From: International Transport Workers Federation (ITF)

Subject: Request for input on Trends, Developments and Challenges for IMO's strategic framework for 2018-2023

1. These comments are submitted by the International Transport Workers Federation (ITF) in response to Circular Letter No. 3574 requesting information on trends, developments and challenges facing the Organization and the maritime community for the 2018-2023 period in order to develop the Organization's strategic work plan.

Introduction

2. The evolving role of technology and robotics in the future development of the maritime industry raises questions as to the appropriate relationship between governments, ship owners, seafarers, equipment providers and technology. The advances in electronic navigation and communications technology that have the potential for the remote monitoring, managing and control of ships raises social, technical, legal and policy issues that need to be addressed. While technology is neither good nor bad, it does create uncertainty and can destabilize existing systems with unintended consequences. As the appropriate body for the regulation and safety of shipping on the high seas there is a need for Organization to address the consequences of technological innovation in a holistic manner that goes beyond a focus on equipment standards and implementation.

Background

3. Terrestrial and satellite based electronic navigation, i.e., GPS, ENC, AIS, ECDIS and Radar, has been used aboard some ships for decades as part of a decision support system to aid masters, pilots and bridge teams. Considerable experience has been gained
in some sectors of the industry with either shipboard INS installations or portable units used by pilots. What is new is not electronic navigation and other shipboard computer systems, but the advances in digital information exchange technology that permits a link between the ship’s systems and shore based monitoring and communications. With the capability to remotely monitor and communicate with ships systems from shore comes the potential for shore based personnel to participate in the decision making over the management of the ship. Taking the trend to its ultimate end there is widespread discussion of autonomous or drone ships operating without human crews onboard. These trends or developments present challenges having implications that go far beyond the technical aspects of equipment and software standards.

**The challenges facing the maritime community**

4. Of concern to seafarers is the relationship between ship and shore based personnel and the degree of intervention to be exercised from ashore. This raises issues that require policy decisions and regulatory action by the Organization. At the present time the responsibility for the management and navigation of the ship lies with the master subject to the oversight and regulatory authority of the flag State. The introduction of port or coastal States participation in the management of the ship outside their territorial waters raises questions as to the division of authority, responsibility and liability between ship owners, masters, flag States, port States and coastal States. This will have implications for numerous international Conventions and instruments as well as settled general maritime law. The division of authority can also lead to confusion as to responsibility for action, or lack of action, leading to maritime casualties.

5. Will over reliance on electronic navigational aids lead to a loss of situational awareness that is dependent on the observation of the real world as well as the displays at a work station? What will be the role of the shore based personnel who participate based only a situational awareness that is limited to viewing the displays the navigator has available at work stations?

6. Are shore based stations that monitor and participate in navigational decision making acting as private services to shipping companies on a voluntary basis, or will they be compulsory regimes operating under governmental authority? If under governmental authority is there a right of privacy as to propriety information generated and is there to be any restrictions on the right to freedom of navigation on the high seas?

7. Will over reliance on technology deskill the workforce and lead to a loss of maritime skills? What will be the alternative fallback position in the event of a denial of electronic information through technical problems or armed conflicts? Will the human interface with the equipment be intuitive and standardized to reduce training requirements? Or, will the technology lead to greater demands on training?

8. What are the risks of reliance on electronic navigation and ship board computer systems in a world that is increasingly subject to cyberattacks? How can satellite signals be protected against jamming or spoofing? To what extent can ships systems be quarantined from cyberattacks when linked to multiple shore based open communication systems?

9. Are the commercial interests of equipment manufacturers driving the agenda for a global ship monitoring, management and control system that is too far in advance of the needs of the industry as a whole? Is marketing creating the demand rather than the needs of the industry?

10. What are the implications for recruitment and retention of a skilled maritime
workforce who view professional development from a life long perspective when faced with possible deskilling or redundancy from technology?

11. Taking electronic navigation and ship computer systems to their ultimate end point, there is widespread discussion outside the Organization\(^1\) of autonomous or drone ships that can operate independently of human control and make their own decisions\(^2\). This presents unique technical, safety and policy issues that will ultimately have to be determined by the Organization.

12. While the Organization primarily deals with technical safety issues the impact of technology and robotics creates social issues as to the future nature of society that is being widely debated in academic circles\(^3\). The question is will we become increasingly dependent on technology and robotics replacing human labor to the point of economic and social breakdown\(^4\)? While each new technical advance considered by itself appears to be desirable, with the displacement of human labor it is difficult for the economy to keep adjusting or the work force to keep retraining. As a governmental organization should the Organization consider the economic and social impacts of its decisions that may not only destabilize the maritime industry but contribute to wider social instability?

Discussion

13. Maritime professionals have always embraced new technology that advanced the efficiency or safety of shipping. The provision of integrated information from ship board Enavigation displays to enhance the navigator’s situational awareness and aid in their decision making has been a welcomed improvement in navigation safety. A shore link that provides the ability to download updated charts and current navigation notices as well as real time information on tidal levels, currents and weather is also a welcomed improvement. The coming development of Emaritime that will permit reporting and the submission of documentation by electronic means in a single window concept to reduce the administrative burden on ships is also eagerly awaited. Information technology is changing the world and the maritime world is part of it.

14. The issue is that with the broad dissemination of information available to viewers external to the ship comes the desire for the viewers to want to participate in the decisions and outcomes. There is a danger in navigation by committee, particularly when part of the committee is acting with governmental authority based only on the information available from a work station. It blurs the line of responsibility and accountability. And, can create confusion with divided authority. In the maritime world safety has always been dependent upon the clear authority and accountability of the master for the conduct of the ship. He is expected to act using sound professional judgment based on experience and a complete situational awareness that takes into account the real world aboard the ship and outside the windows as well as the information from electronic displays at a work station.

15. The apparent trend is to reduce navigation decision making to a linear math problem displayed on screens that are available both on the ship and ashore and the

\(^1\) See, http://www.autonomousshipsymposium.com/
\(^2\) See, http://www.unmanned-ship.org/munin/about/the-autonomous-ship/
\(^3\) See, Race Against the Machine: How the Digital Revolution is Accelerating Innovation, Driving Productivity, and Irreversibly Transforming Employment and the Economy – January 23, 2012, Erik Brynjolfsson and Andrew McAfee (authors), Massachusetts Institute of Technology
\(^4\) See, The Lights in the Tunnel: Automation, Accelerating Technology and the Economy of the Future, Acculant Publishing (October 5, 2009), Martin Ford (author)
inclusion of the shore side viewers as part of the bridge team. Or, in the case of drones ships the only bridge team or no bridge team at all. This is a disturbing development. The maritime environment is multi-faceted and dynamic with sudden and unexpected changes requiring immediate action, often under time constraints, based on instincts gained from experience. It is far from solely a linear problem that can be handled by a shore side observer.

Request

That the Organization in developing the strategic work plan for the 2018-2023 period take into account the above comments
Yours sincerely,

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