Australian Government

Australian Maritime Safety Authority

Looking ahead

AMSA's operating environment 2017-2027

Foreword

The challenges we face as a regulator and response agency, and our operating environment, have changed and will continue to do so in the coming years. For example:

- From 1 July 2018, we assume responsibility for full service delivery of the National System for Domestic Commercial Vessel Safety. This means regulating some 27,000 domestic commercial vessels and 66,000 domestic seafarers.
- With the exception of the cruise industry, the growth in commercial shipping experienced over the past 10–15 years has slowed primarily due to the declining growth in the commodities export sector.
- The forecast long-term growth rate in commercial shipping and cruise activity, and Australian's enthusiasm for recreational boating and general aviation, has a direct impact on how we plan to meet our search and rescue, marine pollution and maritime casualty intervention responsibilities.
- Industry continues to push the boundaries of technology. Vessels that operate within Australian waters are becoming more technologically sophisticated, with increasing automation in navigation, communications and control systems.
- The increasing numbers of recreational vessels and offshore developments, such as oil, gas and renewable energy projects (coupled with other maritime activities), are increasingly competing with commercial shipping for the use of finite sea room, often near ecologically sensitive areas.

A review of our operating environment and stakeholder consultation has identified 10 key challenges for the next decade. These challenges include changes to shipping traffic, maintaining a risk-based approach to compliance, the introduction of new technologies, the welfare of seafarers, and ongoing protection of the marine environment.

To meet these challenges, we need effective policies, regulations and capabilities with commensurate controls in place.

This document informs our corporate plan and has a 10-year outlook. The challenges and priorities contained within have been identified by reviewing our changing operational environment, industry publications and feedback from our stakeholders.

This document considers experience gained from the regional planning approaches in north-east and north-west Australia. Those approaches proposed improvements to safety and additional protective measures to minimise known and potential environmental impacts in the medium to long-term. It also draws on commissioned research into changes to shipping routes, ports and growth in offshore activities.

We will continue to target the needs of the maritime community by meeting our service delivery aspirations for a safe, environmentally responsible and efficient maritime sector.

AMSA Executive
September 2017

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Our current environment

Australia's shipping task

As an island continent with nearly 60,000 kilometres of coastline, and being remote from the world's main trading centres, Australia is heavily reliant on shipping.

Australian seaports trade with over 120 different countries. Over 400 commodities are shipped to and from Australia to hundreds of destinations, using more than 1000 different shipping routes:[1]

- Bulk carriers are used to transport dry bulk commodities; these are mainly iron ore, coal, wheat, sugar, salt and bauxite/alumina. In 2016, bulk carriers accounted for 51 per cent of foreign ship arrivals.
- In 2016 bulk liquid oil and petroleum products shipped by oil tankers and gas carriers had growth rates of 5 per cent and 28 per cent respectively. The closure of several oil refineries in Australia in recent years has resulted in a significant decline in crude oil imports and a corresponding increase in smaller tankers carrying refined products.
- Growth in general cargo, container, car carriers and reefer ships (refrigerated capacity) has declined to almost stagnant annual growth.

Australia's domestic fleet

The shipping fleet conducting international trade within Australia's waters share this space with domestic commercial vessels. These are vessels used in connection with a commercial, government or research purpose that operate within Australia's Exclusive Economic Zone.

Comprising approximately 27,000 vessels manned by some 66,000 seafarers, the domestic commercial vessel fleet services a myriad of industries and operations from very small to large enterprises. These include:

- passenger vessels (tourism, ferries, water taxis, etc.)
- non-passenger work vessels (freight and cargo vessels, research, tugs, barges, offshore support vessels, etc.)
- fishing vessels
- hire and drive vessels (houseboats, jet skis and sailing vessels).

As we assume full service delivery, we will continue to build on our understanding of the breadth and depth of Australia's domestic commercial fleet and the diversity of operations, to ensure our activities as the national regulator are effectively and efficiently targeted.

[1] Braemar ACM Shipbroking, Australian National Traffic Study Report, unpublished, September 2016.

Our functions

Three of our functional divisions align with our three lines of defence to promote maritime safety and environment protection Standards, Operations and Response. As a relatively small agency employing approximately 400 staff in 20 locations, the support provided by our Corporate Services division is a key enabler to helping us achieve our functions.

Our Standards division:

- influences international standards and makes regulations to give legal effect to those standards
- develops policies and technical documentation that guide the development of domestic standards and regulations, and how we intend to enforce them
- engages with industry stakeholders to ensure they know what is expected of them, and to better fulfil our own roles as a contemporary regulator
- engages with our delegates in Australia and sister-agencies internationally to enhance our capabilities and roles as defined by international conventions.

Our Operations division:

- ensures regulatory compliance to enforce vessel safety, qualifications, marine pollution standards and coastal pilotage requirements are met
- provides a consistent and risk-based approach to the regulation and delivery of services for domestic commercial vessels operating in Australian waters
- trains people and organisations in our inspection and compliance procedures both domestic and international partners.

Our Response division:

- undertakes search and rescue, salvage, intervention and pollution response operations 24/7 consistent with Australia's obligations under international conventions
- responds to maritime casualties, marine pollution and search and rescue incidents
- ensures readiness for a forecast doubling of current search and rescue incident responses by 2034 due to forecast growth in domestic and international civil aviation (the number of aircraft is expected to double and passenger numbers increase from the current 3.4 billion to 7.3 billion by 2034)
- contributes to safe navigation by maintaining our network of aids to navigation
- manages service contracts and resources that we need to support our response operations.

Our Corporate Services division:

- is working to ensure we will be equipped with appropriate information and communications technology to able to operate the National System for Domestic Commercial Vessel Safety from July 2018
- ensures we have a dynamic and well managed workforce to meet our responsibilities
- provides a range of fit-for-purpose information technology that enables our operational and business needs
- provides organisational-wide governance support
- ensures delivery timely, effective and relevant communication to stakeholders and the regulated community to enable them to meet their maritime safety obligations.

Arrangements for regulating domestic commercial vessels

The National System for Domestic Commercial Vessel Safety (national system) commenced on 1 July 2013, and is implemented by the *Marine Safety (Domestic Commercial Vessel) National Law Act 2012* (the National Law).

Until 30 June 2018, state and territory delegates in marine safety agencies are responsible for delivering services under the National Law, and cost recovering accordingly.

These services include certification of operators, seafarers and vessels; industry education and compliance services. We assume full responsibility for service delivery under the national system from 1 July 2018.

The national system provides consistency in regulations and standards, regardless of where operations are conducted around Australia.

We seek to improve the safety culture within the domestic commercial vessel industry and simplify the regulatory framework. This is consistent with the objectives set out in the National Law, which include:

- promoting continuous improvement in marine safety
- promoting public confidence in the safety of marine operators
- ensuring effective identification and management of safety risks
- seeking to reduce regulatory burden without compromising safety.

