



AUSTRALIAN  
INDUSTRY  
STANDARDS

# Supply Chain

Industry Outlook 2022





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# Foreword

The importance of the Australian supply chain in our daily life has never been more recognised than in the past two years. The recent floods and bushfires in Australia and the current pandemic highlight how the supply chain is involved in so many aspects of our life, from the food we purchase in supermarkets to the supply of materials used in manufacturing and the movement of goods and services across our nation and internationally. This is all underpinned by an invisible network of technology, data and people, all involved in planning, coordinating and implementing every aspect of such transactions. The slightest disruption can have repercussions in our lives such as the recent shortages of food, medicine, and other essential items.

Supply chains are a key cog in every business and a major contributor to our economy. The supply chain industries that Australian Industry Standards (AIS) supports (Transport and Logistics, Aviation, Maritime, and Rail) provide essential services in the movement of services, goods, and people

across Australia. These industries together employ over 679,000 people across its different sectors and generated an annual revenue of over \$179 billion in 2021-22.

The ongoing disruptions caused by the pandemic have caused major shifts in consumer behaviour and supply chain business operations. There has been an unprecedented increase in e-commerce and parcel movements, and consumers' expectations are changing too. This has placed enormous strain on supply chain industries to meet increasing demands.

The pandemic has elevated the need for digital transformation and resulted in an unprecedented adoption of digital technologies and data analytics capability to deliver services and goods more efficiently and cushion the adverse impacts of COVID-19. Digital transformation has made the supply chain more resilient and agile, helping the industry to meet demands and changing customer expectations.

Our research has identified six megatrends which have and will continue to impact the

supply chain industry. Strategic planning and workforce development are among the keys to meeting the challenges and opportunities presented by these megatrends. The significance of training and skills development have never been more important. A future-ready and agile workforce with transferable skills will enable greater workforce mobility and increased efficiency across multiple industries.

The Australian Vocational Education and Training (VET) system plays a vital role in supplying a skilled workforce and contributing to the economy. The VET system is undergoing significant reforms and will see the establishment of Industry Clusters to give industry a stronger, more strategic voice and broader role in VET. AIS strongly supports the establishment of these clusters as they enable the industry to work more closely with the VET sector to better align training skills development with employers' needs and create a viable and skilled workforce.



**Paul Walsh, CEO**

## About this Industry Outlook

This Industry Outlook presents a whole of industry view about opportunities, challenges, and workforce development needs. The Outlook is deliberately brief and 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 industry's capacity to act.

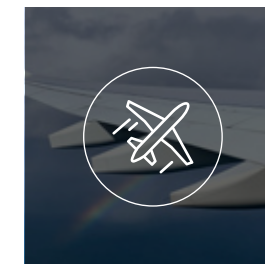
The Outlook is based on extensive industry consultation and research via the Industry Reference Committees for Transport & Logistics, Aviation, Maritime, and Rail. Australian Industry Standards gratefully acknowledges the insightful contributions from the IRC members and industry stakeholders.

# Fast Facts



**800.4B**  
tonnes total freight task  
+2.4%  
increase from the previous year

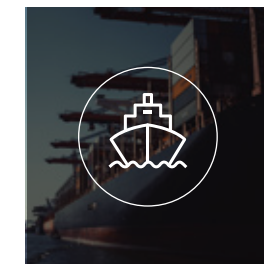
**18.3%**  
Of Australia's total  
emissions, from the  
transport sector by  
June 2021



**1M**  
Passengers on  
international flights  
in 2020-21  
-97.3% ▼

**21.5 M**  
Passengers on  
domestic flights  
in 2020-21  
-52.4% ▼

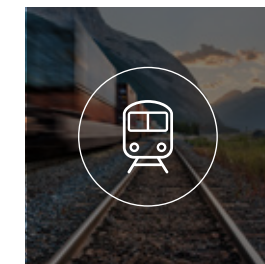
**13M**  
Passengers through  
regional airports  
-30.4% ▼



**5th**  
Australia 5th largest  
user of shipping  
services globally

**80%**  
of Australia's imports  
& exports (by value)  
carried by sea

**111.9B**  
tonnes of freight  
moved by coastal  
shipping in 2020-21  
+0.5% ▲  
Increase from  
the previous year



**453.1B**  
tonnes of freight  
moved by rail in  
2020-21  
+1.3% ▲  
Increase from  
the previous year

**624M**  
heavy rail passenger  
movements in  
Metropolitan areas  
in 2019-20

**174.6M**  
light rail passenger  
movements in  
2019-20



**170,340**  
truck drivers in  
Australia in 2021

**\$62.3B**  
spent on online  
shopping in 2021

**235.4B**  
tonnes of freight  
moved by road  
in 2020-21  
+5.6% ▲  
Increase from  
the previous year

For sources, refer to the reference page.



