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EXECUTIVE SUMMARY

The Maritime industry is an intrinsic part in the Australian economy in the provision of importation and export of goods, as well as tourism and other valued added activities. The Australian Maritime industry has an estimated annual revenue of $5.76 billion. Over 95 per cent of Australian exports are carried by sea and 10 per cent of the world’s cargo passes through Australian ports.

As demand for these activities will continue to increase into the future, the industry will be met with wide-ranging challenges and opportunities to ensure it is able to cope with the rapid changes faced. These challenges include the development of new technologies and innovations, and the ever-increasing complexity of communication systems used to track/monitor vessels at sea and arriving into ports. With a wave of new systems being developed, ensuring the integrity of cyber security will be a significant challenge.

Further adding to this, the development of new autonomous vessels and technology-based operational systems will require new skills from the Maritime workforce. These changes will require new skills to be developed, and in the short-term include training in distress signal systems, and changes to Maritime Operations. Ensuring the industry can be prepared for the onset of these emerging technologies and autonomous systems cannot be overstated.

Further adding to the industry challenges are the changing regulatory framework for the Maritime industry. Increased environmental and efficiency pressures for enterprises drive the goal to reduce greenhouse gas emissions and improve the financial efficiencies of vessels. These goals will continue to influence the skills needed within the industry.

Considering the ongoing changes in the regulatory environment, maintaining the currency of the vocational education and training standards will be vital to prepare industry participants to work within new regulatory environments. The ongoing review of the MAR Maritime Training Package will ensure the industry is capable to operate at its maximum potential.

Electro-Technical Officers continue to be in demand and will be addressed through a new qualification in the Training Package, which meets the certification needs of the Australian Maritime Safety Authority. This project is currently in the development pipeline and is a strong example of adaptive changes presently underway to keep up with industry needs.

The Maritime industry will continue to face increased workforce pressures, including competition from skilled international workers competing for local jobs and access to training. The ageing workforce is also a continued area of concern. Succession planning will be vital to maintain a robust and sustainable industry into the future.

Steven Moon OAM

Maritime IRC Chair

This IRC Skills Forecast was agreed to by the Maritime IRC on 24 April 2018.
IRC SKILLS FORECAST

The Industry Reference Committee (IRC) Skills Forecasts focus on the prioritisation of the skill needs of the industry sectors each IRC has responsibility for. They are developed and reviewed annually and submitted on behalf of the IRC to the Australian Industry and Skills Committee (AISC) for approval.

The document is deliberately brief, it does not seek to identify every issue within every sector. It is a snapshot of a continually evolving story that is intended to alert and inform a wide audience and enhance the industry’s capacity to act.

IRCs are required to consult broadly with stakeholders to ensure a whole-of-industry view about the opportunities and challenges for the workforce and the Training Package review work necessary to meet industry needs. The information is then used to develop the four-year IRC Proposed Schedule of Work.

MARITIME IRC SKILLS FORECAST

This annual IRC Skills Forecast will be submitted by the Maritime IRC to the AISC for approval.

The IRC Skills Forecast identifies the priority skill needs of the Maritime industry following a research and stakeholder consultation process conducted by Australian Industry Standards (AIS) on behalf of the IRC.

Once approved by the AISC, the IRC Skills Forecast informs the development of a four-year rolling National Schedule for review and development work within the MAR Maritime Training Package.

More information on the National Schedule can be found at: www.aisc.net.au/content/national-schedule.

Quick Fact

30% of Australian GDP is dependent on international shipping.

GDP
MARITIME INDUSTRY REFERENCE COMMITTEE

The Maritime IRC has been assigned responsibility for the MAR Maritime Training Package. More information about the Maritime IRC and its work can be found here:


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Ship visits to Australia in 2016, with 10 per cent of the world’s cargo passing through our ports.
MARITIME INDUSTRY OVERVIEW
The Maritime industry has an estimated annual revenue of $5.76 billion, adding $2.58 billion to the Australian economy in 2017. Ten per cent of the world’s sea trade passes through Australian ports and over 95 per cent of Australian exports are transported by sea. Our coastline is over 60,000 kilometres in length and our search and rescue region covers more than 10 per cent of the Earth’s surface.

Per capita, Australia has more cruise passengers than any other nation, making it the fourth-largest cruise market in the world. Into the future, shorter coastal cruises are expected to increase, requiring infrastructure upgrades to accommodate international and domestic vessels 1.

KEY MARITIME METRICS
- Revenue: $5.76B
- Profit: $0.46B
- Average wage per year: $106,176
- Employment growth to 2023: 10.6%

Source: IBISWorld Reports on Navigation, Towage and Services to Water Transport, Water Freight Transport, Water Passenger Transport

ENTERPRISE DENSITY BY STATE/TERRITORY

MARITIME BUSINESS COMPOSITION

EXPLANATORY NOTES

Counts of Australian Businesses
Distinct from the Census and Labour Force data, the Counts of Australian Businesses data uses a top down approach where industries are primarily classified by the single predominant industry class associated with a business’ ABN. A limitation of this approach is that organisations with a presence in several States/Territories will be counted only once. This can lead to enterprise figures appearing low for a given state/territory, but it's not that there are no enterprises existing in the state/territory, it's that the headquarters are located elsewhere. A further consideration is that organisations in more than one industry will also be only counted in one industry.