The National Law imposes general safety duties on a variety of parties involved with domestic commercial vessels. These duties are additional to the core requirements for a domestic commercial vessel to be the subject of a certificate of survey and certificate of operation, be crewed by persons holding a certificate of competency, and be marked with a unique identifier.

The general safety duties include the requirement to implement, document and maintain a safety management system that ensures the safe operation of the vessel, recognising that these persons are best placed to identify, assess and manage the risks associated with their operations.

While this is the key goal, the reality is that regulation alone cannot eliminate every risk and the role of the regulator is to provide support where needed.

The national system contributes to the following outcomes for industry:

- reduced complexity in relation to the required standards for design, construction, equipment, operation and qualifications/crew certification Australia-wide
- support for a more efficient national market and reduced costs for business and labour through eliminating barriers to the transfer of labour and commercial vessels between jurisdictions
- continued strong leadership on maritime issues through forums, working groups and provision of information to assist stakeholders to meet their obligations
- improved safety for the public, domestic commercial vessel owners, operators, crew and the environment.

Compliance

The legislation that we administer contains a wide variety of compliance tools that we will use in accordance with our published compliance and enforcement policy. Regardless of vessel type, the principles of compliance with standards are the same:

- Port and flag State control will remain the primary compliance mechanism for international shipping and we will develop a similar risk-based, intelligence-led inspection regime for domestic commercial vessels.
- We accredit recognised organisations to survey ships and private marine surveyors to survey domestic commercial vessels, and will continue to audit the performance of both.

The future environment

In preparing for the future, we will continue to work closely with the maritime community to build the capabilities, expertise, knowledge and technologies to assess and mitigate new or changing risks in our operating environment.

Challenges over the next decade

In reviewing our operational environment and through discussions with stakeholders, we have identified 10 key challenges. These are:

1. Anticipating and responding to current and emerging risks associated with Australia's commercial and domestic shipping traffic, routes and hubs
2. Maintaining an appropriate risk-based approach to regulation and compliance
3. Enhancing the environmental sustainability of shipping
4. Assisting the introduction of modern navigation systems and information and communication technologies (ICT)
5. Facilitating the operation of autonomous vessels
6. Ensuring human factors are considered in safety
7. Supporting the development of single window reporting for trade facilitation
8. Advocating for national marine spatial planning in Australia
9. Effective international and domestic engagement
10. Anticipating the changing role of seafarers.

This document describes the issues and trends driving change, summarises the implications for the maritime community and our policy responses.

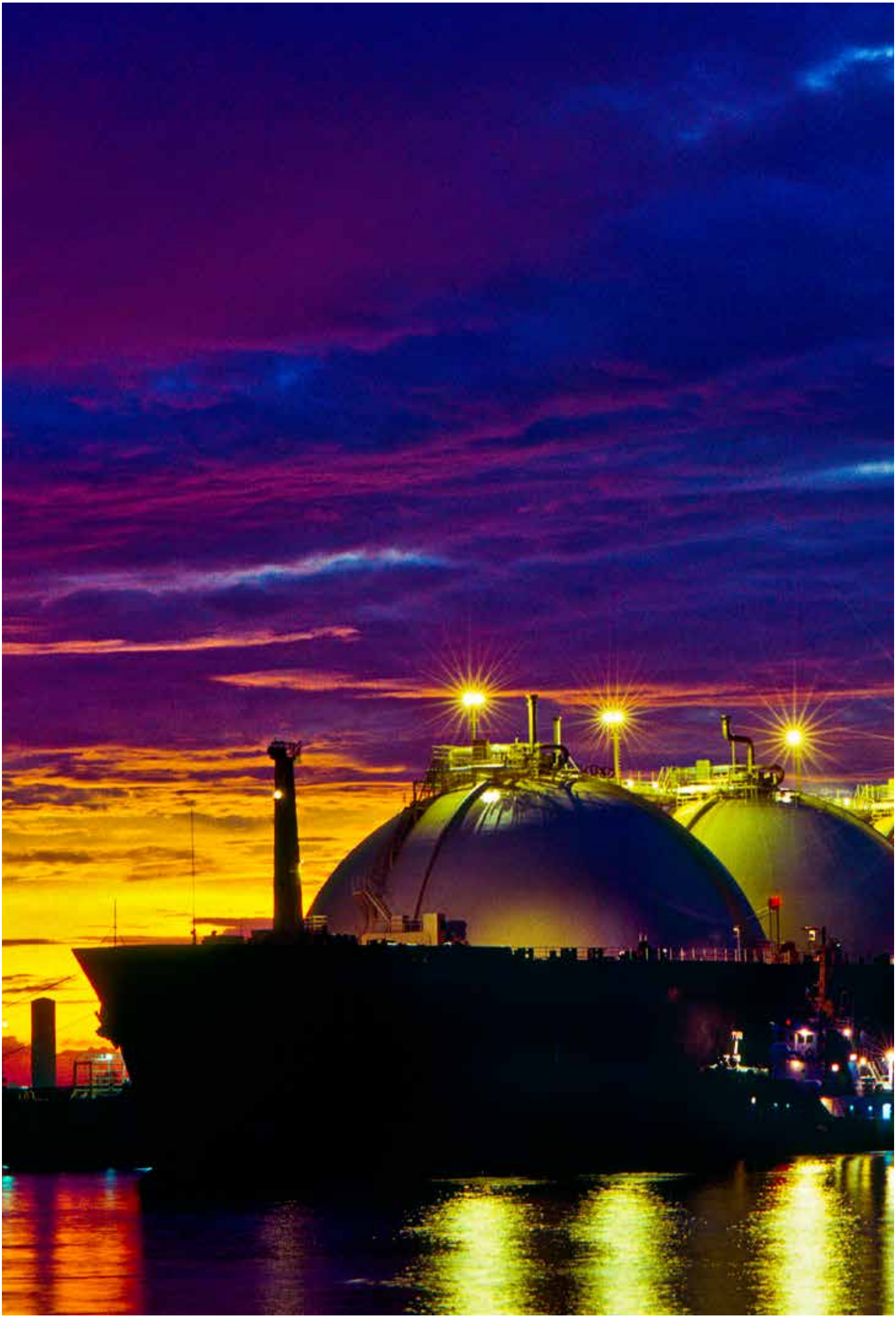
Conclusion

We face a number of ongoing and emerging challenges as a regulator and response agency. Our future operating environment will continue to change, as new trends and developments emerge within the domestic and international maritime industry.

Looking ahead – AMSA's operating environment 2017–27 outlines our long-term planning considerations to respond to these challenges.

