

WORKING GROUP ON THE DEVELOPMENT  
OF A NEW STRATEGIC FRAMEWORK  
2nd session  
Agenda item 2

SF-WG 2/INF.2  
8 April 2016  
ENGLISH ONLY

**CONSIDERATION AND FURTHER DEVELOPMENT OF THE TRENDS,  
DEVELOPMENTS AND CHALLENGES**

**Inputs from Member States, IGOs and NGOs to the development of the Trends,  
Developments and Challenges**

**Note by the Secretariat**

**SUMMARY**

*Executive summary:* This document presents a summary of the topics submitted by Member States, IGOs and NGOs as inputs for the development of the Trends, Developments and Challenges facing the maritime community

*Strategic direction:* 4

*High-level action:* 4.0.3

*Output:* 4.0.3.1

*Action to be taken:* Paragraph 7

*Related documents:* Circular Letter No.3574; C 114/D and C114/3/2

**Introduction**

1 The Council at its 114th session endorsed the development of a new strategic framework for directing the work of the Organization and set out a timeline in order to finalize the creation of the strategic framework in time for its implementation in the 2018-2019 biennium.

2 The development of the new strategic framework involves, as the first step, the preparation of a document, setting out the overall Trends, Developments and Challenges (TDCs) facing the Organization and the maritime community for the 2018-2023 period. The TDCs will be the basis for the development of a vision statement and the Strategic Directions for the six-year period 2018-2023.

3 In order to identify these TDCs facing IMO and the maritime community, the Secretary-General issued Circular Letter No.3574, requesting inputs from Member States, IGOs and NGOs in consultative status by 31 December 2015.

4 The Secretariat received a number of further inputs, which have been included in the analysis going forward. All inputs can be found on the following IMO web page: <http://www.imo.org/en/About/strategy/TDC/Pages/default.aspx>.

5 In order to prepare the TDCs document for consideration by the Working Group on the Development of a New Strategic Framework (SF-WG), as the first step the Secretariat attempted to identify all the different topics that the inputs referred to.

6 The annex to this document provides a synthesis of those topics identified, and is presented with a short synopsis and indication of any data provided by the submitter. It should be borne in mind that in order to make the document as succinct as possible, not all details are reproduced in the synthesis, but all details have been considered in the analysis.

#### **Action requested by the Working Group**

7 The Working Group is invited to note the information provided.

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## ANNEX

SUMMARY OF TOPICS SUBMITTED AS INPUTS TO THE TRENDS,  
DEVELOPMENTS AND CHALLENGESMember States

## Australia

	<b>Topic</b>	<b>Increasing the flexibility of the ISPS code.</b>
<b>1</b>	<b>Synopsis</b>	The ISPS Code is considered a major burden by the maritime community, which has a negative effect on compliance with the Code. In order to reduce this administrative burden and facilitate international trade, there is a need to increase the flexibility of the ISPS Code. This should be done by building on the knowledge and experience gained by Contracting Parties with regard to regulating maritime transport security, including consideration of the availability and adoption of new technologies like unmanned vessels. To reduce the administrative burden related to overlapping or unnecessary regulation, synergies between maritime transport safety, counter-terrorism and counter-piracy measures need to be improved.
	<b>Data</b>	Control Risks' 2015 Maritime Risk Work on existing threats.

	<b>Topic</b>	<b>Reviewing the effectiveness of IMO instruments.</b>
<b>2</b>	<b>Synopsis</b>	Monitoring of the effectiveness of IMO instruments (to ensure that the instruments adopted and implemented have achieved their aims) is currently not carried out consistently or it is carried out in a reactive manner (i.e. based on an incident or issue raised by a Member State). The review could establish if the measures are achieving their required outcomes and if not, whether the measure itself is ineffective (due to drafting issues) or if the issue lies in the implementation of the instruments. Reviews could be prioritised to identify the issues that are most relevant to the ongoing safety of ships and crew and the protection of the marine environment. Mechanisms to perform monitoring and review functions could include the strengthening of port State control, the development of a tool to consistently measure the effectiveness of IMO regulations, the update of the requirements for developing new outputs to include information on how to measure effectiveness and a mandatory implementation section related to the process for assessing the effectiveness of the proposed instruments.
	<b>Data</b>	None submitted

	<b>Topic</b>	<b>Increased accuracy of nautical charts.</b>
<b>3</b>	<b>Synopsis</b>	The increasing size, speed and draught of commercial vessels results in reduced safety margins between vessel and seabed, and consequential requirements for increased accuracy of nautical charts within ports, their approaches and constrained waterways. Contrary to ports, where high accuracy hydrographic surveys are available via commercial organizations, charting as well as hydrographic surveys in constrained coastal waterways away from ports produced by or on behalf of national hydrographic authorities (as required in SOLAS) may not be available. Many national hydrographic authorities are falling behind mariner expectations due to the significant resource implications of surveying. Therefore, ships are increasingly turning to "unofficial" data and bespoke systems for managing under-keel clearance in critical areas. To face these challenges, the maritime community has to clarify the requirements for ships to use official charts and publications to allow for the usage of, for example, dynamic under-keel clearance systems that contain newer, better and more complete information and remove the prescriptive file size limitations from any IMO Electronic Chart Display Information System (ECDIS) documentation to allow for the production of fit for purpose Electronic Navigation Charts (ENC) of constrained shallow waterways.
	<b>Data</b>	None submitted

4	<b>Topic</b>	<b>Harmonization of States' aeronautical and maritime Search and Rescue (SAR) efforts.</b>
	<b>Synopsis</b>	The harmonization of a State's aeronautical and maritime Search and Rescue (SAR) efforts facilitates a timely and coherent SAR response. While those harmonization efforts have already been advanced by the ICAO/IMO joint working group (JWG) as well as other policies and structures (e.g. IAMSAR, Joint Rescue and Coordination Centres, information exchange between military and civilian SAR, capability developments programmes, regional capacity building and optimization of technology), challenges facing the maritime community remain. Those challenges include lack of financial capacity of developing States to implement global SAR, the number of States that are yet to ratify relevant international SAR conventions, the infrequent publication cycle of the ICAO/IMO IAMSAR manual and the lack of financial capacity of ICAO/IMO to resource the technical expertise for the facilitation of the effective harmonization of aeronautical maritime SAR.
	<b>Data</b>	None submitted

5	<b>Topic</b>	<b>Increased reliance on Global Navigation Satellite Systems (GNSS).</b>
	<b>Synopsis</b>	Mariners are increasingly dependent upon GNSS as the primary navigation input to ECDIS, particularly out of sight of land. Despite the risks of potential navigation hazards when GNSS signals are interfered with, blocked or non-available due to equipment failure, navigation via astronomical or other non-GNSS means is decreasing, although the equipment and instruments remain readily available and provide a relative quick alternative form of positioning. Additionally, the widespread introduction of GPS created the practice of accepting waypoints as part of route planning and monitoring. There is a strong trend by watch keepers to stay firmly on the planned track causing avoidable close-quarters encounters between oncoming ships. The challenges facing the maritime community are the heavy reliance on GNSS and the decline in skills required to use alternative methods such as sextants. Besides, there is a need to consider additional functionality in future generations of ECDIS. There is also a need to acknowledge and inform about the limitations associated with the GPS signal, which could be assisted by a review of the reliability of the GPS signal and the associated equipment.
	<b>Data</b>	None submitted

6	<b>Topic</b>	<b>Lack of progress in hydrographic surveying and nautical charting.</b>
	<b>Synopsis</b>	The limitations of information provided in nautical charts due to the lack of resources and progress in hydrographic surveying, may create a risk to human life and the environment. This results in a widening gap between the relatively poor overall quality of hydrographic surveys and nautical charts and the requirements and navigation capabilities of deep draught shipping. Besides, there are currently no technological developments that can adequately address the widening gap. Further challenges facing the maritime community are that 70% of the world's coastal waters remain inadequately surveyed or unsurveyed and that the majority of hydrographic data in modern charts are collected using systems that do not meet modern standards.
	<b>Data</b>	Assessment of the quality hydrographic surveys by the Australian Hydrographic Service, April 2015