Quick Fact

The amount that the Maritime industry added to the Australian economy in 2016

4.78 BILLION
KEY MARITIME STAKEHOLDERS

Employers
Arc Marina Management
ASP Ship Management
Australian Superyachts
Australian National Lines
Australian Defence Force
CSL Australia
Farstad Shipping (Indian Pacific)
Go Marine
Inco Ships
Maersk Supply Services
MMA Offshore Ltd
P&O Maritime
Passions of Paradise
Programmed Total Marine Services
Spirit of Tasmania
Svitzer
Toll Shipping
Total Marine
Yachting Australia

Employer Representatives
Australian Institute of Marine Surveyors
Australian Mines and Metals Association
Boating Industry Association of Western Australia
Marina Industries Association
Maritime Industry Australia Ltd
Superyacht Australia

Employee Representatives
Association of Marine Park Tourism Operators Ltd
Australian Institute of Marine and Power Engineers
Australian Maritime Officers Union
Maritime Union of Australia

Licensing / Regulatory
Australian Maritime Safety Authority

Government
Federal, State/Territory Departments
Australian Communications and Media Authority
Transport for New South Wales

Industry Advisory
State and Territory Industry Training Advisory Bodies (ITABs)

Training Organisations
TAFEs, Private RTOs, Enterprise RTOs
MAR MARITIME TRAINING PACKAGE

The MAR Maritime Training Package provides the only nationally recognised Vocational Education and Training (VET) qualifications for occupations involved in general purpose hands, coxswains, marine engine drivers, marine engineers, marine surveyors, cooks, integrated ratings, deck officers, ship's masters and marina operations.

The MAR Maritime Training Package comprises 26 qualifications, 16 Skill Sets and 199 Units of Competency and associated assessment requirements and covers near coastal and ocean going maritime operations.

The MAR Maritime Training Package contains the following qualifications:

**Certificates**
Certificate I in Maritime Operations (General Purpose Hand Near Coastal)
Certificate I in Maritime Operations (Coxswain Grade 2 Near Coastal)
Certificate II in Maritime Operations (Marine Engine Driver Grade 3 Near Coastal)
Certificate II in Maritime Operations (Coxswain Grade 1 Near Coastal)
Certificate II in Maritime Operations (Linesperson)
Certificate III in Maritime Operations (Master up to 24 metres Near Coastal)
Certificate III in Maritime Operations (Master Inland Waters)
Certificate III in Maritime Operations (Marine Engine Driver Grade 2 Near Coastal)
Certificate III in Maritime Operations (Marine Surveying)
Certificate III in Maritime Operations (Marine Engine Driver Steam)
Certificate III in Marina Operations
Certificate III in Maritime Operations (Marine Cookery)
Certificate III in Maritime Operations (Integrated Rating)
Certificate IV in Maritime Operations (Marine Engine Driver Grade 1 Near Coastal)
Certificate IV in Maritime Operations (Master up to 35 metres Near Coastal)
Certificate IV in Maritime Operations (Marine Surveying)
Certificate IV in Maritime Operations (Chief Integrated Rating)
Diploma - Advanced Diploma

Diploma of Maritime Operations (Master up to 80 metres Near Coastal)
Diploma of Maritime Operations (Marine Engineering Class 3 Near Coastal)
Diploma of Maritime Operations (Marine Surveying)
Diploma of Maritime Operations (Engineer Watchkeeper)
Diploma of Maritime Operations (Master up to 500 GT)
Diploma of Maritime Operations (Watchkeeper Deck)
Advanced Diploma of Maritime Operations (Marine Engineering Class 2)
Advanced Diploma of Maritime Operations (Marine Engineering Class 1)
Advanced Diploma of Maritime Operations (Master Unlimited)

The MAR Maritime Training Package is in the Scope of Registration of 73 Registered Training Organisations.
TRAINING DATA

The below charts investigate commencing enrolments by Australian Qualification Framework (AQF) level and funding source by State/Territory, where commencing enrolments of Units are averaged over three years.

COMMENCING ENROLMENTS BY AQF LEVEL

Overall, commencing enrolments have fallen by 12.9 per cent in the last three years. Commencing enrolments in Certificate I qualifications have been growing strongly over the same time.

UNIT ENROLMENT COUNT BY STATE AND FUNDING TYPE 2014, 2015 AND 2016 AVERAGE

Government funding supports 62 per cent of Maritime commencing enrolments. Government funding is particularly high in Tasmania, the Northern Territory, and South Australia (87.4, 83, and 80.9 per cent respectively). New South Wales and Western Australia have a significant amount of government funding also, albeit lower than the previous States/Territories mentioned.
EXPLANATORY NOTES

Training Charts
Total VET Activity (TVA) data is collected from all types of training providers and not only those in receipt of Commonwealth or State funding. TVA data collection commenced in 2014.

Exemptions
Where the submission of training data to TVA conflicts with defence or national security legislation or jeopardise the security or safety of personnel working in defence, border protection, customs or Australian police departments, an exemption from reporting training data is available.
Organisations that deliver training for vital services to the community (such as emergency, fire, first aid and rescue organisations) may have received an exemption to submit data to TVA. From 1 January 2016 however, the exemption from reporting applies only in respect of training activity not delivered on a fee for service / commercial basis.
CHALLENGES AND OPPORTUNITIES

The Maritime industry plays a significant role in the Australian economy and is the primary means for importing and exporting goods to and from the Australian market. Over 30 per cent of Australia’s gross domestic product (GDP) is reliant on international shipping, and it is estimated at least 10 per cent of the world’s trade passes through Australian ports.

To ensure the ongoing success of the industry to the Australian economy, and the long-term economic viability and sustainability of the Maritime industry, the workforce will need to be able to adjust to the new and emerging technological skill demands of the industry.

TECHNOLOGY

Technologies will continue to evolve and be further integrated into Maritime operations, providing opportunities for new and emerging specialisations within the industry. The future of the industry will be characterised by integration of software systems, with increasing potential for remote operations and automation of vessels. This may require a change in the skill needs of the workforce from “on-board” operational based skills, to remote operations, navigation, and interpreting large volumes of data from remote communication systems.

Technological innovations are rapidly changing the shape of the Maritime industry globally. Building on established technologies, companies are employing new innovations at a rapid pace. New technological innovations shaping the maritime sector include robotics and automation, interconnected sensors and Big Data, remote propulsion and powering, autonomous and ‘smart’ vessels, deep ocean mining, and marine biotechnologies.

The Australian Maritime industry is poised to be one of the first in the world to test a new Satellite-Based Augmentation System (SBAS). This system greatly improves the accuracy and integrity of the location of ships in the Australasian region and provides location accuracy to tens of centimetres.