**Industry**

# OVERVIEWS



**Aviation**



**Maritime**



**Rail**

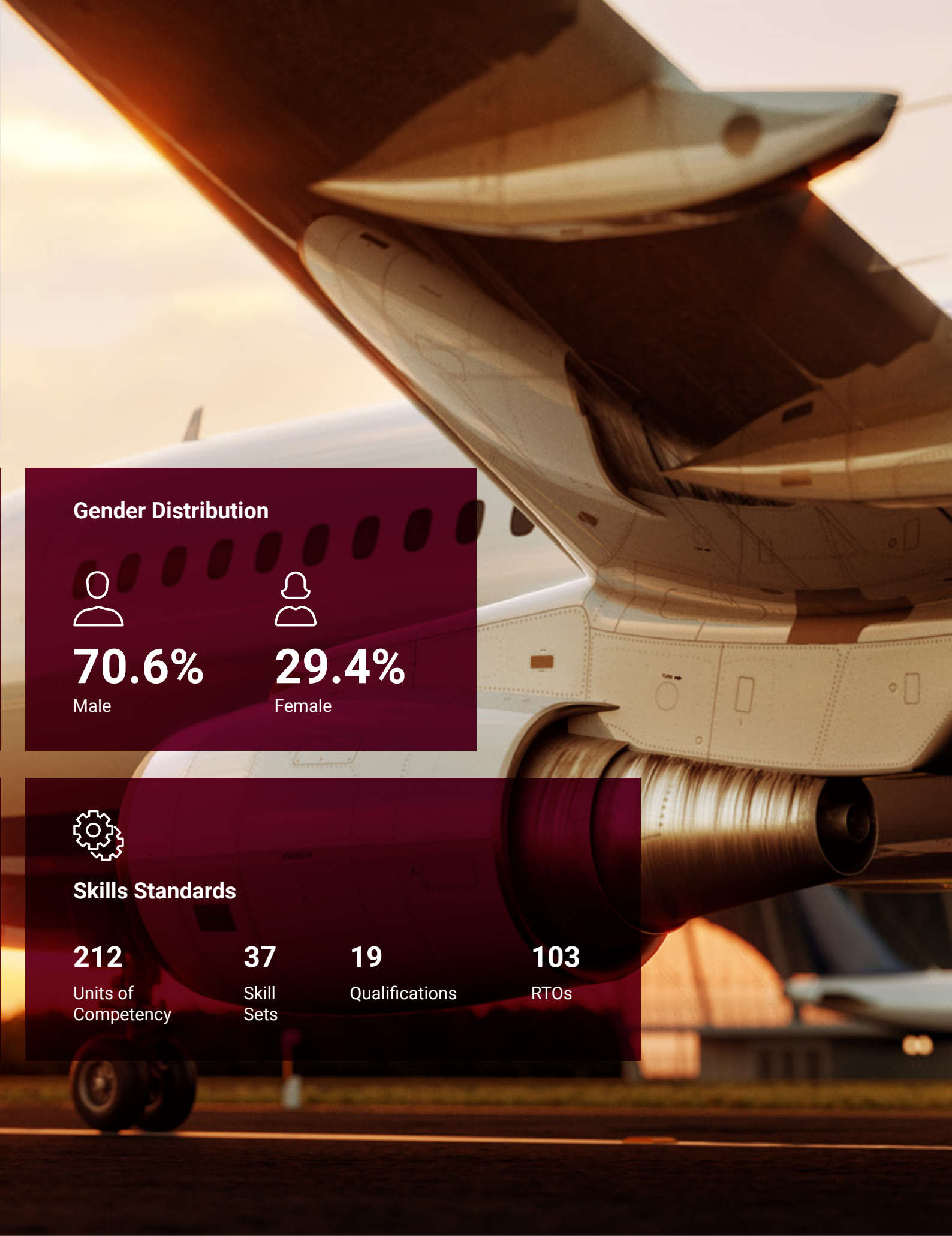


**Transport  
& Logistics**



# Overview: Aviation

The aviation industry provides vital services to Australia, underpinning the operation of the national economy, enabling links to geographically isolated regions, providing tourism and helping Australian business continue to grow. The aviation industry is divided into five main subsectors: domestic commercial aviation; international commercial aviation; general aviation; air-freight transport; and aviation support infrastructure.



\$29.52B

Revenue

+

\$11.99B

Value Added to GDP

54,432

Employment 2022

Reported by ABS

37%

Employment Growth to 2027

Reported by IBISWorld

Gender Distribution

70.6%

Male

29.4%

Female

2,127

Enterprises

Business Composition

94%

Small

5%

Medium

1%

Large

Employment by State 2022

NSW	30.1%
QLD	26.7%
VIC	22.1%
WA	11.3%
SA	3.9%
NT	2.7%
TAS	1.7%
ACT	1.5%

Skills Standards

212

Units of Competency

37

Skill Sets

19

Qualifications

103

RTOs

For sources, refer to the reference page.

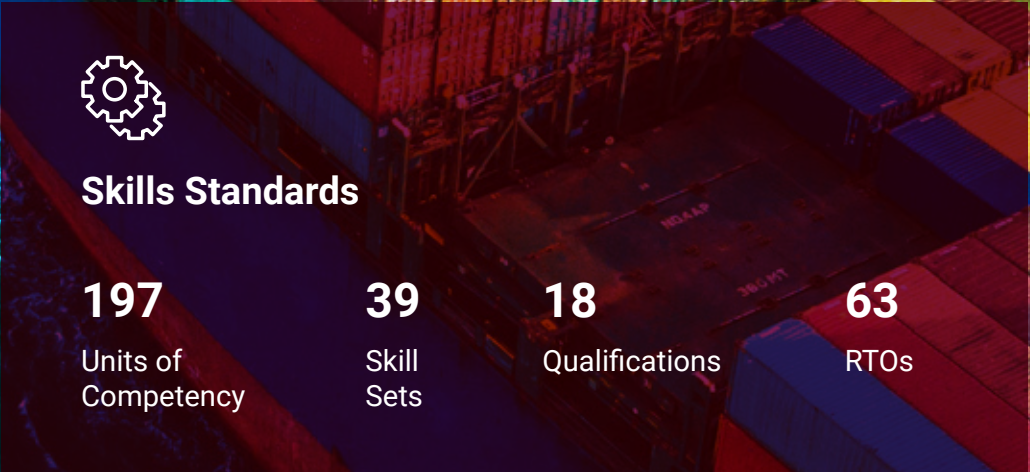
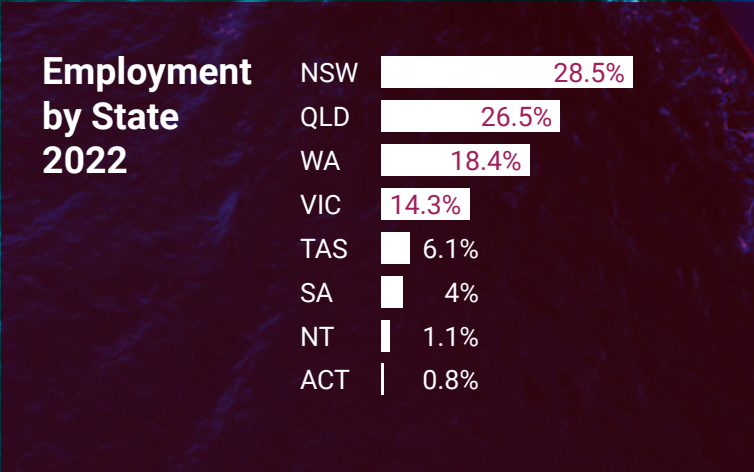
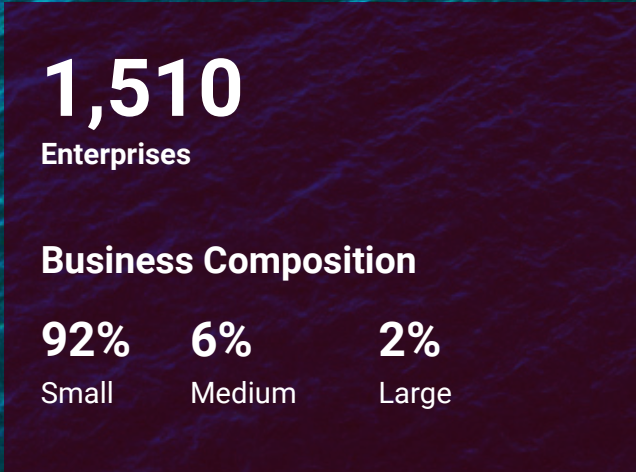
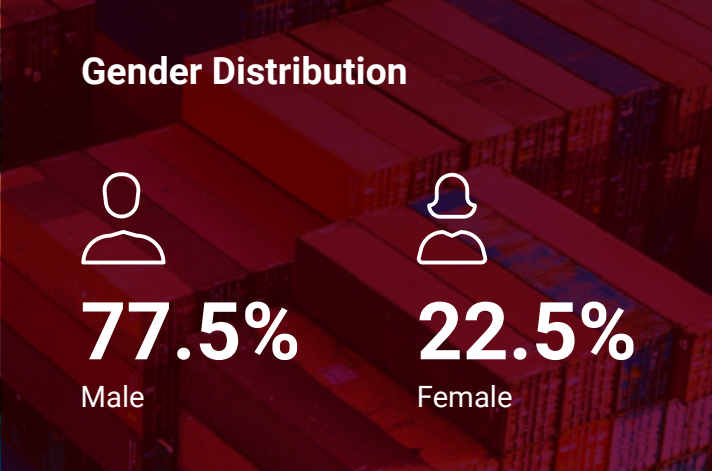