7	<b>Topic</b>	<b>Safe storage and use of gases and low-flashpoint fuels.</b>
	<b>Synopsis</b>	To achieve the limits set in the regulations to control emissions from ships in MARPOL Annex VI in the coming years, ship-owners explore the use of non-diesel fuels such as gas, methane and Liquefied Natural Gas (LNG). However, SOLAS currently only permits oil fuels with a flashpoint of less than 60°C as fuel for main propulsion and auxiliary power machinery. IMO has already recognized that the safe

		use of low flashpoint fuels is essential to economically achieve the low pollutant levels in modern marine engines and has adopted the IGF Code and the necessary amendments to SOLAS, currently concentrating on the use of LNG. The challenges for IMO are to continue to add alternative fuel options to the IGF Code, widening the choice of fuels with low flashpoints and to continue to take into account the ever-changing technologies that increase safety and reduce pollution such as fuel cells using a variety of fuel sources like hydrogen, which present substantial challenges in terms of safe storage and use.
	<b>Data</b>	Number of LGN fuelled vessels in service and construction (no source)

	<b>Topic</b>	<b>Innovation and new technologies not impeded by regulation.</b>
<b>8</b>	<b>Synopsis</b>	Packaged dangerous goods possess hazardous and dangerous properties when loaded on, transported and discharged from ships. Solid bulk cargoes are currently assessed using the same tests and criteria as for packaged dangerous goods, although they may possess different hazardous properties. Requirements for the transport of packaged dangerous goods and solid bulk cargoes have been mandated in SOLAS, the IMDG and IMSBC Codes. With the technological developments and knowledge surrounding the carriage of dangerous goods and solid bulk cargoes by sea, it is essential that the IMDG and IMSBC Codes continue to be updated frequently to ensure current and new cargoes continue to be transported safely and without pollution of the marine environment.
	<b>Data</b>	Incident reports of incidents with solid bulk cargoes, research on properties of certain solid bulk cargoes (no source)

	<b>Topic</b>	<b>Increase of piracy in the Asian region as a threat to maritime trade.</b>
<b>9</b>	<b>Synopsis</b>	Despite the efforts to reduce piracy incidents, i.e. establishment of ReCAAP that have begun to reduce piracy and armed robbery in the Asian region, there was a recent increase in the number of piracy and armed robbery incidents in 2014 compared to 2010-2013. Additionally, there has been a shift in the type of vessels boarded from traditional tugboats towing barges to bigger ships, bulk carriers, general cargo ships and tankers. There is a need to tackle these incidents by authorities and the shipping industry collectively through the sharing of information about incidents, the implementation of anti-piracy measures, a more stringent enforcement of the ISPS Code and the effective policing and patrolling by the relevant agencies, as well as enforcing prosecution on land.
	<b>Data</b>	Number of piracy and armed robbery incidents grouped by region, type of incident and type of vessel; sources: International Maritime Bureau – Piracy Reporting Centre, ReCAAP Annual Report 2014

	<b>Topic</b>	<b>Development of a human-centred design for e-navigation systems.</b>
<b>10</b>	<b>Synopsis</b>	The e-navigation system has been developed by IMO to address the critical lack of human-centred design within the commercial shipping sector. An e-navigation strategy depends on two factors; systems and information. Commercial mariners have reached a point of information and reporting overload due to the separation of onboard systems and the inability to reuse data for multiple purposes. There is a widening gap between ship operators and those that supply and receive information ashore with regard to the speed of adapting to new systems and the resulting growing requirement for additional reporting. As dependency upon electronic information grows, the need for cybersecurity measures also increases. No virus detection software is infallible, and additional factors must be considered to ensure data protection. The lack of coordination in the development to meet e-navigation requirements is unlikely to drive integration or human-centred design. The lack of a coordinated e-navigation capability leads to a lack of awareness in the wider maritime community that a coordinated approach is possible. Additional issues are

		the lack of a specific list of challenges that need to be addressed to implement e-navigation, the need to ensure the security of services delivered by electronic means and the need to establish back-up arrangements.
	<b>Data</b>	None submitted

	<b>Topic</b>	<b>Increase in administrative burdens for ship's officers.</b>
<b>11</b>	<b>Synopsis</b>	The increased ease of communication between ship and shore has resulted in a significant workload increase on masters with regard to the paperwork and reporting required, as they are expected by shore-side administrators to complete and return complex documents quickly. The situation is aggravated by the trend of reducing crew levels, to the minimum number of crew to operate a vessel, not taking into account the increasing administrative overheads being shared among a smaller number of officers. The burden is further increased by the variety of document formats requested that often provide the same or similar information to multiple authorities. Ultimately, the administrative burdens may detract from ensuring the ongoing safety and security of the ship and crew. The challenges facing the maritime community are to assess the current situation with regard to the effects of increased administrative burdens on rest periods, on the ongoing training of junior officers, and to work on the standardization of forms and reports at an international level.
	<b>Data</b>	None submitted

	<b>Topic</b>	<b>Increased interests in the use of ocean resources.</b>
<b>12</b>	<b>Synopsis</b>	The blue economy concept can be defined as marine economic activity to drive sustainable growth and development. A sustainable ocean economy has been defined as emerging when economic activity is in balance with the long-term capacity of ocean ecosystems to support this activity and remain resilient and healthy. Blue economy highlights the role that biodiversity, including marine life and ecosystems, plays in supporting marine economic activity. To pursue a blue economy agenda, ocean governance faces multiple challenges including shipping, coastal port development, food security, fisheries management, oil and gas exploration, sea level rise and ocean acidification. Although, IMO has already brought in new measures to increase efficiency, and reduce greenhouse gas emissions and pollution, more needs to be done to address issues of invasive alien species from ballast water and hull fouling. In this respect, benefits for the blue economy can emerge through simple measures, for example, the provision for waste reception at ports. Of significant use to shipping will be Marine Spatial Planning (MSP) as a strategic process that helps to manage risks and balance the trade-offs across the sustainability aspects (social, environmental and financial) and to ensure the best use of coastal and marine assets. This can be achieved by integrating ecosystem-based approaches, spatial and scale considerations, and a multi-level policy framework (e.g. agreements, regulation, licensing, and legislation).
	<b>Data</b>	Seaborne trade growth in 2011; projections of container traffic by 2013; importance of the contribution of the maritime sector to the Australian economy (no sources)

	<b>Topic</b>	<b>Facilitation of international trade by improving international connectivity.</b>
<b>13</b>	<b>Synopsis</b>	Facilitating more efficient commercial arrangements for shipping is a key challenge, with the linkage between domestic initiatives, policies and international rules being a major consideration. IMO has a critical role to play in improving the end-to-end efficiency of the logistics chains through further work on the single window concept and other means of promoting trade facilitation. The challenges facing the maritime community mainly involve the need for aligning the technological and organizational structures involved in international commerce. In this regard, IMO should continue to play a central role in providing the framework, guidance and resources to achieve the standardization of the design and the implementation of the single window.

		Additionally, IMO should continue the ongoing dialogue with other relevant international organizations with interests and expertise in this area. Still the major challenge will likely be securing agreement between government agencies and industry on the scope and structure of the single window.
	<b>Data</b>	UNCTAD statistics on growth of international imports and exports; WTO reports on growing importance of participation in global economies as growing priority for many nations; WTO/OECD study on barriers on participation in Global Value Chains

	<b>Topic</b>	<b>Clear maritime communications as a key to e-navigation.</b>
<b>14</b>	<b>Synopsis</b>	The ability to transmit information in a digital and language independent format provides an opportunity to address the current nature of on-board, ship-ship and ship-shore communications which has been identified as a key enabler for e-navigation. Maritime communications technologies have increasingly been developed and capabilities are evolving to include more digital data forms using advanced radio communications technology. By combining digital data and machine-to-machine communications, there is an opportunity to digitize existing lexicons, moving towards a language independent communications capability. As systems and technology develops, for example through increasing reliance placed on text information, there will be a need to ensure the latest standards are adhered to, which will require clearly defined and practical testing standards for equipment to be developed by the International Electrotechnical Commission (IEC). Work in this area will need coordination with other international bodies, such as ITU, IEC and IALA.
	<b>Data</b>	None submitted