AUTOMATION

Until recently, the use of autonomous vessels has been to operate underwater for research and exploratory purposes. The prospect of autonomous shipping vessels is fast becoming a reality, with the first autonomous ships due to be launched in 2020.

The first completely autonomous (no human navigation/monitoring) expedition has recently been completed in the Bering Sea. This was an autonomous surface vessel which was able to map a section of the ocean floor on a pre-configured path, requiring minimal human intervention. Researchers have also been using autonomous/driverless vessels to conduct research and inspect infrastructure underwater in remote regions.
Vessels operated remotely have also been used to monitor remote maritime locations. When used in conjunction with high definition cameras, these allow for high resolution detail to be captured and the environmental monitoring to be assessed.

These emergent technologies will have a significant impact on Maritime industries, with the potential to reduce human exposure to dangers of the high seas and will require new skills and competencies for the technology to be fully capitalized on. New and unique skills will be identified from the incorporation of new technology that will require ongoing learning and development in future training initiatives.

Vessel operations will likely change dramatically over the coming decades, with some sectors/enterprises moving toward remote operation centres. Companies will therefore need to invest in capacity building through education and training of the workforce. The International Maritime Organisation is exploring how existing international requirements can be applied to autonomous vessels. Current Maritime Law does not provide for a vessel without a crew and master. While the onset of autonomous vessels is anticipated to be within the next five years, the regulatory framework surrounding these systems is likely to take longer to implement. Maintenance/reliability and cyber security concerns may slow transition to full autonomy.

**Big Data**
Remote operating systems (including SBAS, previous page) utilise a network of satellites to track the movements of ships while at sea. It also provides information on their performance while operating, loading and discharging cargo. The potential of this new technology to influence decision-making and strategy will require specific training to be fully utilised. As automated systems and vessels are introduced, ‘ship intelligence’ will greatly increase demand to diagnose and interface with vessels remotely. Satellite, GPS, and network connections will provide real-time data to control rooms, with Big Data analytics becoming a required skill need of the industry.

**Cyber Security**
New computer systems are being used to operate vessels as well as to track the location, ship origin, and cargo of vessels using Automatic Identification Systems. This can be conducted in real-time and from remote locations. As maritime vessels become increasingly connected to the internet and networks, the risks of cyber-related crime targeting these vessels will increase. Despite separate networks being used for different operations within vessels, remote access to these by unauthorised personnel are real risks. These attacks will run the risk of causing major economic damage, disruptions to logistical operations, displacement of stock/inventories, and the threat of overriding control of the vessels. This carries the potential to cause significant problems when communicating with other vessels and ports.
As such, these threats will demand an increased comprehension and maintenance of network security on vessels to provide secure communications between ports and other ships at sea. The skills needed, and the pressure to future proof the systems, will be a concern for the industry in the near-to-medium future. Planning and implementation of new skills will be necessary to prepare the industry to use these new systems.

OPERATING ENVIRONMENT AND REGULATION
Stagnation in the growth rate of the Australian mineral and energy commodities sector has had an immediate effect on shipping activity. To add to this, there is ongoing decline in numbers of ‘blue-water’ Australian flagged ships operating within Australia.

The Australian Maritime Safety Authority (AMSA) regulations and regulatory requirements are directly linked to International Marine Orders. As such, new regulatory changes proposed by AMSA for blue water and near-coastal crew members are being developed to improve the overall safety of workers on these vessels. AMSA regulatory requirements are being embedded into the qualifications and Units of Competency to ensure safety competence on vessels at sea.

ENVIRONMENTAL PRESSURE
World-wide, there is increasing pressure to reduce the environmental effects of CO$_2$ emissions, in line with the Paris Climate Agreement 2016$^{10}$. Within the Maritime industry, legislative pressures, increasing operating costs, and the complexity of shipping are driving the demand to pursue new methods to reduce the fuel demands for ocean transportation. Methods including slow steaming and super slow steaming are being employed to significantly reduce the fuel requirements of these journeys. As remote-operated vessels are implemented, there is further room to improve efficiencies in fuel consumption and reduce CO$_2$ emissions. Training and application of these methods will be a major skill requirement of the industry.
EMPLOYMENT AND SKILLS OUTLOOK
Cruise ship visitors forecast to visit Australia by 2020, increasing from one million in 2015.
EMPLOYMENT DEMOGRAPHICS
The following charts provide an overview of the Maritime workforce at a glance. These include age profiles, major occupations, gender-composition by employment type, workers by State/Territory, and the projected employment for the next five years.

WORKFORCE BY STATE/TERRITORY

Tasmania has the highest number of Maritime workers per capita and has more workers in the industry than South Australia, despite having less than a third of the South Australia’s population.

Note: Training data and AMSA active certification figures suggest a considerably larger workforce than the Census reports. Total VET Activity data records approximately four thousand commencing enrolments in the Maritime industry per year which, for an industry that requires recertification every five years, would suggest a workforce that is at least 35 per cent larger than the Census total. An even greater divergence is present when comparing Census and AMSA active certification data, but this dataset does not exclude retirees, students and the unemployed, nor contributions from related industries such as Fishing, Port Operations and Search and Rescue.

As such, workforce figures for the Maritime industry should be taken as representative rather than total, even in a Census year.
The number of Maritime workers under the age of 30 has gone backwards in the last 10 years, falling 11.7 per cent. The number of workers aged 60 and over have grown almost 73 per cent over the same time.


The Maritime industry has experienced a notable peak in 2011 across most of the top occupations, although this has mostly been lost in the last five years. The decline since 2011 has been seemingly less severe in administrative roles in the industry, affecting Marine Transport Professionals and Deck Hands most significantly.

While the proportion of females in the workforce has almost tripled over 30 years, the female workforce has actually fallen by around 40 per cent in the last ten years.

