

Report of the Expert Panel on Aviation Skills & Training

June 2018

Contents

Summary

Introduction

1. Challenges for Australia of rapid growth in global aviation
 2. Defining the 'shortage' of skills
 3. International experience
 4. Training and retention of aviation professionals in Australia
 - 4.1 General Aviation's pool of resources
 - 4.2 Flying experience
 - 4.3 Availability of experienced instructors
 - 4.4 Approved Testing Officers/Flight Examiners – Indemnity Issues
 - 4.5 Cost barriers to entry
 - 4.6 'Job' vs 'Career'
 - 4.7 Attrition rate of skilled staff
 - 4.8 Industry partnerships and cooperation
 - 4.9 Education and training alignment
 - 4.10 Cadet Pilot Programmes
 - 4.11 Economic viability of flying schools
 - 4.12 Skilled migration
 - 4.13 Regulation
 - 4.14 Diversity
 5. Training overseas pilot and engineering students
 6. Recommendations
- Appendices

Summary

Australia is experiencing a severe shortage of aviation personnel and the situation is growing worse. The current shortage of qualified pilots and aircraft maintenance engineers is a global problem and a major issue for Australia's aviation system.

Urgent action is required if the country is to avoid major disruptions.

This is not a future threat, it is a significant *present* challenge that is currently disrupting the industry, and actions to address it need to include immediate mitigations supported by a longer-term sustainable strategy which involves many stakeholders.

Introduction

Aviation is a cyclical industry and growth has traditionally been closely related to global economic conditions. For years surpluses and shortages of qualified personnel have been a characteristic of the industry as passenger demand has fluctuated in a cyclical pattern, reflecting developments in the world economy. In the past the tendency would have been to regard the current shortage of personnel as part of a familiar industry cycle. The next two decades however look to be a fundamentally different environment for global aviation and the outlook is for growth to occur at unprecedented levels at a time when the Australian industry is not well prepared.

A different approach to the training of future generations of aviation professionals is required and a start must be made now.

The size of the challenge is enormous. The International Air Transport Association (IATA) has forecast that current annual passenger numbers will double to reach 7 billion by 2036. In that same period Boeing has predicted that global demand for additional aviation technicians will exceed 648,000 (256,000 will be required in the Asia Pacific) and over 637,000 additional pilots will be required (253,000 will be required in the Asia Pacific).

As an advanced aviation nation Australia is potentially well-placed to be a major player in this growth, however, as this review points out, there are issues within the aviation training and regulatory systems which need fixing.

Solutions are available to resolve the many issues which are involved however a collaborative and cohesive set of short and longer-term actions is required by both industry and government to ensure the domestic aviation industry continues to provide safe, reliable and sustainable air services to Australians, particularly regional Australians. The task then is for Australia to fully grasp the substantial growth opportunity of providing larger scale training for aviation professionals from the burgeoning industry in the Asia Pacific and beyond.

In late 2017 industry stakeholders determined there would be value in establishing an industry panel to recommend strategies to respond to concerns about shortages of pilots and maintenance engineers. An Expert Panel on Aviation Skills and Training (the Panel) was formed to undertake a multi-faceted review to identify strategies to support future training and retention of aviation professionals in Australia, and to examine what steps could be taken to further develop Australia's position as a leading exporter of aviation training. The Department of Infrastructure, Regional Development and Cities provided the secretariat for the review.

The Panel's Terms of Reference and Membership is at Appendices 1 and 2.

The Panel has reviewed the alignment of industry needs with how those requirements are currently being supplied and has examined interrelated issues including regulatory requirements, current training processes, barriers to entry to the industry, migration issues, and input from various stakeholders.

This review represents a high-level examination of the key issues which the Panel believes are contributing to the shortage of qualified pilots and maintenance engineers in Australia. Due to limitations on the time Panel members could make available and the relatively short

duration of the review it is not designed to be an exhaustive report. In some areas more detailed work is required.

The principal issues which have led to the current shortage are well identified and the Panel believes that the recommendations in this report should provide the impetus for urgent action.

1. Challenges for Australia of rapid growth in global aviation

Aviation in Australia is a highly-regulated industry. Within that regulatory framework the skills, knowledge and competency that has been developed over many years has underpinned the safety record of the industry in Australia. That reputation is well-regarded globally and Australian aviation expertise is increasingly sought after particularly in the rapidly growing markets of the Asia-Pacific region.

It is clear however that in the face of unprecedented global demand for aviation professionals, Australia does not have an aviation training system capable of meeting the requirements of the industry now, or in the years ahead.

Our training system suffers from a lack of strong policy direction and coordination. It needs to be overhauled to ensure that Australia is able to continue to provide the high standard of aviation safety and services that Australians expect, and for the country to take advantage of the growing demand for pilots and aircraft engineers in the Asia Pacific.

There are many issues which contribute to the current situation.

