Aerospace Industry Reference Committee

Skills Forecast and Proposed Schedule of Work 2018-2022

MEA Aeroskills Training Package

May 2018

IBSA MANUFACTURING

Administrative Information

Name of Industry Reference Committee (IRC):
Aerospace

Name of Skills Service Organisation (SSO):
Innovation and Business Skills Australia (IBSA Manufacturing)

About the Industry Reference Committee

The **Aerospace Industry Reference Committee** comprises fourteen members and was constituted in August 2017.

The 2018 Industry Skills Forecast and Proposed Schedule of Work was reviewed and approved by the membership below:

Mr Russell Burgess (Chair)	Mr Michael Evans
Mr Ken Cannane	Mr Mike Higgins
Ms Lynda Douglas	Mr Douglas Hendry
Mr Stephen Re	Mr Paul Baxter
Mr Matt Murphy	Mr Mark Fagan
Mr Michael McGill	Mr Warren Bossie
Ms Mary Brown	Mr Steven Wright

Industry Reference Committee Signoff

The 2018 Aerospace IRC Skills Forecast and Proposed Schedule of Work was approved as the result of a properly constituted IRC decision.

IRC Chair: Russell Burgess

Date: May 2018

Contents

Executive Summary

The Industry Reference Committee (IRC) Skills Forecast and Proposed Schedule of Work identifies priorities for training package development work to meet the needs of industry. This document is based on research, analysis and consultations with IRC members and other stakeholders and provides evidence of current and emerging industry skills needs.

What is the Aerospace Industry?

The Australian Aircraft Manufacturing and Repair Services industry provides a critical role in the well-respected Australian aviation industry which manages over 10% of the world's airspace.[1] Services include maintenance and repair of commercial and military aircraft, and manufacture of aircraft and aircraft components.

The aviation maintenance, repair and overhaul (MRO) sector is made up of a mix of original equipment manufacturers (OEMs), independent service providers, and airlines with their internal MRO capabilities. Services offered include line and heavy maintenance, repair, overhaul and modification of complete aircraft, aircraft engines and accessories, airframes and systems, aircraft systems and components, avionics and instruments.

Australia has 34 medium-sized (20-199 employees) companies and six large (>200 employees) companies in aerospace manufacturing.[2] The remainder of the 919 enterprises are largely made up of non-employing businesses. Queensland's share of enterprises is much larger than its share of population, principally a result of strong demand for maintenance and repair services driven by the vastness of the state and its large number of remote workers.

Critical Workforce Challenges and Opportunities

The lack of harmonisation between Australian Vocational Education and Training (VET) arrangements and the International Aviation Safety Assessment (IASA) standards is costing the industry money and limits opportunities. The biggest issue is the current rigidity of the VET system to absorb the Civil Aviation Safety Authority (CASA) and European Aviation Safety Agency (EASA) regulations. Other workforce challenges and opportunities include changing industry conditions and different requirements for regional and commercial airlines, an ageing workforce, new entrants lacking basic skills and depth due to quality of training, the impact of emerging technologies, and the financial pressures associated with high training costs and thin markets.

Forecasting Skills Priorities

The skills priorities have been informed by an industry survey, a survey of defence personnel, ABS data, and further research and consultations with industry stakeholders.

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1   2017, Aviation Education and Training, Australian Trade and Investment Commission.

2   Source: ABS 8165.0 Counts of Australian Businesses by State by Employment Size Ranges, June 2016

The skills outlook for the aerospace industry is not straightforward, as the industry needs to retain skills to enable the provision of MRO services for both ageing aircraft using traditional technologies and for state-of-the-art aircraft using highly sophisticated and constantly evolving technologies.

The maintenance skills reported as having left the industry in recent years include:

- component maintenance, repair, overhaul and testing

- fabric and wood aircraft and component overhaul and repair

- heavy maintenance checks

- in-house repair facilities and workshops to undertake fitting, machining and hose-tube maintenance

- undertaking manual adjustments as required, in lieu of automated systems

- sheet metal skills

- detailed cleaning, surface refinishing, and painting skills

- fault finding and troubleshooting skills

- wiring modification and installation.

Training Package Priorities

In response to current and emerging skills needs, the IRC has prioritised a number of training package priorities.

The Proposed Schedule of Work 2018-19 to 2021-22 was developed by the IRC, with support from IBSA Manufacturing, based on identified industry trends. The Schedule lists the priorities over the next four years, the rationale and proposed timeframes for these activities.

The item identified as critical for inclusion as a priority for the 2018-2019 schedule of work and a Case for Change included as part of this Skills Forecast is:

- Alignment of VET qualification standards to CASA licensing regulations.

Other items identified as proposed for inclusion as a priority for the 2018-2019 Schedule of Work are:

- Skills gaps related to ageing aircraft

- B1.1 Licence Exclusion Skill Sets.

Sector Overview

Industry Snapshot

The Aircraft Manufacturing and Repair Services industry maintains and repairs commercial and military aircraft, as well as manufacturing aircraft and aircraft components. It is a critical part of the well-respected Australian aviation industry which manages over 10% of the world's airspace.[3]

The aviation industry is significant to the Australian economy, contributing in excess of $30 billion per annum (2% of annual GDP) and employing in excess of 250,000 people (directly by airlines, airports and indirectly in the industry value chain).[4] By 2030, some commentators predict Australia's population could increase to 30 million people, (an increase of 6 million) and as a consequence, the size of our major and regional centres will continue to grow.[5] This population growth is predicted to result in increased demand for air travel, particularly within corridor areas between major capital cities. The global industry is also predicting robust long-term demand with a growth rate of nearly 5% per year over 20 years. Fast growth in China's domestic market is predicted to make it the largest domestic market in the world, with traffic within Asia set to see it become the largest travel market.[6] Furthermore, as the population increases and general wealth and accessibility to air travel improves, particularly in China and India, the number of international visits to Australia is expected to rise. While domestic aviation activity has been relatively flat over the last few years, international traffic into the major capital cities of Melbourne, Sydney and Brisbane has been growing at a rate of more than 5% per annum.[7] The aviation industry plays a very important role in tourism globally and in Australia, where tourism is one of the biggest industries.

The aviation MRO sector is made up of a mix of original equipment manufacturers (OEMs), independent MRO service providers, and aircraft operators (airlines) that have grown their internal MRO capabilities into third-party maintenance businesses. These enterprises offer expertise in line and heavy maintenance, repair, overhaul and modification of complete aircraft, aircraft engines and accessories, airframes and systems, aircraft systems and components, avionics and instruments. They provide complete 'nose-to-tail' service backed by reliable non-destructive testing and engineering and technical support through the full product life cycle.[8]

3   2017, Aviation Education and Training, Australian Trade and Investment Commission.

4   2016, The Australian Associations Forum – Aviation Policy 2016.

5   ibid

6   2017 Current Market Outlook, 2017-2036 Boeing.

7   2016, The Australian Associations Forum – Aviation Policy 2016.

8   http://amroba.org.au/businesses

Defence[9]

The Government intends investing approximately 17% of the defence capital expenditure in strike and air combat capabilities to 2025–26.

The 72 fifth-generation F–35A Lightning II Joint Strike Fighters will enter service from 2020 to replace the F/A–18A/B Classic Hornets. The Joint Strike Fighters will use a mix of air–to–air and air–to–surface weapons, operate at extended range, maintaining stealth, providing a true multi–role capability. The Joint Strike Fighter aircraft will complement the 24 F/A–18F Super Hornets in the current fleet.

A further 12 E/A–18G Growler electronic attack aircraft will enter service from 2018. These aircraft will provide a unique capability to disrupt, disable or confuse adversaries' electronic systems such as radars and communications systems. The six in–service E–7A Wedgetail airborne early warning and control aircraft will continue to be upgraded in order to maintain their capability edge to the mid-2030s.

The ADF will be equipped with a potent and technologically advanced air combat and strike capability, building on the current fleet of 24 F/A–18F Super Hornets, 71 F/A–18A/B Classic Hornets, and six E–7A Wedgetail airborne early warning and control aircraft.

Defence is an important user of the MEA Aeroskills Training Package.

Looking at the industry as a whole (including our defence capabilities), Figure 1 illustrates the three key segments of the industry and their associated proportion of revenue for 2016-17.

Figure 1: Aircraft Maintenance Engineering products and services segmentation, 2016-17

- Aircraft and aircraft parts manufacturing — 50.9%
- Commercial aircraft maintenance, repair and overhaul services — 24.5%
- Military aircraft maintenance, repair and overhaul services — 23.2%
- Other products and services — 1.4%
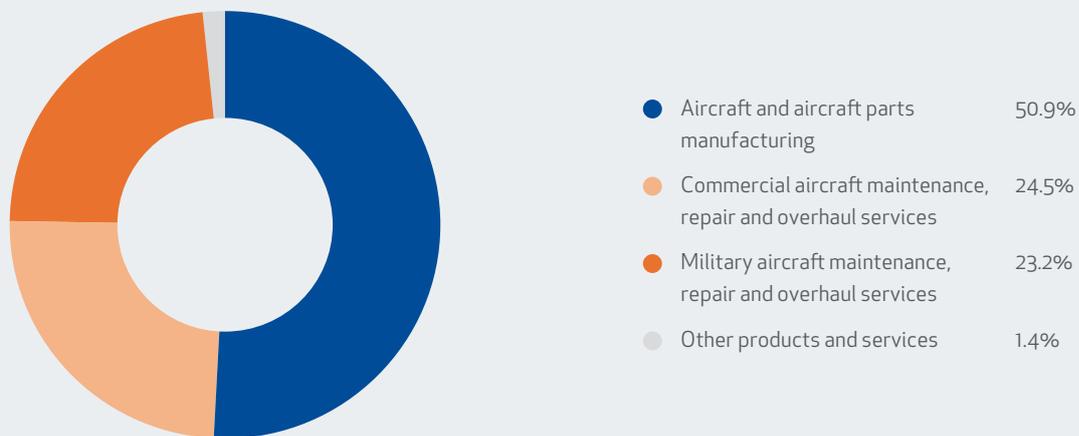
Source: IBISWorld Industry Report C239 Aircraft Manufacturing and Repair Services in Australia January 2017

Manufactured components for light planes, helicopters and gliders are most often exported overseas for assembly, while onshore maintenance, repair and overhaul (MRO) services make up a large proportion of revenue. Defence and commercial airlines have been outsourcing their MRO services for a number of years, with some outsourcing overseas due to lower labour costs.

The proportion of industry revenue has changed over the last five years as follows:

- increased for aircraft and aircraft parts manufacturing, driven by strong order numbers for Boeing's 787 Dreamliner and Airbus's A380 commercial aircrafts, which has led to rising demand for technical components

- decreased for commercial aircraft maintenance, repair and overhaul services despite demand rising

- increased for military aircraft maintenance, repair and overhaul services largely as a result of continued outsourcing by the Australian Defence Force (ADF).[10]

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10   IBISWorld Industry Report C2394 Aircraft Manufacturing and Repair Services in Australia January 2017

The Australian and New Zealand Standard Industrial Classification (ANZSIC) system classifies the aerospace manufacturing industry as follows:

Division C – Manufacturing

- Subdivision 23 Transport Equipment Manufacturing

  - Group 239 Other Transport Equipment Manufacturing

    - Class 2394 Aircraft Manufacturing and Repair Services.

The Australian and New Zealand Standard Classification of Occupations (ANZSCO) classifies the associated occupations as follows:

Unit Group 3231 Aircraft Maintenance Engineers

- Occupations 323111 Aircraft Maintenance Engineers (Avionics)

- Occupations 323112 Aircraft Maintenance Engineers (Mechanical)

- Occupations 323113 Aircraft Maintenance Engineers (Structures).

Business Landscape

Australia has 34 medium-sized (20-199 employees) companies and six large (>200 employees) companies in aerospace manufacturing.[11] This is a small proportion of the 919 enterprises that offered aircraft manufacturer and repair services during 2016-17. In many cases, the remaining enterprises did not have any employees. The number of enterprises has been stable for the last decade with a variance of less than 10% since 2007-08. Aerospace manufacturers dominate the eastern seaboard which accounts for over 80% of the industry enterprises. Queensland's share of enterprises is much larger than its share of the general population, driven by the vastness of the state and its large number of remote workers. New South Wales has Australia's largest commercial airport and hosts several Royal Australian Airforce bases, all requiring aircraft maintenance services.[12]

There are several large enterprises like Airbus Group and Boeing Australia providing maintenance, repair and overhaul services to the major commercial airlines and, in some cases, through life support contracts for the Australian Defence Force (ADF). Around 95% of the enterprises employ less than 20 people and over 50% have no employees.

This sector currently has the opportunity to provide a range of services to the growing aviation market forecast for the Asia Pacific. In addition, greater collaboration between nations is also expected to deliver benefits. An example is Australia's partnership with the United States of America on the Joint Fighter aircraft program.[13]

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11   Source: ABS 8165.0 Counts of Australian Businesses by State by Employment Size Ranges, June 2016

12   IBISWorld Industry Report C2394 Aircraft Manufacturing and Repair Services in Australia January 2017

13   2013, Aerospace Manufacturing Services, Australian Trade Commission

Revenue growth is expected to increase, underpinned by the upgrading of airline fleets and an associated increase in demand for MRO services. Globally, air transport experienced 60% growth over the ten-year period (2005-2015).[14] Air transport growth is highest in expanding regions with a growing middle-class population.[15] The Asia Pacific represents over 40% of the new deliveries of Airbus, the biggest of any region and is expected to lead air traffic by 2036.[16] China is a key market both at a regional and global level and has seen rapid growth in air service and passenger numbers, with predictions the outbound market will double to over 200 million travellers annually by 2020. China is Australia's fastest-growing and highest-spending international visitor market. More than 1 million Chinese tourists visited Australia during 2015-16 (up over 20% from the year before), and they spent almost US$7 billion during their stay.[17]

Key Industry Stakeholders

Boeing Australia is Australia's largest manufacturer of aircraft parts and aircraft servicing with over 25% market share, followed by Airbus Group Australia Pacific Limited with nearly 20% market share and BAE Systems Australia Holdings Limited coming in at third place with nearly 15% of the market share.[18] Raytheon Australia Pty Ltd and Honeywell Holdings Pty Ltd are estimated to each have 3.5 % of the market share, with the former a world leader in the production of guided missiles and the latter providing after-sales support services for aircraft.

Small businesses are commonplace and are most commonly mechanics delivering MRO services on a contract basis and do not employ other workers.[19]

Government and Industry Associations[20]

The aerospace industry is highly regulated nationally and internationally.

Australian Helicopter Industry Association (AHIA) aims to promote the Australian helicopter industry by working with governments, regulatory authorities and the community to ensure it is a safe, efficient and viable industry, readily able to adapt to the continuing needs of its customers through the pursuit of global industry best practice.

Australian Industry and Defence Network (AIDN) is the industry association for small-to-medium enterprises (SMEs) wishing to do business in the defence and security sectors.

Australian Licensed Aircraft Engineers Association (ALAEA) represents the industrial, technical and professional interests of Licensed Aircraft Maintenance Engineers (LAMEs).

Australian Warbirds Association Limited (AWAL) brings together those interested in promoting and preserving Australia's military aviation heritage.

Aviation/Aerospace Australia (A/AA) is the national association representing the aviation and aerospace industries.

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14   Airbus Global Market Forecast 2017-2036 Growing Horizons.

15   Airbus, Global Market Forecast, 2017-2036 Growing Horizons, presentation by John Leahy, COO Customers

16   Airbus Global Market Forecast 2017-2036 Growing Horizons.

17   ibid

18   IBISWorld Industry Report C2394 Aircraft Manufacturing and Repair Services in Australia January 2017

19   IBISWorld Industry Report C2394 Aircraft Manufacturing and Repair Services in Australia January 2017

20   2017, Aviation Education and Training, Australian Trade and Investment Commission.

Aviation Maintenance Repair Overhaul Business Association (AMROBA) is a non-profit organisation dedicated to representing the maintenance, repair and overhaul segment of Australia's aviation industry.

Civil Aviation Safety Authority (CASA) is responsible for regulating the aviation industry and maintaining safety standards.

The Department of Infrastructure, Regional Development and Cities is responsible for overseeing the aviation sector in Australia. Through the Department, the Australian Government contributes to the prosperity of the economy and the wellbeing of all Australians by fostering a viable, competitive and safe aviation industry.

European Aviation Safety Agency (EASA) is responsible for the regulatory and certification process among European Union member states.

Regional Aviation Association of Australia (RAAA) supports its members by working with government, the regulatory authority, and the community to promote a safe and viable regional aviation industry for everyone.

Training Snapshot

Learner Training Profile

Enrolments by jurisdiction, as shown in Figure 2, largely parallel the location of businesses which are concentrated in the eastern states, with the exception of 2014 enrolments in Victoria which appear high.[21] Data has also been provided by the Department of Defence, which shows national completions in 2014, 2015 and 2016.

Figure 2: Program enrolments in MEA Aeroskills qualifications by State/Territory of student residence 2014-2016 Total VET Activity and completion by Department of Defence nationally
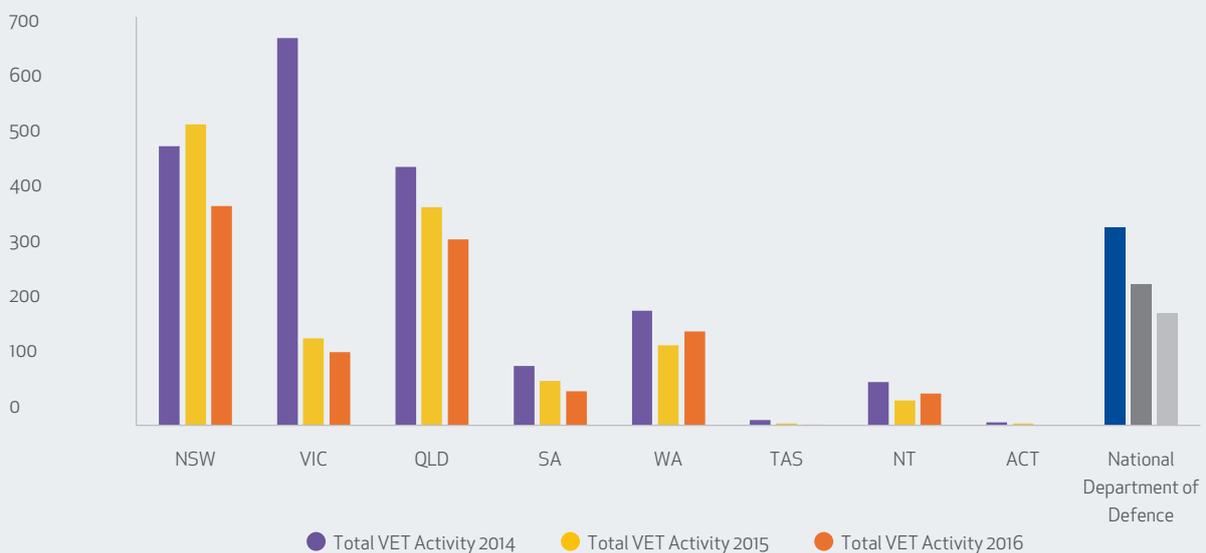
Source: VOCSTATS https://www.ncver.edu.au/data/data/vocstats/vocstats, Government Funded extracted 18/9/2017, Total VET Activity extracted 20/9/2017 and data provided by the Department of Defence.

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21   2014 was the first year of reporting data on Total VET Activity. As a consequence of the exemptions granted to some RTOs during this transition year the data is not strictly comparable to 2015 and 2016 data.

Figure 3 shows declines in government-funded enrolments in all jurisdictions with significant declines in Victoria and New South Wales over the five-year period 2011-16.

Figure 3: Program enrolments in MEA Aeroskills qualifications by State/Territory of student residence 2011-2016 Government-Funded VET Activity.

Source: VOCSTATS https://www.ncver.edu.au/data/data/vocstats/vocstats, Government Funded extracted 18/9/2017, Total VET Activity extracted 20/9/2017

Young people dominate enrolments in Aeroskills qualifications, particularly in the 20-24 age group (see Figure 4). This has been the trend for a number of years, with this group making up almost 55% of all enrolments for the 2011-16 period.

Figure 4: Program enrolments in MEA Aeroskills qualifications by Age Group 2014-2016 Total VET Activity

Source: VOCSTATS https://www.ncver.edu.au/data/data/vocstats/vocstats, Government Funded extracted 18/9/2017, Total VET Activity extracted 20/9/2017

Younger learners also dominate enrolments in VET which are funded by the government – see Figure 5.

