

News

1. NEWS

The IEEE Spectrum magazine published an interesting article of relevance for the future of maritime traffic (see: <http://spectrum.ieee.org/transport/marine/forget-autonomous-cars-autonomous-ships-are-almost-here> and <https://doi.org/10.1109/MSPEC.2017.7833502>). It questions the purpose of mariner education in the face of imminent development of autonomous ships. Starting from the premise that 75 %-96 % of marine accidents are caused by human error, it can be surmised that if the human factor is removed, the number of accidents would drop to 4 %-25 %. Insurance company expenses, material damage suffered by maritime companies, environmental pollution and human casualties would all be reduced.

Tremendous developments will be made during our lifetime. River/fjord-size commercial operation of autonomous (robotic) ships/vessels is expected to occur within the next couple of years. Robotic oceangoing cargo ships are anticipated to become commonplace within 10-15 years. According to Rolls-Royce (<http://www.rolls-royce.com/~media/Files/R/Rolls-Royce/documents/customers/marine/ship-intel/rr-ship-intel-aawa-8pg.pdf>), the next steps are:

- Remotely operated local vessels by 2020,
 - Remotely controlled unmanned coastal vessels by 2025,
 - Remotely controlled unmanned ocean-going ships by 2030,
 - Autonomous unmanned ocean-going ships by 2035.
- This would suggest that classic maritime jobs will soon become obsolete. However, some jobs still come to mind:
- Virtual Reality Control (VRC) Designer,
 - Virtual Reality Control Developer,
 - Virtual Reality Control Operator,
 - Neural Interface Maintenance Technician,
 - Computer Controlled System Maintenance Technician,
 - Distant Communication Officer,
 - Distant Steering Officer, and similar.

2. PREDICTING AN AUTONOMOUS FUTURE

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Seeing into the future might appear to be merely wishful thinking, or something possible only in science fiction. However, Wärtsilä's latest systems launch, SmartPredict, does precisely that; it tells the captain of a ship exactly what is happening during its manoeuvring operations, and what will happen if nothing is done to change its position.

Unprecedented input

Prediction systems have been around for some years already, and as such are not new. The aim of all these systems is to enable safe navigation between ports, and specifically to reduce the risk of accidents occurring within the ports. Two basic approaches have been used in developing these systems, based on dynamic and purely kinematic prediction models; the latter being concerned only with the motion without reference to the forces causing such motion. The simplification of these early prediction systems allows restricted use only.

In developing SmartPredict, Wärtsilä's Dynamic Positioning (DP) unit has sought to overcome the inadequacies of the conventional systems available on the market. The biggest challenge to achieve this has been to utilise all of the parameters used for automated control by the DP system, and to adjust them for the motion characteristics of the vessel. The limited usability of most conventional systems is a result of the limited input they receive. Table 1 compares the input and modeling from traditional systems to those of the new Wärtsilä system.

The Wärtsilä SmartPredict module takes advantage of the DP system's built-in mathematical model to provide advanced motion prediction capability for the vessel. The input to the control algorithm takes consideration of the vessel's current position and heading, as well as the velocity and rate of turn with

all associated accelerations. Furthermore, the manual commands from the coordinated control joystick (3 axis), and environmental input from the onboard wind sensor(s) are included in the total equation. The overall level of input is, therefore, unprecedented in prediction systems, and all of these factors are continuously evaluated to provide a constant update of the vessel's path.

What Where and When

In addition to displaying the vessel's predicted future position and heading, SmartPredict uses proven DP analysis algorithms to evaluate the forces affecting the vessel, thus providing truly advanced motion predictions. What is more, the system comes with a configurable prediction time display. In other words, the system provides the operator with information regarding not only what is happening and where it is happening, but also when it might happen.

The Wärtsilä user interfaces provide a simple, intuitive display whereby the operator can toggle on or off the 'ghost ship' indicators for the predicted positions. The time steps for the predictions can be assessed from the display. SmartPredict is fully compatible with the Electronic Chart Display & Information System (ECDIS) overlay function in Wärtsilä systems and provides clear indications of potential dangers during manoeuvring operations. This immediately increases both the safety and the efficiency of the vessel's movements.

While the initial development of this capability is aimed primarily at cruise ships and passenger ferries, it has obvious relevance also to any vessel that regularly needs to perform challenging manoeuvres. Development is also underway that will allow display of the 'ghost ship' indicators on other displays within the Wärtsilä Nacos Platinum family of navigational and control systems. This will enable the power of SmartPredict to be available even when using manual controls.

Future potential

Dynamic Positioning systems date back to the 1960s, which was when the DP industry as such was born. The evolution began, however, during the 1970s when the first commercial systems were introduced. The development during this phase included the introduction of modern control theories with mathematical modelling of the system. It was during these years too that concepts such as redundancy and feed forward became standard. The huge strides in computer technology from the 1980s onwards, however, enabled completely new DP capabilities. New functions were added to take advantage of the greatly improved processor power, while the user interfaces were also modernised.