	<b>Topic</b>	<b>Utilization of Vessel Traffic Services (VTS).</b>
<b>15</b>	<b>Synopsis</b>	IMO has identified VTS as a means to facilitate safe, efficient and pollution free transits. Not all Member States have implemented VTS in strict accordance with SOLAS and not all services are provided in a similar manner. There are a number of areas that can cause confusion to mariners, these include the varying levels of training and experience of VTS operators, the consistent implementation of the identification of the need for Local Port Services (LPS) versus a VTS, the requirement to use "results oriented" communication and the level of knowledge about LPS and VTS. The adoption of next generation S-101 ENC will enhance this capability to clearly identify the geographic limits of VTS and similar services. With developing work on maritime service portfolios there is an opportunity to better recognise the shore side element in shipping and ship movements.
	<b>Data</b>	None submitted

	<b>Topic</b>	<b>Address Greenhouse Gas (GHG) emissions from shipping.</b>
<b>16</b>	<b>Synopsis</b>	Emissions from shipping should remain under the purview of IMO which has already implemented mandatory international measures to deal with the industry's emissions. There is ongoing concern about the need to address the projected growing share of emissions from the international shipping sector as trade continues to expand, and the development of practical measures to address the reduction of emissions will need to be supported by robust data on the efficiency and emissions from individual ships, which will require finalization of the data collection system being discussed at MEPC.
	<b>Data</b>	IMO GHG Study on GHG emissions from shipping

	<b>Topic</b>	<b>Address the 2020 reduction in sulphur content of fuels.</b>
17	<b>Synopsis</b>	The effective implementation of MARPOL Annex VI needs to be addressed in light of the potential that low-sulphur fuel will not be available for large scale commercial use in time, and considering that there are ongoing safety issues with the processes to change fuel systems whilst the ship is en route. The increasing demand of low sulphur fuel can only be met if there is a strong economic incentive for refineries to produce it, as the shortage is due to economic rather than technical issues. Fuel availability will also be an issue if there are future submissions for the designation of new Emission Control Areas (ECA's). Finally there are challenges in respect to the effectiveness of Regulation 14 of MARPOL Annex VI in addressing stakeholders' expectations. Some reports indicate that residents who live near busy ports are significantly affected by ship emissions and some countries have identified the need to introduce more stringent measures than those outlined in MARPOL Annex VI to meet the wider expectations of communities. Air pollution issues are therefore an ongoing priority.
	<b>Data</b>	IMO GHG Study (2014); NSW Ship Emission Study (2015) on emission reduction when using low-sulphur fuel; Low-sulphur marine fuel availability study (2008); European Community Ship-owners Association (2014) overview of "fuel changeover" issues and challenges

	<b>Topic</b>	<b>Effective management of garbage from ships, in particular plastic debris.</b>
18	<b>Synopsis</b>	MARPOL Annex V needs further consideration with respect to its effectiveness in monitoring garbage disposal from ships at sea. Marine debris, in particular plastics, has negative impacts on the marine environment, tourism and fishing activities as well as posing a risk to human health. As a result of the particularities of plastics, including its global usage and slow degradation, the quantity of plastics reaching the marine environment is expected to increase with time. MARPOL Annex V obligates States party to the Convention to provide adequate garbage disposal facilities at port but despite this, garbage continues to enter the marine environment. Small Island states and territories have additional complications with the lack of available land and resources to deal effectively with waste arriving on ships. There are continued gaps, obstacles and disincentives to effectively implement MARPOL Annex V, due to regulation and enforcement measures, or the ineffectiveness of education materials and guidelines. Likewise, fishing vessels, the majority of which do not meet the gross tonnage necessary for the obligations of MARPOL Annex V to apply, also contribute to the problem of disposal of waste into the marine environment. Innovation and the development of new technology to deal with waste on board of ships will play an important part in addressing the issue.
	<b>Data</b>	US EPA (2011); Marine debris in the North Pacific; CSIRO (2015): Sources, distribution and fate of marine debris; several publications/ studies on the pollution by plastic debris in different regions

	<b>Topic</b>	<b>Illegal, unreported and unregulated (IUU) fishing.</b>
19	<b>Synopsis</b>	IUU fishing continues to undermine efforts by States to manage fisheries on a sustainable basis. Effective regional cooperation has had some success in targeting on the water responses to IUU fishing operations, and port State and market State measures have prevented entry into ports for illegal operators and the trade of fish and fish products from such sources. Ongoing efforts to tackle those engaging in such operations circumventing national and international conservation and management measures and taking advantage of porous mechanisms particularly in developing States, complement IMO's work on maritime crime and security and present future opportunities for increased action by IMO.
	<b>Data</b>	Estimated economic loss from IUU fishing, 2009



	<b>Topic</b>	<b>Measures to manage the risk of biofouling from ships.</b>
20	<b>Synopsis</b>	The spread of invasive species is recognized as one of the greatest threats to the ecologic and economic wellbeing of the planet and is a problem that has intensified through the expansion of trade and traffic volume on the seas. Biofouling is considered one of the main vectors for marine bio-invasions. Management of biofouling can have significant benefits to the environment and economy by improving a ship's performance, as biofouling can increase the ship resistance, which impacts fuel costs and emissions. Changes to marine environments and temperatures due to climate change also increase the risk of species surviving in environments different to their own. Whilst IMO has Guidelines, which it approved in 2011 and are intended to provide a globally consistent approach to the management of biofouling complementing current maintenance practices within the industry, these guidelines are non-mandatory in nature and their implementation and effectiveness in reducing the risk of biofouling has to be examined and remain a part of IMO's work.
	<b>Data</b>	Several publications/ studies on the effects of hull and bio-fouling in different regions

	<b>Topic</b>	<b>Implementation of the Ballast Water Management Convention.</b>
21	<b>Synopsis</b>	The Ballast Water Management Convention (BWMC) is close to meeting its entry into force criteria presenting a series of challenges for Member States including the unilateral protocol for approval of ballast water management systems (BWMS) which creates problems for Member States who operate within US waters and may comply with IMO but not US approved BWMS. Barriers to install BWMS should have been removed by the passing of the resolution on the <i>Application of the International Convention for the Control and Management of Ship' Ballast Water and Sediments, 2004 (A.1088(28))</i> and the ongoing review of the Guidelines. The challenges for IMO are the development of guidance on ballast water sampling and the definition of terms within the Convention. These challenges could delay or reduce the investment in ballast water management systems developments.
	<b>Data</b>	None submitted

## Brazil

	<b>Topic</b>	<b>Impact of IMO regulation on the shipping industry and global trade.</b>
22	<b>Synopsis</b>	The rise in ship acquisitions and the increasing operational costs of ships that are in compliance with IMO requirements leads to the disappearance of smaller companies and restricts competition. New IMO regulations, such as use of low sulphur fuels and installation of equipment for ballast water treatment, already adopted, will have significant cost implications for the shipping industry. Simultaneously, shipping has already reduced the emissions from shipping significantly. Therefore, IMO should consider the impact of new regulations and a balance between environmental aspect and other factors affecting the sustainability of maritime transport.
	<b>Data</b>	IMO GHG Study 2014 (reduction of emissions, reduction in contribution to total global emissions); International Chamber of Shipping potential cost to global shipping of new environmental regulations, 2015-2025)

## Denmark

	<b>Topic</b>	<b>Responding to emerging needs</b>
23	<b>Synopsis</b>	The rising demand for transportation by sea will require continued focus on maritime safety and environmental protection by IMO. This is amplified by the tendency of the global community towards zero tolerance of accidents and the increased impact of media coverage (speed of media flow and use of social media). In contrast, the general economic situation adds pressure on the administration to cut resources

		while delivering more. Nevertheless, the maritime industry must ensure maritime safety and contribute to the reduction of emissions, especially, as the importance of reducing air pollution was highlighted in the Paris Agreement on climate change. In order to achieve this, IMO has also to take into account innovation and the development of new technologies.
	<b>Data</b>	None submitted

24	<b>Topic</b>	<b>Reduction of administrative burdens without compromising the safety of shipping.</b>
	<b>Synopsis</b>	With regard to the accumulation of current regulations, it has to be ensured that resources are used in the most effective way and that seafarers are not overburdened with unnecessary procedures. The recent Assembly resolution on <i>Principles to be considered when drafting IMO instruments (A.1103(29))</i> as well as the recommendations in the final report of the Ad hoc Steering Group on the Reduction of Administrative Burdens should be taken into account, in particular, the effective use of modern technology and electronic solutions.
	<b>Data</b>	None submitted