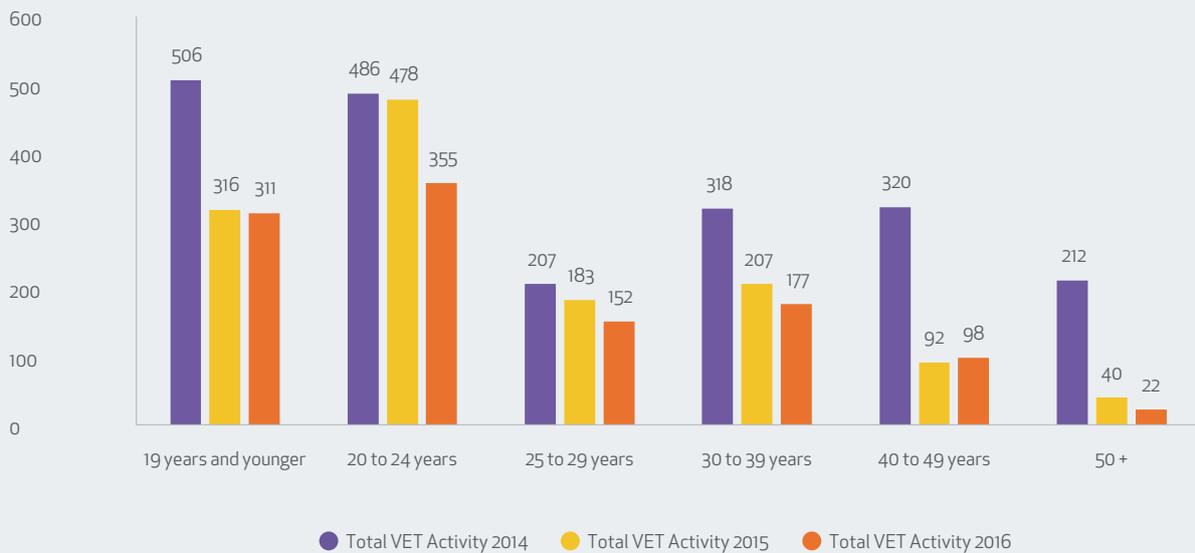## Figure 5: Program enrolments in MEA Aeroskills qualifications by Age Group 2011-2016 Government-funded VET Activity

Source: VOCSTATS https://www.ncver.edu.au/data/data/vocstats/vocstats, Government Funded extracted 18/9/2017, Total VET Activity extracted 20/9/2017

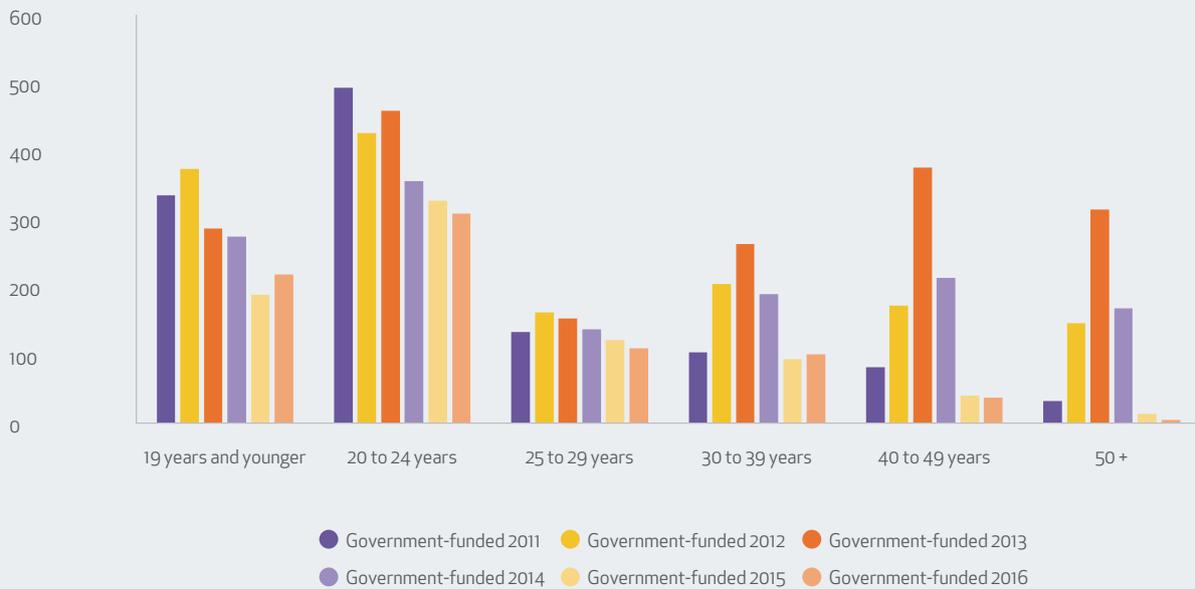Enrolments in Aeroskills qualifications are dominated by males (refer to Figure 6), which is also consistent with the workforce demographics.

Figure 6: Program enrolments in MEA Aeroskills qualifications by Sex 2014-2016 Total VET Activity
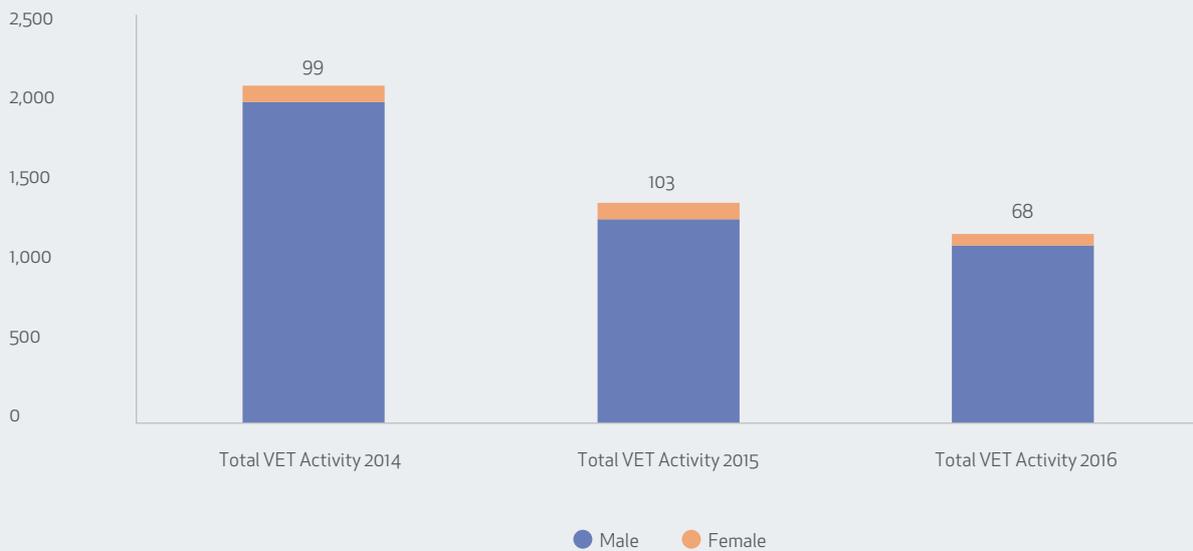
Source: VOCSTATS https://www.ncver.edu.au/data/data/vocstats/vocstats, Government Funded extracted 18/9/2017, Total VET Activity extracted 20/9/2017

Apprenticeships and Traineeships Activity Profile

Although the 2017 VET data is not yet finalised, the declining number of commencements, completions and apprentices and trainees in training is a concern for the industry. This trend is consistent with feedback gained in the 2017 Aerospace Industry Survey Results[22], with a significant decrease reported in the employment of apprentices in New South Wales over the last 10 years.

Figure 7: Apprentice and Trainee Commencements, Completions and In-Training 2013-17
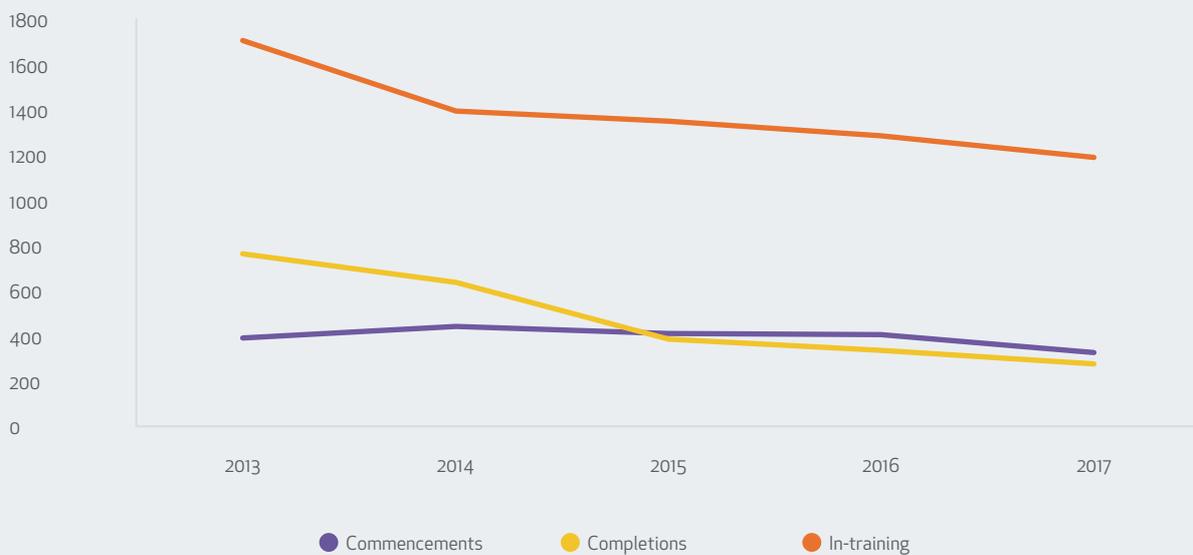
Source: NCVER 2017, Australian vocational education and training statistics: Data slicer: Apprentices and trainees, June 2017, NCVER, Adelaide.

Government-funded enrolments for all categories has continued to decline since 2013, which is a concern to the industry given its ageing workforce, the introduction of new technologies and forecast increases in demand.[23]

In addition to low and declining numbers of apprentices and trainees, the 2017 Aerospace Industry Survey feedback on apprentices indicated 75% of respondents whose organisations currently or previously employed apprentices reported a decline in their apprentices' abilities, and over 85% were not satisfied with the training provided to apprentices for the following reasons:

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22   See Appendix A for more detail.

23   Source: VOCSTATS https://www.ncver.edu.au/data/data/vocstats/vocstats, Government Funded extracted 18/9/2017, Total VET Activity extracted 20/9/2017

- **Training not linked to industry expectations (nearly 55%)** citing:

    - the curriculum being delivered does not align with the skill set required to service the general aviation sector

    - training is complex, disorganised and there is a lack of communication with industry

    - training has been unable to consolidate theory with hands-on practice in a real environment resulting in a lack of basic skills

    - it is not specialised and detailed enough for different aircraft trade streams

    - training appears to be rushed and apprentices pushed through

    - schedule changes by the training organisations severely impact work programming

    - 'qualified' apprentices often need to re-sit licensing exams

    - focus on completing assessment requirements rather than actual practical learning.

- **Industry not meeting training requirements (20%)** with the closure of key maintenance facilities limiting opportunities for apprentices to hone skills and employers not exposing learners to sufficient tasks.

- **Unsuitable students (over 15%)** with a lack of basic skills and knowledge as well as decreased initiative.

Respondents suggested the following areas for improvement in training apprentices:

- more practical skills including basic tools operation and structural repair

- more theoretical knowledge including aircraft systems, inspection techniques and airworthiness requirements

- more soft skills including people management, time management and computer technology.

Training Delivery

There are twenty Registered Training Organisations (RTOs) with the MEA Aeroskills Training Package on scope. The majority of these operate nationally. No training organisation has scope to deliver MEA60415 – Advanced Diploma of Aeronautical Engineering. Only one organisation (a TAFE Institute) has scope to deliver the other two Advanced Diploma qualifications and scope is only registered for Victoria.

TAFE Institutes had the largest number of enrolments of all training provider types for 2015 and 2016, with no enrolments through schools for the Aeroskills Training Package. Total VET activity enrolments decreased for dual sector provider universities by nearly 90% between 2015 and 2016. Enterprise providers experienced an increase in total VET activity enrolments of nearly 30% between 2015 and 2016, while enrolments at private training providers declined by nearly 50%. The increase in enrolments for enterprise-based providers, at a time of overall decline in the numbers in training in the industry, suggests they are stepping in to meet a need for training which public and private providers are not satisfying.

Figure 8: Program enrolments in MEA Aeroskills qualifications by training organisation type 2015-2016 Total VET Activity and Department of Defence[24]
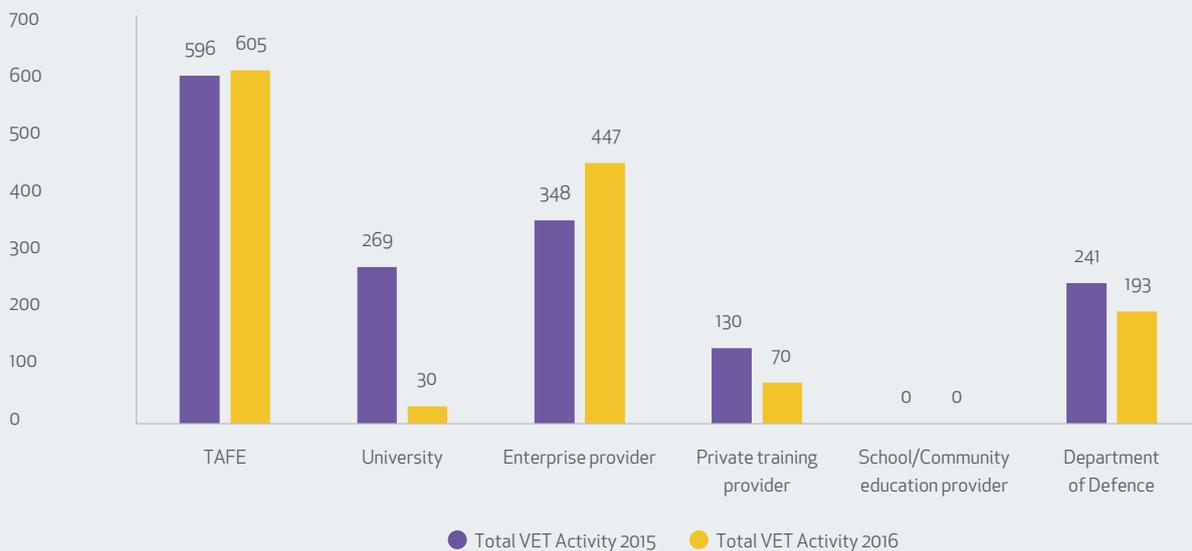
Training in aerospace is considered a thin market; that is, small numbers of potential enrolments across a number of qualifications spread over a wide geographic area, yet it is critical to safety in aviation in Australia. Training organisations issuing nationally accredited qualifications in addition to meeting the standards for RTOs are also required to meet strict domestic and international standards set by CASA. This can be expensive for providers operating in a highly specialised market and may limit access to training by students and employers in some remote and regional locations.

24   Please note Department of Defence data is based on completions 2014-16.

Qualifications Available

Many of the MEA Aeroskills qualifications and skill sets are linked to licensing and subcategories.

- MEA20415 Certificate II in Aeroskills

- MEA20515 Certificate II in Aircraft Line Maintenance

- MEA20615 Certificate II in Aircraft Surface Finishing

- MEA30115 Certificate III in Aircraft Surface Finishing

- MEA30215 Certificate III in Aeroskills (Mechatronics)

- MEA30315 Certificate III in Aircraft Life Support and Furnishing

- MEA40615 Certificate IV in Aeroskills (Avionics)

- MEA40715 Certificate IV in Aeroskills (Mechanical)

- MEA40915 Certificate IV in Aircraft Surface Finishing

- MEA41015 Certificate IV in Aeroskills (Mechatronics)

- MEA41115 Certificate IV in Aircraft Life Support and Furnishing

- MEA41215 Certificate IV in Aeroskills (Armament)

- MEA41315 Certificate IV in Aeroskills (Structures)

- MEA50115 Diploma of Aeroskills (Avionics)

- MEA50215 Diploma of Aeroskills (Mechanical)

- MEA50315 Diploma of Aviation Maintenance Management (Avionics)

- MEA50415 Diploma of Aviation Maintenance Management (Mechanical)

- MEA50515 Diploma of Aeroskills (Non-Destructive Testing)

- MEA50615 Diploma of Aeronautical Engineering

- MEA50715 Diploma of Avionic Engineering

- MEA60115 Advanced Diploma of Aviation Maintenance Management (Avionics)

- MEA60215 Advanced Diploma of Aviation Maintenance Management (Mechanical)

- MEA60315 Advanced Diploma of Aviation Non-Destructive Testing

- MEA60415 Advanced Diploma of Aeronautical Engineering

- MEA60515 Advanced Diploma of Avionic Engineering.

There are 231 current Skill Sets in the MEA Aeroskills Training Package and 262 Units of Competency.

Qualification Uptake

Total VET activity enrolments in MEA Aeroskills qualifications have declined from over 2,000 in 2014 to nearly 1,000 in 2016.[25] Enrolments are concentrated in the Certificate IV and higher qualifications, with a Certificate IV considered entry level for this industry.

The Certificate IV qualifications in the Aeroskills Training Package had the highest number of government-funded enrolments for the period 2014 to 2016. Certificate II qualifications provide a pathway qualification that in some states and territories is offered as a traineeship, and the Certificate II in Aircraft Line Maintenance has been developed for the CASA Category A Licences.

Enrolments in the Certificate IV qualifications declined by over 50% between 2014 and 2016 for both government-funded and total VET activity. The decline in enrolments in Certificate IV qualifications is likely to impact the industry as the ageing workforce retires. Enrolments in Certificate II and higher-level qualifications in 2016 had increased from 2015.

Figure 9: Total program enrolments (Government-funded, Department of Defence[26] and Fee-for-service) by qualification level in MEA Aeroskills qualifications 2014-16
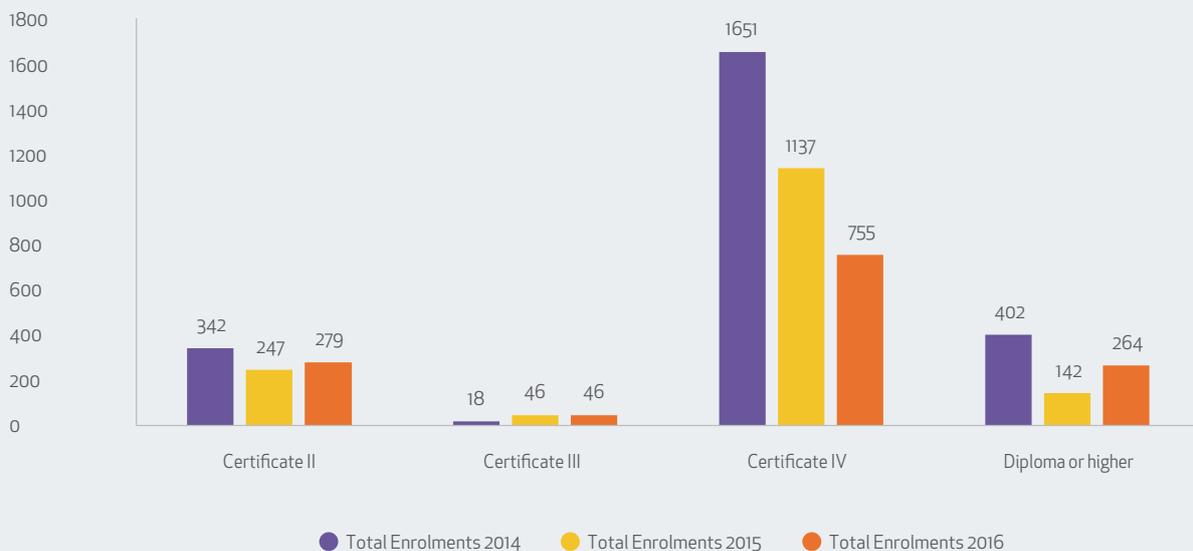
VOCSTATS https://www.ncver.edu.au/data/data/vocstats/vocstats, Government Funded extracted 18/9/2017, Total VET Activity extracted 20/9/2017 and data provided by the Department of Defence.

Figure 10 illustrates the significance of fee-for-service training in this industry, especially at Diploma level. Training in Certificate III and IV qualifications is important to the Department of Defence.

Figure 10: Program enrolments by qualification level in MEA Aeroskills qualifications (Government-funded, Department of Defence[27] and Fee-for-service) by qualification level in MEA Aeroskills qualifications 2014-16.

The qualifications and associated occupational outcomes in the MEA Aeroskills Training Package are of high strategic importance to Australia. They not only keep aircraft operating safely, they provide an opportunity for Australia to offer high-quality training for a skilled maintenance, repair and overhaul workforce to support remote and regional Australia, build on the growing global aviation industry and meet Australia's defence requirements. The downward trend in completions parallels the declining enrolment trend since the peak of 2013.[28] This is creating concerns for the industry both in terms of meeting local demand and also the potential impact on the forecast growth opportunities for the global industry. Some reasons for this decline are provided in the survey results in **Appendix A** and articulated later in this report.

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27   Please note Department of Defence data is based on completions 2014-16.

28   Note completions are unique occurrences.

Figure 11: Completions in MEA Aeroskills Training Package 2011-16
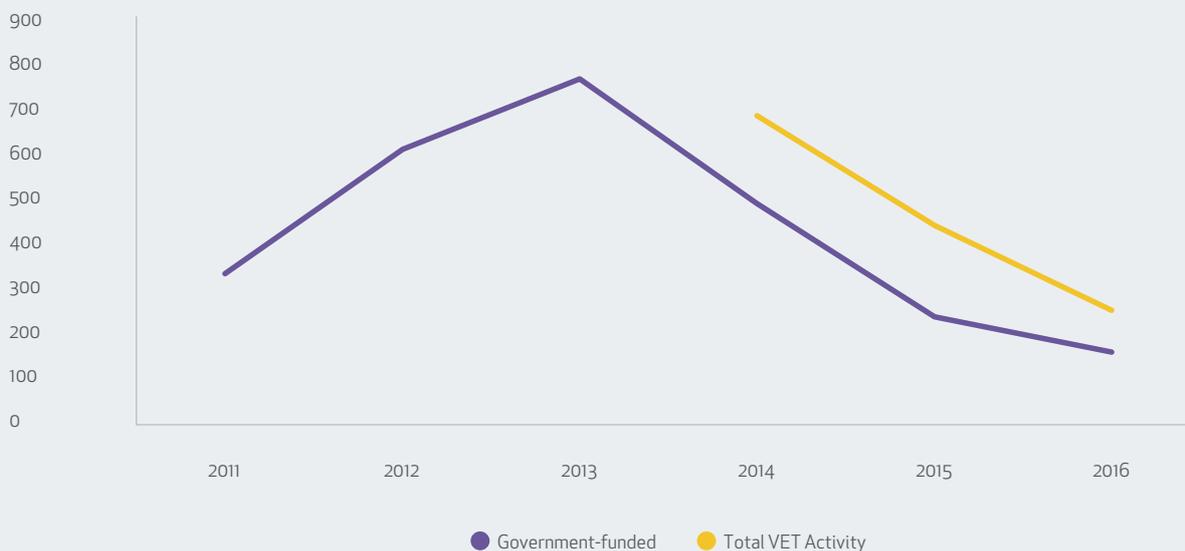
Source: VOCSTATS https://www.ncver.edu.au/data/data/vocstats/vocstats, Government Funded extracted 18/9/2017, Total VET Activity extracted 20/9/2017

The following qualifications and their previously associated linked qualifications were the most popular in 2016.