The aviation training and skills sector is complex and is affected by an interplay of a range of issues which include:

- The nature and extent of a long-running regulatory reform program;
- The continuing evolution and delivery of Aviation and Aeroskills Training Packages;
- Changes in the industry, particularly those impacting on the economic viability of parts of the General Aviation sector;
- The level and availability of student loans and the visa and eligibility requirements for temporary migration of skilled overseas personnel.

For training providers these issues and the constant change that accompany them creating ongoing administrative burdens and compliance costs which impact on their financial viability.

The Panel has also noted that changes to areas of government policy such as to education or immigration have often resulted in unintended but negative consequences for the aviation industry and some examples are included in this review.

The highly competitive nature of the aviation industry means that aviation businesses are operating to much more rigorous commercial demands than ever before. In this context the costs of training, retention and future workforce planning has become an increasing challenge in a dynamic aviation market. Efforts by industry to find longer-term and sustainable solutions that support the expansion of the Australian aviation sector are ongoing. However, the Panel believes that more needs to be done both by industry and government to develop closer collaborative mechanisms to better match the changing demand for skilled professionals with relevant training and retention programs.

As worldwide aviation activity continues to grow, particularly in the Asia-Pacific region, the concern is that internationally based airlines will increasingly look to Australia as a source of highly qualified and experienced airline pilots, flight instructors and licenced maintenance engineers which will further exacerbate the present shortages of aviation professionals in Australia. These personnel cannot be replaced in the short term. Replacement training programs are measured in several years, not months, and years of 'hands on' experience is required to meet the competency levels needed by the industry.

The long-term sustainability of a safe and efficient Australian aviation industry will require a range of measures to be put in place to support ongoing high-quality training and the retention of a sufficient pool of aviation professionals to meet the needs of the aviation industry.

2. Defining the 'shortage' of skills

The Panel noted recent media commentary about the 'shortage' of pilots and licenced engineers in Australia and the impact this was having on Australian airline operations.

As a starting point the Panel was of the view that there was a need to better describe the actual 'shortage' of skills to enable it to better target its recommendations.

In terms of pilots, the current shortage refers to insufficient numbers of pilots with the necessary skills, experience and aptitude to fly and command aircraft operated by Australian airlines. Australia's major airlines are currently expanding operations and have a need for additional pilots to support these plans. The current pool of suitably qualified and experienced pilots is inadequate to meet the current levels of demand, with experienced Australian pilots being recruited by major international airlines to support the global expansion of air services. Without action the gap between demand and supply is likely to grow, and grow quickly.

The Panel also noted recent statements in the media which referred to there not being a shortage of pilots in Australia. The Panel is of the view however that the data referred to in this reporting is based on the number of pilots holding a commercial pilots licence and not on the availability of skilled and experienced pilots able to fly larger multi-engine aircraft, and in particular, to become pilots in command.

Australia's current training system tends to lead to a significant gap in experience and skills between pilots holding a commercial pilots licence, and what is required to fulfil the actual requirements and needs of Australia's airlines. A decline in the availability and retention of experienced flight instructors is another significant factor influencing the availability of pilots and maintenance engineers.

In terms of engineers, the situation is clearer. There is a serious shortage of licensed engineers available to oversee the maintenance of aircraft to the required regulatory standards. The licenced engineer shortage is further exacerbated by the age profile of this group who are generally in their mid to late 50's. This situation is even more pronounced in the General Aviation sector than in larger airline operations.

3. International Experience

Similar challenges are being faced by airlines worldwide and there are lessons for Australia.

The international industry experienced a difficult period from 2002 to 2012 due to the effects and the aftermath of the 9/11 terrorist attacks and the international recession which impacted on passenger demand. The profitability of many airlines was under pressure and pilot hiring freezes were implemented.

Since that time the situation has changed dramatically with a steady improvement in the world economy, growth in passenger numbers, the continuing emergence of low cost airlines and the introduction of new aircraft technology (B787 and A350) capable of providing long haul non-stop city to city connections.

There have been issues at the entry and exit levels of the industry. The 'boom bust' cycle of this period has dissuaded potential new entrants to aviation who have sought alternate careers. During the last few years the industry in the US, Europe, Canada, Australia and New Zealand has also experienced a high level of retirements at a time of strong global growth.

Experienced pilots are now in short supply. The days of a one-company flying career are long gone. Pilots are now changing companies an average of seven times during their careers and have now become 'global employees'. Airlines are experiencing cost pressures as pilots can now command higher salaries and improved conditions. This is now a worldwide issue. For example, experienced pilots are being recruited into Chinese carriers and are reportedly being paid over US \$300K tax free.

The industry has recognised the importance of this issue. IATA is undertaking priority work to identify training capacity, regulatory requirements, career pathways, pilot aptitude testing and partnerships to better connect training organisations with airlines.