The Maritime Freight Transport workforce will increase by 14.1 per cent over the next five years. Similarly, the Passenger Transport workforce is expected to grow by 2.2 per cent over the same time.
EXPLANATORY NOTES

Census Data
Each respondent to the Census is asked to provide the industry of their employer at the location of where the person works. This question is designed to address the problem of single organisation operating in several industries, with the assumption being that the individual respondent is typically working in fewer industries than the company they work for. This approach aims to provide better industrial resolution in the data, however it is worth noting that the industry designation is dependent on the individual's interpretation of the question. An example where this could provide misleading data might be a plumber in the Gas Supply industry describing their employer's business (at the location that they are working) as plumbing which would therefore be counted in the Plumbing Services industry.

Labour Force Data
Outside of Census years, the size of an industry's workforce is established by the Australian Bureau of Statistics using the Labour Force survey. This dataset provides a 30-year view of the industry where, like the Census, industry is assigned at the discretion of the individual respondent. Given that the survey is sample-based, it should also be understood that the smaller the industry being measured, the larger the margin of error.
The scope of the Labour Force survey is limited to the civilian population of Australia and therefore members of permanent defence forces are excluded from the survey.

IBISWorld Data
IBISWorld data is comprised from a variety of economic, demographic, government and company data, including the Australian Bureau of Statistics.
MARITIME INDUSTRY SKILL SHORTAGES
On behalf of the Maritime IRC, AIS conducted an online survey for stakeholders, between 4 December and 16 January 2018. The IRC sought feedback on the current skill shortages and the reasons for the shortages, as perceived by industry stakeholders.

MARITIME SKILL SHORTAGES
Over 75 per cent of employers reported experiencing a skills shortage in the last 12 months. A review of that data suggests the shortage is primarily for Domestic Commercial Vessel occupations, principally those as:

1. Marine Engine Drivers
2. Small vessel (<35m) Masters
3. Deckhands
4. Managers
5. Educators, Trainers and Assessors

REASONS FOR SHORTAGE
Employers identified the following reasons for the shortage with the most frequent response listed first.

1. Cost/time to achieve the required qualification
2. Ageing workforce / current staff retiring
3. Geographic location of the vacancy
4. Competition from other organisations / industries
5. Wages / salaries considered too low

Quick Fact
65,591 SEAFARERS
Appointed seafarers with 104,005 certificates in 2016/17

Maritime Skills Forecast 2018 - © Australian Industry Standards
PRIORITY SKILLS

The priority skills of the Maritime industry are drawn from stakeholder responses to the Maritime IRC Skills Forecast survey conducted between 4 December and 16 January 2018.

SKILL CATEGORY

In order of priority to the industry, the following skills were identified from the survey as the most important for the Maritime workforce within the next three to five years.

1. Health/Safety
2. Navigation/Vessel Handling
3. Operational
4. Compliance
5. Automation

GENERIC SKILLS

The Generic Skills listed are provided to AIS by the Department of Education and Training. Within the survey, the IRC asked stakeholders to rank these skills in order of importance to the industry. Ranking of the 12 generic workforce skills in order of importance to the Maritime industry are as follows:

1. Managerial/Leadership
2. Design mindset / Thinking critically / System thinking / Solving problems
3. Technology
4. Learning agility / Information literacy / Intellectual autonomy and self-management
5. Environmental and Sustainability
6. Science, Technology, Engineering, Mathematics (STEM)
7. Communication / Virtual collaboration / Social intelligence
8. Data analysis
9. Language, Literacy and Numeracy (LLN)
10. Customer service / Marketing
11. Financial
12. Entrepreneurial
WORKFORCE SUPPLY SIDE CHALLENGES AND OPPORTUNITIES

AGEING WORKFORCE
Australia's Maritime workforce is one of the oldest in the country, with 49 per cent of workers 45 years or older\(^{11}\). In the short to medium term, the ability to successfully attract, train and retain young workers will be critical in meeting the skills' needs of the industry.

Provision of mentoring and leadership training to skilled operators with comprehensive technical knowledge, will enable them to help develop younger workers and assist employers with retention.

If the Maritime industry incorporates cutting edge technologies and innovative practices to appeal to younger workers, skill building around these technologies and practices will be required\(^{12}\). An increase in the digital literacy of new and established workers will enhance their career progression and contribute to the Maritime industry substantially.

COMPETITION FOR SKILLED WORKERS
Along with increasing volumes of cargo and value-added activities, including tourism, increasing expectations are being placed on vessel masters and ship's crew to deliver on deadlines while maintaining efficiencies and compliance. This will further increase the pressure of shipping companies and the workforce.

Furthermore, the risk of a widening skill gap between the workforce and new maritime technological systems and processes being developed, is becoming a concern for the industry world-wide. This is putting pressure on the workforce as the complexity of shipping systems increase. Reviewing and ensuring that competency-based training maintains relevancy in the Maritime industry will be necessary to ensure the workforce is suitably qualified and can meet the demands of new shipping systems.

A strong demand for Electro-Technical Officers within the industry is increasing\(^{13}\). Currently, no qualification within the MAR Maritime Training Package provides Australian Maritime Safety Authority (AMSA) certification for this role. To address the industry safety and regulatory requirements, the development of a qualification for Electro-Technical Officers is currently underway.

As new technologies are adopted by companies, the skill requirements of the workforce will also change. The provision of specialist skills in robotics, design, engineering and Big Data analytics will require appropriate training. To develop these projected skills, companies will need to start providing the right education and training programs to ensure that on-boarding of new technologies and operations are adequately resourced.
Some stakeholders report concerns about potential misalignment between skilled migration arrangements and maintaining viable career pathways for Australian trained seafarers. Improved mechanisms for moving between near-coastal to ocean-going operations via efficient skilling pathways now supports enhanced career opportunities for seafarers'.

INTERNATIONAL / NATIONAL WORKPLACE TRENDS
The international Maritime industry operates as a globalised network, shipping almost 80 per cent of trade by volume. The Maritime industry is highly competitive, as organisations compete for market dominance. Locally, these markets also include fishing and aquaculture, tourism, patrol and rescue operations.

Many organisations are seeking productivity gains through improved use of technology and systems. Robotics, Big Data, and biotechnologies are all contributing to new innovations in propulsion and powering, ‘smart vessels’, autonomous systems, ocean mining, and marine biotechnologies. There is global demand for highly qualified personnel who can work and innovate with these technologies.