Table 1: Aeroskills Training Package qualifications with the highest enrolments in 2016.

Qualification Code	Qualification Title	Total VET Activity
MEA40715	Certificate IV in Aeroskills (Mechanical)	465
MEA40615	Certificate IV in Aeroskills (Avionics)	263
MEA20415	Certificate II in Aeroskills	227
MEA50215	Diploma of Aeroskills (Mechanical)	186
MEA50115	Diploma of Aeroskills (Avionics)	65

Source: VOCSTATS https://www.ncver.edu.au/data/data/vocstats/vocstats, Government Funded extracted 18/9/2017, Total VET Activity extracted 20/9/2017

The following qualifications had no enrolments for 2016, with those shown in bold never having had an enrolment.

Table 2: Aeroskills Training Package qualifications with no enrolments in 2016.

Qualification Code	Qualification Title	Qualification Code	Qualification Title
MEA20615	**Certificate II in Aircraft Surface Finishing**	MEA50715	**Diploma of Avionic Engineering**
MEA30215	**Certificate III in Aeroskills (Mechatronics)**	MEA60115	Advanced Diploma of Aviation Maintenance Management (Avionics)
MEA41115	**Certificate IV in Aircraft Life Support and Furnishing**	MEA60215	Advanced Diploma of Aviation Maintenance Management (Mechanical)
MEA50515	**Diploma of Aeroskills (Non-Destructive Testing)**	MEA60315	**Advanced Diploma of Aviation Non-Destructive Testing**
MEA50615	**Diploma of Aeronautical Engineering**	MEA60415	**Advanced Diploma of Aeronautical Engineering**
		MEA60515	**Advanced Diploma of Avionic Engineering**

Source: VOCSTATS https://www.ncver.edu.au/data/data/vocstats/vocstats, Government Funded extracted 18/9/2017, Total VET Activity extracted 20/9/2017

Challenges and Opportunities

For Industry and Employers

The aerospace sector contributes in excess of $30 billion per annum (2% of annual GDP) to the Australian economy and employs in excess of 250,000 people (directly by airlines and airports and indirectly in the industry value chain).[29] With demand for aircraft maintenance service engineers expected to climb to accompany the predicted expansion in air travel, the small and declining numbers of enrolments in nationally accredited qualifications, combined with an ageing workforce, is of great concern to the industry in terms of meeting this predicted demand.

Technological advancements have played an important role in the aerospace industry and continue to drive changes in manufacturing, operations, maintenance and markets.

Table 3: Recent aerospace technology advancements and applications

Technological advancement	Applications
Additive manufacturing	• Prototyping • Manufacturing products with lower weight and improved fuel efficiency such as carbon fibre • Reduce warehouse management and stock obsolescence
Machine learning and advanced analytics	• Analytics solutions based on sensor collected information • Predictive modelling to optimise operations
Smart automation and block chains	• Using scanners to inform robots

Source: 2017 Global aerospace and Defense sector outlook, Deloittes UK

New technologies are expected to lead to new opportunities, including:

- Remotely Piloted Aircraft (RPA) applications to precision agriculture, biosecurity and environmental monitoring projects, infrastructure monitoring, post-disaster surveys, search and rescue, and media for entertainment and advertising

- improved aeromedical evacuation systems interchangeable with local and global standards

- manufacturing opportunities associated with the new Joint Strike Fighter (JSF) global fleet supply

- expansion of the supply chain for the JSF F-135 engine

- large-scale super alloy casting for jet engine casings

- brazing and heat treatment for avionics and components

- advance hypersonic systems

- nanotechnology applications to new materials

- future production of environmentally friendly, fuel-efficient, quiet aircraft drives structures, on-board systems, engines and materials generally

- leverage aerospace precision manufacture into defence maritime and land applications.[30]

The Aerospace IRC engaged with the Australian Industry and Skills Committee-commissioned Future Skills and Training Resource, to identify a number of key trends and considerations for training which are provided in **Appendix B**. The Aerospace IRC ranked the following five key change areas and trends as impacting on the MRO sector. Society and Culture ranked the highest, with global mobility creating growth opportunities for the sector, changing work and career values impacting on the mixed generational workplace in terms of skills and attitudes, and the ageing population and workforce and associated impending retirements leading to a loss of skills and mentors.

Key Change Area	Trend
Society and Culture	• Global Mobility
	• Changing Work and Career Values
	• Ageing Population
Political and Institutional	• Innovation Ahead of Regulation
Technology	• Digitisation
Resources and Environment	• Financial Viability
Business and Economics	

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30   Queensland Aerospace 10 Year Roadmap, Discussions paper, 2016, Department of State Development QLD

Supply-side Challenges and Opportunities

Regional and general aviation communities were, in the past, the 'breeding ground' for the aviation industry, but these areas are now having difficulty in attracting and retaining people to work regionally and remotely and often on ageing fleets. Employers and industry have identified that they need a fresh approach to attract new talent and retain experience in the industry, with training increasingly being viewed as creating value and not simply seen as an incurred expense.

Replacement demand for occupations with a relatively older workforce is high. An example of this is Aircraft Maintenance Engineers (AMEs) where there are training implications with less experienced workers training and supervising apprentices and the training lag time not always factored in to avoid future skills shortages.[31] With increased competition from emerging markets and an ageing workforce, the industry needs to consider how to attract new entrants to the industry.

The aviation industry has well-defined career pathways for pilots but does not offer similar channels for AMEs. The lack of career pathways has seen experienced, trained people start their careers in aviation and move to other industries. More recently there has been a shift of people to the industry as unlicensed Aircraft Maintenance Engineers, from other sectors such as mining. One solution proposed by industry may be for larger airlines (Commercial Aviation) to investigate partnerships with the General Aviation sector to create career pathways for people.

The broad industry trends and changes identified by respondents to the 2017 Aerospace Industry Survey include:

1   The growing **Skills Gap** between experienced Licensed Aircraft Maintenance Engineers (LAMEs) and newly qualified entrants. This gap is further compounded by an ageing workforce and very few new entrants to the industry

2   **Insufficient Training** to apprentices has resulted in a lack of depth in skills and knowledge in the industry

3   **Diminished Quality and Standards** which are influenced by cost reduction business models, a reduction in the amount of preventative maintenance and the continuing devaluation of skills

4   **Rapidly Advancing Technology Changes** have enabled more integrated systems and increased automation of tasks. Other changes include increased use of computer-based fault finding, greater number of unmanned ports aircraft fly to, and increased provision of remote support via digital mediums

5   **Licensing and Regulation** is resulting in higher overheads and increased operational costs. A wide variety of licence requirements for individuals have reduced overall aircraft knowledge. Increased use of drones and the lack of legislation and regulations in relation to unmanned and autonomous aircraft.

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31   Shah, C and Dixon, J 2018, Future job openings for new entrants by industry and occupation, NCVER, Adelaide.

More specifically for Queensland, which is a key location for delivery of MRO services, the main industry challenges appear to be:

- the looming skilled labour shortage of senior technicians and graduate engineers

- the narrow base of SMEs focused on continuous improvement and effectively engaged in aerospace supply chains

- low levels of awareness of emerging trends and technologies and the ability to respond to the trends in a timely fashion

- inadequate access to information, finance and support to develop and grow businesses.[32]

For Learners and Training Package Development

The lack of harmonisation with the International Aviation Safety Assessment (IASA) standards is costing the industry money and limiting opportunities. The biggest issue is the current rigidity of the VET system to absorb the Civil Aviation Safety Authority (CASA) and European Aviation Safety Agency (EASA) regulations. The main difficulty is in trying to match the theoretical regulatory outcomes of CASA and EASA to the competency based model used in VET. Industry is calling for new approaches, such as a 'best practice' skills framework, to be considered.

Consultations undertaken during the preparation of this Skills Forecast suggest the current Training Package has attempted to 'shoehorn' specific and general licences together, but this approach has not been successful. With general licences not being a regulatory requirement, consideration should be given to the development of skill sets or a general qualification to cover the functional role requirements in general aviation and provide entry and exit points that build skill level to a licensed occupation. This could create opportunities for younger generations wanting to develop micro skill sets to build up to a qualification or upskill, as well as meeting the reskilling needs of those transferring from other industries.

Cross-industry Challenges and Opportunities

Funding to upskill the new entrants coming from a mechanical or technical background is limited as they often already possess a trade level qualification. The specificity of the MEA Aeroskills Training Package, where learners need to demonstrate the use of specific tools in an aerospace environment, makes it difficult to encourage new entrants through recognition of common skills. To assist transition to the industry, the training package should be reviewed to ensure there are cross-discipline linkages to other occupations such as the use of standard tools in a maintenance environment.

32   Queensland Aerospace 10 Year Roadmap, Discussions paper, 2016, Department of State Development QLD

Employment and Skills Outlook

Employment Outlook

In the 2016 Census, there were over 12,700 AMEs in Australia. This is a decrease in the overall workforce of 7% from over 13,600 in 2006, but there has been a small increase in the proportion of females employed in 2006 to over 3% in 2016.[33] Employment projections for AMEs predict a 2.7% increase in workers between May 2017 and May 2022.[34]

In the 2016 Census, over 7,800 people were employed in the Aircraft Manufacturing and Repair Services industry. This is a decrease in the industry workforce of nearly 20% from over 9,700 in 2006.[35]

Airbus is predicting 548,000 new technicians will be required globally during the period 2017-36, with nearly 40% of those in the Asia Pacific.[36] This provides Australia with a significant opportunity to train a mobile, skilled workforce to international standards to meet this demand. Airbus also forecasts that a digital transition will cause a re-evaluation of traditional MRO practices as new generation aircraft can communicate in real time through datalink systems up to 400,000 separate parameters, enabling predictive maintenance to begin to play a key role in aircraft operation and support.[37] These changing skill needs may also necessitate further demand for training of existing workers and new entrants.

Workforce Supply Challenges

In preparing for the introduction of new skills, industry respondents identified the following challenges (which may also provide insights into the declining level of completions in Aeroskills qualifications):

Access to Training	respondents reported that training had been diluted, with many employers moving to more cost-effective training models such as online or web-based courses, and there were fewer opportunities to undertake refresher or specialised training due to the cost and/or availability of training.
Cost of Training	is prohibitive.
Management Issuesx	in getting assistance and support from employers.
Time Management	in regard to employers allowing time to undertake the training, some respondents reported needing to take time off work to complete training.
Meeting Licencing and Industry Requirements	was reported as difficult by some respondents which was compounded by regulatory changes. Respondents also noted difficulty in keeping current with industry standards and new regulations.

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33   Source: ABS Census of Population and Housing; 2006, 2011 and 2016 l

34   Department of Jobs and Small Business Labour Market Information Portal (LMIP) Occupation Employment Projections May 2017 – May 2022 ANZSCO

35   ibid

36   Airbus Global Market Forecast 2017-2036 Growing Horizons.

37   ibid

Survey respondents advised that the industry is currently developing skills for new job roles which include:

- Roles related to **licensing and regulation** such as LAMEs, B1 Licence holders, Airworthiness and Safety Inspectors

- **Managerial and leadership** roles including aviation, people and project management as well as supervisory roles

- Roles related to **new technologies** such as avionics, digital systems integration, new aircraft types and composite structures

- **Engineering** roles covering cross-trade mechanical skills, fibre optics and technical research.

Respondents went on to identify the following key changes likely to impact their workforce over the next 3-5 years.

- **Changes in Industry Conditions** including work practices and contracts.

- **Ageing Workforce** with most skilled LAMEs 50 years or older, the industry needs to consider the physical requirements of the roles and how to replace the skills and experience about to leave the industry.

- **Quality of Training** which has resulted in new entrants to the industry having a lack of basic skills depth and knowledge. There has also been a shift to training apprentices to higher technology areas which creates a skills deficit in the general aviation sector. The industry is also inadequately prepared to train workers in regard to changes in technology.

- **Emerging Technologies** with increased reliance on technologies to assist in fault identification, integrated avionic and mechanical systems, increased use of software-based systems, and new aircraft types and structures. A key challenge will be to change the perception that these new technologies will require less maintenance.

- **Financial Pressures** in regard to high operational and training costs as well as the impact of economic uncertainty.

Skills Outlook

The skills outlook for the aerospace industry is challenging, as there is a need to retain skills to provide MRO services to both ageing aircraft using traditional technologies and to state-of-the-art aircraft using highly sophisticated and constantly evolving technologies. There is also a need to ensure that training pathways exist for associated licensed occupations such as AMEs.

The **maintenance skills** reported as having left the industry include:

- engineering skills and knowledge that provide a general and deep understanding of component maintenance, repair, overhaul and testing

- fabric and wood aircraft and component overhaul and repair

- heavy maintenance checks (closure of key facility in 2012)

- in house repair facilities or workshops to undertake fitting-machining and hose-tube maintenance

- underpinning hand skills and mechanical aptitude to undertake manual adjustments as required, too reliant on automated systems

- sheet metal skills

- instrument, electrical and systems knowledge

- detailed cleaning, surface refinishing, and painting skills

- fault finding and troubleshooting skills, and

- wiring modification and installation.

Key Generic Workforce Skills

The key generic workforce skills for the aerospace industry clearly show the strong technical base of the work required. Skills in 'Design mindset/Thinking critically/Systems thinking/Solving problems' ranked number one for the aerospace industry and the aggregated manufacturing industry, indicating the importance of these more complex skills in the future.

Combined Manufacturing IRCs

1	Design mindset/Thinking critically/Systems thinking/Solving problems skills
2	Technology use and application skills
3	Learning agility/Information literacy/Intellectual autonomy and self-management skills
4	Communication/Collaboration including virtual collaboration/Social intelligence skills
5	Science, Technology, Engineering and Mathematics (STEM) skills
6	Language, Literacy and Numeracy (LLN) skills
7	Data analysis skills
8	Managerial/Leadership skills
9	Customer service/Marketing skills
10	Environmental and Sustainability skills
11	Entrepreneurial skills
12	Financial skills

Aerospace IRC from industry survey

1	Design mindset/Thinking critically/Systems thinking/Solving problems skills
2	Learning agility/Information literacy/Intellectual autonomy and self-management skills
3	Communication/Collaboration including virtual collaboration/Social intelligence skills
4	Science, Technology, Engineering and Mathematics (STEM) skills
5	Technology use and application skills
6	Language, Literacy and Numeracy (LLN) skills
7	Data analysis skills
8	Managerial/Leadership skills
9	Customer service/Marketing skills
10	Environmental and Sustainability skills
11	Financial skills
12	Entrepreneurial skills

Key Drivers for Change and Proposed Responses

A number of drivers impact on the industry, including:

Regulatory Reform

Global aviation regulation is covered by an agreed common approach between countries through the International Civil Aviation Organisation (ICAO) to which Australia is a signatory. Maintenance organisations are approved, licensed and regulated by the Civil Aviation Safety Authority (CASA) which derives its authority from the Civil Aviation Act, Civil Aviation Safety Regulations, Civil Aviation Regulations, and amended frequently, establishing the legal mandate for CASA to promulgate Manual of Standards affecting civil aviation safety and security.[38]

Over time, in some areas Australia has moved away from this common approach to aviation regulation which has resulted in regulatory authorities from comparable nations including New Zealand, the United States, Canada and the European Union not recognising Australian training and maintenance qualifications. This lack of harmonisation of aviation licensing and regulations with overseas jurisdictions jeopardises opportunities in exporting aviation products and parts trade, and limits innovation by Australian entities and the mobility of Australia's aircraft maintenance engineering workforce.

The Australian Associations Forum in 2016 raised concerns about Australia's aviation training potential not being realised due to the complexity of aviation regulations and that Australia's unique licensing requirements are not recognised by potential customers in the Pacific, Asia, Europe or North America.[39]

Without a new approach to align the Aeroskills Training Package to CASA/EASA standards, the current disenfranchisement of the industry can be expected to grow.

Different Needs

General aviation commonly refers to that part of the aviation industry that engages in activity other than scheduled commercial airline activity. This may include charter operators, aeromedical operators, agricultural aviation businesses, aviation-based fire-fighting services, training and aerial work such as aerial photography and surveying. It also includes private, business, recreational and sports aviation activity and supporting businesses such as maintenance providers.

In 2015, general aviation hours flown by VH-registered aircraft decreased by nearly 3% to 1.11 million hours. Aerial work decreased by 3.5% to 440,000 hours, and instructional flying decreased by nearly 6% to 306,000 hours. These decreases were partially offset by increases in sport and pleasure flying (up nearly 1% to 200,000 hours), and own-use business flying (up nearly 15% to 136,000 hours).[40]

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38   http://amroba.org.au/wp-content/uploads/2015/08/BASA.pdf

39   The Australian Associations Forum – Aviation Policy 2016

40   https://bitre.gov.au/statistics/aviation/general_aviation.aspx

Regulator public transport routes to regional Australia have declined over the last twenty-five years. This results in issues of access and equity to communities outside major cities and regional centres and potentially impacts the opportunity for regional Australia to tap into the burgeoning Australian tourism market and targets. This has led to a decline in the number of MRO enterprises operating across regional Australia.[41]

Feedback gained from industry indicates that the skill needs of general aviation are different, with ageing aircraft and traditional workplaces and cultures embedded in local communities, while commercial aviation is more greatly impacted by new technologies and automation.

Without a new approach to the Aeroskills Training Package, the widely varying needs of the industry will continue to be unmet.

Tourism Demand and Trends

During the past 20 years, international aviation capacity to Australia has grown from 9.3 million inbound seats in 1995 to 24.6 million seats in 2016, representing an average annual growth rate of nearly 5%. Aviation is a strategic priority for Tourism Australia in achieving the industry's Tourism 2020 targets. Australia's international aviation capacity needs to grow by 40-50% to support the Tourism 2020 strategy's goal of growing overnight visitor expenditure to more than AUS$115 billion annually by the end of the decade.[42]

The pivotal role aviation plays in tourism is underpinned by access to resourced maintenance, repair and overhaul services both in major cities and in the regions where eco-tourism is growing in demand. This growth potential will be seriously compromised if the regional industry providers cannot readily access reliable, high-quality training and attract and retain a local workforce.

Technology

In the field of aircraft manufacturing and engineering, Australia is considered a leader in the provision of through-life services, particularly applied to military aircraft. In addition, there are several engineering training areas in which Australia possesses significant, internationally recognised expertise that holds sizeable potential for international growth. These include advanced fibre composites; integrated componentry; advanced avionics diagnostics systems; prefabricated materials and offsite manufacture; steel-framed multistorey buildings; and unmanned aerial systems (UASs).[43]

The need to include and readily update new technologies in the Aeroskills Training Package is of strategic importance to the aerospace industry.

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41   Feedback from Aerospace IRC Meeting 10 November

42   http://www.tourism.australia.com/en/markets-and-research/aviation.html

43   2017, Australian Industry Standards, AviationWorkforceSkillsStudy.pdf.

Priority Skills	Key Driver for Change	Proposed Response
Regulatory/Legislative		
Licensed occupational skills	Harmonising	VET alignment with CASA standards
Other legislation	Alignment with other regulations	Addition of ozone units
Licence exclusions	Aligning packaging rules	Review of the LME001 and LME019 skill sets
Industry Specific		
Ageing aircraft	Continued regional and local air services and to support tourism demand	New unit
Aircraft surface finishing	New materials and technology	Review of the qualifications
Joint strike fighter	Defence requirements	Seek advice from defence

Training Product Review – Current Activities

2016-17 Activities

In February 2017, IBSA Manufacturing was commissioned to undertake training package development work on behalf on the Aerospace IRC on the MEA Aeroskills Training Package.

The work focused on redeveloping components of the MEA Aeroskills Training Package, including:

- updating MEA41115 Certificate IV in Aircraft Life Support and Furnishing to align with Australian Defence Force (ADF) requirements to become a new qualification – Certificate IV in Aeronautical Life Support Equipment

- developing one new unit of competency to meet licensing requirements (MEA731 Perform aircraft weight control activities) and reviewing four qualifications to include this new unit

- reviewing five units of competency to ensure compliance with updated regulatory standards

- reviewing MTA001 Aircraft Egress System Maintenance Skill Set so that it continues to meet the regulatory requirements of the Australian Defence Force

The Aerospace IRC and IBSA Manufacturing considered industry feedback and finalised the training components, submitting a Case for Endorsement to the Department of Education and Training that was approved by the AISC in February 2018.

2017-18 Activities

In its 2017 Proposed Schedule of Work, the Aerospace IRC recommended urgent training package development work to align MEA50215 Diploma of Aeroskills (Mechanical) to Civil Aviation Safety Authority (CASA) licence subcategories B1.2 and B1.4.

This qualification does not currently provide pathway opportunities towards CASA licence subcategories; nor does it align with ICAO standards.

A subcommittee was established to facilitate work on the Case for Change, which recommended a full review of the qualification and the reinstatement of specific units of competency to facilitate much-needed licence sub-category pathways. The Case for Change was approved by the AISC in February 2018.

Training Package development work is expected to commence in April 2018 and be completed in early 2019.

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AISC Cross-Sector Projects

The AISC identified a number of emerging cross-sectoral themes in previous IRC Skills Forecasts. The AISC sought to strategically address these common skills issues and commissioned nine cross-sector projects. The aim of the projects is to address changing skills needs across industries in a coordinated and efficient way and, where opportunities exist, to create flexible and transferable training package components that will benefit industry, learners and the broader VET sector.

There are two cross-sector projects that will potentially directly impact upon the MEA Aeroskills Training Package.

The **Digital Skills** Cross-Sector Project, which initially focused on the need for coding skills in manufacturing and related training packages, was subsequently expanded to focus on a broader set of skills related to coding and programming, CAD/CAM/CAE, and additive manufacturing/3D printing, as well as the digital analytical/diagnostic skills needed to analyse and respond to data provided by machines in the workplace. Outcomes of the project may result in recommendations for updated content in up to thirty-nine units of competency in the MEA Aeroskills Training Package.