New ways of training aviation professionals to meet the global growth challenge are under active discussion. One issue which has been canvassed in this review is how to address the current difficult career pathway for pilots. This problem has been recognised internationally and the establishment of training support systems built around not for profit organisations which provide financial and career assistance are being suggested. Australia should monitor these developments closely.

Airlines such as Emirates have been forced to 'park' a significant number of their aircraft mainly because of the shortage of pilots and late last year announced a US \$135M initiative to train up to 600 pilots per annum.

Despite these efforts there is a widespread view that the industry will be playing catch up for years and that further disruption to air services is inevitable.

4. Issues impacting the training and retention of aviation professionals in Australia

4.1 General Aviation and the traditional pool of resources

The Panel noted that Australia's commercial aviation industry had traditionally drawn new trainee pilots and engineers from the General Aviation industry into the regional sector and the domestic airlines had attracted pilots from the regional level and from the Australian Defence Force.

The term 'General Aviation' covers a very broad area which contains a number of major segments. The term was originally applied to VH registered (Civil Aviation Safety Authority (CASA) registered) aircraft often owned and flown by private individuals which operated to CASA flying and maintenance regulatory standards. In recent years a 'recreational category' has emerged which is largely self-regulated and which continues to grow strongly. The 'traditional General Aviation' sector has in the past been a major contributor of pilots and maintenance engineers to Australia's aviation industry. Regrettably this is no longer the case.

That traditional 'organic' supply approach is no longer appropriate to present or foreseeable circumstances. Faced with the current levels of demand it is doubtful, even if the traditional General Aviation industry is revived, that this pathway could provide sufficient numbers of pilots and engineers to meet current and future demand.

In relation to the announcement of their intention to start cadet pilot training, Qantas CEO Alan Joyce was recently reported as saying, *"There is a shortage of pilots everywhere. We are lucky because we are at the top of the food chain."* and further, *"what we are worried about is that we are taking pilots from the military and general aviation, and we can't keep doing that or the ecosystem won't survive"*.

It is believed by some Panel members that the 'ecosystem' has actually been incapable of supplying the required skilled individuals through the 'food chain' for some time.

Part of the reason is that the General Aviation sector has undergone significant change which has resulted in the traditional pilot and maintenance engineer pipeline largely drying up.

The decline in traditional General Aviation has been caused by a number of factors which have included the economics of this area of aviation, the cost of regulatory compliance, the cost of access to secondary airports, the age and costs of maintaining the General Aviation fleet and the increasing use of alternatives such as drones for surveillance and aerial photography.

There are two aspects to the current situation which are now exacerbating the shortage and, if action is not taken, will continue to disrupt domestic aviation in Australia.

A critical career pathway was once provided for pilots and maintenance engineers coming from operators flying passenger, charter and freight services using small twin engine aircraft. This area of the industry has now virtually ceased. As a result, a layer of the industry that previously provided an area for skill development has largely disappeared.

The declining use of small twin engine aircraft has contributed to the decline in numbers of pilots and instructors with sufficient multi-engine experience to transition to commercial airline operations in Australia. This declining pool of expertise in the General Aviation sector has, in large part, influenced the establishment of direct pilot training programs by Regional Express in 2007 and more recently by Virgin Australia and Qantas.

Secondly, the global demand for pilots has led to more international carriers poaching pilots from Australia's domestic airlines at a time where these airlines are themselves introducing new aircraft types into service. This further increases their need to recruit from the regional sector.

The impact on regional operators is well illustrated by the recent experience of Regional Express which in the 2017/18 year lost 40 per cent of its captains (38 per cent in 2016/17) and 30 per cent of its total pilots (24 per cent in 2016/17).

Australia's aviation industry is facing the twin dilemma of a lack of trainee pilots at the entry level of regular passenger transport operations and the loss of experienced pilots to international airlines and to retirement.

While the Panel has reviewed the various reasons for this decline in the traditional sector of General Aviation, the steps that may be necessary to revive this important sector of the industry are outside the scope of this review. In the context of this review it is believed however that any likely achievable recovery would not be sufficient to supply the personnel which are now required.

The Panel believes that a more direct, targeted larger-scale training intervention is required.

A range of other factors impacting on the availability of skilled pilots, instructors and engineers are set out below.

4.2 Flying experience

The Panel noted that obtaining relevant flying experience was a key factor for pilots wanting to transition to a career with a major airline.

There have been significant changes occurring in the industry over the past few decades which are making the goal of gaining flying experience more and more difficult.

As mentioned fleets of small twin-engine aircraft in the General Aviation sector are declining and modern replacements for ageing aircraft are more limited. In the past, pilots had been able to gain valuable and extensive experience flying small twin-engine aircraft such as the Piper Navajo which had been used extensively for Regular Public Transport (RPT) services across Australia. However, the steady decline in the number of regional air services operated by such aircraft now provide fewer opportunities for pilots to gain essential multi-engine experience necessary for transitioning to regional and major Australian airline operations.