# Overview: Maritime

The maritime industry is highly regulated and has a diverse range of occupations, business types, sizes and locations. People with a MAR Maritime Training Package qualification and/or Skill Set are well placed to work in the maritime industry.

The range of occupations covered by the Training Package include Linesperson, Deckhands and Coxswains, Marine Engine Drivers, Marine Engineers, Cooks, Integrated Ratings, Marine Surveyors, Deck Officers and Ships Master.

NOTE: The water transport workforce is a sub-category of all domestic seafarers and related figures are presented as merely representative of the broader maritime workforce. The ANZSCO codes do not accurately capture the workforce size. For example, Marine Engineers are only counted from Diploma level and up which misrepresents the size of the employed marine engineers. Industrial and workforce data relating to tourism, marine rescue, fishing, aquaculture and other industries that utilise the Maritime Training Package are not captured. Total VET Activity data records approximately 6000 enrolments in Maritime per year which, for an industry that requires recertification every five years, would suggest an active workforce of more than 30,000. Domestic seafarer data as provided by AMSA suggests there are about 22,000 commercial domestic vessels and the true workforce size could be as high as 66,000.



For sources, refer to the reference page.



# Overview: Rail

The rail industry employs over 46,000 people and comprises private and public operators; passenger and freight operators; track owners and managers; manufacturers and suppliers that operate in urban, regional and rural areas of Australia. It also employs or contracts others from peripheral industries when required including but not limited to, civil construction, engineering and labour hire companies.



\$25.89B

Revenue

+

\$9.94B

Value Added to GDP

46,373

Employment 2022

Reported by ABS

5%

Employment Growth to 2027

Reported by IBISWorld

Gender Distribution

80.5%

Male

19.5%

Female

101

Enterprises

Business Composition

62%

Small

12%

Medium

16%

Large

Employment by State 2022

NSW	43.1%
VIC	24.5%
QLD	21.4%
WA	5.7%
SA	3.7%
ACT	1%
TAS	0.4%
NT	0.2%

Skills Standards

269

Units of Competency

63

Skill Sets

23

Qualifications

82

RTOs

For sources, refer to the reference page.



# Overview: Transport & Logistics

The transport and logistics industry is characterised by immense diversity in occupations, workforce development needs, business types and sizes, and locations. Because of its integration within the economy and the embedded nature of its functions, the relative 'health' of the industry is often considered a barometer for the overall strength of the economy. The industry employs over 542,700 people across its major subsectors: road transport; logistics; warehousing; and stevedoring.

**\$118.25B**

Revenue

+

**\$41.72B**

Value Added to GDP

**542,721**

Employment 2022

Reported by ABS

**8%**

Employment Growth to 2027

Reported by IBISWorld

## Gender Distribution



**79%**

Male



**21%**

Female

**190,681**

Enterprises

## Business Composition

**98.5%**

Small

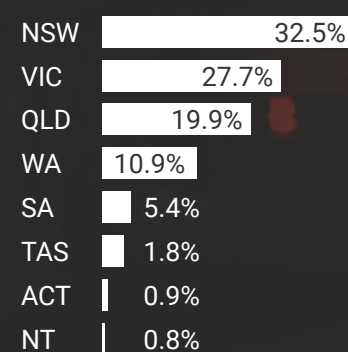
**1.3%**

Medium

**0.1%**

Large

## Employment by State 2022



## Skills Standards

**693**

Units of  
Competency

**117**

Skill  
Sets

**52**

Qualifications

**711**

RTOs

For sources, refer to the reference page.



A photograph of two industrial workers, a man and a woman, in a warehouse setting. They are both wearing hard hats and high-visibility safety vests. The woman is holding a tablet and looking at it, while the man stands next to her, also looking at the tablet. The background shows industrial shelving and boxes. The entire image has a strong orange-red color overlay.

Industry Outlook 2022

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# MEGATRENDS



# Megatrends

Through extensive research and consultation with stakeholders, six megatrends have been identified that are impacting the Australian economy, businesses, and people.

A megatrend is a pattern or trend that has a massive impact on the way businesses operate and how people live in society. The identified megatrends create both challenges and opportunities which can be addressed through forward planning, training, and workforce development.



## Double Disruptors

Digital transformation together with the current pandemic has caused a double disruption to industry, leading business and economic activities to shift rapidly to the online world. Digital transformation gained significant traction during the pandemic with ten years of progress achieved in a few months to cushion the adverse impacts of the pandemic and harness opportunities.<sup>1</sup>

The pace of technology adoption in response to COVID-19 is expected to continue to increase and has already created more in-demand skills, as well

as skills gaps that will need to be addressed.

The World Economic Forum has reported that on average, 40% of workers will require reskilling and 94% of businesses have indicated that they expect their staff to acquire new skills.<sup>2</sup>

Digital transformation can help rebuild our post-pandemic economy, but industry also needs to build a highly skilled and resilient workforce for the movement of goods and services. It is not only about digital technologies, but it is also about those human skills

that cannot be replicated or replaced by algorithms.<sup>3</sup> The Digital Transformation Expert Panel has developed a series of strategies to help VET become a dynamic ecosystem supporting lifelong learning. To meet the challenge, scale and speed of digital transformation change, Australia will need to ensure we upskill and reskill the existing workforce.