The **Automation Skills** Cross-Sector Project focused on current and emerging developments in automated processes to determine the cross-sector skills which are required to use robotics, drones and remote operation systems. Outcomes of the project may result in recommendations for updated content for at least three units of competency in the MEA Aeroskills Training Package.

Training Product Review – Priorities 2018-2022

Following consideration and analysis of the industry challenges and opportunities, current and emerging skills needs and the key drivers for change, the Aerospace IRC have identified a number of areas for training product development. These training priorities are outlined in the IRC Skills Forecast and Proposed Schedule of Work 2018-19 to 2021-2022 table, which lists the priorities for the next four years. This table also provides a rationale for the priorities, proposed scope and timeframes for these activities.

Items Identified as Time Critical and to be Considered by the AISC as Part of the 2018 Industry Skills Forecast and Proposed Schedule of Work

The IRC identified the following training priority as critical and a priority for the 2017-2018 schedule of work:

- Alignment of VET qualification standards to CASA licensing regulations.

A Case for Change has been prepared and included as part of this document. The Case for Change provides further information on the industry imperatives, consultation plan and proposed scope of the project.

Items Identified as Important and to be Included in the Priorities for 2018-19

The items identified as important and proposed for inclusion as a priority for the 2018-2019 schedule of work are:

- B1.1 Licence exclusion removal skill sets

- Ageing aircraft fundamentals

A separate Case for Change will be prepared and submitted to the AISC for consideration.

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Items Identified as Priorities Over the Next Three Years

The IRC identified the following training priorities to be considered over the next three years:

- Inclusion of ozone unit to LAME licence qualifications

- Review overlap between Advanced Diploma of Maintenance (Mechanical) and Diploma of Maintenance (Mechanical) and Advanced Diploma of Maintenance (Avionics) and Diploma of Maintenance (Avionics)

- Aircraft surfacing finishing qualifications

- Articulation of Aeroskills diplomas to higher education qualifications

- Joint strike fighter

- Review of non-CASA-impacted qualifications.

Future Priorities 2023 Onwards

In their analysis of the industry challenges and opportunities, current and emerging skills needs and the key drivers for change, the Aerospace IRC identified the following areas for future training product development:

- New technologies.

Proposed Schedule of Work 2018-19 to 2021-22

Aerospace Industry Reference Committee (IRC)

MEA Aeroskills Training Package

Contact details: Russell Burgess, IRC Chair

Date submitted to Department of Education and Training: May 2018

Year	Items to be included in National Schedule of work

2018-19 **Alignment of VET qualification standards to CASA licensing regulations**

This project will research and develop a framework and transition qualifications for Licensed Aircraft Maintenance Engineers (LAMEs) that accommodates the Civil Aviation Safety Authority (CASA)/ European Aviation Safety Agency (EASA) regulations and VET standards.

Rationale

Aircraft maintenance licensing training is regulated by CASA (under CASR Part 147) as well as by ASQA (the Australian Skills Quality Authority) which operate under different frameworks.

The lack of harmonisation with the International Aviation Safety Assessment (IASA) standards is costing the industry money and limits opportunities. The biggest issue is the current rigidity of the VET system to absorb the Civil Aviation Safety Authority (CASA) and European Aviation Safety Agency (EASA) regulations. The main difficulty is in trying to match the theoretical regulatory outcomes of CASA and EASA to the current vocational education competency-based model.

Attempts have been made to accommodate these two different frameworks into the current licence qualifications, adding much complexity, confusion, inconsistency and potential for interpretation while lacking the rigour required to provide assurance to the industry that licence holders will have the necessary skills and knowledge to undertake the work required.

Industry feedback indicates that qualifications are needed to cover a range of specialist job roles in the sector such as rotary wing, fixed wing and turbine, which are currently not evident in the packaging rules of the Training Package. Core units need to be expanded and each specialist group needs to align to a qualification descriptor. This work will be included in this project.

See Key Drivers for Change and Proposed Responses ; Training Snapshot; Workforce Supply Challenges and Regulatory reform.

This project was identified as time-critical and that training package development work needed to be approved as part of this submission.

Training products impacted:

MEA Aeroskills Training Package

Further information on the industry imperatives, consultation plan and proposed scope of the project is provided in the Case for Change following the proposed schedule of work.

Year	Items to be included in National Schedule of work

2018-19 | ## B1.1 Licence exclusion removal skill sets

Change to the B1.1 licenses:

- LME001 (MEASS00271) Electrical – B1.1 Licence Exclusions E1 and E4 Removal

- LME019 (MEASS00289) Instrument – B1.1 Licence Exclusions E5 and E7 Removal

Rationale

Investigate whether MEA223 and MEA227 could replace MEA211 to address the issue where skill sets are undertaken together (which would be the most common scenario). This may result in the removal of MEA211 in skill set LME019 and replacement with MEA223 and MEA227.

See Qualifications Available and Regulatory reform.

Training products impacted:

- Skill Set LME001 Electrical – B1.1 Licence Exclusions E1 and E4 Removal (Release 1)

- Skill Set LME019 Instrument – B1 Licence Exclusions E5 and E7 Removal (Release 1)

2018-19 | ## Ageing Aircraft Fundamentals

Development of a new unit on ageing aircraft fundamentals.

Rationale

Maintenance on ageing aircraft differs to the skills needed on newer, modern aircraft. With airline fleets in Australia ageing rapidly, the workforce requires skills in understanding how to maintain this fleet which services a vast majority of the population, particularly regional areas.

See Learner Training Profile and Challenges and Opportunities.

Training products impacted:

- MEA30115 - Certificate III in Aircraft Surface Finishing

- MEA40915 - Certificate IV in Aircraft Surface Finishing

2019-20 | ## Addition of ozone unit to LAME licence qualifications packaging rules

The addition of a unit CPPFES2043A – Prevent ozone depleting substance and synthetic greenhouse gas emissions as an elective unit for Aeroskills qualifications for LAMEs and AMEs. Regulatory requirements call for all LAMEs to have competency in this unit.

Rationale

The Fire Protection Industry (ODS and SGG) Board have recommended that LAMEs and Aircraft Maintenance Engineers (AMEs) handling scheduled extinguishing agents complete the unit CPPFES2043A – Prevent ozone depleting substance and synthetic greenhouse gas emissions or an equivalent assessment to achieve competency. The packing rules need to be reviewed to ensure civilian LAMEs and AMEs are able undertake the unit while defence personnel can choose not to undertake the unit.

See Regulatory reform.

Training products impacted:

- MEA50415 Diploma of Aviation Maintenance Management (Mechanical)

Year	Items to be included in National Schedule of work

2020-21   ### Advanced Diplomas of Maintenance overlapping with the Diplomas of Maintenance

Review the following qualifications to ensure they deliver the skills and knowledge required for the identified occupational outcomes.

Rationale

Significant overlap in these qualifications exists which has resulted in low enrolments in the Advanced Diplomas. Review of these qualifications may result in removal of one or more qualifications if there is duplication.

See Qualification Uptake.

Training products impacted:

- MEA50415 Diploma of Aviation Maintenance (Mechanical)
- MEA60215 Advanced Diploma of Aviation Maintenance Management (Mechanical)
- MEA50315 Diploma of Aviation Maintenance (Avionics)
- MEA60115 Advanced Diploma of Aviation Maintenance Management (Avionics)

2021-22   ### Aircraft Surface Finishing

Review of the aircraft surface finishing qualifications to ensure they meet industry need.

Rationale

The Aircraft Surface Finishing qualifications have been identified as low enrolment qualifications which may be due to them not currently meeting industry needs despite being critical to the industry.

Given technological advancements, the qualifications also need to consider use of new materials and work practices to meet standards.

See Qualification Uptake.

Training products impacted:

- MEA20615 Certificate II in Aircraft Surface Finishing
- MEA30115 Certificate III in Aircraft Surface Finishing
- MEA40915 Certificate IV in Aircraft Surface Finishing

2021-22   ### Articulation of Aeroskills Advanced Diplomas to higher education qualifications

Investigate the feasibility of establishing articulation pathways for MEA Aeroskills Advanced Diplomas.

Rationale

Evidence shows that the qualifications required by industry in the future trend toward higher education qualifications. An articulation pathway to higher education providers provides the industry and workforce with structured career pathways.

Training products impacted:

- MEA60415 Advanced Diploma of Aeronautical Engineering
- MEA60115 Advanced Diploma of Aviation Maintenance Management (Avionics)
- MEA60215 Advanced Diploma of Aviation Maintenance Management (Mechanical)

Year	Items to be included in National Schedule of work

2021-22   ## Defence priorities including Joint Strike Fighter

Investigate Department of Defence priorities and the impact on the MEA Aeroskills Training Package.

Rationale

Training is a high priority for the Department of Defence in Australia. Alignment of the training to nationally endorsed and accredited Aeroskills qualifications supports the defence force and provides increased mobility of the workforce.

Training products impacted:

Training products impacted to be confirmed once known.

2021-22   ## Review of the remaining MEA Aeroskills Training Package not impacted by the CASA review

Review of the remaining MEA Aeroskills qualifications not impacted by the proposed VET standards and CASA alignment.

Rationale

Any qualifications not reviewed as part of the VET standards and CASA alignment previously will be over four years old and require reviewing to ensure they meet industry requirements.

Training products impacted:

Training products impacted to be confirmed once known.

2018-19 Case for Change

Aerospace Industry Reference Committee (IRC)

MEA Aeroskills Training Package

Contact details: Russell Burgess, IRC Chair

Date submitted to Department of Education and Training: May 2018

Alignment of VET qualification standards to CASA licensing regulations

Description:	Aircraft maintenance licensing training is regulated by the Civil Aviation Safety Authority (CASA), under Civil Aviation Safety Regulations (CASR) Part 147, as well as by ASQA (the Australian Skills Quality Authority) which operate under different frameworks.
	The lack of harmonisation with the International Aviation Safety Assessment (IASA) standards is costing the industry money and limits opportunities. The biggest issue is the current rigidity of the VET system to absorb the Civil Aviation Safety Authority (CASA)/European Aviation Safety Agency (EASA) regulations. The main difficulty is in trying to match the theoretical regulatory outcomes of CASA/EASA to the current vocational education competency-based model.
	This project will investigate and develop a framework for qualifications for LAMEs that accommodates the CASA/EASA regulations and VET standards.

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Alignment of VET qualification standards to CASA licensing regulations

Rationale:

Australian Government policy requires that licensing requirements be included in Australian Qualifications Framework (AQF) Training Packages. Accordingly, CASA licensing requirements are met through the MEA Aeroskills Training Package. To achieve this, for the A Licence (A1, A2, A3 and A4), the Certificate II in Aircraft Line Maintenance has been developed and for B1 and B2 Licences two Diploma qualifications have been developed and all are included in the MEA Aeroskills Training Package, as follows:

- MEA 20515 Certificate II in Aircraft Line Maintenance

- MEA50115 Diploma of Aeroskills (Avionics) for the grant of a B2 Licence

- MEA50215 Diploma of Aeroskills (Mechanical) for the grant of a B1 Licence in sub-categories B1.1, B1.2, 1.3 and B1.4[44]

- a range of elective units is also provided to meet the requirements of additional ratings related to small aircraft maintenance with units required for each additional rating listed in Skill Sets.

In addition to the application of AQF procedures associated with these qualifications, CASA has additional requirements that have to be met in order for them to maintain alignment with the EASA for other than small aircraft licensing, and to meet international obligations specified by the International Civil Aviation Organisation (ICAO).

Attempts have been made to accommodate these two different frameworks into the current licence qualifications, adding much complexity, inconsistency with current VET standards and potential for interpretation while at the same time lacking the rigour required to provide assurance to the aviation industry that licence holders will have the necessary skills and knowledge to undertake the work required to ensure safety.

The MEA Aeroskills Training Package Companion Volume provides an interface between the AQF qualifications and the additional CASA requirements that have to be met before a licence can be granted by:

- referencing the CASA requirements in addition to the AQF for RTOs to be able to deliver training leading to the grant of a licence

- providing an alignment between the CASA licensing syllabus and the MEA Aeroskills Training Package units of competency

- providing additional explanation of knowledge requirements for units of competency that are aligned with the CASA licensing requirements

- highlighting the more rigorous theory examination pass mark requirements specified by CASA for theory examinations for units leading to the grant of a licence.

Training leading to Aeroskills qualifications can be delivered by any RTO that has the Aeroskills Training Package on its Certificate of Registration. However, if the training is to lead to a licensing outcome, the RTO delivering the training must also be a CASR Part 147 Maintenance Training Organisation (MTO). The requirements that must be met to become a MTO can be found in CASR Part 147 Maintenance Training Organisations and the following associated publications:

- CASR Part 147 Manual of Standards (MOS)

- Acceptable Means of Compliance (AMC) and Guidance Material (GM) for CASR Part 147 Maintenance Training Organisations.

Aircraft maintenance licensing training is regulated by CASA (under CASR Part 147) as well as by ASQA (the Australian Skills Quality Authority) which operate under different frameworks. CASA operates under a knowledge and experience framework and ASQA operates under a competency framework.

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44   Note the Diploma of Aeroskills (Mechanical) is the subject of a current activity order to reinstate units of competency leading to B1.2 and B1.4 licences.

Alignment of VET qualification standards to CASA licensing regulations

Rationale: The CASA Basic examination sets out 17 knowledge modules detailed in a knowledge syllabus and three levels of knowledge linked to different licence categories. Training package standards do not specify syllabus or assessment standards but rather knowledge and performance evidence.

Attempts have been made to accommodate these different frameworks into the current licence qualifications and linked qualifications resulting in the following:

- the packaging rules are rigid (make little use of importing units from other packages) and highly complex to accommodate licensing and different ratings

- lower level qualifications are nested in higher level qualifications so that not only do the licensed qualifications need to be reviewed but also all nested qualifications such as the MEA40615 Certificate IV in Aeroskills (Avionics) and MEA40715 Certificate IV in Aeroskills (Mechanical)

- extensive use of pre-requisites which link lower-level qualifications to higher-level qualifications

- a lack of alignment with the Australian Qualification Framework

- extensive referencing to CASA requirements

- mutual recognition means the recognition and acceptance by an RTO of Australian Qualifications Framework (AQF) qualifications and Statements of Attainment issued by other RTOs enabling individuals to receive national recognition of their achievements which is not consistent with CASA's requirement that only Part 147 organisations (MTOs) deliver competencies for licensing purposes

- CASA Part 66 Manual of Standards (MOS) standardises examinations and sets the pass mark for category modules at 75%, yet 'mutual recognition' requires that RTOs/MTOs recognise Certificates of Attainment from non-Part 147 organisations (which can have a pass mark of 50%)

- the Standards for Training Packages detail the Assessment Requirements for evidence and required conditions of assessment to include the performance evidence, the knowledge evidence and the assessment conditions for each unit of competency; it does not detail curriculum which is required by CASA.

From July 2020, CASA will no longer administer the licence examinations or set a central bank of questions, which will potentially set the scene for RTOs to set and use a wide variation in examinations and interpretation of assessment. CASA will issue the licence on the recommendation of an approved Part 147 organisation, rather than play a role in the assessment of competence, theoretical knowledge, or experience. Additionally, CASA will no longer use the Schedule of Experience to scrutinise a prospective licensee's records of their experience; this will fall to the RTO/MTO that may interpret competence for experience.

This project will investigate vocational education frameworks used by other licence occupations and consult widely with key stakeholder groups to develop a framework that accommodates the CASA requirements, the AQF and the Training Package standards. Once the framework is approved, the licence qualifications will be developed using this new framework.

Current industry feedback indicates that qualifications are needed to cover a range of specialist job roles in the sector such as rotary wing, fixed wing and turbine, which are currently not evident in the packaging rules of the Training Package. Core units need to be expanded and each specialist group needs to align to a qualification descriptor. This work aims to strengthen the vocational outcomes for each qualification and enhance portability.

Currently the CASA Basic Examinations (CASA Basics) and completion of the Schedule of Experience (SOE) provide an alternate means of securing licences but this pathway will only be available until 3 July 2020. Following this date, the MEA Aeroskills Training Package qualifications will provide the only means in Australia to gain a licence to maintain aircraft.

IBSA MANUFACTURING

Alignment of VET qualification standards to CASA licensing regulations

Rationale: The licensed qualifications are:

MEA20515 Certificate II in Aircraft Line Maintenance

MEA50215 Diploma of Aeroskills (Mechanical) (Release 2) B1 Licence in sub-categories B1.1 and B1.3

MEA50115 Diploma of Aeroskills (Avionics) (Release 1) B2 Licence

A total MEA Aeroskills Training Package review is necessary to identify clear vocational licensed and unlicensed outcomes that are aligned with the skill requirements of the AQF levels by addressing the following issues:

- these licensed qualifications include core units that are utilised as core units across all the other MEA Aeroskills qualifications

- these two Diplomas included nested Certificate IVs and are nested in the Advanced Diplomas.

Without a new and radical approach to the entire Aeroskills Training Package to ensure alignment with the CASA/EASA standards and clear vocational outcomes:

- the current disenfranchisement of the industry will grow as it meets its needs using alternative approaches, including sourcing workers from overseas

- student enrolments and completions will decline

- Australian industry will not be well positioned to capitalise on global growth forecasts

- Australia risks no longer being well regarded globally in the provision of aircraft maintenance engineering services.

Without this review, the current industry expects that the inadequate and complex training standards will increasingly impact on the Australian aviation industry.

Alignment of VET qualification standards to CASA licensing regulations

Ministers' Priorities Addressed:	This case for change addresses the following Ministers' Priorities:

Obsolete qualifications removed from the system

This proposed work will provide a complete review of all MEA Aeroskills qualifications, skills sets and units of competency which will result in alignment with vocational outcomes, streamlining and rationalising of some training package products. Qualifications with low enrolments will be reviewed for options to remove, merge or strengthen packaging.

More information about industry's expectations of training delivery is available to training providers to improve their delivery and to consumers to enable more informed choices

The MEA Aeroskills qualifications include variations in the number of units required depending upon the stream being chosen and are often restrictive and complex. This approach will be reviewed to simplify the packaging rules and ensure they are consistent with the intention of the standards to specify unambiguously the total number of units of competency required to achieve the qualification.

The Companion Volume will be updated to ensure that RTOs can better navigate the package and promote career pathways by engaging all sectors including regionally based businesses.

The training system better supports individuals to move more easily between related occupations

CASA licensing requirements, while very specific, also provide for sharing of many common units of competency and are aligned with international standards. The review will enable students who undertake a licensed pathway to find it easier to transition from one sub-category to another within the aircraft maintenance industry and from general aviation to commercial aviation. This should also reduce the cost of training for thin markets for RTOs/MTOs and students.

The current qualifications currently make little use of units from other training packages. This will be reviewed and, wherever possible, units from other industries will be utilised to enable individuals to more easily move between related occupations, e.g. Heavy-duty vehicle mechanic and aircraft maintenance engineering.

Improved efficiency of the training system through units that can be owned and used by multiple industry sectors

Listed units will need to be transitioned to comply to the current training package standards as part of this Case for Change. The current extensive use of pre-requisite units will be reviewed to ensure they are necessary. Removal of pre-requisites will thereby increase the ability for other industry sectors to use MEA Aeroskills units. It must be noted, use by other industries is likely to be limited given the specialised nature of regulatory requirements associated with the MEA Aeroskills units of competency.

Foster greater recognition of skill sets

There are 213 skill sets used extensively for employment of individuals with Certificate III or Certificate IV qualifications in an allied trade in aircraft component maintenance workshops on electrical component repair and overhaul and to differentiate licence subcategories.

Alignment of VET qualification standards to CASA licensing regulations

Consultation Plan:	IBSA Manufacturing Training Development Projects follow the Training Package Development and Endorsement Process Policy and use a five-phase methodology. The IBSA Aerospace Industry Manager will coordinate the project and keep the IRC informed on progress.

Phase 1 – Initial research and analysis

Establishment of a Technical Advisory Committee (TAC) to validate the project scope and plan, contribute to the investigation and interrogation of data and assist in determining industry needs and job role functional analysis. The IRC will appoint a Technical Advisory Committee that will have current skills and knowledge across a broad range including the aviation industry, industry aircraft maintenance engineers, industry and member associations and regulatory authorities to inform this work.

Proposed membership will include representatives from:

- Government Regulators (CASA)/Defence Aviation Safety Authority (DASA)

- One or more employee representatives

- One or more employers of various sizes and employer representatives

- One or more RTOs/MTOs

- One or more technical experts.

Detailed mapping of all relevant units and qualifications will be undertaken.

Extensive consultation will take place to develop a new licensed occupation framework that accommodates CASA requirements and the VET standards. This will be developed into a Discussion Paper with consultation planned in each jurisdiction to understand the challenges, test alternate frameworks, identify concerns to be addressed and understand any issues including implementation matters.

The proposed framework will be developed under the direction of the TAC and then reviewed and approved by the IRC. Further formal approval will be sought from CASA to ensure it meets their requirements.

Once approved the proposed framework will be open for feedback from the broader stakeholder community and that will be considered and incorporated with IRC approval prior to adoption.

Phase 2 – Draft 1 and public consultation

Develop first draft of training package components for feedback from the TAC and then the broader aerospace industry and RTOs.

Phase 3 – Draft 2 and public consultation

Respond to feedback and develop second draft of training package components. Feedback to be sought from the broader aerospace industry and RTOs.

Phase 4 – Approval process

Adjust training package components in response to further feedback and seek approval from respective committees, namely the TAC and IRC and endorsement from state training authorities.

Phase 5 – Submission to Department

Submit to the Department of Education and Training for AISC approval.