The Panel was provided data from the Bureau of Infrastructure Transport and Regional Economics (BITRE) which confirms that while there has been steady growth in overall regional RPT passengers (up 96 per cent from 2000 to 2016) and steady growth in the number of overall aircraft hours flown (up 34 per cent from 2000 to 2016), there have been steep declines in this sub-sector of the industry. Essentially, the regional aviation (and, to a

lesser extent, the General Aviation industry) has up-gauged the size of aircraft conducting many operations.

This is highlighted by data on activity conducted in multi-engine aircraft from the four most common manufacturers of smaller aircraft used in the regional and General Aviation industry (Piper, Beechcraft, Cessna and Fairchild). Total numbers of landings in multi-engine aircraft from these manufacturers decreased 60 per cent from 2000 to 2016. The total number of regional RPT hours in these aircraft types declined more than 73 per cent from 2000 to 2016, with overall hours declining 50 per cent.

At the same time, the total number of landings by multi-engine aircraft from the manufacturers of larger aircraft used in the regional and General Aviation industry (de Havilland, Bombardier, Saab, British Aerospace, Fokker and Embraer) have increased by 14 per cent over the same period, with regional RPT hours increasing 37 per cent and total hours increasing 41 per cent.

Similarly, it was also noted the share of RPT passenger movements at all Australian airports by aircraft with up to 30 seats declined from 8.3 per cent in 1985 to 0.7 per cent in 2017. For Regional Airports (all non-Major-City airports), the share of RPT passenger movements accounted for by aircraft with up to 30 seats declined from 17.7 per cent in 1985 to 2.9 per cent in 2017, while for Smaller Regional Airports (those with less than 100,000 passenger movement in 2017), the share of RPT passenger movements accounted for by aircraft with up to 30 seats declined from 46.3 per cent in 1985 to 19.3 per cent in 2017.

In addition, in terms of aircraft with a Maximum Take Off Weight of under 8000kg (a proxy for aircraft with less than 19 seats), data from the BITRE confirms that between 2000 and 2016, multi-engine hours of such aircraft dropped 68 per cent while single engine (VH registered) aircraft hours also dropped by 24 per cent during the same period.

As noted earlier a major positive change in the industry was highlighted by Recreational Aviation Australia (RAAus) which noted that recreational flying is one sector of General Aviation that has increased substantially over the past five years, with annual growth around 8 per cent pa mainly attributed to 'affordability', a different regulatory environment and the increased availability of recreation-specific flying schools. The association observed that recreational flying was a useful first step for commencing an aviation career, with low cost, access and availability helping to develop a broad base of continuing interest in aviation. While increased recreational flying is fostering interest in aviation careers and developing basic skills, the sector is however not a current direct source of pilots needed by the airline industry. RAAus is looking to engage further on transitioning beyond a Recreational Pilots Licence (from single engine to multi-engine aircraft) as a pathway into commercial operations. To progress this connection the Panel suggests that CASA investigate the recognition of a percentage of RAAus flying hours being recognised for progression into the commercial sector.

There is a view that CASA's regulations with respect to recognition of flying experience are lagging industry practice and slowing the ability of the industry to bring new pilots into operational service.

4.3 Availability of experienced instructors

The availability of experienced instructors is a major issue influencing the numbers of pilots and engineers. In relation to pilot training, for example, flying instructors are being offered attractive salary packages to move or to return to airline flying, leading to a decline in the pool of experienced flying instructors available to undertake pilot training.

Industry stakeholders also raised significant concerns about the decline in the number of candidates undertaking flying instructor courses. Stronger partnerships between training facilities, educational institutions and airlines were needed to attract and retain high quality and experienced instructors who are key to the sustainability of future aviation training in Australia.

The Panel noted that CASA's recent changes to the requirement for class 2A medicals for instructors engaged in certain training activities will potentially assist with the availability of instructors at the entry level of the industry. However, further work in this area is required.

Engineering instructors have traditionally been sourced from highly experienced personnel who seek a career and/or lifestyle change and have a desire to ensure they pass on their experience to future generations. These instructors come from military or civilian backgrounds and tend to be in the middle to older age demographic. While the ability to draw on professionals from these backgrounds still exists, their numbers are diminishing and there are now more attractive alternatives to remaining in the industry.

There were also concerns raised about the number of CASA flight examiners available to undertake mandatory checks and examinations which is impacting the ability to finish training or retraining and so that pilots can be checked to line. These concerns are driven by regulatory changes (Civil Aviation Safety Regulation (CASR) Part 61) which are impacting the aviation industry and has resulted in a lack of sufficiently qualified CASA-approved flight examiners. This is a problem affecting both the industry and CASA's regulatory oversight and the Panel asks that the CASA CEO review this situation.

