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Sea traffic management – beneficial for all maritime stakeholders

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Abstract

Sea Traffic Management is the idea of sharing information and collaborating to optimise the maritime transport chain while increasing safety and sustainability. The digital information on-board and on shore is abundant; however, the interconnection today is point-to-point and proprietary and stops the industry becoming more efficient. We will discuss how Sea Traffic Management will help the industry achieve improved predictability by introducing standards for key information and supplying an infrastructure for information exchange. This enables all actors involved in the transport to plan better and utilise their resources more efficiently. Shorter routes, just-in-time arrivals, shorter port calls are factors that will strengthen the competitiveness of the maritime sector. Improved situational awareness on the bridge and knowledge of planned routes will help optimised planning as well as reducing the number of incidents and accidents. The standard route exchange format submitted by the EU-financed MONALISA 2.0 project partners in 2014 is included in the current edition of the IEC standard, which was launched in August 2015. Solutions using that standard will start realising the benefits already next year. We will describe an infrastructure, which could work in a centralised manner but also has the flexibility to be organised in a more federative manner, similar to how the maritime world works in many aspects. Some key components are: a unique identifier for each voyage; that the information publisher controls who can access the data; that updated information should be made available in real-time; and that subscription to updated data will be the main trigger for many systems and processes. We will also describe the outcomes of the test beds in the MONALISA 2.0 project – The Sound: how shore and vessel can interact better in order improve safety in dense traffic areas; Port of Gothenburg and Port of Valencia – how collaborative decision making can improve operations for all involved actors; European Maritime Simulator Network – how new solutions can be tested in complex traffic situations and areas with real people on a large number of bridges, without risk. How large of an impact will all this have on the maritime transport

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industry? Based on a study from Linköping University, we believe that the number €1 billion/year in Europe due to shorter routes is only the tip of the benefit iceberg. In the study ship operators and society split the benefit 50/50. Ship operators save on fuel and other cost, society saves on reduced emissions, and other actors associated to maritime operations benefit from a higher degree of infrastructural use. We will also present results from other business cases developed during 2015, in which the benefits of Sea Traffic Management are elaborated on main stakeholders.

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Keywords: Sea Traffic Management; just-in-time operations; multi-modal transportation processes; Maritime Informatics; sea transports

1. Introduction

Empowered by digitisation, traditional industries become reconfigured and there relies great opportunities to meet goals that stretches beyond the desires of the single organisation (Adner, 2006). As more and more devices become connected, new business opportunities arise. On the other hand this connectivity also requires that engaged co-producing actors take a joint stance for the production of value for the beneficiaries they share. This is in order to avoid sub optimisation and fragmented distribution of value to the beneficiaries they serve all together. Typically, the transport industry builds upon that multiple producers create value in a coordinated and integrated way for beneficiaries in order to meet the increasing demands in multi-modal transportation processes. Due to the legacy of the maritime industry enhanced collaboration enabled by digitisation is to be promoted (IMO, 2013).

As sea transports have become an environmentally sustainable transport mean for mid- and long-term transports, this type of transport need to be integrated in a larger transportation chain (IMO, 2013). Sea transports, and the multi-modal transport chain as a whole, do however need to meet the three pillars of sustainability (c.f. e.g. Elkington, 1988) by seamless integration and integrated performance. However, the legacy bound to today's processes in the shipping industry stretches many 100 years back in time where much of the logic is built around that "the earlier that you arrive to port the better quality of the tea will be loaded onto your vessel". Much of the contracts of today involving shipping companies build upon this logic resulting in that vessels gather outside the port and wait until possibilities to berth are given. If the vessel needs to wait, means that it, in some cases, could have been driven more slowly and thereby reducing the consumption of bunker. From a sustainability point of view this means that the environment is polluted more than necessary and that the business revenue for a particular sea transport becomes lower than necessary.

Supported by a cost benefit analysis an average reduction of 1% sailed distance per ship within the Baltic Sea Region, would save approximately € 100 million on a yearly basis for traffic sailing in the region. Approximately half of the savings are due to less emissions cost for society, and the other half are fuel and other costs for the ship owners (Andersson & Ivehammar, 2014). Baltic Sea traffic makes up approximately 10% of the European total sea traffic (Stankiewicz et al, 2010), and these finding give an indication of the potential savings within European shipping and further on for the global shipping industry.

However, even if the business logic would be changed where mariners were driven by contracts that prioritise just-in-time operations avoiding unnecessary waiting times other actors in different process steps need to provide solid prediction when value-adding services could be provided. This especially concerns (marine) ports that regulate when vessels are desired and expected to be at berth. A study shows that approx. 20% of vessels arriving to Gothenburg port anchor on average 18 hours before the port call can commence. If they could reduce speed by on average 2.8 knots the last 160 NM, they would save half of the bunker those miles. And they would still have a huge margin in making their port call, anchoring would go down to 15 hours on average (Watson et al, 2015). And bigger savings are possible the more accurate information is shared, and the earlier green steaming (speed reduction) can be applied.

Due to the fact that many ports of today suffer from not knowing when a vessel could depart from berth, predictions to approaching vessels become a challenge (Watson et al, 2015). Such increased knowledge by getting enabling actors to share their information to a larger degree can be enabled by digitisation. Today, a lot of digital data streams exist in the shipping domain, yet there are no standards for these streams and no central directory for locating them and the associated documentation.

As a response to these needs the concept of Sea Traffic Management (STM) has been defined. This concept adopts a holistic view to Sea Traffic Management adopting the principle that the vessel is connected and that the