## Supply Chain Resilience

Supply chains play a vital role in every industry, ensuring goods and services are delivered to the end consumers in a timely fashion. Australian freight transport increased across all sectors in 2021 except for air freight. Last year, 235.4 billion tonne of freight was moved by road, 111.9 billion by coastal shipping, 453.1 billion by rail, and 0.3 billion by air freight which recorded a 9.1% decrease compared to the previous year.<sup>4</sup> Australia has been resilient in cushioning the impacts of the pandemic on many of its supply chains. Still, businesses and industries continue to be under enormous pressure from the unprecedented impacts of the pandemic.

**Australian Industry Group has reported that around 65% of Australian businesses had difficulty sourcing their materials, an issue which is projected to continue in 2023.<sup>5</sup>**

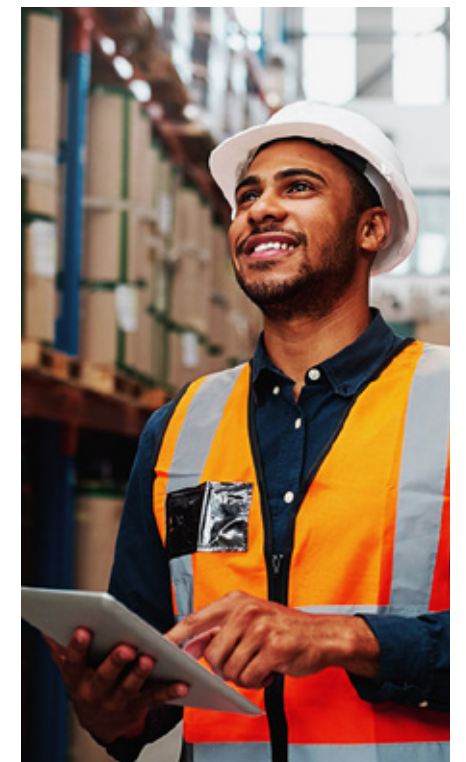
The reasons for many supply chain disruptions include lockdowns and restrictions in activities; increasing demand for goods; labour shortages due to infection of workers and isolation rules; and global shipping container shortages. All supply chain industries have been significantly affected by different strains of COVID-19 and changing consumer demands. Since the onset of the pandemic, grocery and food retailers have been significantly impacted by product availability.

Supply chains have been also affected by labour shortages and an ageing workforce. Transport and logistics operators across Australia have reported a 5% to 20% reduction in their available staff, including heavy vehicle drivers, warehouse staff, forklift drivers,<sup>6</sup> due to COVID infections and isolation requirements.<sup>7</sup> COVID has brought the existing shortage of truck drivers into the spotlight, with the transport industry under extreme pressure to meet the demands of the exponential growth in the national freight task. The Transport & Logistics Industry Reference Committee, supported by AIS, responded to the transport industry's call by proposing a new heavy vehicle driving apprenticeship which has been received positively and will play a vital role in professionalising the heavy vehicle driver occupation and thereby attracting new workers. This is an important step in addressing the shortage of truck drivers and contributing to Australia's economic recovery.<sup>8</sup>

Unprecedented disruptions coupled with consumers' changing behaviour has highlighted the significance of resilient supply chains through planning and investment in supply chain operating models. In 2021, Australian online retail spending grew by 35%, further straining the already vulnerable supply chain.<sup>9</sup> Therefore, supply chain transparency and visibility are gaining more attention across most industry sectors.

Sustainability and the environment continue to be important factors for both businesses and consumers. Consumers have demonstrated a higher level of trust in transparent brands where they know where the materials are being sourced from in order to make ethical purchases.<sup>10</sup>

Measures to improve the sustainability of supply chains and reduce greenhouse gas emissions include ethical sourcing, sustainable supplier and material selection, the use of recyclables, the use of renewable energy, electric vehicles, and alternative fuels.<sup>11</sup> The transport sector is the third largest contributor to Australia's greenhouse gas emissions with 18.3% of total emissions.<sup>12</sup>





Visibility across the supply chains is important to enable effective responses to disruptions and a more efficient monitoring of supply chain inventory.<sup>13</sup> Technology and digital systems are enablers of a resilient supply chain.

**Australian supply chain leaders have emphasised the role of innovations such as predictive analytics, artificial intelligence, robotic automation and optimisation in warehousing and transport operations.<sup>11</sup>**

These technologies along with Internet of Things (IoT) devices, blockchain, and sensors will provide real time data that can improve transparency, resiliency and visibility of the supply chain.<sup>13</sup> Leveraging data to improve visibility into demand, inventory, capacity, supply and finances is vital. The Australian freight data hub is improving the efficiency, safety and resilience of the freight sector through a data-driven approach.<sup>14</sup>

In Australia, the adoption of such innovations has accelerated and is benefitting local industries who provide services or equipment for optimising supply chains. With global disruptions across the supply chain, industries have negotiated local solutions, such as finding local suppliers and manufacturers, where possible, to reduce reliance on overseas suppliers.<sup>15</sup>

The future success of supply chains depends upon being future-ready and resilient.

**Skills development of the workforce is a critical element to address skills gaps in the ongoing digitalisation of supply chains.<sup>16</sup>**

Skills development builds capacity to leverage new technologies and boost efficiency, safety and productivity. The VET system plays a critical role in helping the workforce acquire transferable skills allowing mobility across different sectors. Every industry sector relies on supply chains for their business to operate efficiently and jobs outside of supply chain operations possess skills that are transferable into supply chain careers. Being equipped with transferable skills and knowledge enables workforce mobility across sectors such as retail, mining and aerospace. This recognition of skill pathways can form part of Australia's burgeoning space industry which needs to partner with small and medium-sized companies to participate in global supply chains for the space industry.<sup>17</sup> An agile workforce with transferrable skills can help the aerospace industry better connect with business in Australia and across the globe.





## Data Analytics & Logistics



### The implementation of data-capturing technologies has been expedited by the pandemic and organisations are increasingly employing data analytics to inform their decision making and improve processes.

The Internet of Things (IoT), connected networks of digital devices, appliances, software and sensors, continue to open up new frontiers.