Our annual corporate plan is aligned to the near and mid-term challenges contained within. *Looking ahead – AMSA's operating environment 2017–27* will be incorporated into our annual review cycle and this will ensure that our challenges and responses are regularly reviewed and remain relevant, and that our responses are sufficient and appropriate to the degree of risk.

The key challenges identified for the next decade will continue to evolve, as new technologies emerge, the skill requirements of seafarers change, and the means to protect our marine environment develop. In reviewing and addressing these challenges, we ensure that we continue to meet our vision: safe and clean seas, saving lives.



Challenge 1

Anticipating and responding to current and emerging risks associated with Australia's commercial and domestic shipping traffic, routes and hubs

Issues and trends driving change

Within Australia, the demand for shipping is a derived demand influenced by a range of geographic, macroeconomic, socio-economic, demographic, technical and political factors.

The economic and technological drivers affecting the quality of ships have given rise to a need for better economies of scale.

In 2016, 5719 foreign-flagged ships made over 27,500 calls to Australian ports. The ships that came to Australia were larger overall than in 2015. The average age of vessels calling at Australian ports in 2016 was nine years, a decrease from an average of 10 years in 2015.[1]

Over the past 35 years global trade in goods and services has increased six-fold, particularly as emerging economies have become more integrated with the rest of the global economy. Asian ports are emerging as world shipping hubs[2] due to stronger economic links with the resource-rich Middle East and Africa.

Asia will continue to drive huge demand for a diverse range of goods and services while, at the same time, new markets are being created and many services once only delivered locally are now regularly imported or exported as trade barriers fall and technology improves.

Short to medium-term commodity projections, indicate that:

- the current oversupply of bulk carriers and container ships will continue in the medium term
- growth in shipping of dry bulk commodities may moderate as a result of the slow-down in the Chinese economy
- product tanker visits will continue to rise faster while crude tanker visits will decline as new oil refineries in India lead to further closures of Australian refineries
- total port calls by cargo ships will continue to grow at a reduced rate comparative to recent years, in line with oversupply in the resources sector[3]
- the main area of long-term shipping growth is likely to continue to be those vessels involved in servicing the export trades iron ore, bauxite, coal and natural gas.

The cruise ship sector is a strong growth area. Cruise ships are generally getting bigger, with larger lengths and greater displacement, and resultant increases to the number of passengers they can carry.[4] Globally, 25.8 million passengers are expected to sail in 2017, an increase from 17.8 million in 2009.[5] In 10 years, Australia's cruise passengers have grown more than six-fold, to approximately one million passengers per annum.

An increasing number of cruise ships often visit pristine or environmentally sensitive areas such as the Great Barrier Reef, the Coral Sea, and the Kimberley coast, seeking to use anchorages in remote regions in addition to standard port calls.

[1] Australian Maritime Safety Authority, 2016 Port State Control Report, www.amsa.gov.au/forms-and-publications/international/publications/Ship-Safety/PSC-Annual-Reports/ p. 6.

[2] Commonwealth of Australia 2014, Industry Innovation and Competitiveness Agenda, www.industry.gov.au/industry/Pages/Industry-Innovation-and-Competitiveness-Agenda.aspx.

[3] Bureau of Resources and Energy Economics, Australian bulk commodity exports and infrastructure – Outlook to 2025, July 2012.

[4] www.asa.com.au/our-organisation/the-australian-maritime-industry.

[5] Cruise Lines International Association, '2017 Cruise Industry Outlook', December 2016 www.cruising.org/docs/default-source/research/clia-2017-state-of-the-industry.pdf?sfvrsn=0.

Implications for the maritime community

- The globalisation of shipping introduces a range of new players to the maritime industry. With the expected oversupply of bulk carriers and container ships to continue for the foreseeable future, the consolidation of shipping companies and alliances will enable a lesser number of operators to wield greater influence on global trade.[6]
- Cruise ships and passenger vessels that traverse environmental sensitive areas present additional risks. For example, risks in the Antarctic include sea ice cover, sea water temperature, sea conditions, air temperature, traffic levels, search and rescue (SAR) response, and navigational chart coverage and availability.

Our policy response

We will:

- track new developments affecting the maritime environment and periodically undertake waterway risk assessments as circumstances dictate
- review the training we provide, and exercises we conduct, to ensure that our people and their skills are relevant to the changing nature of petroleum cargos
- continuously monitor changes in shipping traffic and port infrastructure to assess potential impacts on our investment in safety initiatives and the geographic distribution of our response resources
- establish new regional offices where appropriate—staffed to manage the additional maritime activity and to provide services under the National System for Domestic Commercial Vessel Safety
- continue to review our capabilities to respond to incidents involving maritime casualties within Australian waters
- continue to focus, invest and lobby at international level in preventative measures such as propulsion redundancy, emergency towing system, pollutants within double hull and enhance monitoring of vessels to avoid catastrophic maritime environmental emergencies
- monitor changes in the types of fuels, products and cargos carried in Australian waters to ensure our response capability is proportionate to the potential risks
- monitor the volume and types of shipping traffic and related risks to determine the need to modify existing aid to navigation networks, or amend existing or establish new traffic management initiatives
- continue to facilitate, develop and review international standards relating to passenger vessels. This includes the implementation of the Polar Code, which covers vessel design, construction, equipment, operational, training, search and rescue and environmental protection matters relevant to ships operating in the inhospitable waters of the Antarctic
- assess the risk of a mass casualty scenario involving cruise ship operations in remote areas. This analysis will assist in determining if vessel operations are safe, and assist us in being prepared to respond to worst case incidents.

[6] International Maritime Organization, Strategic Plan 2016-21, www.imo.org/en/About/strategy/Pages/.

Challenge 2

Maintaining an appropriate risk-based approach to regulation and compliance

Issues and trends driving change

As an international industry, shipping is subject to a comprehensive regulatory regime which must take into account community expectations and international standards. The safe operation of international trading ships and domestic commercial vessels requires us to consistently apply maritime safety standards.

Responsibility for the safe operation of a ship and its crew rests with its owner, the master and its flag State. We apply a risk-based, proportionate approach to ensure compliance with regulatory requirements.

Our primary means for monitoring and enforcing compliance of international ships with safety and environment protection standards is through port State control inspections. Port State control ensures international shipping complies with international safety, environmental, and labour standards. It is also one of the strategies used to monitor the safety and welfare of seafarers. A particular focus for Australia is on reducing the risk of incidents caused by handling and stowage of cargoes.

We work closely with countries in the Asia-Pacific and Indian Ocean regions to promote effective port State control regimes. Some of this engagement is through Australia's influence in the Indian Ocean and Tokyo Memoranda of Understanding (MOUs) on port State control and liaising with flag States to ensure that they understand the robust nature of Australia's own port State control regime.