25	<b>Topic</b>	<b>Implementation and enforcement of IMO regulations</b>
	<b>Synopsis</b>	With regard to new regulations, it is essential that IMO can respond to emerging needs. However, the focus should be on the ratification and implementation of current IMO instruments and existing initiatives like the introduction of the four-year cycle for SOLAS amendments or as a future step, the possible introduction of a period of basic rule stop, might be a good solution. When drafting new regulations, it is essential to consider how the practical enforcement will be carried out, as new regulation itself will not secure a safer and more environmentally sustainable shipping industry. To achieve this, IMO must put its efforts into the effective enforcement of regulations.
	<b>Data</b>	None submitted

26	<b>Topic</b>	<b>Flexible decision making.</b>
	<b>Synopsis</b>	The five main IMO areas of work have their own distinct features, but are also overlapping or complimentary. The reduction of sub-committees has already enabled IMO to expedite matters and to deliver global solutions quickly. However, it has to be acknowledged that some issues that IMO is dealing with cover more than one topic and their impact could be further improved if several aspect of these issues would be considered simultaneously. Other matters, such as the reduction of administrative burdens, require horizontal considerations to provide sustainable solutions. Therefore, it is prudent to look at the overall working mechanisms of IMO to ensure that IMO's decision making continues to be agile and flexible. Possible solutions could be the development of new fora for the discussion of proposals that approach all relevant aspects of an issue simultaneously. This would improve the efficiency of the decision making of IMO's governing bodies.
	<b>Data</b>	None submitted

## Finland

27	<b>Topic</b>	<b>Emergence of new technologies that enable automation and digitization.</b>
	<b>Synopsis</b>	The use of information technologies allows for automation, improves ship operations, reduces bunker consumption and increases energy efficiency that allows for cost savings and improves maritime safety as they facilitate the reduction of risks caused by human error. Use of data analysis tools optimize the ship's performance and facilitate informed decisions about vessel operation and supports

		ship maintenance. Given these technological developments, there is a need for IMO to adapt to these changes more quickly and strengthen mechanisms that can produce globally harmonized rules that adopt new technological solutions. Further challenges are the collection, verification and storage of data as well as the usufruct of data and the cybersecurity of intelligent ships.
	<b>Data</b>	None submitted

	<b>Topic</b>	<b>Clean solutions in shipping.</b>
<b>28</b>	<b>Synopsis</b>	The use of clean solutions in shipping, such as alternative fuels (e.g. LNG) and the development of new propulsion systems powered by for example electricity and wind require IMO regulations to be flexible enough to facilitate the use of new fuels and new technologies that enhance the energy efficiency of ships.
	<b>Data</b>	None submitted

	<b>Topic</b>	<b>Smart regulation by reducing administrative burdens.</b>
<b>29</b>	<b>Synopsis</b>	The ideal legislation is technology neutral and supports innovation. In order to achieve the needed flexibility, there is a need for a shift from detailed rules to smart regulation in the form of risk-and performance-based regulations like goal-based standards. Smart regulation can also help to avoid frequent amendments and changes to IMO regulation that create administrative burdens and cause difficulties in implementing all IMO instruments in a timely manner.
	<b>Data</b>	None submitted

	<b>Topic</b>	<b>Global partnerships to help Member States to implement IMO regulations</b>
<b>30</b>	<b>Synopsis</b>	IMO needs to ensure an enabling environment where new technologies and practices that increase energy efficiency and safety can be adopted and implemented worldwide. This can be achieved through capacity-building initiatives in developing countries for energy efficient shipping as well as through global partnerships (public and private).
	<b>Data</b>	None submitted

## Germany

	<b>Topic</b>	<b>Interdependencies and interactions between IMO regulations.</b>
<b>31</b>	<b>Synopsis</b>	All maritime safety or environmental protection measures also have implications on human element issues (at sea and on shore) and can also affect other IMO-regulated areas (technical, manning, training and work environment). Therefore, in the development of safety and security regulations, the impact of these regulations on the environment has to be considered.
	<b>Data</b>	None submitted

	<b>Topic</b>	<b>Further reduction and limitation of greenhouse gases and air pollution from international shipping.</b>
<b>32</b>	<b>Synopsis</b>	Although the shipping sector is not included in the Paris Agreement, the Agreement will have consequences and implications for IMO. It also creates pressure for IMO to deliver practical and efficient measures for reducing greenhouse gas emissions from international shipping and promote sustainable shipping, in this IMO has to focus on the marine ecosystem as a whole.
	<b>Data</b>	None submitted

33	<b>Topic</b>	<b>Interlinkage of new measures and regulations with technical cooperation activities.</b>
	<b>Synopsis</b>	Interlinkages with IMO regulations and technical cooperation activities should be increased. The monitoring of success should be focused on the implementation of safety, security and environmental protection measures. The special needs of Small Island Developing States (SIDS) and Least Developed Countries (LDCs) have to be taken into account.
	<b>Data</b>	None submitted

34	<b>Topic</b>	<b>Impact of technological development on safety and security measures.</b>
	<b>Synopsis</b>	Technological development like bigger vessels, exhaust gas cleaning systems, digitization, automation and issues of cybersecurity will have impacts and implications on IMO safety and security measures as well as on human element measures. These technological developments need to be taken into account when drafting IMO instruments.
	<b>Data</b>	None submitted

### Greece

35	<b>Topic</b>	<b>Better regulation for shipping.</b>
	<b>Synopsis</b>	Overregulation can bring on severe commercial, economic and administrative burdens upon national administrations and the industry, threatening the sustainability of maritime transport. In addition, regulations which are hastily adopted can jeopardise the stability of the global regulatory framework and it is important that Member States and other stakeholders have confidence in the process to ensure early adoption, ratification and entry into force as this will render any unilateral measures by Member States unnecessary. The development of new regulations should be accompanied by an effective regulatory impact and feasibility assessment to ensure that implementation of any new regulations does not conflict with others already in existence nor does it cause undue expense for industry or administrative burdens for Member States.
	<b>Data</b>	None submitted

36	<b>Topic</b>	<b>Untested nature of new technological developments.</b>
	<b>Synopsis</b>	Modern technological advancement is unprecedented and yet not all of these technologies have proven positive, practical or feasible. The impact on the shipping industry needs to be taken into account before hastily introducing new technology to deal with issues that regulation is trying to address. Furthermore, new technologies should be tested under real operating conditions before they are introduced in order to ensure their practicability, sustainability and feasibility.
	<b>Data</b>	None submitted

37	<b>Topic</b>	<b>Changes to IMO's working practices.</b>
	<b>Synopsis</b>	The Organization would benefit from revisiting its guidelines on the organization and method of its work to take into account factors such as compelling need, economic impact, technological availability and feasibility when drafting new or reviewing existing regulations, the latter of which should become part of a continuous review of the regulatory stock. Any proposal put forward should also be supported by accurate technical, statistical and economic data and IMO should use a more structured statistical analysis of safety and environmental issues before creating new regulation.
	<b>Data</b>	None submitted

38	<b>Topic</b>	<b>IMO as the only body with the mandate to govern international shipping activities.</b>
	<b>Synopsis</b>	International shipping activities are governed by a large number of rules and regulations which at times may overlap, be burdensome or outdated which may have, in cases, led to unilateral or regional regulations being developed which contradict, or go beyond, those established at IMO. It is however important to underline IMO as the only forum in which to develop regulation which is global and uniformly applied as the development of regional/unilateral regulations can have heavy economic, and other, impacts for stakeholders. Cooperation with official maritime industry associations, Member States and other stakeholders should be developed and strengthened to ensure inclusion of different views before regulation is agreed to ensure its success and greater compliance.
	<b>Data</b>	None submitted

### Japan

39	<b>Topic</b>	<b>Rational, unified and transparent regulation and fair implementation.</b>
	<b>Synopsis</b>	Regional regulation increases due to the long time that is needed to reach consensus with regard to IMO regulations, as well as unnecessary and ineffective international regulations that are not based on reliable data and rationale. To ensure a level-playing field, the implementation of IMO conventions by all IMO Member States is needed. Therefore, when considering new regulations both the need for, as well as the impact of, the regulations has to be demonstrated by accurate data to ensure transparency and predictability of international regulations. Additionally, IMO should concentrate on improving the implementation of existing IMO instruments.
	<b>Data</b>	None submitted

