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A navigating navigator onboard or a monitoring operator ashore? Towards safe, effective, and sustainable maritime transportation: findings from five recent EU projects

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Abstract

This paper aims to summarize and make some conclusions from findings of five EU project during the period 2009–2015. In the ACCSEAS project (2012–2015) the future accessibility of the North Sea region was investigated from a shipping perspective. The EfficienSea project (2009–2012) and the two MONALISA projects (2010–2013, and 2013–2015) investigated Sea Traffic Management (STM) as a way to optimize ship traffic that might satisfy safety and efficiency demands as well as the demands for lower emissions. The paper will look in detail on the navigational solutions and the user tests that has been done with ship officers, pilots and VTS operators.

The EU commitment to reduce greenhouse gas emissions by 80% to 2050 is another factor acting on the shipping industry. By "slow steaming" and just-in-time-arrival, substantial reduction in emissions can be made.

A surprising finding was the large number of planned offshore windmill installations in the North Sea. Managing a growing number of ships in a shrinking sea space will led to issues of who is in control: the master onboard or the central coordination mechanism overseeing the whole traffic situation. The task of the mariner risk being reduced to keeping the ship in a time-slot-box, monitoring an ever better automation. In addition, slower speeds lead to longer voyages, which risk being less socially attractive. Lack of competent seafarers is already today a problem. Finally, the issue of unmanned ships will be considered, the MUNIN project (2013–2015), Maritime Unmanned Navigation through Intelligence in Networks. Even before this project has finished the industry has picked up some of these new possibilities and has proposed different solutions for unmanned ships, one of them electrical, with zero emission.

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1. Introduction

We must be doing something right as the number of shipping accidents is in steady decline. Since 1997, the frequency of total loss as a percentage of the world fleet has more than halved by both the number of vessels and tonnage (IMU, 2015). However, accidents do happen.

1.1. Collisions and groundings

In the beginning of October 2011 the 225 meters long container vessel *Rena* was approaching the port of Tauranga on the North Island of New Zeeland at about 2 o'clock in the morning. They were in a hurry and needed to reach the pilot pick-up point before 3 o'clock, at the very end of the tidal window for the port. On the voyage up to Tauranga, the vessel took several short cuts to improve on its arrival time. Also on the final legs towards the pilot pick-up station *Rena* where cutting the voyage plan short. With all systems working and two officers and a lookout on the bridge *Rena* hit the Astrolabe Reef in 17 knots (see Figure 1, left). One may wonder why. There is still only an interims report from the Transport Accident Investigation Commission of New Zeeland (TAIC, 2012).

Similar accidents happens every year. Some of them pass relatively unnoticed; others make the headlines like the *Costa Concordia*, the *Exon Valdez* or the *Torre Canyon* in its days. Today ships are equipped with transponders regularly sending out their position. Had the Tauranga pilots, or the NZ Coast Guard been looking they could have seen that the *Rena* was heading for danger and sent out a warning. People make mistakes; that is the part of the human condition. However, with more eyes watching, the chances of catching them early increases.

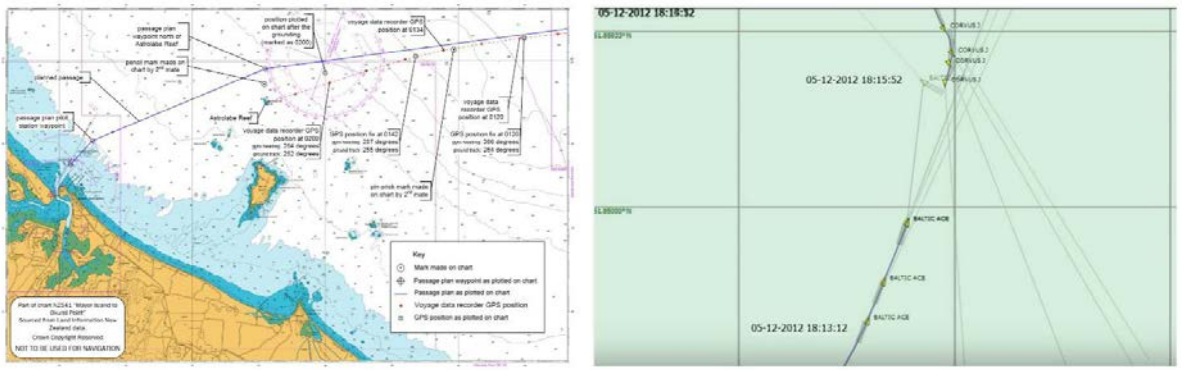

Fig. 1. Left: The final track of the container vessel Rena. The solid line is the voyage plan and the hatched line is the actual track ending on the Astrolabe Reef (Image from TAIC, 2012). Right: The collision between *Baltic Ace* and *Corvus J* in the English Channel in 2011. On this screen compilation the final minutes has been reconstructed from AIS data (VesselFinder, 2012).

A dark and windy December evening 2011 in the English Channel the car carrier *Baltic Ace* collided with the container vessel *Corvus J*. *Baltic Ace* was underway for Kotka in Finland traveling up the northeast bound traffic separation scheme while *Corvus J* was on a southeasterly course inbound for Rotterdam. The web site VesselFinder (2012) made an animated reconstruction of the collision based on AIS positions (see Fig. 1, right). On the reconstruction (where the final minute of *Baltic Ace* maneuvers are missing), it appears that the give-way ship *Corvus J*, is not yielding until very late when *Baltic Ace* has already started to make an evasive port turn. In the collision that followed the car carrier sank within minutes killing 11 of its crewmembers. The accident took place on international