Compliance activity for domestic commercial vessels focuses on collaboration and education/support for operators to achieve compliance outcomes. Our performance-based approach includes moving towards a 'trust and verify' system of monitoring compliance with safety outcomes.

Our compliance policy for domestic commercial vessels supports the objectives of the National Law. The policy includes the encouragement of maximum compliance with the maritime safety legislation through the application of a cooperative regulatory approach and enables us to detect, prevent and manage contraventions of the National Law.

The constantly increasing volume and complexity of international and domestic vessel traffic and offshore activities brings with it a potential increased risk of incidents. We are conscious of the need to ensure that there are adequate measures in place to prevent and respond to maritime incidents of all kinds, particularly those that could result in injury or loss of life or incur significant pollution.

Where operators have compliant vessels and operations, a good safety record and a safety management system, we should focus on periodically verifying that they are complying with the safety outcomes required by the law through risk-based surveillance and systems-based audits.

More oversight may be directed towards industry sectors and operators that do not have a good record of regulatory compliance. This will include vessels, operators and crew, and where the risks and/or consequences of an incident are high.

Importantly, this performance-based or 'trust and verify' approach to compliance cannot be implemented overnight. A transitional process will be applied to ensure that operators take responsibility for operational safety outcomes through the development and implementation of an effective safety management system.

In alignment with compliance principles, breaches of the law may also be met with strong enforcement actions to promote voluntary compliance in the future.

The implementation of equivalent solutions, which are contained within marine orders, allows greater compliance flexibility without compromising safety.

Implications for the maritime community

- For international ships, we apply inspection rate targets based on the calculated risk factor for each ship. This risk factor calculation takes into account a number of criteria and, based on this, ships are categorised into priority groups with each group having a specific target inspection rate.
- We conduct port State control inspections on international shipping in accordance with international guidelines and within the constraints of our authority. Port State control inspectors use their professional judgement in conducting an inspection, in determining the extent of inspection and in determining the required action required in response to identified deficiencies.
- For domestic commercial vessels, a streamlined national compliance service, which focuses on reducing regulatory burden, presents real and substantial benefits to the domestic maritime industry and the Australian economy.
- Operators are trusted to comply with the law. Verification occurs in partnership with industry to ensure compliance and enforcement activities are clearly targeted to vessel operations and safety practices that are at risk. The aim should be to base our activities on risk, incident data, inspections and analysis.
- The goals of reduced costs of compliance with the National Law and increased accountability will affect the manner in which we adopt and implement new national regulations and standards.
- As we take over full service delivery under the National Law, our compliance approach will change from a reliance on conducting regulatory operations, such as surveying or inspections, to oversight, education, quality assurance and audit of regulatory functions.
- Monitoring and assessing the risks related to our developing and ever changing maritime industry should shape the way we regulate. We must consider the risks to seafarers, vessels and the environment, alongside developing technologies, and foster a safety focused approach, culture and methodology for enforcement of our national maritime regulatory framework.

Our policy response

We will:

- require private accredited marine surveyors to develop and maintain a management system that aligns with ISO 9001(4) Quality Management System to aid their performance improvement
- maintain our international engagement activities with a focus on the safety of shipping in Australian waters and in areas of Australian responsibility. Our activities should include:
    - continuing to work with the Tokyo and Indian Ocean MOUs on port State control
    - working bilaterally in the Asia-Pacific and Indian Ocean regions to ensure that ships coming to Australian ports come from nations with effective port State control regimes
    - working with flag States to ensure that they understand the robust nature of Australia's own port State control regime
    - continuing to work closely with counterpart agencies of our major trading partners—including China, Japan and Republic of Korea—and with neighbouring states such as Indonesia, Papua New Guinea and New Zealand
- continue implementation of the International Maritime Organization (IMO) goal-based standards. Where appropriate, we should adopt IMO standards directly to avoid any unnecessary unique Australian standards or additional requirements
- continue our work to improve cargo safety, with a focus on the liquefaction of bulk cargoes
- base our activities on risk analysis and assessments, using incident data, and information gathered during vessel inspections
- use a central compliance management unit to enhance our capabilities in identifying compliance priorities and coordinating compliance actions
- actively work with other government agencies, the states and territories and the maritime community to maintain and enforce a modern regulatory and compliance framework consistent with Australia's interests and international maritime standards
- promote a goal-based safety culture, that manages risk and encourages ownership of operational safety
- continue to accredit and audit the performance of both recognised organisations, for international ships, and private marine surveyors, for the survey of domestic commercial vessels
- conduct regular consultations with our domestic stakeholders and work with our advisory committees to develop and implement deregulatory suggestions with the aim of achieving an appropriate mix of regulation and education
- continue to contribute to international work that focuses on modernising the maritime industry. Work at an international level will help to inform our domestic regulatory approach and promote performance based safety management of Australia's domestic vessels.

Challenge 3

Enhancing the environmental sustainability of shipping

Issues and trends driving change

Australians expect that shipping in our waters occurs without significant incident or adverse environmental impacts. This expectation is reflected in the *Australian Maritime Safety Authority Act 1990*, where our role includes protecting the marine environment from pollution and other environmental damage caused by shipping.

Over the last 10 years, significant improvements to communication, vessel tracking and navigation technologies, as well as improved quality and decreasing age of ships operating in our waters, have helped reduce the risk of both significant incidents and associated large scale impacts to our marine environment.

Environment protection standards for shipping have been steadily rising, largely in response to rising community expectations both here and overseas. The MARPOL Convention[1] has progressively tightened standards and in 2013 prohibited all garbage types from being discharged into the sea[2], and requires a reduction in sulphur content of ship fuel oil, from 4.5 per cent in 2011 to 0.5 per cent in 2020.

There are a range of other environmental issues that will need to be addressed over the coming decade. The potential impacts of shipping on marine fauna, through underwater noise and potential collision, are ongoing concerns and the subject of research both in Australia and overseas.

While Australia does not have the intersection of high shipping traffic and critical whale habitats (observed elsewhere globally) that is likely to impact whale species at the population level, community acceptance of vessels colliding with whales is very low.

A better understanding of the actual risk to whale species in our waters would inform options for reducing the risk as much as possible. The collision risk for near-shore marine fauna (dugong, turtles, and dolphins), particularly from smaller, fast-moving vessels, should also be better understood.

Human-induced underwater noise can have chronic impacts on marine fauna and shipping is a contributor to these noise levels. There are international guidelines[3] for the reduction of underwater noise, which consider ship design, operation and maintenance as means that can reduce noise levels from ships.

[1] MARPOL – International Convention for the Prevention of Pollution From Ships

[2] With limited exceptions, e.g. macerated food waste offshore

[3] IMO MEPC.1/Citc.833: Guidelines for the Reduction of Underwater Noise from Commercial Shipping to Address Adverse Impacts on Marine Life

Underwater noise impact also appears to generally be considered as part of environmental impact assessments (EIAs) for new port developments and the subject of ongoing scientific research.