40	<b>Topic</b>	<b>Lack of visibility of the maritime industry.</b>
	<b>Synopsis</b>	Despite the fact the more than 80% of the world trade is transported by ships, which illustrates the importance of shipping with regard to international trade, the general public does not pay much attention to shipping. Although IMO and maritime nations have addressed the improvement of the image of the maritime industry, they have not have as much effect as expected.
	<b>Data</b>	Percentage world trade transported by ships, number of seafarers detained by pirates since 2008

41	<b>Topic</b>	<b>Development and entry into force of regulations to reach the 2°C goal of the Paris Agreement.</b>
	<b>Synopsis</b>	Although IMO has already done much with regard to GHG emissions from ships, due to the Paris Agreement at COP 21, there is a need to develop further measures to improve energy efficiency of shipping, such as data collection and reporting systems on fuel consumption of ships, as well as regulatory arrangements for these systems.
	<b>Data</b>	Paris Agreement (UNFCCC), IMO GHG Study 2014

42	<b>Topic</b>	<b>Implementation of IMO regulations</b>
	<b>Synopsis</b>	Some IMO measures, like the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships have not yet entered into force or might not be implemented by all Member States (e.g. sulphur limitation). Therefore, IMO should ensure a level playing field by promoting and encouraging implementation of existing and entry into force of new regulations.
	<b>Data</b>	None submitted

43	<b>Topic</b>	<b>Consideration of safety aspects when introducing, using and regulating new technologies.</b>
	<b>Synopsis</b>	The development of new technologies enables new navigation systems, remote control of ships as well as the fast exchange of data. Additionally, new technologies enable the use of natural gas as fuel and an increase of cargoes with new properties that can be transported by ships, like liquefied hydrogen or granular bauxite. At the same time, the issue of cybersecurity, the development of standards to cover these new complex technologies, and possible safety concerns with regard to the use of these new technologies, gain importance and need to be addressed by IMO.
	<b>Data</b>	Discussion at MSC 95, development of IGF Code, discussion at CCC 2

#### Mauritius

44	<b>Topic</b>	<b>Global shortage of seafarers and officers.</b>
	<b>Synopsis</b>	Although the shipping industry offers highly remunerated career opportunities, a global shortage of seafarers has been predicted. The maritime industry depends on an adequate supply of seafarers and officers to operate ships and provide all services surrounding shipping. Shipping is a highly technical discipline that requires skills, knowledge and expertise, in particular considering the impact of technological innovation on the shipping industry. The decrease in the numbers of recruits, lack of properly educated and trained seafarers and difficulties in retaining skilled personnel within the maritime sector are issues which need to be addressed. To grow the maritime sector and increase the direct participation of the industry in skills development, additional measures need to be implemented, these could be for example maritime awareness campaigns, international partnerships between maritime training institutions, a centralized management of information on maritime sector skills, implementation of various employee strategies, the offering of tax benefits and financial incentives.
	<b>Data</b>	None submitted

45	<b>Topic</b>	<b>Increased containerization of seaborne trade and its impact on port facilities.</b>
	<b>Synopsis</b>	The growing size, capacity and sophistication of ships to accommodate trade growth as well as to offer economies of scale in a highly competitive market, has implications on port facilities. The challenge is to attract investment into port infrastructure and to develop the human capital in the maritime industry to enable ports to offer the service requirements of large vessels.
	<b>Data</b>	None submitted

#### Mexico

46	<b>Topic</b>	<b>Regulation of activities involving the dumping of waste from deep seabed mineral exploration and exploitation activities in areas under national jurisdiction.</b>
	<b>Synopsis</b>	Neither MARPOL, nor the London Convention and Protocol regulate waste dumping and marine pollution caused by operational or accidental factors associated with ships, platforms and other marine structures engaged in deep seabed mineral exploration and exploitation activities, or in the transport of such resources towards areas of national jurisdiction. This leaves a gap in the regulation of such activities at an international level. The International Seabed Authority (ISA) has been developing rules and regulations as the first part of a "Mining Code" governing all deep seabed mineral exploration on the seabed and subsoil thereof beyond the limits of national jurisdiction. In order to ensure that waste from undersea mining activities in jurisdictional waters is covered within the framework of LC/LP, the coordination

		between the LC/LP and ISA needs to be promoted. The aim is to approve criteria and procedures leading to an eventual amendment of LC/LP. The result should be an international regulatory framework for undersea mining, applicable to the disposal of tailings and waste and also controlling the volume of such materials that may be dumped at sea.
	<b>Data</b>	None submitted

**Norway**

47	<b>Topic</b>	<b>Development of a stable and forward looking global regulatory framework.</b>
	<b>Synopsis</b>	IMO plays a significant role in establishing a level playing field for the maritime industry through the development of international rules. IMO should strengthen its work in addressing the challenges ahead for the maritime industry and societies (e.g. challenging economic landscape, low oil prices, record number of refugees, growing security issues, and global climate challenges), to work towards the establishment of stable and forward-looking global regulatory framework within the remit of the Organization. IMO must further strengthen its work towards achieving robust results and regulations that can tackle both expected and unexpected developments within its core activities safety, security and environmental protection.
	<b>Data</b>	None submitted

48	<b>Topic</b>	<b>Implementation through the facilitation of entry into force of IMO regulation.</b>
	<b>Synopsis</b>	IMO should strive towards facilitating a higher degree of predictability for the maritime industry. One of the main challenges in this regard is the length of time between adoption of new conventions and their entry into force. Given the amount of resources spent negotiating new mandatory conventions, one should consider ways to facilitate its entry into force. IMO should consider any possible actions within its responsibility in this highly important issue. Failing to ensure the entry into force of important international instruments will lead to the adoption of regional measures and can be detrimental to IMO's role and credibility. The role of technical cooperation in this regard is important.
	<b>Data</b>	None submitted

49	<b>Topic</b>	<b>Encouragement of technological developments and innovations.</b>
	<b>Synopsis</b>	At present, the industry is seeing rapid technological developments in ship design and equipment as well as other technological developments to improve information flow and progress in the development of alternative fuels. IMO must become more flexible in order to facilitate development and implementation of new technologies to enhance ship safety and protection of the marine environment. IMO should also strengthen its work towards using available technologies to reduce administrative burdens and improve efficiency, i.e. the single window concept, electronic certificates and e-navigation. It is also necessary to ensure that seafarers have the necessary skills to use new technology being developed.
	<b>Data</b>	None submitted

50	<b>Topic</b>	<b>Technological synergies between shipping and other ocean based industries.</b>
	<b>Synopsis</b>	There is a growth of ships used in marine food, and other biological production, in alternative energy production and in minerals extraction, but there might be other segments not developed as of present, which will grow in due course. Therefore, IMO should be attentive towards these future developments and maintain flexible legislation for segments that fall within its remit.
	<b>Data</b>	None submitted

51	<b>Topic</b>	<b>Further development of regulations that support greener international shipping.</b>
	<b>Synopsis</b>	IMO should work towards achieving a systematic approach to reduce the total environmental burden of international shipping. Shipping should play a part in the climate change solution and Member States should cooperate actively to establish an ambitious IMO framework for quality shipping, especially by developing strict environmental standards. Shipping needs to use more environmentally friendly fuels, needs to be more energy efficient, and shipping needs to take a larger share of the transport work. The most important thing is to succeed in establishing second generation climate requirements for international shipping.
	<b>Data</b>	None submitted

### Singapore

52	<b>Topic</b>	<b>Developing a sustainable maritime transport system taking into account the strong impetus to mitigate global climate change.</b>
	<b>Synopsis</b>	IMO should continue to work on its Sustainable Maritime Transportation System, with focus placed on the goal regarding environmental stewardship. Environmental stewardship covers the development and implementation of global standards for pollution prevention and protection of the marine environment. However, there is no IMO instrument that directly regulates GHG emissions unlike other pollutants that are regulated under MARPOL. IMO must therefore continue to work with relevant stakeholders to contribute to global GHG reduction goals and support global efforts in climate change mitigation such as using new technologies and renewable energies. IMO must also strike a balance between efforts to reduce GHG emissions and the economic viability for the shipping industry, develop regulations that can be implemented effectively and efficiently and consider how to provide capacity building to IMO Member States.
	<b>Data</b>	Emissions Gap Report 2015, by UNEP