Alignment of VET qualification standards to CASA licensing regulations

Consultation Plan:	**Consultation Plan** IBSA will create a project web page to provide project updates, gather feedback from stakeholders and validate training package components. National consultations are proposed with: • general and commercial aviation employers operating in regions and metropolitan areas to identify industry and job requirements, and trends and work opportunities • relevant associations including the Civil Aviation Safety Authority regarding licensing regulations and knowledge requirements • industry associations including Aviation Maintenance Repair Overhaul Business Association (AMROBA), Australian Licensed Aircraft Engineers Association • industry training boards • unions • RTOs with these qualifications on scope and recent or current students if accessible to gain feedback on the actual qualifications and employment outcomes • Australian Industry Standards (AIS), to explore how the 'Maritime and AVI' training packages address licence requirements • State Training Authorities to ensure all jurisdictions are engaged.

Scope of Project

Timing	**Estimated Project Duration:** 22 months If approved, the project would be undertaken in stages. **Anticipated Start Date:** August 2018 Anticipated Completion Date: Case for Endorsement to be submitted to the Department May 2020 (these dates will ensure a seamless transition from the CASA Basics exam pathway which finishes in July 2020.)
Training Package	**Training Package to be developed/revised:** MEA Aeroskills Training Package

Alignment of VET qualification standards to CASA licensing regulations

Qualifications A total of **25 qualifications** to be redeveloped as part of this project.

The first phase of this work will determine if any **new qualifications** will be required.

25 existing qualifications to be revised:

- MEA20415 Certificate II in Aeroskills
- MEA20515 Certificate II in Aircraft Line Maintenance
- MEA20615 Certificate II in Aircraft Surface Finishing
- MEA30115 Certificate III in Aircraft Surface Finishing
- MEA30215 Certificate III in Aeroskills (Mechatronics)
- MEA30315 Certificate III in Aircraft Life Support and Furnishing
- MEA40615 Certificate IV in Aeroskills (Avionics)
- MEA40715 Certificate IV in Aeroskills (Mechanical)
- MEA40915 Certificate IV in Aircraft Surface Finishing
- MEA41015 Certificate IV in Aeroskills (Mechatronics)
- MEA41115 Certificate IV in Aircraft Life Support and Furnishing
- MEA41215 Certificate IV in Aeroskills (Armament)
- MEA41315 Certificate IV in Aeroskills (Structures)
- MEA50115 Diploma of Aeroskills (Avionics)
- MEA50215 Diploma of Aeroskills (Mechanical)
- MEA50315 Diploma of Aviation Maintenance Management (Avionics)
- MEA50415 Diploma of Aviation Maintenance Management (Mechanical)
- MEA50515 Diploma of Aeroskills (Non-Destructive Testing)
- MEA50615 Diploma of Aeronautical Engineering
- MEA50715 Diploma of Avionic Engineering
- MEA60115 Advanced Diploma of Aviation Maintenance Management (Avionics)
- MEA60215 Advanced Diploma of Aviation Maintenance Management (Mechanical)
- MEA60315 Advanced Diploma of Aviation Non-Destructive Testing
- MEA60415 Advanced Diploma of Aeronautical Engineering
- MEA60515 Advanced Diploma of Avionic Engineering

Alignment of VET qualification standards to CASA licensing regulations

Skill Sets	The first phase of this work will determine if any new skill sets are required.

A total of **213 existing Skill Sets** to be reviewed and redeveloped:

- MEASS00245 AMW001 Electrical component repair/overhaul

- MEASS00246 AMW002 Mechanical and electro-mechanical instrument component repair/overhaul

- MEASS00247 AMW003 Aircraft display, control and distribution system component repair/overhaul

- MEASS00248 AMW004 Oxygen system component repair/overhaul

- MEASS00249 AMW005 Aircraft radio frequency communication and navigation system component repair/overhaul

- MEASS00250 AMW006 Aircraft pulse system component repair/overhaul

- MEASS00251 AMW007 Aircraft audio and visual system and reproducer repair/overhaul

- MEASS00252 AMW008 Hydraulic system component repair/overhaul

- MEASS00253 AMW009 Electro-hydraulic component repair/overhaul

- MEASS00254 AMW010 Pneumatic system component repair/overhaul

- MEASS00255 AMW011 Electro-pneumatic component repair/overhaul

- MEASS00256 AMW012 Fuel system component repair/overhaul

- MEASS00257 AMW013 Gas turbine engine air inlet and compressor module/component repair/overhaul

- MEASS00258 AMW014 Gas turbine engine combustion section module/component repair/overhaul

- MEASS00259 AMW015 Gas turbine engine turbine and exhaust module/component repair/overhaul

- MEASS00260 AMW016 Gas turbine engine ancillary section module/component repair/overhaul

- MEASS00261 AMW017 Piston engine disassembly for repair/overhaul

- MEASS00262 AMW018 Repair and/or overhaul aircraft piston engine cylinder assembly components

- MEASS00263 AMW019 Repair and/or overhaul aircraft piston engine crankcase assembly components

- MEASS00264 AMW020 Reassemble aircraft piston engines

- MEASS00265 AMW021 Assemble aircraft piston engine quick engine change unit

- MEASS00266 AMW022 Test aircraft piston engines after repair or overhaul

- MEASS00267 AMW023 Propeller repair/overhaul

- MEASS00268 AMW024 Rotary wing dynamic component repair/overhaul

- MEASS00269 AMW025 Mechanical system component repair/overhaul

- MEASS00270 AMW026 Composite structure maintenance

- MEASS00271 LME001 Electrical B1.1 Licence Exclusions E1 and E4 Removal

- MEASS00272 LME002 Electrical B1.1 Licence Exclusions E1 and E4 Removal (small aircraft with gas turbine engine)

- MEASS00273 LME003 Electrical B1.2, B1.3 or B1.4 Licence Exclusions E1 and E4 Removal

- MEASS00274 LME004 Electrical B1.2 or B1.4 Licence Exclusions E1 and E4 Removal (small aircraft/helicopters)

- MEASS00275 LME005 Electrical B2 Licence Exclusions E1 and E4 Removal

Alignment of VET qualification standards to CASA licensing regulations

Skill Sets	
	• MEASS00276 LME006 Electrical B2 Licence Exclusions E1 and E4 Removal (small aircraft or helicopters)
	• MEASS00277 LME007 Airframe B1.1 Licence Exclusion E2 Removal
	• MEASS00278 LME008 Airframe B1.1 Licence Exclusion E2 Removal (small aircraft with gas turbine engine)
	• MEASS00279 LME009 Airframe B1.2 Licence Exclusion E2 Removal
	• MEASS00280 LME010 Airframe B1.2 Licence Exclusion E2 Removal (working on small aircraft)
	• MEASS00281 LME011 Airframe B1.3 and B1.4 Licence Exclusion E2 Removal
	• MEASS00282 LME012 Airframe B1.4 Licence Exclusion E2 Removal (working on basic helicopters)
	• MEASS00283 LME013 Power Plant B1.1 Licence Exclusion E3 Removal
	• MEASS00284 LME014 Power Plant B1.2 Licence Exclusion E3 Removal
	• MEASS00285 LME015 Power Plant B1.2 Licence Exclusion E3 Removal (working on small aircraft)
	• MEASS00286 LME016 Power Plant B1.3 Licence Exclusion E3 Removal
	• MEASS00287 LME017 Power Plant B1.4 Licence Exclusion E3 Removal
	• MEASS00288 LME018 Power Plant B1.4 Licence Exclusion E3 Removal (working on basic helicopters)
	• MEASS00289 LME019 Instrument B1 Licence Exclusions E5 and E7 Removal
	• MEASS00290 LME020 Instrument B1.2 and B1.4 Licence Exclusions E5 and E7 Removal (small aircraft/helicopters)
	• MEASS00291 LME021 Instrument B2 Licence Exclusions E5 and E7 Removal
	• MEASS00292 LME022 Instrument and Radio B1 Licence Exclusion E6 Removal
	• MEASS00293 LME023 Instrument and Radio B1.2 and 1.4 Licence Exclusion E6 Removal (small aircraft/helicopters)
	• MEASS00294 LME024 Instrument and Radio B2 Licence Exclusion E6 Removal
	• MEASS00295 LME025 Instrument and Radio B2 Licence Exclusion E6 Removal (non-type rated aircraft/helicopters)
	• MEASS00296 LME026 Radio B1 Licence Exclusion E8 Removal
	• MEASS00297 LME027 Radio B1.2 and B1.4 Licence Exclusion E8 Removal (working on small aircraft/helicopters)
	• MEASS00298 LME028 Radio B2 Licence Exclusion E8 Removal
	• MEASS00299 LME029 Radio B2 Licence Exclusion E8 Removal (non-type rated aircraft and helicopters)
	• MEASS00300 LME030 Airframe B1 Licence Exclusion E9 and E43 Removal
	• MEASS00301 LME031 Airframe B1 Licence Exclusion E10 Removal
	• MEASS00302 LME032 Radio B2 Licence Exclusion E11 Removal
	• MEASS00303 LME033 Airframe/Engine B1.1 and B1.2 Licence Exclusion E12 Removal
	• MEASS00304 LME034 Airframe B1 Licence Exclusion E13 Removal
	• MEASS00305 LME035 Airframe B1 Licence Exclusion E14 Removal
	• MEASS00306 LME036 Airframe B1.1 and B1.3 Licence Exclusion E15 Removal
	• MEASS00307 LME037 Airframe B1.1 Licence Exclusion E15 Removal
	• MEASS00308 LME038 Airframe B1.1 Licence Exclusion E16 Removal

Alignment of VET qualification standards to CASA licensing regulations

Skill Sets	
	• MEASS00309 LME039 Airframe B1.2 Licence Exclusion E16 Removal
	• MEASS00310 LME040 Radio B2 Licence Exclusion E18 Removal
	• MEASS00311 LME041 Radio B2 Licence Exclusion E19 Removal
	• MEASS00312 LME042 Radio B2 Licence Exclusion E20 Removal
	• MEASS00313 LME043 Radio B2 Licence Exclusion E21 Removal
	• MEASS00314 LME044 Radio B2 Licence Exclusion E22 Removal
	• MEASS00315 LME045 Radio B2 Licence Exclusion E23 Removal
	• MEASS00316 LME046 Radio B2 Licence Exclusion E24 Removal
	• MEASS00317 LME047 Radio B2 Licence Exclusion E25 Removal
	• MEASS00318 LME048 Radio B2 Licence Exclusion E26 Removal
	• MEASS00319 LME049 Instrument B2 Licence Exclusion E27 Removal
	• MEASS00320 LME050 Instrument B2 Licence Exclusion E28 Removal
	• MEASS00321 LME051 Instrument B2 Licence Exclusion E29 Removal
	• MEASS00322 LME052 Instrument B2 Licence Exclusion E30 Removal
	• MEASS00323 LME053 Instrument B2 Licence Exclusion E31 Removal
	• MEASS00324 LME054 Electrical B2 Licence Exclusion E32 Removal
	• MEASS00325 LME055 Engine B1.2 or B1.4 Licence Exclusions E33 and E38 Removal
	• MEASS00326 LME056 Electrical/Instrument/Radio B2 Licence Exclusion E34 Removal
	• MEASS00327 LME057 Airframe B1.1 or B1.2 Licence Exclusion E35 Removal
	• MEASS00328 LME058 Engine B1.2 or B1.4 Licence Exclusions E36 and E37 Removal
	• MEASS00329 LME059 Engine B1.2 or B1.4 Licence Exclusions E36 and E37 Removal (small aircraft/helicopters)
	• MEASS00330 LME060 Airframe B1.1 or B1.3 Licence Exclusions E39 Removal
	• MEASS00331 LME061 Airframe B1.2 or B1.4 Licence Exclusion E39 Removal (small aircraft/helicopters)
	• MEASS00332 LME062 Airframe B1 Licence Exclusion E40 Removal
	• MEASS00333 LME063 Airframe B1 Licence Exclusion E41 Removal
	• MEASS00334 LME064 Airframe B1 Licence Exclusion E42 Removal
	• MEASS00335 LME065 Electrical B1 Licence Exclusion E44 Removal
	• MEASS00336 LME066 Units of competency for A1 licence if Certificate IV in Aeroskills (Mechanical) is held
	• MEASS00337 LME067 Units of competency for A2 licence if Certificate IV in Aeroskills (Mechanical) is held
	• MEASS00338 LME068 Units of competency for A3 licence if Certificate IV in Aeroskills (Mechanical) is held
	• MEASS00339 LME069 Units of competency for A4 licence if Certificate IV in Aeroskills (Mechanical) is held
	• MEASS00340 LME070 Units of competency for A1 licence if Certificate IV in Aeroskills (Avionics) is held

Alignment of VET qualification standards to CASA licensing regulations

Skill Sets	• MEASS00341 LME071 Units of competency for A2 licence if Certificate IV in Aeroskills (Avionics) is held
	• MEASS00342 LME072 Units of competency for A3 licence if Certificate IV in Aeroskills (Avionics) is held
	• MEASS00343 LME073 Units of competency for A4 licence if Certificate IV in Aeroskills (Avionics) is held
	• MEASS00344 LME074 Units of competency for A1 licence if a B2 licence is held
	• MEASS00345 LME075 Units of competency for A2 licence if a B2 licence is held
	• MEASS00346 LME076 Units of competency for A3 licence if a B2 licence is held
	• MEASS00347 LME077 Units of competency for A4 licence if a B2 licence is held
	• MEASS00348 MTA001 Aircraft egress system maintenance
	• MEASS00349 MTA002 In-flight entertainment system maintenance
	• MEASS00350 MTA003 Borescope inspection approval
	• MEASS00351 MTA004 Aircraft composite structure repair/modification using hot and cold bonding
	• MEASS00352 MTA005 Aircraft composite structure repair/modification using cold bonding only
	• MEASS00353 MTA006 Aircraft welding using the gas welding process – aluminium alloys
	• MEASS00354 MTA007 Aircraft welding using the gas welding process – magnesium alloys
	• MEASS00355 MTA008 Aircraft welding using the gas welding process – carbon and low alloy steels
	• MEASS00356 MTA009 Aircraft welding using the gas welding process – corrosion and heat resisting steels
	• MEASS00357 MTA010 Aircraft welding using the gas welding process – nickel alloys
	• MEASS00358 MTA011 Aircraft welding using the gas welding process – copper based alloys
	• MEASS00359 MTA012 Aircraft welding using the gas welding process – titanium alloys
	• MEASS00360 MTA013 Aircraft welding using the braze welding process - aluminium alloys
	• MEASS00361 MTA014 Aircraft welding using the braze welding process - magnesium alloys
	• MEASS00362 MTA015 Aircraft welding using the braze welding process - carbon and low alloy steels
	• MEASS00363 MTA016 Aircraft welding using the braze welding process - corrosion and heat resisting steels
	• MEASS00364 MTA017 Aircraft welding using the braze welding process - nickel alloys
	• MEASS00365 MTA018 Aircraft welding using the braze welding process - copper based alloys
	• MEASS00366 MTA019 Aircraft welding using the braze welding process - titanium alloys
	• MEASS00367 MTA020 Aircraft welding using the gas metal arc welding process - aluminium alloys
	• MEASS00368 MTA021 Aircraft welding using the gas metal arc welding process - magnesium alloys
	• MEASS00369 MTA022 Aircraft welding using the gas metal arc welding process - carbon and low alloy steels
	• MEASS00370 MTA023 Aircraft welding using the gas metal arc welding process - corrosion and heat resisting steel
	• MEASS00371 MTA024 Aircraft welding using the gas metal arc welding process - nickel alloys
	• MEASS00372 MTA025 Aircraft welding using the gas metal arc welding process - copper based alloys
	• MEASS00373 MTA026 Aircraft welding using the gas metal arc welding process - titanium alloys

Alignment of VET qualification standards to CASA licensing regulations

Skill Sets	
	• MEASS00374 MTA027 Aircraft welding using the gas tungsten arc welding process - aluminium alloys
	• MEASS00375 MTA028 Aircraft welding using the gas tungsten arc welding process - magnesium alloys
	• MEASS00376 MTA029 Aircraft welding using the gas tungsten arc welding process - carbon and low alloy steels
	• MEASS00377 MTA030 Aircraft welding using gas tungsten arc welding process - corrosion and heat resisting steel
	• MEASS00378 MTA031 Aircraft welding using the gas tungsten arc welding process - nickel alloys
	• MEASS00379 MTA032 Aircraft welding using the plasma arc welding process - aluminium alloys
	• MEASS00380 MTA033 Aircraft welding using the plasma arc welding process - magnesium alloys
	• MEASS00381 MTA034 Aircraft welding using the plasma arc welding process - carbon and low alloy steels
	• MEASS00382 MTA035 Aircraft welding using the plasma arc welding process - corrosion and heat resisting steels
	• MEASS00383 MTA036 Aircraft welding using the plasma arc welding process - nickel alloys
	• MEASS00384 MTA037 Aircraft welding using the plasma arc welding process - copper based alloys
	• MEASS00385 MTA038 Aircraft welding using the plasma arc welding process - titanium alloys
	• MEASS00386 MTA039 Aircraft welding using the manual metal arc welding process - aluminium alloys
	• MEASS00387 MTA040 Aircraft welding using the manual metal arc welding process - magnesium alloys
	• MEASS00388 MTA041 Aircraft welding using the manual metal arc welding process - carbon and low alloy steels
	• MEASS00389 MTA042 Aircraft welding using manual metal arc welding process - corrosion and heat resisting steels
	• MEASS00390 MTA043 Aircraft welding using the manual metal arc welding process - nickel alloys
	• MEASS00391 MTA044 Aircraft welding using the manual metal arc welding process - copper based alloys
	• MEASS00392 MTA045 Aircraft welding using the manual metal arc welding process - titanium alloys
	• MEASS00393 MTA046 Liquid penetrant inspection approval for aerospace
	• MEASS00394 MTA047 Magnetic particle inspection approval for aerospace
	• MEASS00395 MTA048 Eddy current inspection approval for aerospace
	• MEASS00396 MTA049 Ultrasonic inspection approval for aerospace
	• MEASS00397 MTA050 Radiographic inspection approval for aerospace
	• MEASS00398 MTA051 Basic visual liquid dye penetrant inspection approval for aerospace
	• MEASS00399 MTA052 Basic magnetic particle inspection approval for aerospace
	• MEASS00400 MTA053 Basic eddy current inspection approval for aerospace
	• MEASS00401 MTA054 Ultrasonic thickness testing inspection approval for aerospace
	• MEASS00402 MTA055 Basic radiographic inspection approval for aerospace
	• MEASS00403 MTA056 Electroplate aeronautical product component parts
	• MEASS00404 MTA057 Produce anodised film on aluminium alloy components
	• MEASS00405 MTA058 Metal spray aeronautical product component parts
	• MEASS00406 MTA059 Machine aeronautical product component parts (general)

Alignment of VET qualification standards to CASA licensing regulations

Skill Sets	• MEASS00407 MTA060 Grind aeronautical product component parts
	• MEASS00408 MTA061 Precision jig boring of aeronautical product component parts
	• MEASS00409 MTA062 Complex milling of aeronautical product component parts
	• MEASS00410 MTA063 Machine aeronautical product component parts using horizontal and/or vertical boring machines
	• MEASS00411 MTA064 Machine aeronautical product component parts using NC/CNC machines
	• MEASS00412 MTA065 Machine aeronautical product component parts using NC/CNC machining centres
	• MEASS00413 MTA066 Machine plastic aeronautical product component parts
	• MEASS00414 MTA067 Aeronautical product component parts metal spinning lathe operations
	• MEASS00415 MTA068 Aircraft tyre retreading (basic)
	• MEASS00416 MTA069 Aircraft tyre retreading (advanced)
	• MEASS00417 SAL001 B1 Small aircraft elementary maintenance
	• MEASS00418 SAL002 Mechanical/Avionic - B1 and B2 Electrical systems multi-generator - Rating 2
	• MEASS00419 SAL003 Mechanical B1.2 Wooden structures Rating 3
	• MEASS00420 SAL004 Mechanical B1.2 Fabric surfaces Rating 4
	• MEASS00421 SAL005 Mechanical B1 Hydraulic systems Rating 5
	• MEASS00422 SAL006 Mechanical B1 Vapour cycle air conditioning systems Rating 6A
	• MEASS00423 SAL007 Mechanical B1.1 and B1.3 Air cycle air conditioning systems Rating 6B
	• MEASS00424 SAL008 Mechanical/Avionics B1 and B2 Oxygen systems Rating 8
	• MEASS00425 SAL009 Mechanical B1.1 and B1.2 Pressurisation and pneumatic systems Rating 10
	• MEASS00426 SAL010 Mechanical B1.3 and B1.4 Helicopter powered flight control systems Rating 11
	• MEASS00427 SAL011 Mechanical B1 Boosted induction systems Rating S
	• MEASS00428 SAL012 Mechanical B1.2 Constant speed and variable pitch propeller Rating V
	• MEASS00429 SAL013 Avionics B2 Electrical 1 Rating
	• MEASS00430 SAL014 Avionics B2 Instrument 1 Rating
	• MEASS00431 SAL015 Avionics B2 Radio 1 Rating
	• MEASS00432 SAL016 Avionics B2 Autopilot and flight control systems Aeroplane Rating 12
	• MEASS00433 SAL017 Avionics B2 Autopilot and flight control systems Helicopter Rating 13
	• MEASS00434 SAL018 Avionics B2 Glass cockpit Rating 14
	• MEASS00435 SAL019 Avionics B2 Navigation systems Rating 15
	• MEASS00436 SAL020 Avionics B2 Flight management systems Rating 16
	• MEASS00437 SAL021 Avionics Inertial navigation systems Rating 17
	• MEASS00438 SAL022 Avionics B2 Secondary radar Rating 18
	• MEASS00439 SAL023 Avionics B2 Weather radar Rating 19

Alignment of VET qualification standards to CASA licensing regulations

Skill Sets	
	• MEASS00440 SAL024 Avionics B2 Cockpit voice recorder Rating 20
	• MEASS00441 SAL025 Avionics B2 Flight data recorder systems Rating 21
	• MEASS00442 SAL026 Avionics B2 High frequency radio systems Rating 22
	• MEASS00443 SAL027 B1.1 Removal of small aircraft limitation
	• MEASS00444 SAL028 B1.3 Removal of small aircraft limitation
	• MEASS00445 SAL029 B2 Removal of small aircraft limitation
	• MEASS00446 SAL030 Attainment of a B1.2 licence by holders of a B1.1 small aircraft licence
	• MEASS00447 SAL031 Attainment of a B1.3 licence by holders of a B1.1 small aircraft licence
	• MEASS00448 SAL032 Attainment of a B1.4 licence by holders of a B1.1 small aircraft licence
	• MEASS00449 SAL033 Attainment of a B1.1 small aircraft licence by holders of a B1.2 licence
	• MEASS00450 SAL034 Attainment of a B1.3 small aircraft licence by holders of a B1.2 licence
	• MEASS00451 SAL035 Attainment of a B1.4 licence by holders of a B1.2 licence
	• MEASS00452 SAL036 Attainment of a B1.1 small aircraft licence by holders of a B1.3 small aircraft licence
	• MEASS00453 SAL037 Attainment of a B1.2 licence by holders of a B1.3 small aircraft licence
	• MEASS00454 SAL038 Attainment of a B1.4 licence by holders of a B1.3 small aircraft licence
	• MEASS00455 SAL039 Attainment of a B1.1 small aircraft licence by holders of a B1.4 licence
	• MEASS00456 SAL040 Attainment of a B1.2 licence by holders of a B1.4 licence
	• MEASS00457 SAL041 Attainment of a B1.3 small aircraft licence by holders of a B1.4 licence

Alignment of VET qualification standards to CASA licensing regulations

Units of Competency	A total of **383 units of competency** to be redeveloped as part of this project.