Big Data, the ever-increasing volume of data being captured by sensors and subject to analysis, is further transforming the skill needs across the aviation, maritime, rail, and transport and logistics sectors. Most of this data, stored in cloud-based platforms, can be analysed to improve productivity,<sup>18</sup> enabling businesses to make increasingly informed 'real-time' decisions based on modelling that predicts consumer demands.<sup>19</sup>

Data analytics technologies provide access to real time data to assist operators monitor vehicle performance, manage fleet downtime, and reduce costs leading to optimal fleet movement and business operations.<sup>20</sup> The benefits include dynamic routing; anticipatory shipping;<sup>21</sup> real-time tracking of shipments; warehouse-capacity optimisation; predictive asset maintenance; improved last-mile delivery; and proactive fault detection and resolution.<sup>22</sup> The Australian government is currently capturing freight and supply chain performance data via a Supply Chain Benchmarking Dashboard which provides greater visibility on road and rail freight data.<sup>23</sup>

This will help freight operators and the businesses they support to save costs and improve operations.

The rail sector is leveraging data through technologies such as the Advanced Train and Management System (ATMS) to improve rail network capacity, operational flexibility, train service availability, transit times, rail safety, and system reliability.<sup>24</sup> Some rail networks in Australia have undertaken a digital integration project to replace trackside signalling with the latest systems and have implemented Automatic Train Operation (ATO) and Traffic Management System (TMS), improving safety and efficiency.<sup>25</sup>

The maritime sector uses e-navigation systems which facilitate the harmonised collection, integration, and analysis of maritime information to enhance navigation and improve safety and security. There is an international trend to implement Navigation Satellite Systems as a means of shipboard navigation, which highlights the significance of electronic aids in navigation.<sup>26</sup>

The Satellite Based Augmentation System (SBAS) is being implemented which

will enhance accuracy and improve safety in the aviation sector.<sup>26</sup> The expected growth in drone technologies requires the effective management of safety standards and the integration of drones into traditional airspace and flight operations.<sup>27</sup> The use of data and algorithms to manage airspace is pivotal. The aviation sector continues working towards Digital Aerodrome Services, also known as Digital Control Towers, to assist air traffic controllers, enhance service delivery and improve safety outcomes.<sup>28</sup>

Digital towers can also be integrated into the air traffic management data networks to improve flow management and collaborative decision-making.

These new technologies have created demands for skills in communications technologies, data management, data analytics, predictive modelling, machine learning, deep learning, problem-solving, AI, and an understanding of autonomous systems.<sup>29</sup>





## Automation



The transport and logistics sector is increasingly using robotics and Automated Guided Vehicles (AGVs) in warehouses to perform tasks more efficiently and safely.<sup>30</sup>

**It is projected there will be four million commercial robots in warehouses globally by 2025.<sup>31</sup>**

Some of Australia's ports and stevedore operations, including stacking cranes, are already automated.<sup>32</sup> Autonomous trains will play a more prominent role in Australia's rail freight.<sup>33</sup> They are already operating in Australia, leading to cost reductions and increased service punctuality and reliability.<sup>34</sup> Rio Tinto operates the world's largest autonomous train, 2.4 kilometres long, in the Pilbara in Western Australia, which is remotely controlled from their operation room.<sup>35</sup>

The maritime sector plays a significant role carrying 80% (by value) of Australia's imports and exports.<sup>36</sup> The world's first autonomous electric cargo ship was launched in Norway last year.<sup>37</sup> Trials and development of autonomous ships are underway in the Asia Pacific region.<sup>38</sup>

The Centre for Supply Chain and Logistics at Deakin University has reported a growing need for skills in digital, telecommunications and automation technologies.<sup>39</sup> Drones will play significant roles, delivering food or medical supplies and unmanned aerial taxis for commuting to work will be available in the future. A new development is Electric Vertical Take-off and Landing (eVTOL) vehicles which will provide even more opportunities.<sup>39</sup> Drone technology can create up to 5,500 new full-time jobs each year for the next two decades.<sup>40</sup>

The National Skills Commission indicates that occupations in the transport and logistics sector are more likely to be impacted by automation.<sup>41</sup> However, there will also be significant employment growth necessitating upskilling and reskilling of the workforce as the interaction of technology in the movement of goods and services continues.

## Labour Shortages



**One of the main challenges adversely affecting Australia's economic recovery is an industry-wide labour shortage.**

According to the Australian Bureau of Statistics (ABS), more than a quarter of businesses (27%) experienced difficulty in recruiting suitable staff.<sup>42</sup> The ABS reports that the top three factors which have strained the labour market are: lack of job applicants; lack of required skills and qualifications; and international border closures.<sup>42</sup> The pandemic and the increasing adoption of digitalisation have affected both the supply and demand side of the labour market. In a recent KPMG survey of over 400 Australian business leaders, 69% of respondents indicated that talent acquisition, retention, upskilling and reskilling are their number one challenge over the next three to five years.<sup>43</sup>

Labour shortage has been further exacerbated by border closures and an exodus of foreign workers which has caused a decline in the net migration.

**Apprentices and trainees play an important role in providing the much-needed skills to alleviate labour shortages.**

The NCVER VET data shows an increase of 35% in apprenticeship and traineeship enrolments compared to the start of the pandemic.<sup>46</sup>





# Digital Transformation

The onset of the global pandemic provided the impetus for the dramatic uptake of digital technologies and smart business processes to offset the adverse economic impacts of COVID-19. Businesses, such as those in the retail sector, quickly shifted to the online world with end-to-end systems to manage their supply chains and support customers. The acceleration of digitalisation impacted the skills needs of the workforce requiring many to upskill or reskill.

Business leaders in Australia consider digital transformation and upskilling and reskilling to be among the top priorities in the next three to five years on the path to a more digitalised future.<sup>43</sup>

A recent study by AlphaBeta of six APAC economies indicates that Australia has the highest level of application of digital skills (64%) in the workplace.<sup>47</sup>

While the acquisition of digital skills is important, the future of work will still be human-centred. The Digital Transformation Expert Panel reported that while future jobs are technology-enabled, they still significantly rely on those human skills that cannot be replicated by algorithms.<sup>3</sup> The panel considers investment and industry leadership in workforce development, building a national lifelong learning system, and holistic support for learners throughout their learning cycle as keys to

reskilling and upskilling the workforce throughout their working lives. The findings of the expert panel are aligned with international trends for the future of work. APEC considers the future of work to be human and also recommends promotion of lifelong learning and skills building to keep up with the changing labour market.<sup>48</sup> The International Labour Organization<sup>49</sup> and World Economic Forum<sup>50</sup> have developed global skills frameworks which emphasise the role of soft skills and cognitive and metacognitive skills such as communication, problem-solving, collaboration and strategic thinking. The Australian Academy of Science<sup>51</sup> and the National Skills Commission<sup>52</sup> both corroborate the international trends by emphasizing lifelong learning, soft skills, cognitive and communication skills as equally important to the future of work in Australia.

