide where the insurance arbitrations will take place. As the NMIP conditions can be expected to be ready for the market when more autonomy will take place in shipping, it is probable that these conditions of cover will be increasingly used and trusted by the industry together with Nordic jurisdiction.^{xiv}

4. NORDIC OFFSHORE AND MARITIME ARBITRATION

Effective, highly skilled and especially cost effective ad hoc -arbitration in Norway has also been one of the benefits of NMIP. As a tool with updated Commentary, it is also possible for foreign arbitrators to understand it. Mainly arbitrated in Norway it has offered cost effective and smooth ad hoc- arbitration near the main financial markets in Europe.

Nordic Offshore and Maritime Arbitration (NOMA) was founded in November 2017 by the initiative of Nordic countries maritime law associations. It can be seen as part of continuous development started by creation of Nordic Marine Insurance Plan and creation of strong common judicial market for Marine and offshore industry.^{xv} The Nordic countries have long traditions for settling disputes within the maritime- and offshore industry by arbitration. Traditionally, ad hoc arbitration has been dominant in the Nordics, particularly in Norway and Denmark, while Sweden and Finland have stronger traditions for institutional arbitration^{xvi}. NOMA will unify this Nordic arbitration market in following years and form a strong alternative to London market.

The NOMA arbitration rules were incorporated to NMIP rules 2019. The NOMA associations arbitration clause has also already been used in offshore/chartering contracts. In combination NMIP conditions and NOMA Rules they give the assured a client friendly insurance and cost-effective arbitration in Nordic countries in jurisdiction preferred by clients and chosen language. The NOMA rules have raised interest and attracted potential users also outside Nordic countries as Nordic countries are generally known for highly skilled arbitration for commercial disputes in general. The Board of directors is currently guiding the work on creating the Fast Tract procedure rules and Mediation rules to be implemented in practice of NOMA in 2020^{xvii}. After this has been done the Associations Rules will cover the same procedures that the London maritime arbitration covers.

When Nordic Offshore and Maritime Arbitration Associations Mediation and arbitration rules are in effective use in 2020's, they will offer an economically lucrative, legally firm and speedy solution for the industry for commercial arbitration based on NMIP conditions. NOMA can provide arbitrators who have strong background in interpreting Nordic Marine Insurance Plan Conditions based on Nordic law. This can have a positive effect that future shipping arbitrations

will be divided more equally between England and Nordic countries when shipping will be more and more automated industry.^{xviii}

5. AUTONOMOUS SHIPPING AND CHARTERPARTIES

As autonomous shipping is still in experimental phase, there is still no standard charterparties available. One of the reasons is that there is a lot of work still to be done with the international conventions so that fully autonomous can operate commercially. IMO Maritime Safety Committee and Legal Committee are preparing a scoping exercise which defines the needs of changes in international regulations before the international operation is possible. As the needs of risk management have already been started in the maritime insurance industry, it is expected that when the IMO has proceeded with the conventions the charterparties will be drawn up for the autonomous shipping. This will probably take place under the auspices of BIMCO. National solutions will probably be made for national traffic already before that as they are less affected by the international development. As a part of the RAAS project these national solutions will be developed and the target of the projects legal task force is to offer its expertise and assistance later to international development when BIMCO will start to plan the standard charterparty development in the area. The jurisdiction and arbitration clauses have already been developed by NOMA in order to existing vessels to use the service of the association. those clauses can be used also with the autonomous shipping.^{xix}

6. CONCLUSION

The Nordic model of managing legal obstacles for autonomous shipping can influence shipping also internationally. The idea is to serve the industry development to tackle the the problems which arise by increasing automation to maritime legal issues, risk management and charterparties. The process will take years and the SAMK research group is prepared to continue with the issues with international partners and experts from the partner universities and industry. The research targets developed under the RAAS project are a starting point for creation of competitive entity of solutions which can be applied as a whole by the industry. Combining the risk management issues and charterparty issues to effective arbitration model offers a lucrative entity for the autonomous maritime industry in future. The idea of RAAS is also to build national education network for maritime industry and to combine research activities strongly to the education. Formulating the research needs for autonomous vessels in Maritime Universities has been in progress for one year since SAMK received a major part of funding (80 percent of the Legal Task Force funding). Master of Maritime management students knowledge and abilities to apply the information received in relation legal issues, risk management and charterparties has been tested throughout the year as a part of the Master programs studies and applied industry experiments and assignments.

The research results by August 2020 are promising – The four stages of autonomy (Now basis for scoping exercise, becoming standard when confirmed as standard in the next IMO Legal

Committee session 107) will create huge challenges for the studies, and needs research activities to enhance the level of assignments to be connected to both Bachelor and Master Programmes. Research needs to be based on differences of four levels of autonomy vessels operating simultaneously in the same environment and concentrating legal, risk management and charterparty issues applied on different levels of autonomy and changes when level of autonomy is different in relation to others in the area. Comparative approach to multiple levels of autonomy by adding legal regulation, risk management by varying insurance rules, and different charterparty clauses under which the vessels are operating will change the regulatory environment and make it dramatically more complex.

Responsibility for RAAS projects educational part in Maritime field in Finland will be transferred to Universities of Applied Sciences in the next stage of the project starting Autumn 2020. This will be based on the existing work described in this paper but hopefully more closely coordinated also with international partners than what Covid-19 situation has allowed us to do in 2020. Formulating the needs in the final form at the moment awaits the decisions of IMO LEG 107.

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