The first phase of this work will determine if there are any new units of competency required.

262 existing units of competency to be revised and redeveloped:

- MEA101 Interpret work health and safety practices in aviation maintenance

- MEA103 Plan and organise aviation maintenance work activities

- MEA105 Apply quality standards applicable to aviation maintenance processes

- MEA107 Interpret and use aviation maintenance industry manuals and specifications

- MEA108 Complete aviation maintenance industry documentation

- MEA109 Perform basic hand skills, standard trade practices and fundamentals in aviation maintenance

- MEA111 Perform administrative processes to prepare for certification of civil aircraft maintenance

- MEA112 Plan and implement civil aircraft maintenance activities

- MEA113 Supervise civil aircraft maintenance activities and manage human resources in the workplace

- MEA114 Certify aeronautical product maintenance

- MEA115 Plan and implement aeronautical product maintenance activities

- MEA116 Apply occupational health and safety procedures at supervisor level in aviation maintenance

- MEA117 Apply self in the aviation maintenance environment

- MEA118 Conduct self in the aviation maintenance environment

- MEA119 Perform administrative processes to prepare for certification of civil aircraft A level line maintenance

- MEA120 Manage an aviation maintenance quality system

- MEA121 Manage aircraft/aeronautical product configuration

- MEA122 Manage aircraft/equipment system performance testing

- MEA123 Manage aviation maintenance work environment policy and practices

- MEA124 Coordinate change programs in the aviation maintenance environment

- MEA125 Develop aviation maintenance personnel

- MEA126 Manage aircraft maintenance activities

- MEA127 Provide technical advice in the maintenance and management of aircraft and aeronautical product

- MEA128 Provide engineering advice in the modification, maintenance and management of aircraft systems

- MEA129 Investigate technical aspects of aviation occurrences

- MEA130 Manage deployed/detached aviation maintenance activities

- MEA131 Manage the custody, transfer and disposal of aircraft, aeronautical product and support equipment

- MEA132 Manage budgetary resources in the aviation maintenance environment

- MEA133 Communicate aviation technical and maintenance management knowledge

- MEA134 Establish, maintain and evaluate the organisation's work health and safety system

IBSA MANUFACTURING

Alignment of VET qualification standards to CASA licensing regulations

Units of Competency	
	• MEA135 Use computers in aviation maintenance-related integrated logistic support activities
	• MEA136 Assess aviation maintenance spares and manage repairable items
	• MEA137 Write aviation technical publications
	• MEA138 Perform aviation technical publication management activities
	• MEA139 Perform aviation maintenance – related integrated logistic support management activities
	• MEA140 Supervise aviation maintenance teams and perform maintenance quality inspections
	• MEA141 Manage risk in aviation maintenance
	• MEA142 Manage self in the aviation maintenance environment
	• MEA143 Develop and manage maintenance error management programs
	• MEA145 Conversion from allied trades for employment in aviation maintenance workshops
	• MEA146 Prepare and manage aviation maintenance organisation budgets and financial plans
	• MEA147 Perform airworthiness management and maintenance program tasks
	• MEA148 Apply mathematics and physics in aviation maintenance
	• MEA201 Remove and install miscellaneous aircraft electrical hardware/components
	• MEA202 Remove and install basic aircraft electrical system components
	• MEA203 Remove and install advanced aircraft electrical system components
	• MEA204 Remove and install basic aircraft instrument system components
	• MEA205 Remove and install advanced aircraft instrument system components
	• MEA206 Remove and install aircraft basic radio communication and navigation system components
	• MEA207 Remove and install aircraft electronic system components
	• MEA208 Remove and install aircraft pressurisation control system components
	• MEA209 Remove and install aircraft oxygen system components
	• MEA210 Inspect, test and troubleshoot basic aircraft electrical systems and components
	• MEA211 Inspect, test and troubleshoot advanced aircraft electrical systems and components
	• MEA212 Inspect, test and troubleshoot basic aircraft instrument systems and components
	• MEA213 Inspect, test and troubleshoot advanced aircraft instrument systems and components
	• MEA214 Inspect, test and troubleshoot aircraft basic communication and radio navigation systems and components
	• MEA215 Inspect, test and troubleshoot advanced aircraft communications systems and components
	• MEA216 Inspect, test and troubleshoot instrument landing systems and components
	• MEA217 Inspect, test and troubleshoot fixed wing autopilot systems and components
	• MEA218 Inspect, test and troubleshoot rotary wing autopilot systems and components
	• MEA219 Inspect, test and troubleshoot aircraft pressurisation control systems and components

Alignment of VET qualification standards to CASA licensing regulations

Units of Competency	
	• MEA220 Inspect, test and troubleshoot aircraft primary radar systems and components
	• MEA221 Inspect, test and troubleshoot aircraft secondary radar systems and components
	• MEA222 Inspect, test and troubleshoot aircraft oxygen systems and components
	• MEA223 Inspect aircraft electrical systems and components
	• MEA224 Inspect aircraft instrument systems and components
	• MEA225 Inspect fixed wing aircraft automatic flight control systems and components
	• MEA226 Inspect aircraft electronic systems and components
	• MEA227 Test and troubleshoot aircraft electrical systems and components
	• MEA228 Test and troubleshoot aircraft instrument systems and components
	• MEA229 Test and troubleshoot aircraft radio frequency navigation and communications systems and components
	• MEA230 Test and troubleshoot fixed wing aircraft automatic flight control systems and components
	• MEA231 Inspect, test and troubleshoot rotary wing aircraft automatic flight control systems and components
	• MEA232 Test and troubleshoot aircraft pulse systems and components
	• MEA233 Inspect, test and troubleshoot aircraft inertial navigation and reference systems and components
	• MEA234 Inspect, test and troubleshoot aircraft global navigation systems and components
	• MEA235 Perform advanced troubleshooting in aircraft avionic maintenance
	• MEA238 Perform routine removal and installation of miscellaneous aircraft electrical hardware/components
	• MEA239 Fabricate aircraft electrical looms and harnesses
	• MEA240 Use electrical test equipment to perform basic electrical tests
	• MEA241 Perform aircraft weight and balance calculations as a result of modifications
	• MEA246 Fabricate and/or repair aircraft electrical hardware or parts
	• MEA252 Test, align and troubleshoot aircraft synchro and servo system components
	• MEA260 Use electrical test equipment
	• MEA261 Use electronic test equipment
	• MEA262 Modify/repair aircraft component single layer printed circuit boards
	• MEA263 Modify/repair aircraft component multi-layer printed circuit boards
	• MEA264 Remove and install aircraft electrical/avionic components during line maintenance
	• MEA265 Remove and install general aircraft electrical hardware
	• MEA266 Terminate and repair aircraft optical fibre cable
	• MEA270 Lay out avionic systems
	• MEA271 Lay out avionic flight management systems
	• MEA274 Maintain basic light aircraft electrical systems and components
	• MEA275 Maintain basic light aircraft instrument systems and components

Alignment of VET qualification standards to CASA licensing regulations

Units of Competency	
	• MEA276 Maintain basic aircraft communication and radio navigation systems and components
	• MEA277 Maintain twin engine aircraft electrical systems and components
	• MEA278 Inspect, test and troubleshoot instrument display systems and components
	• MEA279 Inspect, test and troubleshoot full authority digital engine control systems
	• MEA280 Inspect, test and troubleshoot flight management systems and components
	• MEA281 Maintain light aircraft AC powered instrument systems and components
	• MEA282 Repair or overhaul aircraft pulse system components
	• MEA283 Repair or overhaul aircraft display, control and distribution system components
	• MEA284 Repair or overhaul aircraft instrument system components
	• MEA285 Repair or overhaul aircraft radio frequency communication and navigation system component
	• MEA286 Repair or overhaul aircraft electrical/electro-mechanical components
	• MEA287 Repair or overhaul aircraft oxygen system components
	• MEA288 Repair or overhaul aircraft audio and visual systems and reproducers
	• MEA289 Maintain basic light aircraft avionic systems and components
	• MEA290 Fit avionic modification sheet metal components
	• MEA291 Inspect, test and troubleshoot fixed wing single axis autopilot systems and components
	• MEA301 Perform aircraft flight servicing
	• MEA302 Remove and install aircraft hydro-mechanical and landing gear system components
	• MEA303 Remove and install aircraft pneumatic system components
	• MEA304 Remove and install non-pressurised aircraft structural and non-structural components
	• MEA305 Remove and install aircraft fixed wing flight control system components
	• MEA306 Remove and install engines and engine system components
	• MEA307 Remove and install propeller systems and components
	• MEA308 Remove and install rotary wing rotor and flight control system components
	• MEA309 Inspect, test and troubleshoot aircraft hydro-mechanical and landing gear systems and components
	• MEA310 Inspect, test and troubleshoot aircraft pneumatic systems and components
	• MEA312 Inspect, test and troubleshoot aircraft fixed wing flight control systems and components
	• MEA313 Inspect, test and troubleshoot piston engine systems and components
	• MEA314 Inspect, test and troubleshoot gas turbine engine systems and components
	• MEA315 Inspect, test and troubleshoot propeller systems and components
	• MEA316 Inspect, test and troubleshoot rotary wing rotor and control systems and components
	• MEA317 Remove and install pressurised aircraft structural and non-structural components
	• MEA318 Inspect aircraft hydro-mechanical, mechanical, gaseous and landing gear systems and components

Alignment of VET qualification standards to CASA licensing regulations

Units of Competency	
	• MEA319 Inspect gas turbine engine systems and components
	• MEA320 Test and troubleshoot aircraft hydro-mechanical, gaseous and landing gear systems and components
	• MEA321 Test and troubleshoot aircraft fixed wing flight control systems and components
	• MEA322 Test and troubleshoot gas turbine engine systems and components
	• MEA323 Perform advanced troubleshooting in aircraft mechanical maintenance
	• MEA325 Weigh aircraft and perform aircraft weight and balance calculations as a result of modifications
	• MEA327 Fabricate and/or repair aircraft mechanical components or parts
	• MEA328 Maintain and/or repair aircraft mechanical components or parts
	• MEA329 Maintain aircraft basic hydraulic and pneumatic components or parts
	• MEA330 Maintain aircraft non-primary structural removable components or parts and internal fittings
	• MEA331 Maintain aircraft gas turbine engine components or parts
	• MEA332 Maintain aircraft mechanical components or parts
	• MEA333 Maintain aircraft piston engine components or parts
	• MEA339 Inspect, repair and maintain aircraft structures
	• MEA340 Lay out and set up aircraft systems
	• MEA341 Apply basic aircraft design characteristics
	• MEA342 Apply basic aircraft power plant design characteristics
	• MEA343 Remove and install avionic system components
	• MEA344 Remove and install aircraft components
	• MEA345 Perform scheduled line maintenance activities on gas turbine engine fixed wing aircraft
	• MEA346 Perform scheduled line maintenance activities on gas turbine engine rotary wing aircraft
	• MEA347 Perform scheduled line maintenance activities on piston engine fixed wing aircraft
	• MEA348 Perform scheduled line maintenance activities on piston engine rotary wing aircraft
	• MEA351 Maintain airframe systems of basic light fixed wing aircraft
	• MEA352 Maintain basic rotary wing aircraft systems
	• MEA353 Maintain basic light aircraft engines and propellers
	• MEA354 Maintain light aircraft pneumatic systems
	• MEA355 Maintain light aircraft air cycle air conditioning systems
	• MEA356 Maintain light piston engine aircraft pressurisation systems
	• MEA357 Inspect, test and repair aircraft fabric surfaces
	• MEA358 Re-cover aircraft fabric surfaces
	• MEA359 Inspect and repair aircraft wooden structures
	• MEA360 Maintain aircraft diesel engines

Alignment of VET qualification standards to CASA licensing regulations

Units of Competency	
	• MEA361 Maintain aircraft two stroke petrol engines
	• MEA362 Maintain aircraft vapour cycle air conditioning systems
	• MEA364 Maintain and/or repair small aircraft mechanical components or parts
	• MEA365 Assess structural repair/modification requirements and evaluate structural repairs and modifications
	• MEA366 Perform borescope inspections
	• MEA367 Repair/modify aircraft composite structure using cold bonding
	• MEA368 Shot peen aircraft components
	• MEA369 Inspect and maintain structures and related components of non-pressurised small aircraft
	• MEA370 Repair the structure of non-pressurised small aircraft
	• MEA371 Perform major repairs and modifications to small aircraft metal structure
	• MEA372 Perform mechanical elementary maintenance
	• MEA380 Repair and/or overhaul aircraft hydraulic system components
	• MEA381 Repair and/or overhaul aircraft pneumatic system components
	• MEA382 Repair and/or overhaul aircraft fuel system components
	• MEA383 Repair and/or overhaul gas turbine engine air inlet and compressor components and/or modules
	• MEA384 Repair and/or overhaul gas turbine engine combustion section components and/or modules
	• MEA385 Repair and/or overhaul gas turbine engine turbine and exhaust section components
	• MEA386 Repair and/or overhaul gas turbine engine ancillary section components
	• MEA387 Test gas turbine engines and engine modules after overhaul or repair
	• MEA389 Repair and/or overhaul propellers
	• MEA390 Repair and/or overhaul rotary wing dynamic components
	• MEA391 Repair and/or overhaul aircraft mechanical system components
	• MEA392 Disassemble aircraft piston engines
	• MEA393 Repair and/or overhaul aircraft piston engine cylinder assembly components
	• MEA394 Repair and/or overhaul aircraft piston engine crankcase assembly components
	• MEA395 Reassemble aircraft piston engines
	• MEA396 Assemble aircraft piston engine quick engine change unit
	• MEA397 Test aircraft piston engines after repair or overhaul
	• MEA401 Inspect aircraft structures
	• MEA405 Repair/modify aircraft composite material structure/components
	• MEA406 Repair/modify aircraft non-primary structural sheet metal components
	• MEA407 Repair/modify aircraft non-primary structural non-metallic components
	• MEA410 Maintain aircraft structure/components

Alignment of VET qualification standards to CASA licensing regulations

Units of Competency	
	• MEA411 Remove surface coatings from aircraft or aircraft components
	• MEA412 Pre-treat aluminium alloy surfaces
	• MEA413 Seal aircraft and aircraft component structural seams
	• MEA414 Remove light corrosion from aircraft
	• MEA415 Paint aircraft surfaces
	• MEA416 Apply aircraft identification markings, graphics and decals
	• MEA417 Apply specialty coatings to aircraft
	• MEA418 Perform basic repair of aircraft internal fittings during line maintenance
	• MEA419 Inspect and repair/modify aircraft cabin/cockpit non-primary structure components
	• MEA420 Fabricate basic structural components for aircraft
	• MEA421 Fabricate advanced structural components for aircraft
	• MEA422 Repair/modify aircraft metal structure
	• MEA423 Aircraft structure major disassembly and reassembly
	• MEA424 Evaluate aircraft non-destructive tests
	• MEA425 Perform bolted composite skin repairs
	• MEA430 Gas weld aircraft components
	• MEA431 Braze weld aircraft components
	• MEA432 Weld aircraft components using the gas tungsten arc welding process
	• MEA433 Weld aircraft components using the gas metal arc welding process
	• MEA434 Weld aircraft components using the plasma arc welding process
	• MEA435 Weld aircraft components using the manual metal arc welding process
	• MEA501 Maintain and fit anti-G suits
	• MEA502 Maintain and fit helmets
	• MEA503 Maintain and fit immersion suits
	• MEA504 Maintain and fit oxygen masks
	• MEA505 Maintain and pack parachutes
	• MEA507 Maintain, pack and fit survival inflatable buoyancy vests
	• MEA508 Maintain, install and remove restraint systems
	• MEA509 Manufacture, repair and alter aircraft related fabric components
	• MEA510 Maintain seat and pod electrical and electronic systems
	• MEA511 Operate and maintain sewing machines and overlockers
	• MEA512 Maintain general aviation recovery devices with ballistic parachute systems
	• MEA513 Maintain and pack survival inflatable life rafts

Alignment of VET qualification standards to CASA licensing regulations

Units of
Competency

- MEA514 Maintain and pack escape slides

- MEA601 Maintain aircraft egress systems

- MEA602 Remove and install aircraft stores management system components

- MEA603 Remove and install aircraft stores suspension system components

- MEA604 Inspect, test and troubleshoot aircraft stores management systems and components

- MEA605 Inspect, test and troubleshoot aircraft stores suspension systems and components

- MEA701 Produce aeronautical engineering related graphics

- MEA702 Produce avionics engineering related graphics

- MEA703 Apply aeronautical modelling for computer-aided engineering

- MEA704 Apply avionic modelling for computer-aided engineering

- MEA705 Apply basic scientific principles and techniques in aeronautical engineering situations

- MEA706 Apply basic scientific principles and techniques in avionic engineering situations

- MEA707 Select and test aeronautical engineering materials

- MEA708 Select and test avionic engineering materials

- MEA709 Apply aeronautical structure design techniques

- MEA710 Apply aeronautical system design techniques

- MEA711 Apply avionic analogue design techniques

- MEA712 Apply avionic digital design techniques

- MEA713 Integrate aeronautical fundamentals into an engineering task

- MEA714 Integrate avionic fundamentals into an engineering task

- MEA715 Evaluate aeroplane flight control systems

- MEA716 Evaluate avionic analogue systems

- MEA717 Evaluate avionic digital systems

- MEA718 Evaluate rotorcraft flight control systems

- MEA719 Evaluate aircraft electrical systems

- MEA720 Evaluate aircraft gas turbine engine power plants

- MEA721 Evaluate aircraft hydro-mechanical systems

- MEA722 Evaluate aircraft piston engine power plants

- MEA723 Evaluate aircraft pneumatic systems

- MEA724 Evaluate aircraft structure

- MEA725 Apply advanced scientific principles and techniques in avionic engineering situations

- MEA726 Apply aircraft electrical system design techniques

- MEA727 Apply calculus in avionic engineering situations

Alignment of VET qualification standards to CASA licensing regulations

Units of Competency	
	• MEA729 Apply configuration management procedures in airworthiness engineering management
	• MEA730 Apply systems engineering procedures to airworthiness engineering design project management

121 imported units of competency to be reviewed for suitability and currency as many have been superseded

- AURVTP2003 Prepare spray painting materials and equipment
- AURVTP3012 Apply air dry and polyurethane enamel refinishing materials
- AURVTT2004 Trim vehicle components
- AURVTT2005 Select and apply trim and fabric materials
- AURVTT2006 Select and apply trim and fabric adhesives
- AVIF3016A Marshal aircraft
- DEFEO101D Work safely with explosive ordnance
- DEFEO301D Package ammunition
- DEFEO302D Unpackage ammunition
- DEFEO501D Conduct explosive ordnance inspection
- DEFEO718C Maintain cartridge operated fire extinguisher systems
- LMTTF2008A Use adhesives
- MEM05004C Perform routine oxy acetylene welding
- MEM05006C Perform brazing and or silver soldering
- MEM05007C Perform manual heating and thermal cutting
- MEM05012C Perform routine manual metal arc welding
- MEM05015D Weld using manual metal arc welding process
- MEM05016C Perform advanced welding using manual metal arc welding process
- MEM05017D Weld using gas metal arc welding process
- MEM05018C Perform advanced welding using gas metal arc welding process
- MEM05019D Weld using gas tungsten arc welding process
- MEM05020C Perform advanced welding using gas tungsten arc welding process
- MEM05022C Perform advanced welding using oxy acetylene welding process
- MEM05026C Apply welding principles
- MEM05043B Perform welds to code standards using gas metal arc welding process
- MEM05044B Perform welds to code standards using gas tungsten arc welding process
- MEM05046B Perform welds to code standards using manual metal arc welding process