Stakeholders noted, and the Panel agreed, that CASA, working through its Aviation Safety Advisory Panel, should undertake a review of flight examiner upgrade pathways and examiner/instructor qualifications, privileges and proficiency checking to determine if adjustments could be made to relevant regulatory requirements, with the view to ensuring such processes enhance the transition to flight examiner qualifications and that related regulatory checking processes are streamlined.

4.4 Approved Testing Officers /Flight Examiners - Indemnity Issues

A government decision with another unintended consequence concerns the indemnity which had been provided to Approved Testing Officers (ATOs). As a delegate of CASA, Approved Testing Officers have been indemnified against liability or loss arising from the exercise of powers conferred upon them by CASA, with CASA's comprehensive insurance covering any liabilities or losses arising from their performance of functions carried out on behalf of CASA. However, in September 2014 CASA replaced ATO delegations with a system of flight examiner ratings (FER) on the licences of suitably qualified and experienced licence holders. Under these revised arrangements, flight examiners conduct flight tests under the

authority of their rating and not as a delegate of CASA and therefore without the CASA liability insurance cover.

For ATOs that have transitioned to the FER regime, responsibility for indemnity insurance now rests with the flight examiner or the organisation employing the flight examiner, not with CASA. Existing ATOs who have yet to transition to the FER regime are still indemnified by CASA however CASA has set 31 August 2018 as the deadline for this transition to the FER regime.

A large number of ATOs yet to transition to the FER regime are located in regional Australia, with a significant proportion working as independent operators due to the relatively small throughput of trainees in these areas. Industry stakeholders have raised concerns that these regionally based examiners in particular will not be able to afford the cost of their own indemnity insurance, and will therefore no longer undertake flight examination work, leading to a shortage of examiners in regional areas. In these circumstances, trainees will need to travel to larger centres for mandatory examinations, adding significantly to the cost of undertaking training in regional areas.

Some stakeholders have called for ongoing CASA indemnification for flight examiners to address this issue and the Panel agrees. CASA is in the process of reviewing these arrangements. As part of that review, a working group comprising CASA, the Department of Infrastructure, Regional Development and Cities, and the Department of Finance/Comcover was established to examine all aspects of the indemnity scheme and the insurance-related considerations that underpin them. Comcover has confirmed that indemnities for ATOs will continue until 31 August 2018 and it is expected a decision on the future of indemnities will be settled mid-July.

The Panel urges the government to continue with the indemnity scheme as it previously operated and thus avoid further disruptions to the pilot pipeline at a time when the industry can least afford them.

4.5 Cost barriers to entry

Another significant barrier to entry into the aviation industry is the cost of undertaking relevant pilot training or engineering courses, particularly in circumstances where there was no certainty of post-training employment.

It was noted that the availability of Vocational Education and Training (VET) student loans had recently encouraged more applicants to take up aviation related training. While this support is helpful the Panel believe that the current cap of \$75,000 should be raised to \$150,000 as the present limit does not support a student undertaking the full suite of courses needed to progress through to the basic Commercial Pilot with Instrument Rating and certainly not to instructor level.

VET Student Loans

Australian vocational education has a world-leading funding model with the VET Student Loans (VSL) program. Aviation is a very expensive choice for students, and graduates need to spend at least \$100,000 to gain the minimum qualifications for the industry.

Prior to the introduction of VSL, vocational aviation training was limited to students with significant financial support from families. However, VSL has opened up pilot training to students from any socio-economic background. This has resulted in an increase in enrolments, although this increase is not sufficient to mitigate the pilot shortage.

Although the benefits of the VSL program are recognised, there are three significant drawbacks to the system: the student level cap, the Registered Training Organisation (RTO) level cap and the exclusion of maintenance training in the system.

Student Level Cap

In 2018, the FEE HELP loan limit is \$102,392. However this limit is not sufficient to provide student pilots with all of the licences and ratings required.

The table below illustrates the tuition fees required to achieve various licences and ratings.

CASA Licence / Rating	Tuition Fees¹	Explanation of Requirement
Commercial Pilot Licence	75,000	All pilots
Multi Engine Command Instrument Rating	30,000	>99.9 per cent of Pilots
Flight instructor Rating	30,000	Specialist requirement, high demand
Agricultural Rating	15,000	Specialist requirement, low demand
Multi Crew Co-Operation	7,500	All airline pilots

A brief note on Licences and Ratings is at Appendix 3.

The implication of the FEE HELP Loan Limit of \$102,392 is that student pilots from a poorer socio-economic background can access funding for only the Commercial Pilot Licence and the Multi Engine Command Instrument Rating. This is leading to severe shortages in the industry for pilots with Flight Instructor Ratings and Agriculture Ratings.

The main area where the shortage of pilots with a Flight Instructor Rating appears is in the lack of instructors, check and training captains and flight examiners in the industry.