Australia's VET system is powerful, life-changing and pivotal to optimising what technology offers our economy and our workforce.





Industry Outlook 2022

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# IMPACT ON THE SECTORS



# Impact on the Sectors



The identified megatrends will have varying impacts on the labour supply and skills needs of each sector. The AIS Industry Survey indicates that 78% of respondents believe that their organisations will continue to face labour shortages. This is in line with other industry reports echoing the same concerns.

The Industry Survey also identified that the workforce will require a mix of both technical and non-technical skills in the next three to five years.

**The top three technical skills in demand are digital skills; the operation of new systems and emerging technologies; and STEM skills.**

**The identified top three non-technical skills are communication; flexibility and adaptability; and problem solving.**

With the increasing adoption of digital technologies, and the changing way businesses operate due to the pandemic,

digital and interpersonal skills have become increasingly significant in building a resilient and capable workforce. Digital skills for data analytics, data management, AI, etc, and skills related to autonomous systems will be in demand across transport and logistics, aviation, maritime, and rail sector.

**With the increasing automation of the transport and logistics sector, organisations will be utilising more digital devices and technologies to improve their operational efficiency. This requires upskilling and reskilling the workforce to be able to use these technologies. Having transferrable skills will enable a more agile and resilient workforce.**



The recently released federal Aviation Recovery Framework recommends building a sustainable pipeline of aviation workforce skills and adopting and integrating emerging aviation technologies.<sup>53</sup> Drone technology can create up to 5,500 new full-time jobs each year for the next two decades, which highlights the importance of skills related to such new technologies.<sup>40</sup> Maintenance of aviation skills and capabilities during the COVID-19 downturn remains a high priority for the sector as pilots require ongoing professional training.

The maritime sector has also emphasised building new capabilities in the workforce as a strategic priority.<sup>36</sup> Australia is an island nation with 80% of its imports/exports carried by sea and 10% of the world's sea trade passing through its ports. Therefore, developing and retaining skills in the maritime sector is integral to conducting trade via ports safely and efficiently and also complying with national and international regulations and requirements.<sup>54</sup>

The rail sector has indicated the significance of investing in workforce development initiatives to grow the available skills base for rail and promote rail careers.<sup>55</sup> The sector is currently facing skills shortages which can adversely impact current and future recent infrastructure projects. The issue is further exacerbated by lack of trainers and assessors, and cost and length of training time.<sup>44</sup>

The respondents to the AIS Industry Survey similarly identified the issue of cost and time of achieving a qualification as one of the causes of skills shortage. The survey respondents indicated that flexibility in training delivery and engaging the industry in qualification development can help mitigate this issue.



# VET Reform & Industry Leadership

**Australia's VET system is recognised internationally for its quality in delivering qualifications aligned with industry and workforce skills needs.**

The impacts of digital transformation and the pandemic have significantly altered the way we work and have created skills gaps in the workforce. A robust and dynamic training system can play a vital role in supporting Australia's prosperity and growth in the face of these challenges. To this end, Australia's VET system is currently under reform to expand and strengthen industry's leadership role. This will be achieved by the establishment of new industry-based clusters (Industry Clusters) with broad roles and responsibilities for skills and workforce development. The reform will enable industry to provide strategic and operational leadership, engage with industry leaders to collect workforce intelligence, and prioritise and develop qualifications and training products.

The reform will have a number of benefits including enhanced industry engagement especially small businesses and niche industries; enhanced employer engagement and access to training; improved cross-

collaboration between sectors; improved speed to market of qualifications and training products; better alignment of products and skills to industry needs; and increased workforce productivity. It will also empower the industry to work more cooperatively with training providers to align training with employers' needs.

The VET system is well poised to help Australia's economic recovery from the COVID-19 pandemic and support employers to meet skill needs and develop an agile and adaptable workforce. Employers rely on both nationally recognised training and other forms of accredited and non-accredited training to skill their workforce. According to a recent NCVER report,<sup>56</sup> employers highly regard the quality of nationally recognised training in terms of its ability to be assessed against national performance standards in Training Packages. Employers also highlighted that nationally recognised training is suitable for entry into the workforce as well as future upskilling in emerging technical skills.

Industry's role in policy design and product development as well as a strong relationship with the National Careers Institute are key to creating a viable and skilled workforce and improving cross industry collaboration on training products.





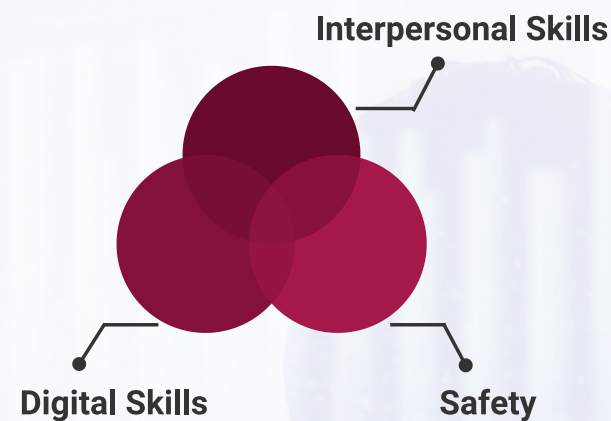
# What Industry Told Us

AIS conducted an online survey for stakeholders, between November 2021 and January 2022 to seek feedback on the current skill shortages and the reasons for the shortages, as perceived by industry stakeholders.

**78%** of respondents believe they will have a labour shortage in the next 12 months

## Top 3

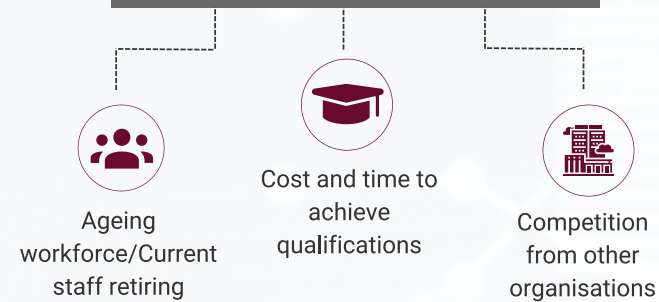
Skills in demand in the next 12 months due to the pandemic:



Non-technical skills in the next 3-5 years:



## Top 3 causes of labour shortages



## Technical skills in the next 3-5 years:



In our survey we found the following barriers and opportunities to meeting skills demands:

## Barriers to meet skill demands

- 1 COVID-19 negative impact
- 2 Limited funding for training
- 3 Employees do not have required qualifications