Serious shipping incidents can have a range of environmental impacts, due to pollution, but also physical impacts, for example, grounding on underwater dangers including coral reefs. Closely related is the capacity to 'clean up' after these incidents.

The Australian Government advocates a 'polluter pays' approach to such incidents and there are international liability and compensation conventions that apply to international shipping pollution. Under these conventions shipowners are able to limit their liability, related to the tonnage of their ship.

Australia previously successfully argued at the IMO for an increase in liability limits, however, it is doubtful that the 50 per cent increase in limits adequately provides for the potential clean-up costs of serious incidents in our more sensitive marine environments. Further, the conventions address only pollution, and not physical damage.

With the entry into force of the Ballast Water Management Convention[4] in September 2017, the focus of the IMO has moved to other vectors that may translocate harmful aquatic species, such as biofouling.

The IMO released the Biofouling Guidelines[5] in 2011, but is now set to progress work on this issue in more detail with the establishment of the GloFouling Project, launched in July 2017.

Australia, through the Department of Agriculture and Water Resources, will engage in this project with the IMO, which will support domestic work to manage the issue of biofouling in Australian waters.

Environment protection measures come at a cost to industry and, while standards have progressively tightened, the shipping industry remains subject to economic cycles. The current economic downturn and over-supply of bulk carriers and container ships has greatly reduced international freight rates for many cargo types.

There is the potential for increased cost pressures during economic downturns resulting in some operators cutting corners when it comes to environmental protection. However, these pressures are also a catalyst for industry innovation.

Australia, like other parts of the world, is seeing the emergence of new technologies, such as LNG power and fuel cells, which will contribute to the environmental sustainability of shipping.

[4] International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004

[5] Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species (MEPC.207(62))

Our policy response

We will:

- improve national consistency of environment protection measures by engaging with state/territory regulators on MARPOL Convention standards, and promoting national approaches to environmental issues that extend beyond state/territory borders
- investigate improvements to the management of ships' wastes including:
  - working with Commonwealth and state/territory agencies on streamlining regulatory arrangements for low biosecurity risk wastes, such as oily waste and incinerator ash
  - examining opportunities for increased recycling of ships' recyclable wastes, to reduce costs and encourage onshore disposal
- work with domestic stakeholders and at the IMO to prepare for the regulatory and operational impacts associated with the introduction of lower sulphur fuel under the MARPOL Convention in 2020
- contribute to the development of the IMO greenhouse gas strategy for shipping, to improve shipping's energy efficiency and minimise its carbon footprint
- consistent with the objects of the AMSA Act, continue to engage on other 'non-pollution' environmental impacts from shipping, such as underwater noise and vessel strike, by engaging with researchers, industry and other stakeholders
- ensure Australia maintains its high incident prevention and response standards, by remaining focused on maintaining the National Plan for Maritime Environmental Emergencies (national plan) through:
  - engaging with national plan governance bodies and associated technical groups, comprising industry and government agency representatives
  - developing agreed approaches, such as place of refuge guidelines
  - testing the capacity of those guidelines and the national plan response protocols through regular review and periodic exercises
- ensure our liability, compensation and cost recovery framework for pollution incidents is robust, so the 'polluter pays' for pollution incidents and, similarly for physical damage to the marine environment
- use compliance and enforcement options, such as issuing directions and improvement notices, to deter offenders from unlawfully discharging waste in Australian waters
- continue to engage stakeholders through a range of communication and educational mechanisms, to support regulatory compliance and to support innovative industry led approaches to compliance
- use marine spatial planning to guide policy in assessing environmentally sensitive areas, development applications and shipping routes.

Challenge 4

Assisting the introduction of modern navigation systems and information and communication technologies

Issues and trends driving change

Significant developments in modern navigation systems and information and communication systems (ICT) are taking place internationally as well as being adopted nationally. These changes are poised to join ship and shore more efficiently, with the intention of making navigation safer and communications more efficient. There is, however, the opportunity for new risks to emerge and hence there is a growing need to monitor and respond appropriately as a responsible and proactive regulator.

Termed e-navigation and led by the IMO, these global initiatives aim to provide bespoke information, in electronic formats, on board and ashore to enhance the safety and efficiency of marine navigation. The International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA), International Hydrographic Organization (IHO) and other international organisations are part of this global, coordinated approach.

E-navigation is a broad concept. For now, it has three focus areas:

- harmonised and improved data exchange and communications
- harmonised presentation of navigational information
- improved design of navigation and communications equipment.

Implications for the maritime community

- Emerging developments in navigation systems and communications technologies will join ship and shore more reliably and efficiently, enhancing the safety and efficiency of navigation.
- Modernisation of systems and equipment will enable the delivery of digital information and services, seamlessly on board ships, to better support decision-making.
- Non-standardised equipment displays, controls and interfaces have the potential to cause confusion amongst mariners, reduce efficiency, hinder good decision-making and jeopardise safety.
- The international trend to consider Global Navigation Satellite Systems as the primary means of shipboard navigation will mean that electronic aids to navigation will grow in importance. This will reduce the significance of legacy aids to navigation networks.

Our policy response

We will:

- continue to engage at relevant national and international forums, contributing to and influencing progressive changes to navigation and communication systems
- provide leadership and awareness at a national level, that will foster the development and provision of e-navigation services, including changes to training, in Australia
- continue to facilitate the implementation of modern maritime communication and navigation safety technologies ashore; analyse developments in navigation and communications equipment and provide guidance to the maritime industry, so that they may better plan for future shipboard investments
- lead the development of guidance on the design of navigation systems, under keel clearance management (UKCM) product specification and a national aids to navigation database
- plan for the infrastructure and communications that will enable Australia to be e-navigation enabled
- lead the development and transition to e-navigation services in Australia
- critically appraise current navigation services and infrastructure considering the future e-navigation enabled operating environment.

Challenge 5

Facilitating the operation of autonomous vessels

Issues and trends driving change

The use of autonomous vessels in Australian waters has increased over recent years. These vessels have been traditionally small, bespoke solutions predominantly operated by research organisations and universities. The early purpose of these vessels has generally been exploratory, but has also included technology development.

The use of this autonomous technology has greatly expanded to applications in the offshore oil and gas industry, surveying, and other commercially driven initiatives.

International programs are studying the upscaling of this technology for increased automation, remote operation, and the potential for autonomous vessels to replace crewed international ships.

Classification societies, and industry groups have developed and released a number of new industry standards and codes to support the design, build and operation of unmanned and autonomous vessels.