ACCESS TO TRAINING
Training for blue water seafarer’s is affected by the scarcity of training berths, due to a decline of blue-water vessels within the Australian fleet. Training within near-coastal, including tourism, fishing and aquaculture, patrol and rescue operations, continues to be strong.

Variations in jurisdictional funding and traineeship arrangements are also reported as impacting the viability of delivering training in a narrow market for specialist technical areas. Longer term, this situation may lead to capacity constraints for industry and Registered Training Organisations (RTOs) alike. These conditions present challenges for RTOs when considering future investment in training infrastructure and equipment, particularly those involved in new technology.

By imparting high-level skills in digital practices, RTOs will have the opportunity to influence the adoption of similar approaches within the Maritime industry. The benefits of incorporating cutting-edge technology in education can be seen in the ship and tug simulators. These enable Maritime workers to gain simulated work experience. This technology can be applied to the entire manoeuvring team, providing upkeep and maintenance of skills and knowledge in the industry.
REFERENCES


‡ IbisWorld
PROPOSED SCHEDULE OF WORK
KEY DRIVERS

MARITIME OPERATIONS (MARINE SURVEYING)
The Australian Institute of Marine Surveyors identified that the Marine Surveying qualifications require revision, to align to the changing skill requirements due to technology implementation and regulatory requirements.

There have been changes to the Australian Maritime Safety Authority (AMSA) provided regulatory framework required for use by Marine Surveyors to assess compliance with vessel safety standards. The onboard technologies have progressed, both in equipment and structure, which affects the survey requirements for vessels.

DECK AND ENGINEER OFFICERS
Industry is driving this review to ensure the management (leadership) on vessels is appropriate and meets the needs of industry. Deck and Engineer officers must manage not only the crew and vessel but the compliance requirements of the various countries that vessels dock in.

Stronger and more highly skilled leadership will not only achieve compliance for international ports, but also ensure the seafarer in charge has the necessary skills to manage and support a greater number of direct reports, subsequently increasing productivity.

GLOBAL MARITIME DISTRESS AND SAFETY SYSTEMS, OIL CHEMICAL TANKER CARGO, LIQUIFIED GAS TANKER, OIL TANKER CARGO, AND GAS AND LOW FLASHPOINT FUELS
The development of these five Skill Sets is in direct response to new AMSA regulatory requirements. The MAR Maritime Training Package incorporates AMSA certification requirements and is the pathway for Australian seafarers to gain AMSA certification.

International Marine Orders (IMO's) have now implemented a requirement for AMSA to ensure Australian seafarers have the required skills and knowledge to operate safely and compliantly in accordance with the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), which sets qualification standards for masters, officers and watch personnel on seagoing merchant ships.
PROPOSED RESPONSES

MARITIME OPERATIONS (MARINE SURVEYING)
The Maritime IRC has proposed this project to review and develop new Units of Competency for the Certificate IV and Diploma in Maritime Operations (Marine Surveying). The purpose is to ensure that the current regulatory and technical competencies required by the Marine Surveyors is contained within the qualifications.

The role of Marine Surveyors is to inspect and verify that Australian and international vessels are up to both Australian and International safety and construction standards which has a direct link to seafarer safety.

Changes to the 457 visa conditions has meant that Australia now has a demand for additional Marine Surveyors, particularly in blue water merchant vessels. This review and development will also facilitate the opportunity for unemployed or older seafarers to transition into a Marine Surveyors role. It is critical for the Australian industry to have Marine Surveyors with the appropriate skills and knowledge to keep the Australian fleet in a safe operational state.

Throughout the project, broad consultation with state and territory Marine Surveyors, associations, regulators and other key stakeholders will be undertaken.

DECK AND ENGINEER OFFICERS
The Maritime IRC has proposed this project to review the Units of Competency contained in the MAR Maritime Training Package and develop a Skill Set and associated Units of Competency to meet industry requirements. Industry has identified that the appropriate leadership and management conventions are included in the existing Units of Competency, and a Skill Set is developed to assist in bridging gaps in seafarer skills. This will ensure that Australian maritime enterprises have the appropriately skilled management/leaders to lead direct reports and remain competitive in a highly competitive market place.

Throughout the project, broad consultation with Maritime industry enterprises, associations, unions, regulators and other stakeholders will be undertaken.

GLOBAL MARITIME DISTRESS AND SAFETY SYSTEMS, OIL CHEMICAL TANKER CARGO, LIQUIFIED GAS TANKER, OIL TANKER CARGO, AND GAS AND LOW FLASHPOINT FUELS
The Maritime IRC has proposed this project to develop Skill Sets and associated Units of Competency in response to AMSA regulatory requirements. The development will enable seafarers to gain AMSA certification required for operational seafarers in specific roles and on specific vessel types, including:

- Global Maritime Distress and Safety Systems
- Oil Chemical Tanker Cargo
- Liquified Gas Tanker
- Oil Tanker Cargo
- Gas and Low Flashpoint Fuels
PROPOSED SCHEDULE OF WORK

2018-19

Maritime Operations (Marine Surveying) – Review
This review is driven by new technologies being employed in industry and will also include updating of the regulatory requirements contained in the qualification and Units of Competency.

Deck and Engineer Officers – New Skill Set
The development of a new Skill Set and a review of the Deck and Engineer officers, leadership and management skills contained in the existing Units of Competency.

Global Maritime Distress and Safety System – New Skill Set
Advances in Maritime safety technology and regulatory requirements require the development of a new Skill Set for Global Maritime Distress and Safety Systems (GMDSS). This will include a review of the existing relevant Units of Competency in the existing MAR Qualifications that incorporate GMDSS be undertaken to align with current industry and regulatory requirements.

Oil Chemical Tanker Cargo – New Skill Set
Changes in Maritime regulations requires seafarers to have specific skills and knowledge regarding oil chemical tanker cargo operations to achieve compliance. The development of a new Skill Set including up to three new Units of Competency will address this requirement for industry.