## Barriers to organisations provide training

- 1 Cost
- 2 Productivity lost due to time off the job
- 3 Lack of flexibility in course delivery/COVID-19 impacts

## Reasons that organisations provide training

- 1 Meeting skills requirements for the organisation
- 2 Regulatory compliance
- 3 Organisational commitment to training

## How can VET qualifications better meet the needs of your sector?



**Location of respondent's organisations**  
75% Metropolitan | 23% Regional | 2% Remote

**Respondents' organisations size**  
27% Small Enterprise | 13% Small to Medium | 7% Medium to Large | 53% Large



# Remote Pilot Training

**Ross Brown**  
Senior Remote Pilot  
Training Instructor



**Ross Brown's interest in remote technology and a passion for teaching led him to his current role as a senior Remote Pilot Training Instructor at SuasRov, preparing learners for roles in the burgeoning drone industry.**

His exciting new career began after watching a segment about drones on 'Sunrise'. Seeing this as a great opportunity, Ross enrolled in a Certificate III in Aviation, Remote Pilot. After completing the course, he achieved a Remote Pilot's Licence and a Radio Operators certificate through the Civil Aviation Safety Authority (CASA). For the next 12 months, he practiced with his Phantom 4 drone to build his flying hours up, before securing a job as a drone instructor.

Remote Aviation, encompassing Remotely Piloted Aircraft and systems, is the fastest growing sector of the Aviation industry, with an increasing demand from industry and employers for skilled Remote Pilots. Drones have various applications that are used in different industry sectors. They include infrastructure inspections, natural resource inspections, 3D modelling of quarries and mining areas, roof inspections, photography, movie production, emergency services, surf lifesaving, agriculture, and many more. Ross says, "I am passionate about the capture of data and information through RPAS techniques so we can better inform all clients how to look after our built and natural resource assets."

SuasRov delivers CASA Certified Remote Pilot's Licence (RePL) Drone Training Courses to students and recreational users of Remotely Piloted Aircraft (RPA), professionals seeking to gain the skills necessary to integrate drone operations into their existing work practices, and to people seeking a change of career. It also delivers a Remote Aviation Foundation Course (RAF) through a balance of hands on and theoretical learning, where students study a wide range of aeronautical, risk management and operational topics. Students gain practical experience in everything from

preparing Remotely Piloted Aircraft (RPA) for flight to understanding how to safely execute missions. This program provides a foundation to progress towards a CASA Certified Remote Pilot Licence (RePL) and an AROC Certificate.

Ross has extensive experience delivering the Certificate III in Aviation, Remote Pilot in the High School environment. He has taught over 150 learners in CERT III in Aviation across Queensland and received positive feedback from both students and industry. Employers have been impressed that the students not only learn technical skills, but also soft skills such as communication and problem solving.

**"My main passion is to make sure every student achieves the best possible learning outcome so they can move forward in the RPAS industry."**

**Ross Brown**





# Skilling the Workforce

## A skilled and adaptable workforce has been identified as critical to the National Freight and Supply Chain Strategy.

Industry Reference Committees, with industry stakeholders, lead Training Package (TP) development to ensure qualifications are contemporary and future focused for the needs of the industry and its workforce. This work responds to new and emerging skills and changing job roles, latest technologies and work practices, key industry and regulatory developments, and cross industry skills requirements. Below are snapshots of some of the many projects, completed or underway, that address the priority skill needs of the supply chain industry.

### New & emerging skills matched to job roles

A world-first qualification in Remote Pilot-Beyond Visual Line of Sight (BVLOS) was developed to provide a pathway to operate Remotely Piloted Aircraft Systems (RPAS) or drones across multiple industry sectors. A new Skill Set was developed for Remotely Piloted Aircraft (Excluded Category Operations) to address skill needs where a licence is not required. This was designed to enable contextualisation across multiple industries in a variety of operating environments. Currently under development is a new Diploma of Aviation Chief Remote Pilot (CRP).

The Maritime IRC has developed new Units of Competency to support specialised career pathways for Dynamic Positioning Operators, Compass Adjusters and Maritime Towing, enabling greater workforce mobility and job opportunities in the sector.

Qualifications were updated and amalgamated to address current and future skills needs of entry-level workers and team leaders/supervisors for the Supply Chain industries, enabling workforce mobility across multiple industry sectors.

In the rail sector, the new Certificate II in Rolling Stock Maintenance has created an entry-level pathway for rolling stock maintenance workers. Skills and knowledge requirements relating to new automation systems, security and monitoring operations have been included and will help maintain rail traffic efficiencies.



### Key industry & regulatory developments

With the current boom in rail infrastructure projects, the Rail Training Package was revised to cover specific infrastructure skill requirements for various operator levels (entry level through to higher-level technical skills) and to address new technologies used in building rail infrastructure; and automation used in track infrastructure installation and maintenance.

New Units of Competency were developed to address regulatory changes in Heavy Vehicle National Law regarding the Chain of Responsibility and to support the National Heavy Vehicle Regulator Fatigue Management accreditation process.

Qualifications in the Maritime Training Package were updated in phased projects to incorporate Australian Maritime Safety Authority certification requirements, including near coastal, IMO and STCW. This has created career pathways for seafarers, helped remove red tape, improve efficiency and reduce costs for students, industry and the regulator.

In consultation with Safe Work Australia, Units of Competency for Crane High Risk Work licences have been updated and aligned to existing requirements for crane operators as set out in Schedule 4 of the model WHS Regulations. This delivered efficiencies and maintained safety protections.

### Cross industry synergies

The Australian Industry and Skills Committee (AISC) commissioned the development of 10 cross-sector supply chain skill sets and 16 Units of Competency for use by multiple industry sectors and to support the existing supply chain workforce to quickly upskill and adapt to widespread technological change. The materials cover issues of growing importance to industry and the Australian economy more broadly, such as sustainability, ethics, traceability, blockchain and digital supply chains. These products address many core skills that are common across industries, improving the efficiency of the national training system and supporting individuals to move more easily from one related occupation to another.

In support of building a strong, sustainable Naval Shipbuilding industry, a new Skill Set and Units of Competency were developed to meet the skills requirements of Integrated Logistics Support. They also provide the skills and knowledge requirements for Logistics Support Analysis within defence integrated logistics environments.



## Latest technologies captured

The Maritime IRC is developing new Units of Competency related to emerging job roles and technologies in Autonomous Maritime Systems, Autonomous Underwater Vehicles and Uncrewed Surface Vessels.