Alignment of VET qualification standards to CASA licensing regulations

Units of Competency	• MEM05052A Apply safe welding practices
	• MEM06003C Carry out heat treatment
	• MEM07001B Perform operational maintenance of machines/equipment
	• MEM07002B Perform precision shaping/planing/slotting operations
	• MEM07005C Perform general machining
	• MEM07006C Perform lathe operations
	• MEM07007C Perform milling operations
	• MEM07008D Perform grinding operations
	• MEM07009B Perform precision jig boring operations
	• MEM07010B Perform tool and cutter grinding operations
	• MEM07011B Perform complex milling operations
	• MEM07012B Perform complex grinding operations
	• MEM07013B Perform machining operations using horizontal and/or vertical boring machines
	• MEM07015B Set computer controlled machines/processes
	• MEM07016C Set and edit computer controlled machines/processes
	• MEM07018C Write basic NC/CNC programs
	• MEM07019C Program NC/CNC machining centre
	• MEM07020C Program multiple spindle and/or multiple axis NC/CNC machining centre
	• MEM07021B Perform complex lathe operations
	• MEM07022C Program CNC wire cut machines
	• MEM07024B Operate and monitor machine/process
	• MEM07028B Operate computer controlled machines/processes
	• MEM07030C Perform metal spinning lathe operations (basic)
	• MEM07031C Perform metal spinning lathe operations (complex)
	• MEM07032B Use workshop machines for basic operations
	• MEM08001B Perform wire, jig and barrel load/unload work
	• MEM08002C Pre-treat work for subsequent surface coating
	• MEM08003C Perform electroplating operations
	• MEM08004B Finish work using wet, dry and vapour deposition methods
	• MEM08006B Produce clear and/or coloured and/or sealed anodised films on aluminium
	• MEM08018B Electroplate engineering coatings
	• MEM09002B Interpret technical drawing
	• MEM09003B Prepare basic engineering drawing

Alignment of VET qualification standards to CASA licensing regulations

Units of Competency	• MEM09009C Create 2D drawings using computer aided design system
	• MEM12001B Use comparison and basic measuring devices
	• MEM12003B Perform precision mechanical measurement
	• MEM12023A Perform engineering measurements
	• MEM12024A Perform computations
	• MEM13003B Work safely with industrial chemicals and materials
	• MEM13013B Work safely with ionizing radiation
	• MEM15004B Perform inspection
	• MEM15010B Perform laboratory procedures
	• MEM15017B Use and maintain reference standards
	• MEM16002C Conduct formal interviews and negotiations
	• MEM16006A Organise and communicate information
	• MEM16008A Interact with computing technology
	• MEM16010A Write reports
	• MEM17002B Conduct workplace assessment
	• MEM18001C Use hand tools
	• MEM18002B Use power tools/hand held operations
	• MEM22013A Coordinate engineering projects
	• MEM23004A Apply technical mathematics
	• MEM23007A Apply calculus to engineering tasks
	• MEM234019A Apply finite element analysis in engineering design
	• MEM234022A Apply advanced calculus to technology problems
	• MEM24001B Perform basic penetrant testing
	• MEM24002B Perform penetrant testing
	• MEM24003B Perform basic magnetic particle testing
	• MEM24004B Perform magnetic particle testing
	• MEM24005B Perform basic eddy current testing
	• MEM24006B Perform eddy current testing
	• MEM24007B Perform ultrasonic thickness testing
	• MEM24008B Perform ultrasonic testing
	• MEM24009B Perform basic radiographic testing
	• MEM24010B Perform radiographic testing
	• MEM24011B Establish non-destructive tests

Alignment of VET qualification standards to CASA licensing regulations

Units of Competency	
	• MEM24012C Apply metallurgy principles
	• MEM30007A Select common engineering materials
	• MEM30012A Apply mathematical techniques in a manufacturing engineering or related environment
	• MSAENV272B Participate in environmentally sustainable work practices
	• MSAENV472B Implement and monitor environmentally sustainable work practices
	• MSAENV672B Develop workplace policy and procedures for environmental sustainability
	• MSFSF2001 Cut single layer fabric
	• MSFSF2002 Machine sew materials
	• MSFUP3012 Apply marine sewing and installation techniques
	• PMBPROD262B Operate tyre curing equipment
	• PMBPROD263B Operate retread curing equipment
	• PMBPROD264C Check recycle wash process
	• PMBPROD265C Operate portable vulcanising equipment
	• PMBPROD266B Prepare tyre casings for retreading
	• PMBPROD324B Inspect tyres for retreading
	• PMBPROD325B Lay on tyre retreads
	• PMBPROD326B Inspect tyres
	• PSPMNGT610A Manage public sector financial resources
	• TAEASS401B Plan assessment activities and processes
	• TAEASS402B Assess competence
	• TAEASS403B Participate in assessment validation
	• TAEASS502B Design and develop assessment tools
	• TAEDEL301A Provide work skill instruction
	• TAEDEL402A Plan, organise and facilitate learning in the workplace
	• TAEDES401A Design and develop learning programs

Alignment of VET qualification standards to CASA licensing regulations

Units of Competency	
	• MEM09009C Create 2D drawings using computer aided design system
	• MEM12001B Use comparison and basic measuring devices
	• MEM12003B Perform precision mechanical measurement
	• MEM12023A Perform engineering measurements
	• MEM12024A Perform computations
	• MEM13003B Work safely with industrial chemicals and materials
	• MEM13013B Work safely with ionizing radiation
	• MEM15004B Perform inspection
	• MEM15010B Perform laboratory procedures
	• MEM15017B Use and maintain reference standards
	• MEM16002C Conduct formal interviews and negotiations
	• MEM16006A Organise and communicate information
	• MEM16008A Interact with computing technology
	• MEM16010A Write reports
	• MEM17002B Conduct workplace assessment
	• MEM18001C Use hand tools
	• MEM18002B Use power tools/hand held operations
	• MEM22013A Coordinate engineering projects
	• MEM23004A Apply technical mathematics
	• MEM23007A Apply calculus to engineering tasks
	• MEM234019A Apply finite element analysis in engineering design
	• MEM234022A Apply advanced calculus to technology problems
	• MEM24001B Perform basic penetrant testing
	• MEM24002B Perform penetrant testing
	• MEM24003B Perform basic magnetic particle testing
	• MEM24004B Perform magnetic particle testing
	• MEM24005B Perform basic eddy current testing
	• MEM24006B Perform eddy current testing
	• MEM24007B Perform ultrasonic thickness testing
	• MEM24008B Perform ultrasonic testing
	• MEM24009B Perform basic radiographic testing
	• MEM24010B Perform radiographic testing
	• MEM24011B Establish non-destructive tests

Alignment of VET qualification standards to CASA licensing regulations

Units of Competency	
	• MEM24012C Apply metallurgy principles
	• MEM30007A Select common engineering materials
	• MEM30012A Apply mathematical techniques in a manufacturing engineering or related environment
	• MSAENV272B Participate in environmentally sustainable work practices
	• MSAENV472B Implement and monitor environmentally sustainable work practices
	• MSAENV672B Develop workplace policy and procedures for environmental sustainability
	• MSFSF2001 Cut single layer fabric
	• MSFSF2002 Machine sew materials
	• MSFUP3012 Apply marine sewing and installation techniques
	• PMBPROD262B Operate tyre curing equipment
	• PMBPROD263B Operate retread curing equipment
	• PMBPROD264C Check recycle wash process
	• PMBPROD265C Operate portable vulcanising equipment
	• PMBPROD266B Prepare tyre casings for retreading
	• PMBPROD324B Inspect tyres for retreading
	• PMBPROD325B Lay on tyre retreads
	• PMBPROD326B Inspect tyres
	• PSPMNGT610A Manage public sector financial resources
	• TAEASS401B Plan assessment activities and processes
	• TAEASS402B Assess competence
	• TAEASS403B Participate in assessment validation
	• TAEASS502B Design and develop assessment tools
	• TAEDEL301A Provide work skill instruction
	• TAEDEL402A Plan, organise and facilitate learning in the workplace
	• TAEDES401A Design and develop learning programs

Appendix A: Aerospace Industry Survey Analysis

On behalf of the Aerospace Industry Reference Committee, IBSA Manufacturing conducted a survey in October 2017 to gather industry intelligence on current workforce arrangements and challenges as well as future training needs.

The survey results inform the Aerospace IRC Industry Skills Forecast and assist in identifying future training package development work. The survey consisted of two sections:

1   covered general information about the industry; and

2   covered information about apprenticeships in the industry.

Please find below an analysis of the survey results.

Survey Respondents Profile

In total, 143 respondents completed the survey across all states and territories as indicated in the figures below:

ACT	4%
NSW	36%
NT	1%
QLD	18%
SA	8%
TAS	1%
VIC	17%
WA	15%
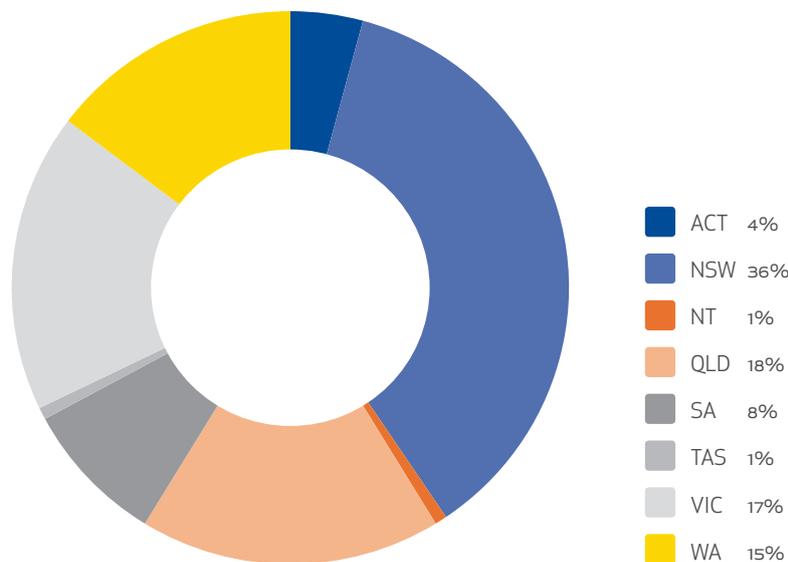
Over 80% of total respondents work within Aviation Maintenance and are Licensed Aircraft Maintenance Engineers (LAMEs).

Respondents to the survey indicated that they primarily maintain civil aircraft as follows:

- Fixed wing turbine – large   (40%)

- Fixed wing turbine – small   (10%)

- Fixed wing piston   (10%)

The type of maintenance undertaken includes:

- Aircraft Mechanical   (40%)

- Aircraft Avionic   (29%)

- Structures   (13%)

- Component Mechanical   (10%)

The top ten technologies maintained are:

1   Air Cycle air-conditioning

2   AC generation (alternating current)

3   Fixed fire suppression

4   Full Authority Digital Engine Control (FADEC) engine control

5   Satellite Navigation

6   Oxygen Storage

7   Oxygen generation

8   Automatic Dependent Surveillance Broadcast (ADSB)

9   Structural Composites

10   Fly by wire flight controls

11   **Attachment A** provides a respondent profile for key states.

The Department of Defence also conducted a VET Industry and Workforce Survey in November 2017. A summary of the Aerospace sector results is provided in **Attachment B**.

Section 1: General Industry Information

The broad industry trends and changes identified by respondents include:

- The growing Skills Gap between experienced LAMEs and new qualified entrants. This gap is further compounded by an ageing workforce and very few new entrants to the industry

- Insufficient Training to apprentices has resulted in a lack of depth in skills and knowledge in the industry

- Diminished Quality and Standards which are influenced by cost reduction business models, a reduction in the amount of preventative maintenance and the continuing devaluation of skills

- Technology Changes with technology advancing rapidly and more integrated systems, there is a tendency toward automation of tasks. Other changes include increased use of computer-based fault finding, greater number of unmanned ports to which aircraft fly and increased provision of remote support via digital mediums

- Licensing and Regulation is resulting in higher overheads and increased operational costs. A wide variety of licence requirements for individuals have reduced overall aircraft knowledge. Increased use of drones and the lack of laws and regulations in relation to unmanned and autonomous aircraft.

When asked to rate the level of impact (Low = 1, Medium = 2 or Significant impact = 3) of specific workforce challenges, respondents rated the ageing workforce and a shortage of skilled workers as key challenges for the industry. Automation of tasks was rated as the challenge which had the least impact on the industry as shown in the following figure.

The table below shows which workforce challenges were rated as having the highest and lowest impact in each state.

	NSW	QLD	VIC	WA	Other
Highest impact	Shortage of Skilled workers	Ageing Workforce / Shortage of Skilled workers	Shortage of Skilled Workers	Ageing Workforce	Ageing Workforce
Lowest impact	Rural and remote geographic locations	Automation of Tasks	Rural and remote geographic locations	Rural and remote geographic locations	Language, literacy & numeracy (LLN)

In regard to access to accredited training, Victoria had the highest weighted impact score followed by New South Wales, as indicated below.

Access to accredited training, Weighted average impact score:

VIC	NSW	WA	Other	QLD
2.73	2.68	2.5	2.5	2.3

Respondents identified the following key changes to impact their workforce over the next 3-5 years.

1   **Changes in industry** conditions including:

- Increased used of contract labour and sending work offshore

- Anti-competitive work contracts, changing penalty rates, and shift arrangements

- Continuing devaluation of skills and experience in favour of a 'flexible' workforce

- Increasing workload, time pressures to rectify aircraft and larger fleet sizes have resulted in unsustainable productivity practices.

2   **Ageing Workforce** – with most skilled LAMEs 50 years or older, the industry needs to consider the physical requirement of the roles and how to replace the skills and experience about to leave the industry.

3   **Quality of Training** which has resulted in new entrants to the industry having a lack of basic skills depth and knowledge. There has also been a shift to training apprentices in higher technology areas which has resulted in a skills deficit in the general aviation sector. The industry is also inadequately prepared to train workers in regard to changes in technology.

4   **Emerging Technologies** increasing reliance on technologies to assist in fault identification, integrated avionic and mechanical systems, increased use of software-based systems, and new aircraft types and structures. A key challenge will be to change the perception that these new technologies will require less maintenance.

5   **Financial Pressures** in regard to high operational and training costs as well as the impact of economic uncertainty.

The range of technologies or skills reported by respondents as having left the industry or diminished in importance in the last decade fell into the following categories:

Category	% of respondents	Category	% of respondents
Maintenance Skills	40	Apprentices	5
Basic Skills	20	Quality	3
Level of Training	11	Development Opportunities	2
Technology	9	Technical Skills	2
Avionics	7	Licensed Pathways	1

The maintenance skills reported as having left the industry include:

- General and deep understanding of component maintenance, repair, overhaul and testing

- Skills and knowledge to overhaul and restore fabric- and wood-covered aircraft components

- Heavy maintenance checks (closure of maintenance facilities)

- In-house repair facilities or workshops to undertake fitting-machining and hose-tube maintenance

- Undertaking manual adjustments as required due to heavy reliance on automated systems

- Sheet metal skills

- Detailed cleaning, surface refinishing, and painting skills

- Fault finding and troubleshooting skills

- Wiring modification and installation.

The **basic skills** reported as having diminished over the last decade include:

- Underpinning hand skills and mechanical aptitude

- Engineering skills and knowledge

- Instrument, electrical and systems knowledge

- Basic work skills and common sense

- Cross-category knowledge.

In regard to the **level of training,** the closure of a key training institute was reported as having an effect on the industry as well as less access to refresher and specialist training. Respondents also noted there appeared to be less on-the-job training and a lack of theoretical knowledge.

Respondents ranked the following workforce skills in order of importance within their organisation (highest to lowest importance):

1   Design mindset/Thinking critically/Systems thinking/Solving problems skills

2   Learning agility/Information literacy/Intellectual autonomy and self-management skills

3   Communication/Collaboration including virtual collaboration/Social intelligence skills

4   Science, Technology, Engineering and Mathematics (STEM) skills

5   Technology use and application skills

6   Language, Literacy and Numeracy (LLN) skills

7   Data analysis skills

8   Managerial/Leadership skills

9   Customer service/Marketing skills

10   Environmental and Sustainability skills

11   Financial skills

12   Entrepreneurial skills

New job roles the industry is currently developing skills for include:

•   Roles related to **licensing and regulation** such as LAMEs, B1 Licence holders, Airworthiness and Safety Inspectors

•   **Managerial and leadership** roles including aviation, people and project management as well as supervisory roles

•   Roles related to new technologies such as avionics, digital systems integration, new aircraft types and composite structures

•   **Engineering** roles covering cross-trade mechanical skills, fibre optics and technical research.

In preparing for new skills, industry has experienced the following challenges:

- **Access to Training** respondents reported that training had been diluted, with many employers moving to more cost-effective training models such as online or web-based courses, and there were fewer opportunities to undertake refresher or specialised training due to the cost or availability of training

- **Cost of Training** is prohibitive

- **Management issues** in getting assistance and support from employers

- **Time Management** in regard to employers allowing time to undertake the training, some respondents reported needing to take time off work to complete training

- **Meeting licensing and industry requirements** was reported as difficult by some respondents which was compounded by regulatory changes. Respondents also noted difficulty in keeping current with industry standards and new regulations.

In regard to the future workforce, a quarter of total respondents indicated:

- their organisation intended to employ apprentices in the near future

- they would need to recruit for new and emerging job roles and skills requirements within the next 3-5 years.

	NSW	QLD	WA	VIC	Other
Apprentices in the near future	13	8	5	5	2
Emerging job roles in next 3 – 5 years	13	4	4	9	5

When looking at the number of respondents who reported that their organisation was intending to employ apprentices in the near future or recruit for emerging job roles (see table above), the following can be noted:

- NSW and WA: equally focused on apprentices and emerging job roles

- QLD: higher focus is on apprenticeships rather than emerging job roles

- VIC and other states: increased focus on emerging job roles over apprenticeships.

When seeking a new employee, respondents valued broad generic skills as applicable to a range of aircraft/systems more than specialised skills focused on particular aircraft/systems as shown in the figure below.

Not Important	Somewhat important	Very important

Broad generic skills — 78

Specialised skills — 69

When seeking a new employee, 44% of respondents looked for specific Vocational Education and Training (VET) or Higher Education qualifications when recruiting staff. The qualifications specified include:

- Certificate III level qualifications (new recruits to have completed an apprenticeship)

- Certificate IV Aeroskills

- CASA Licence Holder

- Diploma level qualification (Industry specific).

The respondents who did not look for specific qualifications valued:

- Common sense

- Hands-on skills and basic practical aptitude

- Attitude and interest in the industry.

Other challenges respondents reported include:

Global mobility: employers bringing in foreign workers has reduced investment in skills and apprentice training.

Changing work and career values: The industry struggles to maintain people in managerial and leadership roles which results in limited long-term planning.

Changing work and career values: Lower pay rates have resulted in young people leaving the industry.

Innovation ahead of regulation: The decisions of regulatory bodies on licensing requirement impact ability to undertake work.

Section 2: Information on Apprentices

In regard to employment of apprentices:

- 60 respondents work with organisations which have employed apprentices over the last 10 years

- 40 respondents work within organisations which currently employ apprentices.

This shows a significant decrease over the last 10 years in the employment of apprenticeships, particularly in New South Wales and Victoria.

	NSW	QLD	WA	VIC	Other
Have employed apprentices previously	25	9	5	14	7
Currently employ apprentices	14	8	5	8	5

75% of the respondents whose organisations currently or have previously employed apprentices reported that they had noticed a decline in apprentices' abilities.

The most common way apprentices currently engage with training is via on-the-job-training, followed by block release. Over 85% of respondents were not satisfied with the training provided to their apprentices for the following reasons:

- **Most said Training** not linked to industry expectations, citing:

  - the curriculum being delivered does not align with the skill set required to service the general aviation sector

  - it's complex, disorganised and there is a lack of communication with industry

  - training has been unable to consolidate theory with hands-on practice in a real environment, resulting in a lack of basic skills

  - it's not specialised and detailed enough for different aircraft trade streams

  - training appears to be rushed and apprentices pushed through

  - schedule changes by the training organisations severely impact work programming

  - 'qualified' apprentices often need to resit licensing exams

  - focus on completing assessment requirements rather than actual practical learning.

- Some said **Industry not meeting training requirements (20%)** – closure of key maintenance facilities has limited opportunities for apprentices to hone skills and employers are not exposing learners to sufficient tasks.

- Some said **Unsuitable students (17%)** – there appears to be a lack of basic skills and knowledge as well as decreased initiative.

38% of respondents felt that the training for their apprentices lacked practical (hand skills). The figure below shows which areas of training for practical skills could be improved for apprentices.

Practical skills - Basic tools operation

Practical skills - Structural repair

A further 27% of respondents felt that the training for their apprentices lacked theoretical (knowledge skills). The figure below shows which areas of training for theoretical knowledge could be improved for apprentices.

Theoretical Knowledge - Aircraft systems

Theoretical Knowledge - Inspection techniques

Theoretical Knowledge - Airwothiness requirments

Respondents also indicated the following areas of training in relation to soft skills could be improved for apprentices.

Soft skills - People management

Soft skills - Time management

Soft skills - Computer technology

Attachment A – Respondent profile by key state

	NSW	QLD	VIC	WA	Other
% respondents Aviation Maintenance	79%	84%	84%	81%	85%
% respondents LAMEs	77%	84%	88%	71%	75%
% maintain Civil Aircraft	100%	80%	100%	100%	90%
Aircraft type maintained (Top 2 responses)	• Fixed wing turbine large (75%) • Fixed wing turbine small (25%)	• Fixed wing turbine large (60%) • Fixed wing piston (40%)	• Fixed wing turbine large (100%) • Aircraft components (7%)	• Fixed wing turbine large (100%) • Fixed wing turbine small (33%)	• Fixed wing turbine large (80%) • Fixed wing piston (30%) • Rotary wing piston (30%)
Maintenance undertaken (Top 2 responses)	• Aircraft Mechanical (81%) • Aircraft Avionic (56%)	• Aircraft Mechanical (80%) • Aircraft Avionic (40%)	• Aircraft Mechanical (73%) • Aircraft Avionic (67%)	• Aircraft Mechanical (83%) • Aircraft Avionic (67%)	• Aircraft Mechanical (70%) • Aircraft Avionic (50%)
Top technologies maintained	• Fixed fire suppression (88%) • Sat Navigation (84%) • FADEC engine control (84%) • AC generation (84%) • Air Cycle air-conditioning (84%)	• Structural Composites (80%) • AC generation (80%) • Air Cycle air-conditioning (70%)	• AC generation (100%) • Air Cycle air-conditioning (100%) • FADEC engine control (93%) • Oxygen generation (93%) • Fixed fire suppression (93%)	• FADEC engine control (100%) • Air Cycle air-conditioning (100%) • Oxy-Storage (100%) • Fixed fire suppression (100%)	• FADEC engine control (90%) • Air Cycle air-conditioning (90%) • Fixed fire suppression (90%) • AC generation (80%) • Oxy-Storage (80%)

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Attachment B

Department of Defence, 2017-18 VET Industry and Workforce Survey Summary of Aerospace Sector Results

Workforce – Key Changes

New or emerging defence job roles requiring new skills development were identified as:

- Networks air and ground integration

- The use of drone technology for professional imagery capture and exploitation

- Low observable air frames.