53	<b>Topic</b>	<b>Sustainable stewardship of oceans resources and maritime activity.</b>
	<b>Synopsis</b>	Ocean governance gains importance because of the increased competition or conflict for the use of the oceans' resources. An example is the growing international attention on issues relating to marine biological diversity beyond areas of national jurisdiction (BBNJ). The pressure on marine ecosystems from activities such as pollution, overfishing, expanded shipping and marine deep seabed mining led to the consensus at the UN to develop a legal framework under UNCLOS on the conservation and sustainable use of BBNJ and an increase in the designation of Marine Protected Areas (MPAs). The availability and adequacy of governance structures and legal tools are emerging issues that are embarked upon at international, regional and national levels. Ocean governance issues are discussed across various different UN agencies, but an increasing intersection of ocean and shipping issues and the coordination and coherence between UN agencies will become more challenging. As a consequence, IMO's work in maintaining coherence among UN bodies in global governance, regulations and policies will become a challenge.
	<b>Data</b>	Global Environmental Alert Service 2014 by UNEP: increase in deep seabed mining, increase in the designation of MPAs

54	<b>Topic</b>	<b>Shortage of competent and experienced of seafaring officers.</b>
	<b>Synopsis</b>	The expansion of the world fleet has led to a shortage of seafaring officers. The gap between supply and demand of seafarers has slowed down (slowing growth of fleet, larger vessels), but the shortfall remains especially for competent and experienced officers, which has a direct impact on the safe and secure operation of ships. Maritime accidents caused by human error could be alleviated with competent and



		experienced officers. Besides, the complex global environments and changing landscape creates the need for developing strong and effective maritime leadership skills. Maritime leaders need to be trained and equipped with the necessary skills and mindset. The challenges facing the maritime industry with regard to the shortage of competent officers are to attract more people, especially the younger generations, to ensure that officers are properly trained and possess the necessary skills before obtaining qualifications and promotions. Additionally, there is a need for investments to update training curricula and to overcome the lack of sufficient cadet positions for training on board ships. The challenge with regard to maritime leadership is to provide leadership courses that provide training standards and qualifications that are tailored to the maritime sector and flexible enough to accommodate the schedule of maritime leaders.
	<b>Data</b>	Drewry Article, June 2015, on increase on officer demand by 2019; Deloitte report, 2011, on shortage of competent officers; Allianz Global and Corporate Specialty, 2013, on human error as root cause of most maritime incidents

55	<b>Topic</b>	<b>Utilization of technology.</b>
	<b>Synopsis</b>	The shipping industry has been trying to leverage new technologies to improve the safety, security, environmental protection and efficiency of shipping and to close the manpower gap. IMO has already engaged in those efforts by adopting the e-navigation implementation strategy, the use of e-certificates and the design of a maritime single window to reduce administrative burdens. However, the difference in the pace of adoption in different maritime nations may create a technology gap, in particular if there is a lack of effective technology transfer and training opportunities to use these new technologies. The challenges for the maritime industry are to create adequate training opportunities on the use of new technologies for seafarers and crew, offshore and on board and to facilitate successful technology transfer between countries to increase the use of maritime technologies worldwide. However, the shipping industry has also to address the threat of cybersecurity and to consider back-up plans when technology fails.
	<b>Data</b>	IHS article, 2016, on need to integrate new technologies to attract new generation of seafarers; DNV-GL study, 2014, on the acceleration of technology in the shipping industry towards 2015; Reuters article, on issues of cybersecurity in the shipping industry; DNV-GL study on the top ten cybersecurity issues for the offshore industry; roundtable of shipping associations (BIMCO, ICS, INTERCARGO, INTERTANKO), on the development of standards and guidelines to address major cybersecurity issues for the shipping industry

## Sweden

56	<b>Topic</b>	<b>Development of advanced technologies, in particular automation and digitization.</b>
	<b>Synopsis</b>	The developments of new technologies, such as automation on board ships, new forms of communication, the use of information technology and new forms of traffic management that can increase the efficiency, safety and environmental sustainability of the shipping industry and will require regulatory solutions. This will also impact the training and expertise of crew, users and supervisory functions as more autonomous ships might require fewer but highly qualified crew members. There should also be incentives to invest in new technologies especially with regard to environmental matters for the shipping industry. A mechanism is needed to ensure that early adopters of new technologies are not penalised but rather rewarded.
	<b>Data</b>	None submitted

	<b>Topic</b>	<b>Increase in the intensity of the use of maritime space.</b>
<b>57</b>	<b>Synopsis</b>	Due to the emergence of new maritime industries (such as wind power) and the extensive growth of existing industries, new forms of shipping services and activities are developing. There is a need for IMO to develop rules and regulations for these new maritime industries, so they do not fall behind the safety and environmental standards of the shipping industry while ensuring the efficiency of the new maritime industries. Additionally, there is a need for IMO to cooperate with regional organizations with regard to sustainable marine management including marine spatial planning.
	<b>Data</b>	None submitted

	<b>Topic</b>	<b>Development of a legal framework of goal-based standards.</b>
<b>58</b>	<b>Synopsis</b>	The development of a legal framework of goal-based standards should result in clear, transparent, measurable and comparable regulations and a successful implementation. This can be achieved by increasing the knowledge and understanding of such methods as well as the consequences of such a new approach. The regulatory framework should be agreed by Member States and cooperation with the shipping industry has to be increased with additional focus on the interpretation of standards. The implementation has to be monitored and reviewed regularly to identify its effects and learn from experiences.
	<b>Data</b>	None submitted

	<b>Topic</b>	<b>Increase regulatory effectiveness through harmonization of instruments.</b>
<b>59</b>	<b>Synopsis</b>	For shipping to remain competitive, there is a need to reduce the overall bureaucracy and to harmonize requirements. In order to achieve this, IMO needs to recurrently examine, assess and challenge its current regulatory framework, with a clear vision of the results, in order to avoid that the simplification process results in an increase in regulations. To perform this analysis, IMO should seek external competence as well as consider experience from other transportation modes concerning their requirements of permits or certificates.
	<b>Data</b>	None submitted

	<b>Topic</b>	<b>Reduction of time between adoption and entry into force of IMO instruments.</b>
<b>60</b>	<b>Synopsis</b>	Adopted conventions must be ratified in a timely manner. Therefore, IMO should send clear signals to Member States, in order to improve this process.
	<b>Data</b>	None submitted

	<b>Topic</b>	<b>Reduction of the environmental impact of shipping.</b>
<b>61</b>	<b>Synopsis</b>	With the continued growth of maritime transport, the shipping sector's contribution to climate change will increase. Therefore, it is necessary that the shipping industry contributes to the limitation of emissions in line with the Paris Agreement. To improve the environmental impact of pollution from ships (air, water, waste handling, ballast water management etc.), efficient and effective implementation of IMO instruments is necessary. Nevertheless, the industry needs to be informed in advance to be able to plan ahead. This can be achieved through better cooperation between Member States with regard to ratification and implementation of instruments. It is also IMO's role to coordinate with other international organizations and UN agencies to meet common objectives, e.g. incorporation of relevant Sustainable Development Goals (SDGs) into IMO's Strategic Plan. Additionally, there is a need to analyse the environmental performance of ships to assess their environmental impact. In this respect, the development of a system for monitoring, reporting and verifying emission from ships to enable transparency and comparability is needed.
	<b>Data</b>	None submitted

**United States**

	<b>Topic</b>	<b>Heightened safety and security risk due to cyber technologies.</b>
<b>62</b>	<b>Synopsis</b>	Ship and port facility operators are increasingly dependent on computers and technologies for navigation, propulsion, engineering, cargo, ballast, safety and environmental control. These new technologies provide opportunities but also constitute risks. Those risks can concern security issues, for example, malicious acts to control disable or exploit system, and safety issues, for example, malware, misuse of systems and technical errors. Additional steps need to be taken by the maritime community to assist ship owners and operators to implement cyber risk management practices.
	<b>Data</b>	Relevant documents submitted to MSC and FAL