Liquefied Gas Tanker – New Skill Set
Changes in Maritime regulations requires seafarers to have specific skills and knowledge regarding liquified gas tanker operations to achieve compliance. The development of a new Skill Set including up to three new Units of Competency will address this requirement for industry.

Oil Tanker Cargo – New Skill Set
Changes in Maritime regulations requires seafarers to have specific skills and knowledge regarding oil tanker cargo operations to achieve compliance. The development of a new Skill Set including up to three new Units of Competency will address this requirement for industry.

Gas and Low Flashpoint Fuels – New Skill Set
Changes in Maritime regulations requires seafarers to have specific skills and knowledge regarding Gas and low flashpoint fuels operations to achieve compliance. The development of a new Skill Set including up to three new Units of Competency will address this requirement for industry.
2019-20

**Maritime Operations (General Purpose Hand Near Coastal) – Review**

This Qualification is to be reviewed to include Maritime industry areas such as harbor, ferries, marine tourism, pearling, fishing and ship servicing that were not previously covered in the Qualification. Any required regulatory changes will be included.

**Maritime Transport Security – New Qualification**

The Office of Transport Security (OTS) requested this qualification development following the results identified in the Aviation and Maritime transport security education and training in Australia (the inquiry). Changes requires seafarers that are working in Maritime security to have specific skills and knowledge regarding Maritime Transport Security operations. The development of a new qualification will address this requirement for industry.

**Compass Adjuster’s – New Skill Set**

Changes in Maritime regulations requires seafarers to have specific skills and knowledge regarding Compass adjuster’s operations to achieve compliance. The development of a new Skill Set including up to three new Units of Competency will address this requirement for industry.

**Maritime Towage – New Skill Set**

Increasing towage incidents in the Maritime industry identified a need for safe and appropriate skills to be provided to the towage operators. Maritime regulatory requirements will also be included in this Skill Set. It is envisaged that four new Units of Competency will be developed.
2020-21

Dredging Skill Set – New Skill Set
This development is driven by new technologies being employed in industry, it will also include the applicable regulatory requirements. Development of a new Skill Set including up to four new Units of Competency.

Maritime Operations (Linesperson) – Review
This qualification has not been reviewed since it was developed there is a necessity for the content of the qualification to remain current and appropriate. This review will include a full review of the associated Units of Competency.

Certificate III in Marina Operations – Review
This qualification has not been reviewed since it was developed there is a necessity for the content of the qualification to remain current and appropriate. This review will include a full review of the associated Units of Competency.

2021-22

MAR Maritime Training Package Release 4.0
Review remaining qualifications within the MAR Maritime Training Package that have not been reviewed within the four-year period.
2018-19 PROJECT DETAILS

MARITIME OPERATIONS (MARINE SURVEYING)

Description

Rationale
Marine Surveying qualifications at Certificate IV and Diploma levels require review to align to changing skill requirements due to technology implementation and regulatory needs (see pages 15-17). Concerns raised by the Australasian Institute of Marine Surveyors (AIMS) that the Certificate IV and Diploma does not adequately address the current skill and knowledge requirements of industry or certification of the Marine Surveyor (page 26).

 Ministers' Priorities Addressed
• The project may propose removal of obsolete and superfluous qualifications from the National Register however none have been identified to date
• The project will ensure that more information is made available about Maritime Operations training delivery to training providers
• The project will address the needs of individuals and industry and provide transferable skills from one occupation to another in the Maritime industry
• The project will support creation of units that can be owned and used by multiple industry sectors
• The project will not propose the development of additional Skill Sets for Maritime Operations
• The project does not propose the incorporation of existing accredited course materials into the MAR Maritime Training Package

Consultation Plan
• AIS will undertake consultation on the IRCs behalf with all State Training Authorities and other key national stakeholders
• Seek public feedback and input into development of material through the project's duration
• Communicating to enterprises, State/Territory Training authorities, State/Territory Industry Training Advisory Bodies, Peak Bodies, Registered Training Authorities (RTOs) and other interested parties, of the establishment of the project
• Conducting initial consultation with stakeholders to identify and invite key representatives to establish the Technical Advisory Committee (TAC) and posting information about the project on the AIS website and newsletter
• Conduct face to face consultation sessions as required
• Conducting the first TAC meeting to explain the process and gather comments/feedback
Communicating the process of drafting, identified Training Package material (Qualifications/ Units of Competency/Skill Sets), then verifying and validating this material with stakeholders through email, the AIS website and the AIS newsletter for wider stakeholder involvement, throughout the review process

- Continuing communication on the project via the AIS website and newsletter

**Scope of Project**

Realignment of the Marine Surveyor Job roles with the qualifications and Units of Competency.

- Incorporating changes in maritime regulations
- Technology implemented
- State and Territory regulations
- Modify the packaging rules enable industry flexibility ensuring that the qualifications are fit for purpose

Project activity is planned to be undertaken from September 2018, with a Case for Endorsement planned for submission before 31 August 2019.

**Training Package**

MAR Maritime Training Package Release 4.0

**Qualifications**

- MAR40115 - Certificate IV in Maritime Operations (Marine Surveying) Release 2
- MAR50215 - Diploma of Maritime Operations (Marine Surveying) Release 2

**Units of Competency**

- Two new Units of Competency to be developed (see appendix A)
- 23 Units of Competency to be reviewed (see appendix A)
- Update imported Units of Competency where applicable
2018-19 PROJECT DETAILS

DECK AND ENGINEER OFFICERS

Description
This project is to review the Deck and Engineer officers, leadership and management skills contained in existing MAR qualifications and include any imported Units of Competency. The key activity will ensure appropriate leadership and management conventions are included and the regulatory responsibility is defined. Imported Units associated will undergo review for suitability and be reaffirmed of a suitable replacement identified as required.

Rationale
The existing qualifications for senior Maritime personnel contain imported Units of Competency and small sections within some MAR Units of Competency specifically for providing leadership and management skills. Industry has identified that these are not meeting the Industry expectations or requirements (page 26). With Technology increasing on vessels, the number of leadership positions on board has diminished. It is therefore critical to ensure the management/leadership officers on board have the skills to ensure that the Seafarer in charge on board has the necessary skills to be equipped to manage and support a greater number of direct reports. Compliance to duty of care is paramount in many dangerous conditions faced at sea (see pages 15-17).