It is recommended that increasing the FEE HELP Loan limit for aviation to \$150,000 would permit more students to be able to complete the Flight Instructor Rating as well as either the agriculture rating for students wanting to stay in General Aviation or the Multi Crew Cooperation course for those wanting to continue to the airlines.

RTO Provider Cap

Currently, the Department of Education and Training and Australian Skills Quality Authority (ASQA) set a limit on each provider for the maximum amount of VSL funding that will be provided to students at that RTO.

¹ Indicative tuition fees in the industry, and not representative of any single provider.

This limit may cause a shortage of capacity in flight training, which will then reduce the number of new pilots graduated each year.

The Panel recommends that:

- Greater transparency is given to RTOs on how this limit is calculated;
- The total industry limit is increased when there is an increasing demand for graduates, as there currently is for pilots; and
- RTOs with higher graduation success rates are rewarded with larger limits.

A further unintended consequence with impact on the pilot shortage issue has been drawn to the attention of the Panel by Swinburne University of Technology.

A decision announced in the recent Federal Budget concerning proposed changes to FEE-HELP will result in a student's HECS-HELP loan counted with their FEE-HELP loan when determining if they have exceeded the FEE-HELP loan cap. This will result in all piloting aviation students who are undertaking their first tertiary qualification facing significant up-front fee imposts under the CSP / FEE-HELP model.

Currently, a Bachelor of Aviation student will incur a FEE-HELP loan for the flying training of \$100,070 (minimum) and an additional HECS-HELP debt of \$27,555 (minimum). In addition, there is an upfront cost of equipment/publications, and medical of \$4,938 bringing the total to \$132,563. If a student elects to undertake a Flight Instructor rating then the fee costs (plus equipment) costs will increase to \$145,788. For a double degree student that increases to \$154,973.

The effect of this proposed change would be to reduce the amount of FEE-HELP for trainee pilots at a time when the opposite is required to manage the pilot shortage in Australia.

In order to support the ongoing availability and viability of the VSL scheme, the Panel is of the view that the current cap should be raised to \$150,000 and greater targeting of these loans is necessary as currently some students do not complete the training or are unable to reach a job-ready standard to obtain a job for which they trained.

In aircraft maintenance training no student loan scheme currently exists. While the amount of student assistance varies from State to State there is a contribution required from the student or the employer. While this amount is significantly smaller than the pilot training figures above it is still a sizeable out of pocket expense for those wishing to embark on a career in aircraft maintenance.

The Panel recommends that the VET loan cap be raised to \$150,000 and that it be more targeted and a loan scheme similar to the pilot VET program be introduced to assist maintenance engineer student costs.

4.6 'Job' vs 'Career'

The Panel observed that an issue being faced by airlines was that being a pilot or an engineer is now considered to be a 'job' rather than a 'career', and as such, it was now more difficult to hire and retain staff for the medium to long term. In addition, the Panel was of the view that the aviation sector had lost some of its 'gloss' as a preferred and well-paid career choice and more attractive jobs/careers are now available in industries such as Information Technology which tend to offer good levels of remuneration and are better suited to the lifestyles now sought by younger generations.

It was also noted that pathways to career progression needed to be improved to enable the aviation industry as a whole to compete with other industries and retain staff in the longer term. Currently, the pathway to post-training employment and career progression is unclear, with students uncertain about their 'return on investment' given the high cost and time needed to undertake relevant training. In the case of recently graduated pilots, it was also often the case that they would need to locate to remote areas to build up sufficient flying hours and these locations can act as a disincentive to attracting people to the aviation industry.

Other industries were also competing strongly with aviation in terms of salary packages, entitlements and workplace choices and location and the Panel believes that the aviation industry needs to do more to foster an ongoing interest in an aviation career.

4.7 Attrition rate of skilled staff

Stakeholders believed that accurate workforce planning was difficult due to the lack of data in the various separate sectors which comprise the industry. It is difficult to quantify attrition rates of skilled staff which impacts on the ability of the industry to adequately plan for the recruitment of new staff, particularly during a rapidly changing aviation environment. The demographic profile of the industry, lack of a defined retirement age, external factors such as potential ongoing changes to superannuation entitlements, and the ease of mobility into other employment or early retirement were among some of the factors that made attrition rates difficult to quantify and manage.

Better workforce planning would help to establish a pool of expertise which would assist in meeting the demands of the industry particularly during cycles of low and high activity. The Panel noted organisations such as Airlines for Australia and New Zealand (A4ANZ) could potentially provide a forum to enable airlines to share data, facilitate improved workforce planning and address a number of issues raised in this review.

4.8 Industry partnerships and cooperation

The establishment of effective training partnerships is a challenge for industry as well as government.

The Panel believes that industry needs to move away from the traditional 'poaching mindset' and promote stronger training linkages across the industry.