There are many technical and regulatory issues to be addressed before autonomous and unmanned vessels reach a level of maturity and reliability acceptable to industry and the Australian community.

For example, autonomous vessels will need to be equipped with technology that will enable collision avoidance and allow the independent function of onboard systems.

The conduct of safe vessel operations, such as enabling the remote or automated operation of switches, valves and other controls will also need to be taken into account. Notwithstanding these technical issues, small autonomous vessels are already being used by the military, oil and gas industry and surveying companies. Australia can expect to see increased use of the technologies that support autonomous operation.

An important consideration for autonomous vessels is that we still expect people, even if remotely, are in charge and responsible for safety-related functions. Humans will still need to oversee the performance and hold a level of responsibility for automated functions.

The challenge is to determine where and what special provisions are necessary for the design, registration, certification and operation of autonomous vessels.

Implications for the maritime community

- The advent of autonomous vessels challenges our traditional regulatory approach and we will need to:
  - ensure the safety of all vessels and compliance with the various international conventions and regulations (eg SOLAS, COLREGS[1])
  - decide whether autonomous vessels can be considered equivalent to manned vessels, and manage the interaction between manned and autonomous vessels
  - consider whether systems required for autonomous vessels can provide the same or a better level of reliability as human operated systems
  - evaluate whether additional regulations or best practices are needed to ensure these vessels are safely operated
  - identify the role of vessel traffic services (VTS) and pilotage in the operation of autonomous vessels
  - identify appropriate design and construction standards
  - provide guidance and direction for the maritime industry on how Australia's maritime regulatory framework can be applied to autonomous and unmanned vessels.

Our policy response

We will:

- adopt a risk-based approach to the regulation of domestic commercial autonomous and unmanned vessels in Australia under Australia's maritime regulatory framework
- ensure our aids to navigation infrastructure will reflect the needs of e-navigation
- consider a qualifications framework for the operators of autonomous and unmanned systems
- engage with stakeholders to promote safe autonomous and unmanned vessel operations, and an awareness of the appropriate levels of safety responsibility under the National Law
- ensure Australia's interests are appropriately reflected in international forums that review existing international conventions and contribute to amendments that will be necessary to accommodate the operation of international autonomous ships.

[1] SOLAS – *International Convention for the Safety of Life at Sea*
COLREGS – *Convention on the International Regulations for Preventing Collisions at Sea*

Challenge 6

Ensuring human factors are considered in safety

Issues and trends driving change

The discipline of human factors aims to understand how humans perform in various operational contexts. From a design and operational perspective, applying this understanding to optimise the interaction between seafarers, their technology and systems, and the environment in which they work can help improve ship safety, efficiency and reliability.

From a human factor's perspective, maritime incident and accident investigations and follow-up interventions, tend to focus on individual behaviours (human error) on ships, in most cases ignoring the more critical system issues in which shipping operates and where more effective safety improvements can be made.

As the movement of ships requires a system to function effectively and efficiently, the sole focus on human error undermines the importance of potential safety issues in the rest of the maritime system. When assessing risks, the need to consider the role of human factors from a socio-technical perspective is important to identify appropriate interventions.

The integrity, availability, reliability and maintainability of incident data will greatly influence the strength and validity of risk assessments to support safety interventions. We are working on strengthening our incident data collection, recording and analysis to improve overall understanding of maritime safety issues providing the basis for more effective safety interventions.

We are also working with the research community in the human factors area of domestic commercial vessels. There is strong evidence suggesting that a positive relationship exists between the level of safety culture and the number of accidents in the workplace. These studies will ensure that targeted safety interventions are implemented.

Implications for the maritime community

- There is a need for improved incident and near-miss reporting and data collection. Improvements are needed in the capture, quality, quantity and validity of data and its application to address safety issues. This will support better and more effective implementation of broad general safety duties by the domestic commercial vessel fleet in particular, where understanding of safety management is inconsistent and, in some parts of the fleet, in its formative stages.
- There is a need for increased ability to conduct analysis that identifies effective interventions required to manage and mitigate risks to safety.
- There is a need to educate and promote the 'value' of safety as studies indicate that people work more safely and have fewer accidents when there is a culture in which safety is valued.

Our policy response

We will:

- continue to streamline incident capture and reporting, and improve the quality, quantity and validity of data being sent to us
- collect data to provide lessons learned and identify potential systematic improvements in our systems and procedures
- use human factors principles to increase our ability to analyse and model data that identifies effective safety interventions
- develop a systematic framework that underpins our maritime data collection and recording for incident analysis
- consult with stakeholders on improved and modern data collection techniques and processes
- conduct education on the importance of reporting safety incidents and near misses that effect, or have the potential to effect, safe operations
- continue to work collaboratively with research institutions to collect data from seafarers, ship operators, managers and regulators to understand:
    - how people work and why accidents happen
    - what organisations and people need to do to better control and manage risks to maritime safety and the environment.

Challenge 7

Supporting the development of single window reporting for trade facilitation

Issues and trends driving change

Initiatives to improve the efficiency of logistics chains, such as improved infrastructure, intermodal connections and best practice regulatory frameworks have been recognised as critical policy solutions to address port-side and land based inefficiencies.

The international standards components of logistics chains and physical infrastructure and electronic systems available in ports can be a limiting factor in realising efficiency gains.

Single window reporting is a facility that allows parties involved in trade and transport to provide standardised information and documents through a single entry point to fulfil all import, export and transit-related regulatory requirements.[1]

According to the United Nations Economic Commission for Europe, 'the value of a single entry point - or 'single window' - for traders to submit information to governments so as to fulfil import or export-related regulatory requirements has taken on increased importance in the new security environment and emphasis on advance information and risk analysis'.[2]

A principal function of single window reporting is the information exchange to facilitate transactions, electronic payments and the monitoring of procedures by electronic means.[3]

While there is adequate technology available for electronic information exchange, the establishment of national single window processes is a broader government policy issue.

Australian ports have been working closely with state and federal transport agencies on initiatives to achieve these aims.

In addition, the Australian shipping industry supports the development of a joint government portal for maritime data submission, citing the development of agency specific data submission requirements in isolation from one another as one of the primary key challenges for industry.

[1] Guidelines for setting up a Single Window System, FAL.5/Circ.36, 9 November 2011

[2] United Nations Economic Commission for Europe,' The Single Window Concept: Enhancing the efficient exchange of information between trade and government', www.unece.org/fileadmin/DAM/trade/ctied/ctied7/ece_trade_324e.pdf

[3] The 37th session of the International Maritime Organization's Facilitation Committee approved Guidelines for setting up a Single Window System in Maritime Transport (FAL 5/Circ.36).