Wärtsilä's SmartPredict system now represents the beginning of the new evolution, which will inevitably lead to

greater vessel automation. The technology is moving beyond merely maintaining station and onto better and smarter DP systems providing dynamic control. More and more operators are today looking for the safety and reliability of automatic operations. This means that each phase of vessel control will need to be validated and proven in order for true vessel autonomy to be possible. However, without question, SmartPredict is an important first step in the direction of achieving fully autonomous ship manoeuvring.

3. OTHER NEWS

EU ship recyclers have joined voices to promote clean and safe practices (see link: <http://www.shipbreakingplatform.org/platform-news-eu-ship-recyclers-join-voices-to-promote-clean-and-safe-practices/>).

An interesting news is the re-emergence of Somali Pirates (see link: <http://www.marinelink.com/news/floating-pirates-somali423505>).

4. CONSTITUTION OF SPECIAL CURRICULUM "NAVAL SHIPPING" IN THE REPUBLIC OF CROATIA

The Government of the Republic of Croatia on its 26th session, held on 26 March 2017, accepted the Draft decision on initiating the procedure of the constitution of the special curriculum "Naval Shipping" at the University of Split. The performance of the curriculum will start in the academic year 2018/2019, and will take place at the venue of the Croatian Military Academy "Dr Franjo Tuđman" and the University of Split components (Faculty of Maritime Studies, Faculty of Electrical engineering, Mechanical Engineering and Naval Architecture, and Faculty of Humanities and Social Sciences), which will jointly carry out the curriculum. Hereafter, there is the Government exposition of the reasons for the establishment of the studies, which is publicly available on the Government web pages: <https://vlada.gov.hr/sjednice/26-sjednica-vlade-republike-hrvatske-20304/20304>.

Explanation

The constitution of the special curriculum "Naval Shipping" has been initiated to achieve a uniform education of maritime officers for all the state bodies participating in the area of maritime safety. It is the prerequisite of their integrated activity in the protection and promotion of the national interests of the Republic of Croatia at sea.

To acquire the necessary competencies required of maritime officers, the Croatian Military Academy "Dr Franjo Tuđman" and the Croatian Navy in cooperation with the University of Split and

the Faculty of Maritime Studies, Faculty of Electrical engineering, Mechanical Engineering and Naval Architecture, and Faculty of Humanities and Social Sciences, as components of the University of Split, have started to elaborate on the integrated undergraduate and graduate university studies "Naval Shipping".

The concept of the integrated studies "Naval Shipping" is planned to comprise three directions: "Naval Nautical Studies", "Naval Marine Engineering", and "Naval Electronics". The studies would last for ten semesters, i.e. five years. On the completion of the studies, the students would acquire the title of the Master of Naval Shipping, direction of Naval Nautical Studies, Naval Marine Engineering, or Naval Electronics.

The curriculum contents would mainly be carried out in specialized lecture rooms of the barracks "Sveti Nikola – Lora" in Split, and partly at the facilities of the University of Split components. The accommodation and meals would be provided in the dedicated object within the above mentioned barracks.

The main learning outcomes are determined as acquaintance with and understanding of the professional and scientific principles and standards important for the maritime profession, as well as of maritime disciplines essential in the process of ship exploitation: navigation, manoeuvring, maintenance, cargo handling, and other specific procedures regulated by the International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers, as well as other international and national standards.

In each direction, the performance of 71 courses has been planned, of which 55 courses are common to all the directions. The structure of the studies has the following important characteristics:

- The first two years of study are common to all the three directions
- The third and fourth years consist of 50% of common and 50 % of elective courses (elective courses are compulsory for certain directions as well as for the Ministry of the Interior requirements)
- The fifth year is common to all the three directions
- The military camps and navigational practice are also part of the study plan and curriculum.

Considering that the Ministry of the Sea, Traffic and Infrastructure, Ministry of the Interior, and other national authorities participate in the protection of the Adriatic along with the Croatian Navy and the Coast Guard of the Republic of Croatia, by such an integrated university study it is possible to carry out common education of maritime officers required by all the national authorities.

The general competencies acquired by the cadets on the completion of "Naval Shipping" studies are equal to those acquired at other maritime universities. Beside the general competencies, the cadets also acquire specific competencies within the scope of the Coast Guard of the Republic of Croatia, Ministry of the Interior, use of marine combat systems and alike, as well as the competencies required for work in Harbourmaster's Offices, Search and Rescue Service, and in the Vessel Traffic Monitoring and Information System. They also acquire additional competencies for a successful work and performing tasks in the national authorities for which they are educated. It is at the same time an excellent nursery from which it will be possible to grow and develop high-quality reserve maritime officers.