	<b>Topic</b>	<b>Increased presence of unmanned maritime systems (UMSs).</b>
<b>63</b>	<b>Synopsis</b>	UMSs are being used more often and becoming more technically sophisticated and larger in size. These evolving technologies that drive advances in automation, smart controls, robotics, optimization and decision support tools, and maintenance of equipment and system management, demand updates to the international standards in order to mitigate any unforeseen safety implications to the maritime transport system. In order to ensure safety of navigation, protection of life and property at sea and the proper operation of manned and unmanned vessels, best practices coupled with COLREGs/Inland Navigation Rules changes and amendments to IMO conventions such as Convention on the International Regulations for preventing Collisions at Sea (COLREGs) and SOLAS will be necessary.
	<b>Data</b>	None submitted

	<b>Topic</b>	<b>Use of alternative fuels, hybrid power distribution systems and energy storage devices and techniques.</b>
<b>64</b>	<b>Synopsis</b>	Alternative propulsion systems have environmental benefits in terms of air emissions and fuel efficiency, but also present unique risks and safety hazards. The need to meet increasingly strict emission control mandates has led to a push toward the use of LNG as a fuel and subsequent development of the International Code of Safety for Ships using Gases or other Low flashpoint Fuels (IGF) Code. The expansion of the scope of the IGF Code to other alternative fuel technologies (e.g. hydrogen fuel cells, alcohols, low-flashpoint diesel fuels) might create challenges that go beyond the fire safety issues traditionally associated with fuels or cryogenic issues known with regard to LNG fuel. Additionally, advances in hybrid power system technologies enabled by Lithium-based batteries facilitate energy storage and power management systems on some types of vessels. However, the use of Lithium-ion batteries causes unique safety issues in installation and operation as do power management systems. Although, these techniques have been proven in other sectors, they have not been implemented in the commercial shipping industry and a regulatory shift may be necessary to enable those new technologies.
	<b>Data</b>	None submitted

	<b>Topic</b>	<b>Use of advanced materials in ship design and construction.</b>
<b>65</b>	<b>Synopsis</b>	Advancements in composites, for example fibre reinforced plastic (FRP) and nanotechnology, are progressing rapidly and there is an increased desire to apply these types of materials in ship design and construction. With regard to composites, there is a push from certain sectors of the maritime industry to construct commercial vessels in whole or in part with these materials. Accepting this has significant regulatory implications, as existing standards throughout SOLAS assume steel or equivalent construction. Factors to consider beside fire performance are, among others, damage stability and subdivision, arrangements of life safety alliances and egress routes,

		electrical issues regarding counterpoise, radio communication interference, health and environmental concerns regarding construction and disposal. With regard to other advanced materials, nanotechnology can be applied to create specialized nanomaterials, for example nanocomposites, nanometals and nanocoatings, to develop new equipment and improve existing design. The application of nanotechnology is an emerging development in the maritime industry. IMO has to maintain awareness of its advancements in order to address any emergent issues.
	<b>Data</b>	Submissions: MSC 97/24/9 (United Kingdom); FP 55/19 (United Kingdom); FP 55/19/1 (Sweden); FP 56/12 (Sweden); FP 56/12/1 (United States); FP 56/12/2 (China); MSC 95/10/7 (United States); SDC 3/17 (Germany); SDC 3/17/1 (United States); SDC 3/17/2 (Sweden); and SDC 3/17/3 (CESA) requesting the development of composite construction guidelines; Fortune Magazine article on corrosion-protected nanometals manufactured using advances in nanotechnology

	<b>Topic</b>	<b>Control and management of operational discharges by vessels.</b>
<b>66</b>	<b>Synopsis</b>	As the environmental sensitivity of stakeholders' increases, there will be pressure to address environmental risks associated with operational discharges from ships. Addressing these concerns requires multidisciplinary engagement and collaboration among several distinct but related technical fields, including marine engineering, biology, chemistry and naval architecture. Treatment and management strategies of air and water pollution may have potential adverse environmental and safety consequences, including mechanical and electrical failure of equipment, impact on ship propulsion and human health risks of using chemicals and other mechanical treatments. The major challenge is to ensure that pollution control technologies both protect the environment and do not interfere with the safety and proper operation of vessels. The technical challenges to establish standards for incidental discharges and emissions, and the means of achieving and assessing compliance with such limits, are becoming increasingly complex as these technologies require interacting aspects of science, engineering and ship design. To ensure safety while simultaneously advancing technology, IMO will need to increase the breadth of its competency.
	<b>Data</b>	None submitted

	<b>Topic</b>	<b>Implementation of IMO instruments.</b>
<b>67</b>	<b>Synopsis</b>	The increasing number of safety, security and environmental protection requirements in IMO's mandatory instruments, continues to be subject to varied implementation and compliance among IMO Members. The effects of the financial crisis demand the periodization of work and further scrutiny on new requirements to minimize additional administrative burdens. As IMO and the maritime industry will be judged by their overall performance, there is a need to not only raise standards, but also increase overall implementation and compliance.
	<b>Data</b>	None submitted

	<b>Topic</b>	<b>Need of seafarer training for specialized operations and technology.</b>
<b>68</b>	<b>Synopsis</b>	The requirement for seafarer training will continue to increase due to the constant increase of technology used on board ships and the increased specialization of ships. Current training requirements are modelled around general training and are supplemented by specialized training and familiarization while on board the ship. The current training paradigm envisions the Administrations ensuring the competency of seafarers through the issuance of certificates of competence. However recently, there is a move towards ensuring that the owner is the responsible charge that the ship is manned with qualified seafarers. Experience with new technologies has raised questions on the need to develop detailed equipment performance standards to ensure similar equipment across all manufacturers. IMO will be faced with changing its approach to "when" and "where" training is conducted while ensuring seafarers are qualified and competent to carry out their duties.
	<b>Data</b>	None submitted

**Intergovernmental Organizations in consultative status**

**International Hydrographic Bureau (IHO)**

69	<b>Topic</b>	<b>Increased use of maritime resources and the maritime space.</b>
	<b>Synopsis</b>	The growth in mariculture, offshore energy, structures and other maritime based industries continue to increase. New routes, along with technological developments outpacing charts and surveys, creates environmental and safety concerns and reduces the efficiency of maritime navigation. Poorly charted areas and a lack of relevant information causes voyages to be longer than necessary, and may prevent the optimum loading of ships, thus increasing overall costs. The saving of time and money resulting from the use of shorter and deeper routes and the possibility to use larger ships or load ships more deeply can generate important economies for national industries. Reliance on modern navigation equipment tends to overlook the fact that caution is needed when planning and navigating ships to ensure that there is a sufficient safety margin between charted hazards and the ship's intended route.
	<b>Data</b>	None submitted

70	<b>Topic</b>	<b>Capacity building for the development of hydrography.</b>
	<b>Synopsis</b>	Hydrographic Services have contributed significantly to the expansion of world trade. However, too few coastal States are supporting hydrography at the national level. In fact, there has been a reduction in the number of government owned surveying vessels and many countries do not yet have appropriate structures and organizations in place to survey and chart their maritime areas or circulate the relevant nautical information. Relevant nautical information can help governments meet the requirements to provide reliable maritime safety information (MSI) to their designated NAVAREA Coordinator necessary to meet their national SOLAS obligations. Capacity building is necessary to provide suitable services for the mariner and ship operators.
	<b>Data</b>	The numbers of government owned surveying vessels has actually declined by one-third over the last three decades. At the current rate of progress, to survey uncharted areas would take about 600 ship years to complete.