Implications for the maritime community

- There are currently limited electronic reporting interfaces available to the maritime industry, affecting standards of compliance and border clearance procedures.
- The benefit of a more interfaced system and process has the potential to reduce costs across all of our regulatory activity as well as reducing regulatory compliance costs to businesses, community organisations and individuals.
- The single window concept is expected to simplify reporting formalities for ships coming in and out of port and address the issue of lengthy shipping times created by inefficient routes, port congestion, unnecessary regulation or lengthy administrative procedures, which can depreciate the value of goods before they are landed.[4]
- Aligning the technological and organisational structures involved in the implementation of the single window will require regular and ongoing dialogue with relevant international organisations with interests, expertise and experience in this area.

Our policy response

We will:

- implement any whole-of-government initiatives to facilitate the introduction of safe and secure single reporting windows which streamline electronic transmission of information and improve the efficiency of maritime transport logistics chains
- play our part among government agencies and industry organisations to establish the scope and structure of single reporting windows in Australia.

[4] See Sourdin S & R Pomfret, *Trade Facilitation: Defining, Measuring, Explaining and Reducing the Cost of International Trade*, 2012

Challenge 8

Advocating for national marine spatial planning in Australia

Issues and trends driving change

An integrated management approach that recognises the specific requirements of sensitive species and habitats will be key to the future conservation of our ocean resources.[1] Without adequate planning, there is limited opportunity to protect the precincts and corridors needed to meet future demand for shipping areas. Given the growth in demand for use of marine areas, and the demarcation of regulation at an agency level, there is evidence that marine regulation is siloed within individual agencies.

Marine spatial planning (MSP) is a practical way to establish a more informed discussion and rational arrangement for the use of common ocean areas and the interaction of all users. Common and shared marine areas are under increasing pressure from a growing range of human activities. These include the:

- exploration and exploitation of offshore petroleum and gas
- installation and maintenance of underwater cables and pipelines
- introduction of offshore renewable energy projects
- increased use of offshore transhipment operations
- increasing number of recreational vessels
- routeing of ships on non-standard or irregular routes
- identification of areas for greenhouse gas sequestration
- ability for vessels to pursue resource exploration and extraction in far more extreme locations (deep water, the seabed and remote areas).

Offshore developments can potentially increase vessel congestion at some locations and impact the safety of navigation due to their physical size, expanse and risk profile.

MSP aims to balance the demands of diverse and possibly incompatible uses of marine areas by bringing together an aggregated view of the activities and responsibilities in an area, using geospatially-enabled tools. To be effective in servicing a wide range of public and private interests, MSP requires engagement from all relevant government agencies with a regulatory responsibility for maritime related activities.

MSP has been undertaken in some areas to a limited extent, with one of the earliest and best-known examples being marine zoning in the Great Barrier Reef Marine Park. For the other limited MSP systems that do exist, they can operate in isolation from other established domain users, and more work is needed to apply a holistic review to the planning process.

[1] Commonwealth of Australia, 2011, *State of the Environment Report*

Implications for the maritime community

- The recognition of the 'blue economy' concept at the 2012 Rio+20 United Nations Conference on Sustainable Development is a reflection of the growing appreciation that the world's oceans and seas require more in-depth attention and coordinated action. It is founded on the assessment and incorporation of all aspects and costs of economic activity while taking advantage of sustainable, clean and equitable opportunities for all users of maritime spaces.
- MSP alleviates the problem of fragmented planning and decision-making, which places constraints, and potential latency, on legitimate activities, making them less efficient. It offers some solutions to the challenge of multiple sectors making increasing and competing demands for use of the same inshore and offshore water space. MSP also facilities strategic decision making for use of water spaces in two, three and potentially four dimensions.
- MSP is commonly facilitated by spatially-enabled online tools, allowing for more engaging and cost-effective industry consultation as the information is available to many parties simultaneously. As the consultation progresses, the information can be rapidly updated to reflect the evolving process.
- MSP will become increasingly important as a tool for sustainably managing the regulation and water space de-confliction of domestic commercial vessels. These vessels operate in a manner and in areas not previously regulated by us.

Our policy response

We will:

- participate in whole of government MSP initiatives that facilitate strategic decision making and planning in the maritime sphere
- continue to actively monitor the safety of navigation and environmental implications of increases in vessel traffic in environmentally sensitive areas such as the Great Barrier Reef, Torres Strait, Coral Sea and north-west Australia
- ensure pollution response and shipping are addressed in the new Australian Government's marine reserve management plans
- contribute to the Australian Government's MSP data it already collects, such as Automatic Identification System (AIS) information, incident reports and regulatory zones. This data will build the Geoscience Australia hosted Australian Marine Spatial Information System (AMSIS) into a more comprehensive tool, and ensure that any decisions made take into account our roles and interests.

Challenge 9

Effective international and domestic engagement

Issues and trends driving change

We engage in a variety of international and domestic fora, given Australia's significant interest in ensuring that ships operate safely through our marine areas. Australia also has an interest in safe shipping in adjacent waters, for some of which we have an existing responsibility to provide pollution response and search and rescue services.

An important way of delivering outcomes in Australia's interests is though our continued influence at the International Maritime Organization (IMO), the UN agency with responsibility for setting and maintaining international ship safety standards.

Australia also needs to continue work at the bilateral and regional level, to complement this engagement. This includes encouraging the development and effective implementation of domestic and international standards by neighbouring States and our trading partners.

A significant emerging challenge is managing the increasingly evident links between maritime safety and broader security, trade and environment issues such as illegal and unregulated fishing, piracy, unsafe migration, climate change, transnational crime, and marine debris and ocean pollution.

We support international and regional arrangements that assist us to regulate ships and to protect the maritime environment beyond the framework provided by international conventions.

We also engage with our domestic commercial vessel stakeholders to enable better outcomes for all parties. We will work with these stakeholders to expand understanding of the key issues by both parties and, where appropriate, to jointly develop solutions.

As we develop greater understanding of the domestic commercial vessel fleet, we will ensure operators and crew are aware of their safety obligations by providing them easy access to the information they need through the channels which best work for them.

Our website will be the primary delivery mechanism for guidance and transactions with us. Content will be developed and designed for the people who will use it—underpinned by a commitment to user testing of changes and a program of continuous improvement.

Implications for the maritime community

- Our international engagement to influence the development, acceptance, and effective implementation of international standards and strong domestic regimes will have ongoing benefits in terms of the quality of ships traversing Australian waters or areas of Australian responsibility.
- New Zealand, Indonesia, Timor Leste, Solomon Islands, Fiji, and Papua New Guinea are our closest maritime neighbours and, as such, are integral to our responses in the areas of transboundary pollution, pollution response obligations, and search and rescue.
- Continued regular engagement with our domestic commercial vessel stakeholders will allow us to better understand the issues affecting them and facilitate a general improvement in the industry's understanding of our role.