While some welcome recent developments have occurred in relation to pilot training the Panel suggests that part of the solution lies in better alignment of training programs with

actual flying and engineering experience which meets the competency requirements for airline pilots and licenced engineers.

The Panel believes that more needs to be done by the industry to work up a strategy to meet these challenges. The Panel suggests that the airline industry body A4ANZ should consider arranging a forum with stakeholders from industry and government to discuss forward resource planning and how more effective training partnerships can be developed between various sectors of the industry in order to provide clearer career pathways for both pilots and maintenance engineers. Further, the forum could also discuss with state and federal government stakeholders steps to develop a more coherent training policy aimed at meeting the needs of industry now and into the future.

4.9 Education and training alignment

There is a major problem with the system of aviation training in Australia.

As the schematic at Appendix 5 indicates there are numerous organisations involved in policy development, funding, delivery and auditing of aviation training in Australia but no one organisation has oversight and responsibility for coordination, continual improvement and to ensure the most efficient use of government funding.

The training system appears to have developed in a piecemeal fashion, there are overlaps as well as gaps in delivery and oversight and, as it currently stands, it is not well equipped to meet the challenges of aviation industry demand now or into the future.

In the flight training sector there is good alignment of competencies between CASA and the Department of Education and Training; there is a national scheme of VSL funding available for most of the flight training required and there is less requirement for alignment between Australian regulations and European Aviation Safety Agency (EASA) regulations.

The major problem areas are in maintenance training where there is poor alignment of competencies between CASA and Department of Education and Training; there are separate funding schemes in each state; and there is an urgent need for alignment with EASA regulations.

Structure and alignment of training

The structure and alignment of current training courses is producing sub-optimal outcomes.

Australia currently has two primary engineering maintenance training streams each with their own suite of requirements. This structure produces outcomes that are not efficient and are in fact contributing to the shortage of qualified licenced aircraft maintenance personnel.

These two course options are a Certificate IV course which results in an aircraft maintenance engineer (AME) qualification, and a Diploma course which leads to a licenced aircraft maintenance engineer (LAME) qualification. The LAME qualifications, which the Diploma pathway offers, are urgently needed in the industry as these qualifications provide the ability to check and certify aircraft engineering work prior to the aircraft entering or re-entering service.

Both courses are separately audited. Registered training organisations are audited by ASQA under different legislation to that applied by CASA. CASA only audit maintenance training organisations and not RTO's delivering Certificate IV training or any other courses only delivered as a vocational outcome even though they may have a relationship at some stage with a regulatory requirement.

ASQA is tasked with ensuring RTOs are delivering training appropriate for the qualification in accordance with the relevant training package however it does not have any input into the content.

There is also the issue of misalignment.

The Certificate IV course which is provided by RTOs (which include state-based TAFEs) is not aligned to CASA's Part 66 maintenance regulations. Unless training is delivered by a CASA approved Part 147 training organisation, students who graduate from courses through non-approved organisations obtain qualifications that do not match CASA's licencing requirements and the needs of the industry (as described in CASA Part 66). As a result they require retraining and re-examination. CASA is of the view, and the Panel agrees, that all maintenance training should be consistent with CASR Part 147 requirements to ensure graduating students are of a consistently high standard and have the ability to obtain internationally recognised licences. At present some maintenance training organisations, primarily RTOs, operate under the VET based system, with the assessment of training undertaken by ASQA. Students are able to graduate from these organisations with a pass rate of 50 per cent and which provides an outcome that has little or no use as part of the regulatory pathway to a licenced engineer qualification. Other maintenance training organisations conduct training under CASA Part 147 requirements which require a pass rate of 75 per cent and this means that the student graduates to a higher-level qualification that is recognised for licencing purposes.

There is also a further misalignment of the competency package with respect to gaining a Diploma of Aeroskills where competencies do not directly align with the CASR Part 66 module topics.

Harmonisation of regulations

The lack of harmonisation of Australia's regulations with other leading aviation countries is also impacting the supply of skilled employees for the domestic market, as well as the ability of Australian training organisations to compete in the global market for training delivery.

CASA currently has formed a Technical Working Group comprised of representatives from industry and CASA (reporting to the Aviation Safety Advisory Panel) which is examining a new CASR Part 66 covering engineering and maintenance.

This work provides the opportunity to harmonise Australian engineering and maintenance regulations with frameworks being used by the rest of the aviation world. The complete adoption of the EASA equivalent Part 66 basic training processes would streamline training programs and again harmonise Australia's regulations with the vast majority of advanced aviation countries. The EASA approach would ensure that regulatory-based aviation maintenance training is of a standard where a vocational outcome would become a secondary benefit not an influencing component as it is today. Alignment with EASA would

mean that Australian licenced engineering qualifications would again be globally recognised which in turn would make Australian maintenance providers more attractive for international clients, particularly those in the Asia-Pacific region.