The following new challenges faced by defence as result of new or emerging job roles were identified as:

- Overlap between current job roles

- Operation of drones to capture imagery.

Key changes anticipated to impact the Defence Aerospace Workforce over the next 3-5 years were identified as:

- Increased network requirement, increased cyber awareness and defence

- Low observable air frame support

- Drone technology and imagery support.

Defence ranked the following organisational skills in order of importance to their industry:

1   Science, Engineering and Mathematics

2   Technology

3   Thinking Critically

4   Language, Literacy and Numeracy (LLN).

NEW Innovation was a new workforce skill nominated in the responses

The technologies and skills identified as having left the defence industry or diminished in importance in the last 15 years and have impacted the workplace include:

- decreased reliance on heavy engineering support within the ADF uniform presence

- less equipment reliant on deep level maintenance, more contracted support

- increased number of components require fewer servicing skills due to a higher degree of throw-away items in general.

The following table recognises the nominated impact (low, moderate of significant) each workforce challenge places on the defence industry.

Workforce Challenge	Low	Moderate	Significant
Ageing workforce			
Change in Government Policy / Legislation			
Changing supply chain relationships			
Language, literacy and numeracy (LLN)			
Automation of roles			
New and emerging technologies			
New skills and capabilities			
Organisational reform			
Shortage of skilled workforce			
Skilled workforce changing requirements			

Job Roles and Developing Capability

Anticipated recruitment – in the next 3 to 5 years – due to new or emerging job roles and skill sets are anticipated:

• Yes, cyber and networking skill sets.

Challenges experienced in preparing for new skills or capability – the following responses were recorded.

• Yes, experience and training alignment not yet in place particularly in emerging technologies.

Formal qualifications are desirable for the defence aerospace industry when developing capability or recruiting:

• Sometimes (100% of respondents)

Defence Aerospace Apprentices:

The table below shows the number of current registered defence apprentices in the aerospace trades:

Qualification	MEA40615 - Certificate IV in Aeroskills (Avionics)	MEA40715 - Certificate IV in Aeroskills (Mechanical)	MEA41315 - Certificate IV in Aeroskills (Structures)
Active Apprenticeships as at 05 MARCH 2018	332	326	37

Appendix B: Future Skills Outcomes

The Australian Industry and Skills Committee (AISC) commissioned the Future Skills and Training Resource which summarises data on current and future Australian and international megatrends, to support Industry Reference Committees (IRCs) in developing their Industry Skills Forecasts and Proposed Schedules of Work.

The following trends and considerations are based on Aerospace IRC discussions. This appendix presents the preliminary thinking of IRC members in order to stimulate broad discussion in industry.

Trends

Society and Culture

The key trends affecting the aerospace industry are:

Ageing Population: The industry's current workforce is ageing, and this has an urgent and critical impact on training investment as well as attracting new, younger entrants into the industry. Aspects of the industry's multigenerational workforce also pose challenges to ways of working, communication and learning within the industry.

Global Mobility: The industry operates within a global framework and standards which promote global mobility of the workforce. There is currently a discrepancy between Civil Aviation Safety Authority (CASA) (knowledge focus) and Australian vocational standards (practical focus). Australian expertise is highly sought-after which results in experienced aircraft maintenance engineers leaving for lucrative overseas roles that offer higher remuneration and lifestyle benefits.

Changing Work and Career Values: New entrants to the industry have different career expectations with respect to long-term tenure and no longer expect to see out their career with any one organisation. New entrants also bring a different range of practical knowledge with them as the definition of 'common sense' is changing.

Political and Institutional

The key trend affecting the aerospace industry is:

Innovation Ahead of Regulation: CASA licensing requirements drive the skills needs and training for the industry. The Australian regulation and licensing requirements need to be harmonised to International Standards to enable the sector to capitalise on growth opportunities in South East Asia and to enhance mobility of the skilled workforce. There is also a discrepancy in relation to General Aviation requirements compared to other sectors which can hamper worker mobility in the industry.

Technology

The key trends affecting the aerospace industry are:

Digitisation: Artificial intelligence and automation is impacting on the work of Aircraft Maintenance Engineers. There is also an increased use of tablets and devices to complete work such as scheduling, reporting, diagnosis and sign-off on maintenance.

Mobility and Connectivity: The industry is seeing an increased use of Unmanned Aerial Vehicles as well as integrated systems.

Augmented and Virtual Reality: The defence sector has augmentation and virtual reality qualifications which are aligned to AQF4 level.

Cross-Disciplinary Science: An emerging cross-disciplinary skill need in the industry is the requirement for workers to be able to work on both mechanical and avionic technologies.

Resources and Environment

The key trends affecting the aerospace industry are:

Financial Viability: Increased cost pressures have resulted in limited investment in new technologies by General Aviation. The General Aviation sector is particularly sensitive to rising operational costs.

In regard to training, funding only full qualifications is a barrier to industry as some workers may only require upskilling in key areas. Employers prefer 'just-in-time' training so the cost can spread over a greater time period. The rising cost of delivery and thin markets has resulted in the increased opportunity to utilise simulation for training delivery, however this requires a costly initial investment. Assessment needs to be conducted in a 'real' workplace.

Access to Quality Internet: Larger operators are more driven to adopt technology to support data security and integrity than smaller operators. Poor internet connectivity has restricted the ability of Registered Training Organisations (RTOs) to embrace and utilise augmented reality training resources.

International Sustainability Action: Sustainability has a significant impact across the industry and operational environment. One industry consideration is the disposal of airline componentry, such as carbon fibre casings, which can have negative environmental impacts if not disposed of correctly.

Business and Economics

The key trends affecting the aerospace industry are:

Empowered Customers: Demand for lower airfares continues to put pressure on airlines operating in a highly competitive global market.

Emerging Markets: The forecasted growth of the aviation industry the in South-East Asian region is expected to impact the Australian industry. Demand for skilled workers in the region is outstripping training capacity.

Changing Workplace Dynamics: Industry and employers are taking less responsibility in ensuring career pathways exist for industry entrants, with their focus being on the 'just-in-time' training of key skills that meet compliance requirements.

Skills Mismatch: This mismatch exists between expectations of new workforce entrants, the maintenance of ageing aircraft and the use of old tooling and traditional hand skills and work practices. The industry is grappling with skills to operate and maintain both ageing and emerging aircraft technologies.

Considerations for Training

Employers / Industry

In the past, regional and general aviation communities were the 'breeding ground' for the aviation industry, but these sectors are having difficulty in attracting people to work regionally and remotely and on ageing fleets.

Employers and industry need a fresh approach to attract new talent and retain experience in the industry. Training needs to be viewed as value creation and not simply an incurred expense.

With increased competition from emerging markets and an ageing workforce, the industry needs to consider how to attract new entrants to the industry. One solution is for larger airlines (Commercial Aviation) to investigate partnerships with the General Aviation sector to create career pathways for people. The industry has well defined career pathways for pilots but hasn't considered similar channels for aircraft maintenance engineers.

Learners / Workers

Access to quality training which leads to a licence outcome is important to learners and workers as licensing drives the ability to work in the industry.

Younger generations have a different, less structured approach to work and the industry and training organisations need to be more versatile and flexible to meet these changing attitudes.

The lack of career pathways has seen experienced, trained people start their careers in Aviation and move to other industries. More recently, there has been a shift of people drawn to the industry as unlicensed Aircraft Maintenance Engineers later in their careers from other sectors, such as mining.

Government

Lack of harmonisation with International Aviation Safety Assessment (IASA) standards is costing the industry money.

As Aircraft Maintenance Engineers and other new entrants often come from a mechanical or technical background this situation poses funding implications that governments need to consider. Funding to upskill these new entrants is limited as they often already possess a trade level qualification.

Younger generations wanting to undertake micro skill sets to build up to a qualification or upskill also have similar funding implications.

Education and Training

The biggest issue is the current rigidity of the Vocational Education and Training (VET) system to absorb the CASA/EASA regulations. The main difficulty is in trying to match the theoretical regulatory outcomes to a competency-based model. New approaches such as a 'best practice' skills framework need to be considered.

The specificity of the MEA Aeroskills Training Package, where learners need to demonstrate the use of specific tools in an aerospace environment, makes it difficult to encourage new entrants through Recognition of Prior Learning (RPL) of common skills. To assist transition to the industry, the training package needs to be reviewed to ensure there are cross-discipline linkages to other areas such as the use of standard tools in a maintenance environment.

The training package has attempted to shoehorn specific and general licences together, but this approach hasn't been successful. With general licences not being a regulatory requirement, consideration need to be given to the development of skill set or a general qualification to cover the functional role requirements in general aviation and provide entry and exit points that build skill level to a licensed occupation.

Currently, the VET system does not support ongoing professional development for post-trade job roles in the aerospace industry.
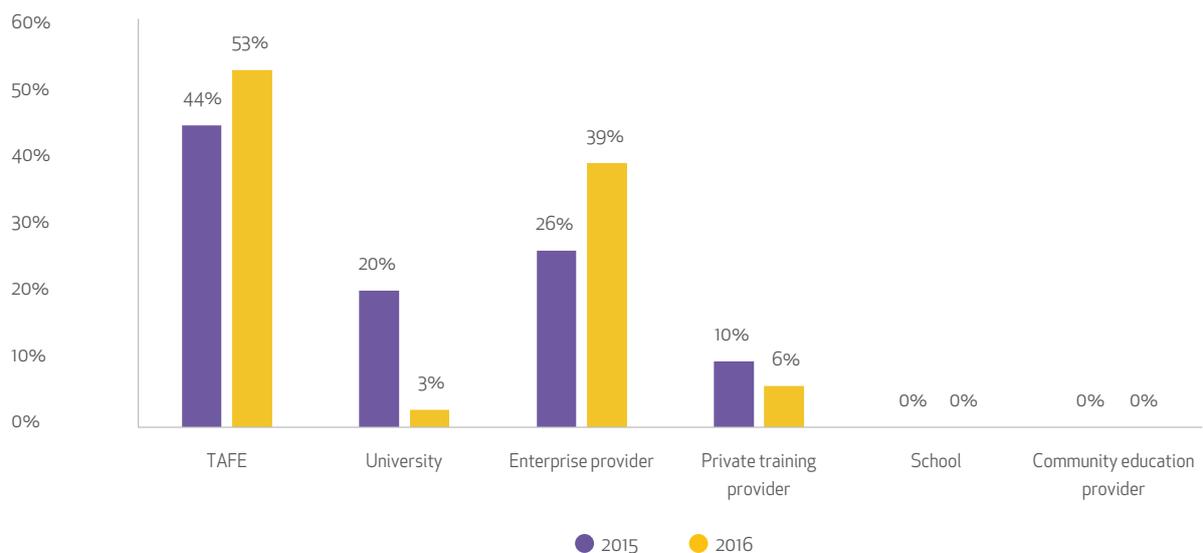
Appendix C: Training Package Enrolment Snapshot

Program enrolments in MEA Aeroskills qualifications by State/Territory of student residence
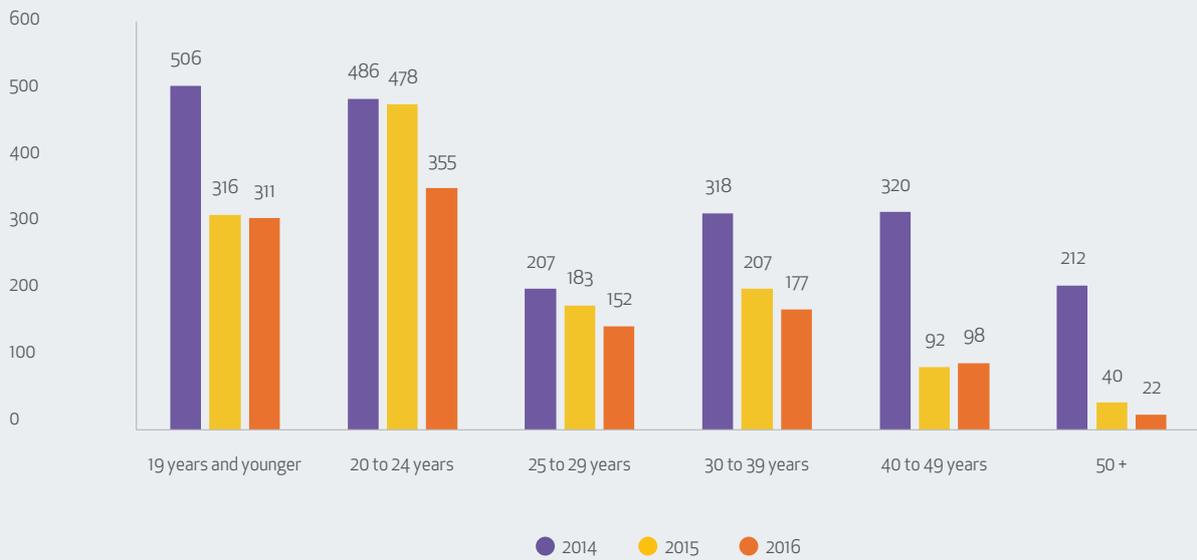
2016 Total VET Activity

●	NSW	375
●	VIC	126
●	QLD	318
●	SA	58
●	WA	160
●	TAS	2
●	NT	55
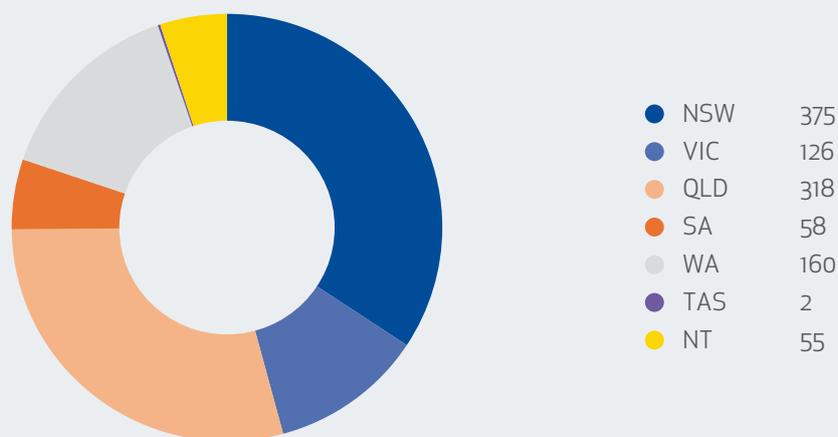
Program enrolments in MEA Aeroskills qualifications by Training Organisation Type

Percentage of 2015 - 2016 Total VET Activity

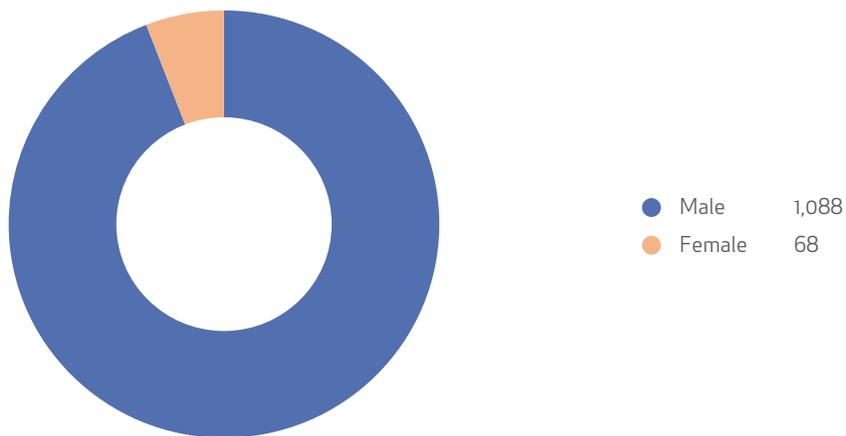|	TAFE	University	Enterprise provider	Private training provider	School	Community education provider
2015	44%	20%	26%	10%	0%	0%
2016	53%	3%	39%	6%	0%	0%

● 2015   ● 2016

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Program enrolments in MEA Aeroskills qualifications by Age Group

2014 - 2016 Total VET Activity

	2014	2015	2016
19 years and younger	506	316	311
20 to 24 years	486	478	355
25 to 29 years	207	183	152
30 to 39 years	318	207	177
40 to 49 years	320	92	98
50 +	212	40	22

● 2014   ● 2015   ● 2016

Program enrolments in MEA Aeroskills qualifications by Sex

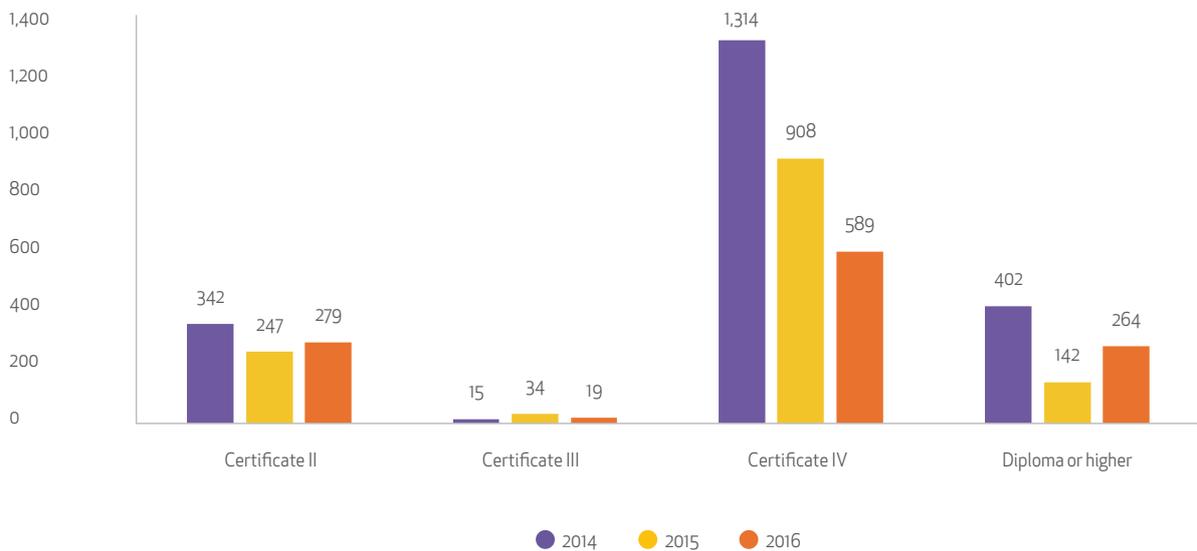2016 Total VET Activity

● Male   1,088
● Female   68

Program enrolments in MEA Aeroskills qualifications by Apprentice/Trainee by Apprentice/Trainee status of student'

2014-2016 Total VET Activity

- ● Apprentices and trainees undertaking off-the-job training
- ● Not an apprentice or trainee
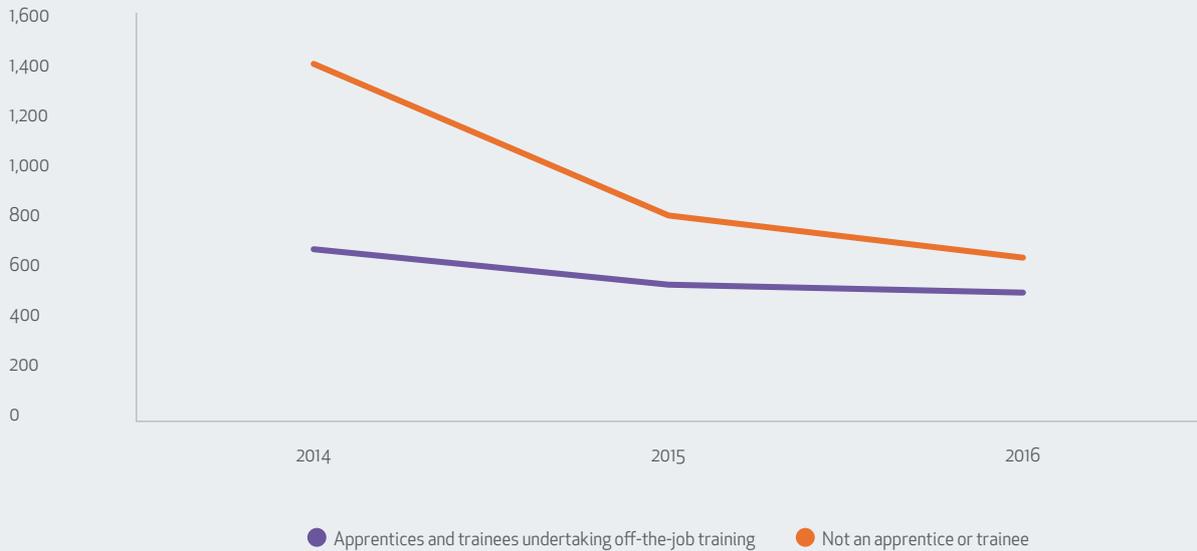
Program enrolments in MEA Aeroskills qualifications by qualification level

2014 - 2016 Total VET Activity

- ● 2014 ● 2015 ● 2016

All data in this Appendix is sourced from the VOCSTATS VET Provider Collection. 2016 Government Funded and Total VET Activity Program enrolments extracted September 2017

VOCSATATS data are 'randomly' adjusted by small amounts by a data perturbation tool to avoid the release of confidential data. Hence numbers are only approximate. The perturbation impact is negligible for most practical purposes. The effect can be significant and must be considered when interpreting small numbers.

MEA Aeroskills Training Package
Skills Forecast and Proposed Schedule of Work 2018-2022

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