Our policy response

We will:

- continue work with our major trading partners and regional transhipment States to ensure strong port and flag State control regimes
- effectively work with neighbouring States to minimise the likelihood and impact of transboundary pollution incidents that may affect Australian waters
- continue to work with the domestic commercial vessel industry in the review of standards and regulations to ensure they remain robust, contemporary and result in increased safety outcomes
- allow our stakeholders sufficient notification and time to review and provide considered responses to changes in regulations and standards
- effectively communicate with our domestic stakeholders about the changes as we assume full responsibility for the national system service delivery and cost recovery
- be prepared to assist neighbouring and less-developed States to prepare and respond to maritime incidents
- continue to work with countries responsible for search and rescue regions adjacent to our own, to ensure ongoing improvement in the coordination and efficiency of search and rescue activities
- continue engaging with international, regional and domestic fora, including:
    - International Maritime Organization (IMO)
    - International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA)
    - International Civil Aviation Organization (ICAO)
    - Asia Pacific Heads of Maritime Safety Agencies (APHoMSA)
    - Indian Ocean and Tokyo MOUs on port State Control
    - Secretariat of the Pacific Regional Environment Programme (SPREP)
    - Secretariat of the Pacific Community (SPC)
    - Maritime Agencies Forum (MAF)
    - Technical Advisory Panel (TAP)
    - Domestic Commercial Vessels Industry Advisory Committee (DVIAC)
    - Fishing Industry Advisory Committee (FIAC).

Challenge 10

Anticipating the changing role of seafarers

Issues and trends driving change

The international maritime industry is experiencing a period of significant change. The introduction of automation, and the technologies and systems that will support maritime navigation in the future present a unique challenge for the maritime industry. The role of the seafarer, job profile, training and level of competence is changing as technologies that support the maritime industry evolve.

The introduction of Electronic Chart Display and Information Systems (ECDIS), and other electronic navigation systems, have had a significant influence on the safety of ships. Over the next 10 years, the industry is likely to experience significant development in technologies that will support safe and automated navigation. This will have an effect on the role of today's seafarer.

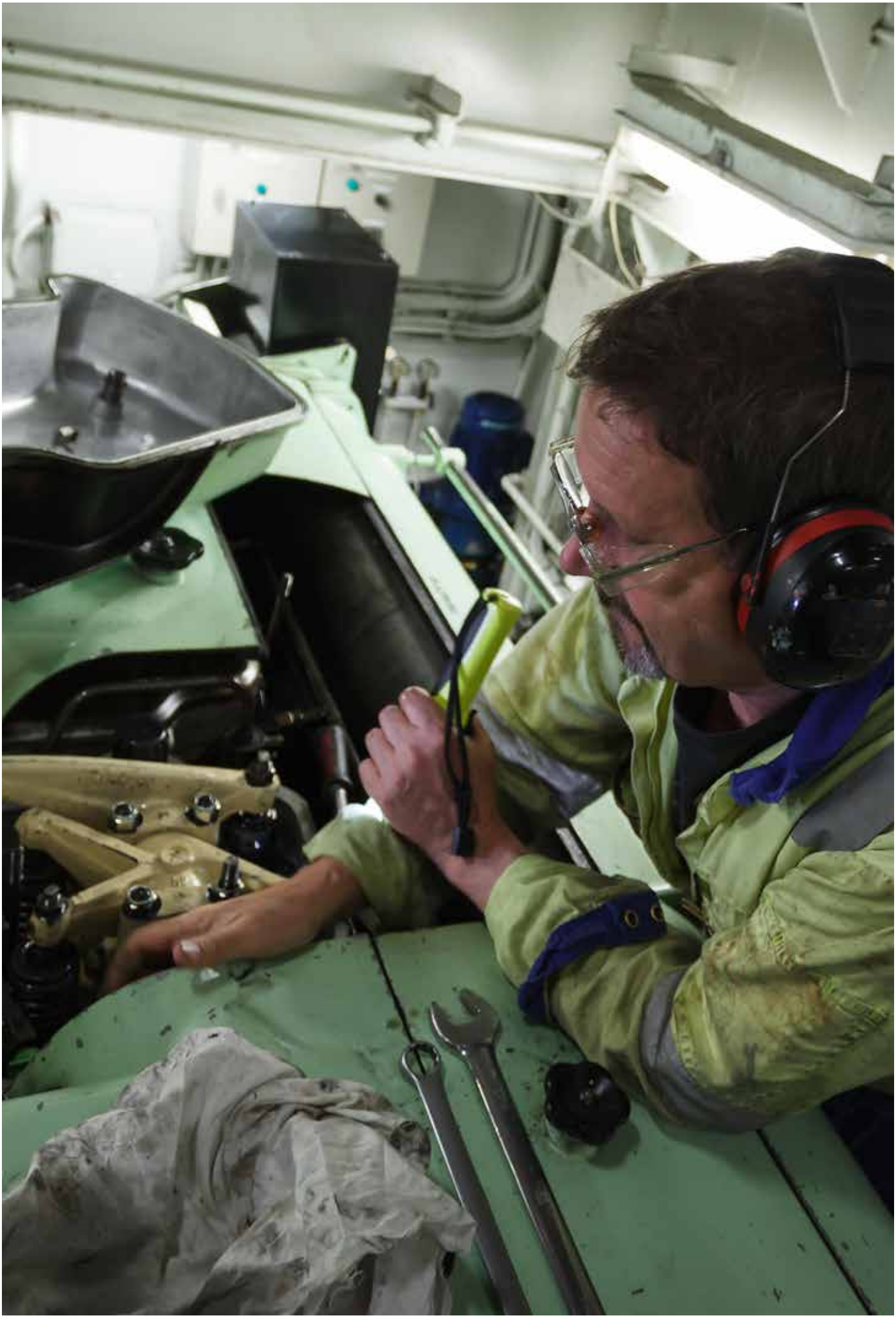
Implications for the maritime community

- Greater use of training delivered through flexible online learning mechanisms.
- Maritime training organisations will need to change their delivery mechanisms otherwise there may be a steady reduction in the number of Australian training organisations.
- Future seafarers will need to be multi-skilled with superior technical skills for automation and problem solving. Deck and engineer officers may need to hold combined certification as permitted in Chapter VII of the STCW Convention.
- A changing role of the seafarer in the use of systems and equipment that have increased levels of automation and decision support.
- Development of training and education programs that support the increased use of technology at sea and increased levels of automation and remote operation.
- Changes to culture that involves the management of risks, and safer operation of vessels within the domestic commercial fleet.

Our policy response

We will:

- consider the role of the seafarer in a modern maritime industry where automated systems may require different skillsets
- encourage the use of technologies that enhance safety and human performance
- promote continuing professional development for mariners.



Looking ahead

AMSA's operating environment 2017-2027