Ministers’ Priorities Addressed
- The project has not identified for the removal of any obsolete and superfluous qualifications from the National Register to date
- The project will ensure that more information is made available about Maritime Operations training delivery to training providers
- The project will address the needs of individuals and industry and provide transferable skills from one occupation to another in the Maritime industry
- The project will support creation of units of competency that can be owned and used by multiple industry sectors if required
- The project is not developing a Skill Set for the MAR Maritime Training Package
- The project does not propose the incorporation of existing accredited course materials into the MAR Maritime Training Package
Consultation Plan

- AIS will undertake consultation on the IRCs behalf with all State Training Authorities and other key national stakeholders
- Seek public feedback and input into development of material through the project's duration
- Communicating to enterprises, State/Territory Training authorities, State/Territory Industry Training Advisory Bodies, Peak Bodies, Registered Training Authorities (RTOs) and other interested parties, of the establishment of the project
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- Communicating the process of drafting, identified Training Package material (Qualifications/ Units of Competency/Skill Sets), then verifying and validating this material with stakeholders through email, the AIS website and the AIS newsletter for wider stakeholder involvement, throughout the review process
- Continuing communication on the project via the AIS website and newsletter

Scope of Project

A review of the Units of Competency that cover leadership and management skills for senior officers and seafarers including Deck and Engineer officers. Industry requirements for the job roles will be incorporated into the Units of Competency including:

- Ensure appropriate leadership and management conventions are included
- Technology implemented
- Incorporate changes in Maritime regulations
- State and Territory regulations
- Utilising imported Units where they meet the requirements

Project activity is planned to be undertaken from November 2018, with a Case for Endorsement planned for submission before 31 August 2019.

Training Package

MAR Maritime Training Package Release 4.0

Qualifications

Nil
Units of Competency
Units requiring review:

• Seven Units of Competency to be reviewed (see appendix B)

Skill Sets
No Skill Sets to be reviewed
2018-19 PROJECT DETAILS

Regulatory Requirements requiring new Skill Set development:

- Global Maritime Distress and Safety System
- Oil Chemical Tanker Cargo
- Liquefied Gas Tanker
- Oil Tanker Cargo
- Gas and Low Flashpoint Fuels

Description

There are five specific Skill Sets to be developed to address the Maritime regulatory requirements for specific skills required on various industry specific vessels.

Rationale

The following projects are identified by the Maritime IRC to maintain compliance with regulatory requirements (page 17).

Global Maritime Distress and Safety System

Regulatory requirements and advances in Maritime safety technology drive the development of a new Skill Set and two Units of Competency for Global Maritime Distress and Safety Systems (GMDSS). This will include a review of the existing relevant Unit of Competency in MAR Qualifications. The new Units will align to regulatory requirements, incorporating STCW Regulation IV/2, STCW Code Chapter IV – Section A-IV/2, Table A-IV/2 requirements.

Advanced Oil Chemical Tanker Cargo Operations

Regulatory requirements drive the required development for a new Oil Chemical Tanker Cargo Skill Set and two Units of Competency. The new Units will align to regulatory requirements, incorporating STCW Regulation V/1-1 (paragraphs 5 and 6) – STCW Code Chapter V – Section A-V/1-1 (paragraph 3), Table A-V/1-1-3 requirements.

Advanced Liquefied Gas Tanker Operations

Regulatory requirements drive the required development for new Liquefied Gas Tanker Skill Set and two Units of Competency. The new Units will align to regulatory requirements, incorporating STCW Regulation V/1-2 (paragraphs 3 and 4) – STCW Code Chapter V – Section A-V/1-2 (paragraph 2), Table A-V/1-2-2 requirements.

Advanced Oil Tanker Cargo Operations

Regulatory requirements drive the required development for a new Skill Set and two Units of Competency to meet the Oil Tanker Cargo. The new Units will align to regulatory requirements incorporating STCW Regulation V/1-1 (paragraphs 3 and 4) – STCW Code Chapter V – Section A-V/1-1 (paragraph 2), Table A-V/1-1-2 requirements.
Gas and Low Flashpoint Fuels
Regulatory requirements drive the required development for a new Skill Set and two Units of Competency for compliance with the STCW convention concerning gas and low flashpoint fuels and to meet the development of vessels operating on LNG as the primary fuel.

The new units will align to regulatory requirements incorporating STCW Table A-/1-2 and MO3 endorsement.

Ministers’ Priorities Addressed
• The project **has not** identified for the removal of any obsolete and superfluous qualifications from the National Register to date
• The project **will ensure** that more information is made available about Maritime Operations training delivery to training providers
• The project **will address** the needs of individuals and industry and provide transferable skills from one occupation to another in the Maritime Industry
• The project **will support** creation of units that can be owned and used by multiple industry sectors
• The project **is developing** Skill Sets for the MAR Maritime Training Package
• The project **does not** propose the incorporation of existing accredited course materials into the MAR Maritime Training Package

Consultation Plan
• AIS will undertake consultation on the IRCs behalf with all State Training Authorities and other key national stakeholders
• Seek public feedback and input into development of material through the project's duration
• Communicating to enterprises, State/Territory Training authorities, State/Territory Industry Training Advisory Bodies, Peak Bodies, Registered Training Authorities (RTOs) and other interested parties, of the establishment of the project
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• Conduct face to face consultation sessions as required
• Conducting the first TAC meeting to explain the process and gather comments/feedback
• Communicating the process of drafting, identified Training Package material (Qualifications/ Units of Competency/Skill Sets), then verifying and validating this material with stakeholders through email, the AIS website and the AIS newsletter for wider stakeholder involvement, throughout the review process
• Continuing communication on the project via the AIS website and newsletter
Scope of Project
To develop the required Skill Sets and Units of Competency to meet the Australian Maritime Authority (AMSA) regulatory requirements for:

- Global Maritime Distress and Safety System (GMDSS)
- Oil Chemical Tanker Cargo
- Liquefied Gas Tanker
- Oil Tanker Cargo
- Gas and low flashpoint fuels

Project activity is planned to be undertaken from September 2018, with a Case for Endorsement planned for submission before 31 August 2019.