In the Rail industry, revisions to incorporate technology changes, including automated vehicles, devices and systems, in relation to Rail Train driving, track protection, rolling stock maintenance, rail yard coordination were included in the Transport and Logistics Training Package (Release 10.0).

In response to advances in aviation technology, including digital literacy, cyber security, data analysis and advanced communications, new specialisation streams in the Certificate IV in Aviation (Aviation Supervision) were developed for Aerodrome, Cabin Crew and Ground Operations supervisors, creating career pathways and workforce mobility.

Skills and knowledge requirements for licensed customs brokers' are being aligned with regulatory requirements, blockchain and data analytics to enhance the resilience of the supply chain.





## Responding to the changing skills needs of industry

The Maritime Industry Reference Committee (IRC) continues to monitor the industry landscape to identify the changing skill needs of its workforce.

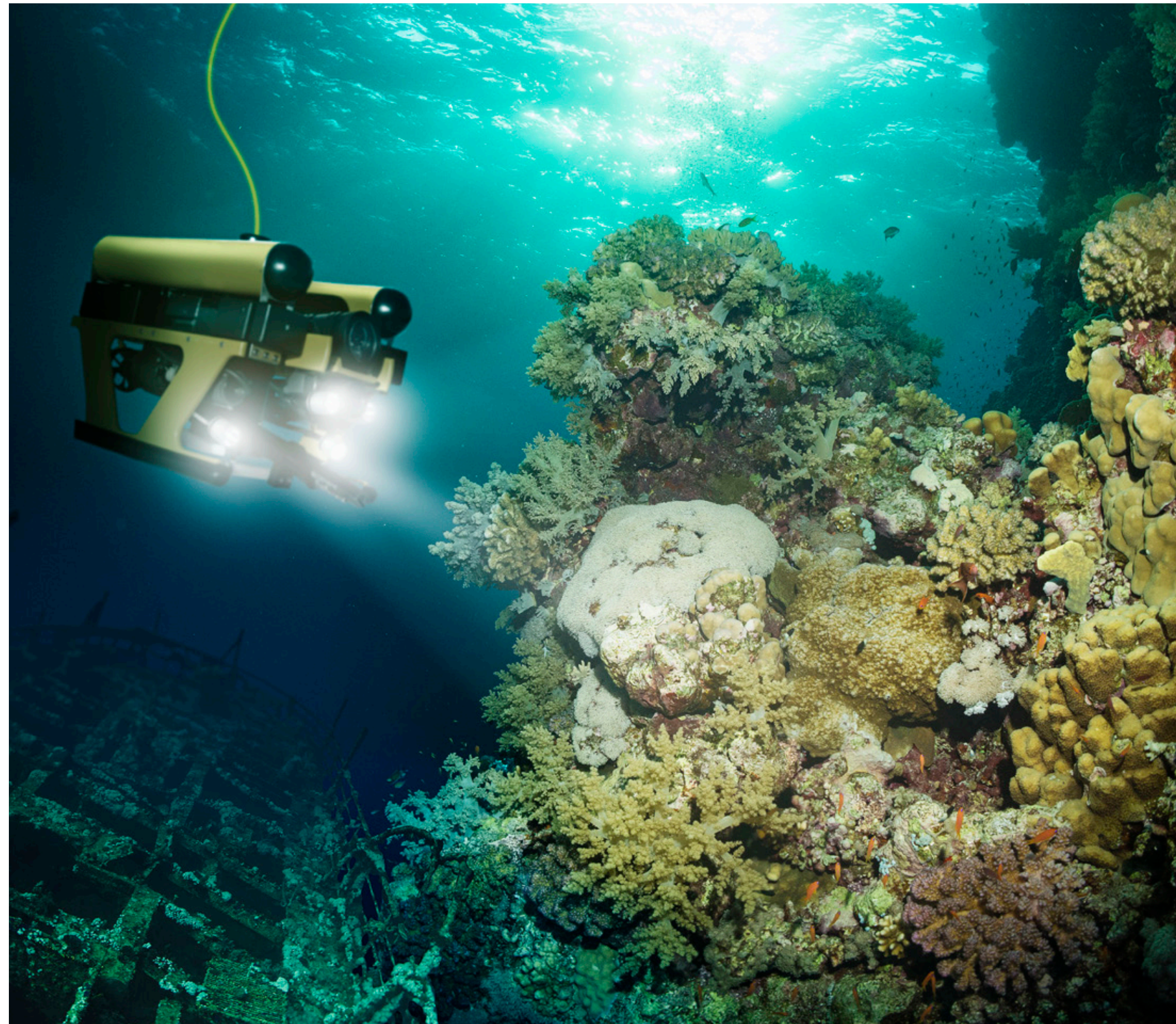
In the foreword to the 2021 Maritime Industry Outlook the Chair of the Maritime IRC, Steve Moon, noted “the implementation of digitalisation and automation are gaining more pace in the industry. Underwater or surface autonomous vessels equipped with a range of data collection technologies are currently in operation. Autonomous technology will reshape the industry’s technology-based operational systems and necessitate new skills and training.”

The Australian Maritime Safety Authority (AMSA) also highlighted the need for a risk-based approach to the regulation of domestic commercial autonomous and uncrewed vessels in Australia under Australia’s maritime regulatory framework.

This initial identification encouraged industry to provide the IRC with a comprehensive analysis of Autonomous Maritime System (AMS), Uncrewed Surface Vessels (USV) and Autonomous Underwater Vehicles (AUV) technologies which validated the growing demand for dedicated training.

Subsequently a project to develop new national skill standards commenced in September 2021 with a focus on the skills required to operate autonomous underwater vessels and uncrewed surface vessels. These skills will be used by operators of these vessels in conducting exploration and research, search and rescue, weather and ocean monitoring, and salvage operations.

A new Certificate III qualification is being developed for USV and AUV, including eight new Units of Competency, as well as three new Skill Sets to enable a national and standardised approach to training for these critical skill needs and emerging job roles in this growing sector.





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# About AIS

**In our role as a Skills Service Organisation, Australian Industry Standards (AIS) provides high-quality research and professional secretariat services to eleven allocated IRCs.**

AIS supports IRCs covering Transport and Logistics, Aviation, Maritime, Rail, Corrections, Gas, Electricity Supply (Generation and Transmission, Distribution and Rail), Electrotechnology, Public Safety (including Police, Fire and Emergency Services, Defence), and Water industries. We support these important industry sectors using our 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 2003.

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.**







AUSTRALIAN  
INDUSTRY  
STANDARDS

# Supply Chain

Industry Outlook 2022

