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FORUM

Readers' Letters

What Is the Next?

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It's been over 70 years since I put on a seaman's uniform. Three generations of Poles that I sent to the sea were educated by me.

I am looking at today's world, which is rushing in the development of civilization at a dizzying pace.

I recall the years (1947-1950), when only three Polish vessels, i.e. m/s 'Batory', ORP 'Błyskawica' and s/v 'Dar Pomorza' were equipped with radars.

Sextants were the most common equipment used on board vessels and technical navigational devices comprised: radio, rarely gyrocompasses and Pilot tube marine logs.

In the North Sea fishermen counted dashes and dots from the Console. Radionavigation techniques developed slowly. The 1960s provided us with the first navigation equipment of hyperbolic systems: the Decca-medium range and the long-range Loran and Omega, and then the age of electronic aids to navigation devices: ARPA, ECDIS, AIS, DP, LRIT, EPFS, PNT, INS, IBS, GMDSS, etc. Finally, navigational global satellite systems: GPS, GLONASS, Galileo, BeiDou.

I gained the necessary professional knowledge on a daily basis, in a wide theoretical and practical scope, both as lecturer and captain of the ship. I am reminiscing about those years but I also carefully observe the existing transformation of modern civilization.

Each historical period has its own characteristic features that impose relevant behavior of a man. At the same time, they make us not only think but also participate actively in the creation of a different, better world.

We observe unnoticed pace of changes in all areas of life, including the pace and development directions of maritime transport.

The reasons for the changes are undoubtedly both economic factors and the level of safety of navigation. In the former case, there is need to reduce the costs of operating ships, in the latter need to reduce number of maritime accidents resulting from improper decisions and human activities.

The elimination of human errors and the improvement of shipping efficiency have greatest impact on the directions of research into the reduction of ship crews, as well as the preference for technical solutions for managing remote-controlled and autonomous ships.

As in any innovative project, caution is required, usually expressed in gradations of solutions from simple to most complex ones.

I observe a number of scientific centers engaged in solving this problem. It is reflected in various stages of research into technological solutions, in other ways specifying the automation of tasks carried out by the ship.

There are various studies in which the levels of autonomy, i.e. the degree of independence, independence from the influence of a man, that is his direct participation in the automation of the ship's operation process, have been subsumed and defined.

Examples of the above are solutions presented by:

– Lloyd's Register- 7 levels of autonomy,
– Bureau Veritas- 5 levels of autonomy,
– Munin project- 4 levels of autonomy, [1]

which take into account the applied technologies and operating procedures from the zero level (status quo) where there are man made decisions and where they perform all operational and control tasks, to full autonomy, where decisions and actions are devoid of human supervision.

The intermediate forms and levels of autonomy of the ship are determined by the role in the decisions and choices of human action in the control of the ship.

In the projects of unmanned and autonomous vessels, the scope of activities of land centers remains open in terms of monitoring ship transport with the possibility of interfering with the control process during the tasks.

It should be emphasized that there is a consensus on the extension of the scope of tasks of the land center, which is presented by the Rolls-Royce study.

Taking into consideration the research studies, they have already gone beyond the level and scope of projects. In the nearest future the result of these works will be the following:

– Kongsberg autonomous electric container ship for coastal shipping (known to me from purchases for AM in Szczecin when visiting a design and executive center)
– autonomous vessel - small passenger ferry (Rolls - Royce) in the port of Trondheim (Norway). [1]

Accepting this information I am humbled by the boldness of the constructors, the power of scientific thought and technological solutions that precede legal provisions related to the construction and operation of unmanned and / or autonomous ships.

I am assuming IMO role, which should already proceed to the elaboration of legal acts for the discussed ships at various levels of autonomy and the near future fully autonomous ones.

Already existing legal documents are not useful for the above Solutions, neither SOLAS International Convention on the Safety of Life at Sea, nor COLERG-containing provisions for the prevention of collisions at sea or STCW - International Convention on Standards of Training, Certification and Watchkeeping for seafarers or even the International MARPOL Convention - the International Convention for the Prevention of Pollution from Ships or SAR - the International Convention on Maritime Search and Rescue.

I feel challenge for dozens of committees and subcommittees which are going to create working groups, and at a record pace ahead of plans build programs for design offices and shipyards.

You do not need to have a unique imagination to see from the changes that occur to be aware of the need to take immediate action regarding the above.

And now maritime education. What plans, educational programs and curricula should be framed for new development conditions in the construction and operation of sea-going vessels.

Before the implementation of the transition phases mentioned above (2020, 2025, 2030) and the completion of projects planned for 2035 [1] takes place, the new graduate of the Maritime University will be under 50, full of knowledge and professional experience.

The reduction of the crew 'introduced for autonomous ships will be preceded by the introduction of use of remotely controlled vessels and autonomous ships under human supervision with a reduced number of crew (skeleton)' [1]. It stems from a number of conditions, including the preparation of teaching aids that ensure the safety of navigation and security, repair and maintenance of ship systems.

Plans and curricula should take into account the presented levels of autonomy, the resulting ranges and requirements for them.

You can predict based on the above Projects and levels of various studies what knowledge and skills a graduate of a maritime university should possess according to new IMO regulations.

You cannot oversleep because the demand for such educated staff will be exceptional.

I do not think my imagination is running wild. So far, my predictions have been effective, i.e. regarding the development of maritime universities in Poland.

I realized the difficulties with both tasks, equally in IMO as well as in maritime education.

In foreseeable future artificial intelligence will arise. Its launch is the beginning of a new existence in which people will coexist with an unknown intelligent species, which in addition develops faster than we do.

Man has never been in such situation. We have always been brighter. It carries great opportunities, but also fears: therefore, good and bad situations.

We do not know who will control their independent actions and if we will be able to control them at all, and if so, what it is going to look like.

Is it possible to exercise control over something that is more intelligent than we are?

How can we protect ourselves from evil?

Do we realize that after the machine learning process, there is a chance that we will find a way to understand how the brain works?

Currently, we are focused on the application of artificial intelligence to rationality, on "the ability to reproduce the complex components of our intelligence, that is logical thinking, decision making, symbol processing, but there are also many pieces that we do perceive". [2]

We have no ability to comprehend the comparison of human sensation by robot sensors. But the problem is not the computing power. Deep machine learning allows you to get results up to a certain level. It lacks knowledge of the structure of the human brain, "the ability to understand and reject bodily intelligence, so much developed in man" [2]. So far, artificial intelligence and its components have been focused on high rationality as an electronic calculator for commercial needs.

If we change the perspective, if we create a "creature" functioning as a human being, then it is possible that we will get answers to many questions that may have enormous consequences. Such a possibility exists. Scientists at universities and Silicon Valley are now developing two ideas to connect the brains in the network, so-called brainet and a communication system based on sending messages directly from brain to brain.

The invention of "brainet" would be the embodiment of an idea straight from science fiction. At the same time, it carries a risk. The brainet becomes a system that you can hack into. The hacker would have access to thoughts and behaviors of people connected to the brainet. He would also be able to manipulate them.

We already know that it is possible. In 2013 scientists from the University of Washington [3] proved it.

Slowly people start to understand the sense of development and the direction of this technology. The hitherto prevailing fascinations arising from the use of artificial intelligence are slowly entering ethical considerations in the form of "creating shields, appropriate emergency switches, in case of inappropriate scientific activities and resentment to humanoid robots". [3]

What is next? It is complicated to answer such a difficult problem, which the world has faced, especially that it is associated with detailed, multi-directional research, including maritime transport.

The future depends on the skills of contemporary and next generations in perceiving and solving existing research problems.

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