Training Package
MAR Maritime Training Package Release 4.0

Qualifications
Nil

Units of Competency
See Appendix C

- Review one Unit of Competency and two new Units of Competency for Global Maritime Distress and Safety System (GMDSS)
- Develop two new Units of Competency for Oil Chemical Tanker Cargo
- Develop two new Units of Competency for Liquefied Gas Tanker
- Develop two new Units of Competency for Oil Tanker Cargo
- Develop two new Units of Competency for Gas and low flashpoint fuels

Skill Sets
Five Skill Sets to be developed
## APPENDIX A

### MAR40115 - CERTIFICATE IV IN MARITIME OPERATIONS (MARINE SURVEYING) AND MAR50215 - DIPLOMA OF MARITIME OPERATIONS (MARINE SURVEYING)

<table>
<thead>
<tr>
<th>Unit Code</th>
<th>New Units Title</th>
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<tbody>
<tr>
<td>New</td>
<td>MARXXXX Interpreting the Vessel requirements</td>
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<tr>
<td>New</td>
<td>MARXXXX International Vessels</td>
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<table>
<thead>
<tr>
<th>Unit Code</th>
<th>Units Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MARF001 Apply basic survival skills in the event of vessel abandonment</td>
</tr>
<tr>
<td>2</td>
<td>MARF002 Follow procedures to minimise and fight fires on board a vessel</td>
</tr>
<tr>
<td>3</td>
<td>MARF004 Meet work health and safety requirements</td>
</tr>
<tr>
<td>4</td>
<td>MARF006 Observe personal safety and social responsibility</td>
</tr>
<tr>
<td>5</td>
<td>MARM001 Apply knowledge of safety management system legal framework in the workplace</td>
</tr>
<tr>
<td>6</td>
<td>MARM002 Apply vessel construction theory to marine survey tasks</td>
</tr>
<tr>
<td>7</td>
<td>MARM003 Identify factors that affect a commercial vessel’s fitness for purpose</td>
</tr>
<tr>
<td>8</td>
<td>MARM004 Work in the marine surveying sector</td>
</tr>
<tr>
<td>9</td>
<td>MARM005 Assess compliance with marine environment protection requirements</td>
</tr>
<tr>
<td>10</td>
<td>MARM006 Assist in the survey of commercial vessels</td>
</tr>
<tr>
<td>11</td>
<td>MARM007 Assist in the survey of vessel mechanical features</td>
</tr>
<tr>
<td>12</td>
<td>MARM008 Evaluate vessel stability</td>
</tr>
<tr>
<td>13</td>
<td>MARM009 Implement a systematic approach to the audit of safety management systems</td>
</tr>
<tr>
<td>14</td>
<td>MARM010 Survey lifesaving appliances, fire and other safety systems</td>
</tr>
<tr>
<td>15</td>
<td>MARM011 Calculate, assess and report on vessel trim and stability</td>
</tr>
<tr>
<td>16</td>
<td>MARM012 Conduct a range of surveys on domestic commercial vessels</td>
</tr>
<tr>
<td>17</td>
<td>MARM013 Conduct an audit of safety management systems</td>
</tr>
<tr>
<td>18</td>
<td>MARM014 Develop marine survey reports</td>
</tr>
<tr>
<td>19</td>
<td>MARM015 Participate in investigating marine incidents</td>
</tr>
<tr>
<td>20</td>
<td>MARM016 Survey hull and superstructure of a commercial vessel</td>
</tr>
<tr>
<td>21</td>
<td>MARM017 Survey vessel operational systems</td>
</tr>
<tr>
<td>22</td>
<td>MARM018 Undertake a periodic statutory survey</td>
</tr>
<tr>
<td>23</td>
<td>MARM019 Establish a marine surveyor practice</td>
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# APPENDIX B

## DECK AND ENGINEER OFFICERS, LEADERSHIP AND MANAGEMENT SKILLS

### UNIT OF COMPETENCY – REVIEW

<table>
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<tr>
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## APPENDIX C

### REVIEW OF ONE UNIT OF COMPETENCY, DEVELOPMENT OF SKILL SETS AND UNITS OF COMPETENCY

- Global Maritime Distress and Safety System (GMDSS)
- Oil Chemical Tanker Cargo
- Liquefied Gas Tanker
- Oil Tanker Cargo
- Gas and low flashpoint fuels

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<tr>
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<tbody>
<tr>
<td>MARSSXXXX</td>
<td>Global Maritime Distress and Safety System (GMDSS) Operations</td>
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#### Review Unit

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<tr>
<td>MARO003</td>
<td>Transmit and receive information by the global maritime distress and safety system</td>
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<td>MARSSXXXX</td>
<td>Liquefied Gas Tanker Operations</td>
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AUSTRALIAN INDUSTRY STANDARDS

Australian Industry Standards (AIS) provides high-quality, professional secretariat services to the Maritime IRC in our role as a Skills Service Organisation. AIS provide services to eleven allocated IRCs which cover Aviation, Corrections, Gas, Electricity Supply (Generation and Transmission, Distribution and Rail), Electrotechnology, Maritime, Public Safety (including Police, Fire and Emergency Services, Defence), Rail, Transport and Logistics, and Water industries. AIS supports these important industry sectors using our world class in-house capability and capacity in technical writing, quality assurance, project management and industry engagement in the production of Training Packages.

AIS was established in early 2016, 20 years after its predecessor the Transport and Logistics Industry Skills Council (TLISC) was established in 1996. More information about AIS can be found at http://www.australianindustrystandards.org.au.

- We support industry growth and productivity through our modern innovative approach to establishing skills standards
- We provide high-quality, professional secretariat services to help our allocated industry reference committees develop the skills that industry needs
- We partner with industry to shape the workforce of the future