**Non-governmental Organizations in consultative status**

**Friends of the Earth International (FOEI)**

71	<b>Topic</b>	<b>Address tailings as marine pollution to protect the marine environment.</b>
	<b>Synopsis</b>	The dumping of mine waste into the oceans has a significant impact on the destruction of marine ecosystems worldwide. IMO should continue to examine the impact of tailings dumping and the potential role the Organization can play in solving the problem including the possibility of playing an enforcement role in the banning of submarine tailings disposal.
	<b>Data</b>	Earthwork's Troubled Waters report on tons of hazardous waste dumped by mining companies; Nature (2015): Ecological impacts of large-scale disposal of mining waste in the deep sea

**International Association of Maritime Universities (IAMU)**

72	<b>Topic</b>	<b>Shortage of qualified seafarers.</b>
	<b>Synopsis</b>	In order to ensure sustainability in maritime transportation, the provision of suitably qualified seafarers is one of the most important factors. The lack of seafarers is a result of a loss of prestige in the industry, the shortage of qualified teaching staff as well as a lack of training facilities. In addition, the development of increasingly sophisticated vessels and port systems, alongside the IMO requirements for regulating safety, security and protection of the environment, demand a workforce both on the ship and ashore that is properly trained and educated. Recruitment in countries where labour is cheaper also presents challenges in terms of for example language and education of seafarers. Current STCW levels of competencies are minimum standards which are not sufficient to cope with the increasing size and complex nature of some ships operating at present.
	<b>Data</b>	UNCTAD Review of Maritime Transport (2015); Drewry's Manning 2014 Annual Report; BIMCO/ISF Manpower Update 2000-2015; IMO (2014): data on maritime casualties

73	<b>Topic</b>	<b>Overregulation) and increase in the cost of shipping.</b>
	<b>Synopsis</b>	Implementation of and training on new regulations will increase the cost to the shipping industry, in particular when the industry is faced by a reduction in the number of qualified seafarers. The shipping industry would have to meet the skills shortfall to ensure that the crew operating the ship is suitably qualified to safely manage these vessels, and to comply with international regulations, as well as ensuring that crew training keeps up to date with changing regulation. The shortage of qualified seafarers can have an impact on the safe and efficient operation of ships that can result in further development of regulations to address incidents or accidents that may be triggered by underprepared crew, which sustains the problem of overregulation in the industry and continued high costs in training seafarers on it.
	<b>Data</b>	Marinelink (2015): Ship operating costs on the rise

**International Cargo Handling Coordination Association (ICHCA)**

74	<b>Topic</b>	<b>Management of carbon emissions from the maritime sector.</b>
	<b>Synopsis</b>	The Paris Agreement identifies a goal of "holding the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels." IMO is widely recognised as the international organization with responsibility for international shipping. Despite minimum efficiency levels for ships (introduced through EEDI) being internationally agreed, the increase in the number of vessels due to an increased trade volume, will lead to increased emissions. It may be necessary for IMO to reach a consensus on additional Market-based Measures to complement the EEDI.
	<b>Data</b>	IMO GHG Study (2014); Report by European Parliament on emission reduction targets for international aviation and shipping (2015)

75	<b>Topic</b>	<b>Facilitation of trade by improving port and border procedures.</b>
	<b>Synopsis</b>	The WTO Trade Facilitation Agreement encourages Member States to improve port and border procedures and the ongoing development of more stringent security measures surrounding shipping is likely to place additional strain on the flow of cargo through the maritime supply chain. There will be a need to balance security and facilitation policies to improve the operational efficiency and effectiveness of procedures in the maritime supply chain.
	<b>Data</b>	None submitted

**International Chamber of Shipping (ICS)**

76	<b>Topic</b>	<b>Harmonization of global regulations to support the efficient and environmental sustainability of shipping.</b>
	<b>Synopsis</b>	<p>IMO is widely considered to be the international body for regulating maritime transport. The establishment of regional requirements and initiatives that add requirements or standards to ship operations, which have not been agreed at IMO, place a burden on trade and ship operations internationally. Consistency of regulation and application of the international regulatory framework can minimize disruption to trade.</p> <p>The exercise initiated by IMO on reviewing existing regulations and on the development of new regulations to ensure they are harmonised, fair and transparent, can be of great potential benefit to the shipping industry.</p> <p>Regulation may be developed as a response to an incident report where it seeks to address the cause(s) of an incident. However the challenge lies in ensuring new regulation is proposed only after the review and assessment of existing regulation to ensure they are being effectively implemented, particularly in the case of proposed requirements which affect the same issues, thus avoiding the development of complex regulatory requirements.</p> <p>The development of individual regulations should not take place in isolation and there is a need to balance responses to safety or environmental issues with the need to assist the cumulative impact and/or conflicts between subsequent amendments to IMO instruments. In addition the development of regulations should take into account the technical and commercial feasibility of the solutions required.</p>
	<b>Data</b>	None submitted

77	<b>Topic</b>	<b>Use of advanced technology and the development of a genuine single window to effectively manage communications between ports and ships.</b>
	<b>Synopsis</b>	<p>The increasing requirements for ships' crew to manage large volumes of complex information and to submit detailed reports to multiple stakeholders in a wide range of conflicting formats has increased the burden on masters at sea. The introduction of technology and in particular the single window approach should facilitate the reporting requirements of ship masters and focus activity on board ships on safety. This in itself will bring challenges to ensure acceptance of new technology, ensure the security of information exchanged, streamlining the approach to type approval and carriage requirements and unifying communication formats, whilst assessing the training requirements of staff on board ships to adapt to these new technologies.</p>
	<b>Data</b>	None submitted

78	<b>Topic</b>	<b>Data based techniques to assess regulatory responses.</b>
	<b>Synopsis</b>	<p>There will be an increase in data-based approaches to create risk-based regulation. Establishing the necessary tools within IMO's regulatory process will be an important aspect of this future work. However, given that the submission of data to IMO is very inconsistent, the challenge for the Organization will be to develop resources to justify a compelling need, and to carry out a risk-based assessment of any proposed regulation. The need to develop new, or amend existing regulation should be justified through a transparent and consistent understanding of the level of impact on for example safety, crew welfare or the environment.</p>
	<b>Data</b>	None submitted

	<b>Topic</b>	<b>Management of the impact of new regulation on seafarers.</b>
<b>79</b>	<b>Synopsis</b>	There is a need to align the requirements of regulatory instruments with the realities of life at sea. With increasing amounts of regulation and increasing complexity of regulations, there is a need for effective anticipation of the training requirements for seafarers to allow programmes to be developed. Training and certification must be managed to ensure sufficient time for full compliance by companies, training providers and seafarers. This should be done by ensuring that the time available during phase-in periods takes full account of the need to facilitate practical implementation.
	<b>Data</b>	None submitted

	<b>Topic</b>	<b>Further development of IMO's working practices.</b>
<b>80</b>	<b>Synopsis</b>	During IMO meetings (committees and sub-committees), there has been increasing difficulty in maximizing the use of available technical experts to debate complex technical proposals, assess risks to the maritime sector and develop appropriate regulatory initiatives to address maritime issues. The use of technical expertise should be maximised in order to use resources effectively to achieve optimal results.
	<b>Data</b>	None submitted

#### International Transport Workers' Federation (ITF)

	<b>Topic</b>	<b>Impact of advanced technologies on maritime stakeholders.</b>
<b>81</b>	<b>Synopsis</b>	Advances in digital information technology has permitted ship systems and shore-based monitoring and communications to be linked in previously inexistent ways. This relationship between ship and shore can open up the management of ship operations to others beyond the ship master who operates under the oversight and regulatory authority of the flag State. The potential for a division of authority will divide responsibility and liability between multiple actors. Furthermore, increased management from shore based personnel can lead to a loss of situational awareness world and a de-skilling of the workforce on board a ship. The consequences of technological innovation need to be looked at holistically, going beyond a focus on equipment standards and implementation to focus on the social, technical, legal and policy issues surrounding use of technology in managing shipping activities.
	<b>Data</b>	None submitted

	<b>Topic</b>	<b>Cybersecurity.</b>
<b>82</b>	<b>Synopsis</b>	Technological advancements which may be commercially driven rather than required by industry may also pose additional threats to safe, secure and sustainable maritime transportation, as technology may be more susceptible to cyberattacks, it may leave a ship unprepared for dealing with technological failure and it may place greater demands on training of personnel if technology is not developed to be intuitive and standardized. This may also have an impact on recruitment and retention of staff who may see their career opportunities curbed by de-skilling or redundancy due to technology.
	<b>Data</b>	None submitted

#### International Association of Classification Societies (IACS)

<b>83</b>	A series of research papers and publications that capture global trends, developments and challenges facing the maritime community. The data provided in these publications will be used to underpin the trends, developments and challenges facing the maritime industry in the next years.
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