Recognition of Australian maintenance training internationally is not completely achieved by the adoption of EASA Part 66 but also requires a review of CASA's regulation allowing the acceptance of EASA maintenance training performed in other countries. For example, under EASA's Part 147 Type Training Certificates a person who completes a Boeing 787 training course does not have that training recognised by CASA. Currently only CASA Part 147 type training is recognised even though in this case the course is most likely derived from the same manufacturer, Boeing.

State and Federal training financial assistance

The Panel further noted that there is an anomaly with respect to incentives from both State and Federal governments, such as payroll tax arrangements for apprentices whereby employers receive financial assistance when engaging staff undertaking a Certificate IV course, however it is understood no such benefit is paid when engaging staff undertaking a traineeship (diploma) course. It is noted that these types of incentives do vary from State to State which further complicates the process for national training organisations. Importantly the diploma is the course that can ultimately provide licenced engineers which are the target group in critically short supply, particularly in the General Aviation sector.

This situation has produced unintended outcomes in relation to the availability of training and employment opportunities for aircraft maintenance engineers (a Certificate IV course) and licenced aircraft maintenance engineers (a diploma course). This has contributed to a serious shortage of LAMEs especially in the General Aviation sector. The current system in most cases requires re-enrolment into further training such as a traineeship to obtain a CASA licenced qualification but also to attract what funding may be available in relation to the diploma. The two-step process would be unnecessary if funding was more accurately targeted to current needs.

Various Panel members and stakeholders noted that training needed to continue to be not only of high quality but also 'fit for purpose'. A prevailing view amongst certain areas of the training industry seemed to be that 'competency' of their graduates related to their ability to successfully complete the training course whereas when it came to pilot and engineering training, competency covered a broader definition where knowledge, behaviour and attitude (decision making and safety) were other key components. Practical experience also needed to be given greater priority as part of an overall training curriculum.

The Panel believes the notion of whether a student is competent to enter a career in the aviation industry needs to be revised to reflect this broader package of 'competencies' which are essential to a professional and safe aviation industry and which would achieve a more balanced training outcome and develop more 'job-ready' graduates.

A series of measures are recommended later in this review.

4.10 Cadet Pilot Programs

There is a strong view in industry, especially in the regional aviation sector, that Australia's major airlines need to step up and invest in long term training of pilots and engineers.

The industry has fundamentally changed. Pilots that once came from General Aviation are no longer available in the numbers that are now required and this has occurred at a time of massive international demand for aviation personnel.

The Panel welcomed the contribution that has been made by Australian airlines in support of ongoing pilot training, including the programs currently being undertaken by Regional Express and Virgin Australia. The recent announcement by Qantas that it intends to open a new pilot training facility in 2019 to train up to 500 pilots per annum is an indication of the urgency of this issue.

The need for all sectors of the aviation industry to take responsibility for and provide meaningful contribution towards the production of the required skilled workforce is considered fundamental.

The Panel also believes that there are broader opportunities for these cadet pilot academies to train increasing numbers of pilots and engineers not just for Australia but for the international aviation industry.

4.11 Economic viability of flying schools

The Panel noted the economic viability of some of the traditional flying schools was being impacted by the limited availability of suitably experienced flying instructors, high operating costs (including insurance), and the cost of complying with a range of recent regulatory requirements. This remains an important source of new entry cadet pilots however the Panel acknowledges that this area of the industry is under significant financial and regulatory pressure. The Panel recommends that for flying schools whose principal role is flight training, some form of financial relief should be made available, possibly through a review of landing fees and airways charges which would assist this sector of the industry to survive.

In relation to the agriculture sector, there is an ongoing need for a small number of pilots each year with a specific 'agriculture' rating. However, it is currently uneconomical for flight training schools to offer agriculture-specific flight training due to the low annual throughput of trainees needed for this small but important sector. The ability to maintain an appropriate number of trained pilots for agriculture operations will diminish over time as experienced agriculture rated pilots begin to retire from the industry and the sector loses this source of trainers. A partnership with a training organisation, with appropriate support and incentives, is needed to address future shortfalls in trained agriculture sector pilots.

4.12 Skilled migration

The Panel noted how reforms to the migration framework had impacted the supply of skilled labour for the aviation industry. Skilled migration is an essential consideration in medium and long-term aviation workforce planning, particularly if skills shortages are expected. In April 2017, a number of aviation-related occupations (including Aeroplane Pilot, Helicopter Pilot, Air Traffic Controller, Aircraft Maintenance Engineer (Avionics) and Flying Instructor) were removed from migration eligibility lists, attracting negative industry feedback.

During subsequent reviews, pilot, engineer and flying instructor roles were among aviation occupations returned to migration eligibility lists, with caveats:

- Aeroplane Pilot – only for regional Australia;
- Aircraft Maintenance Engineer (Avionics) – short-term skilled occupation list;
- Flying Instructor – only for regional Australia; and
- Helicopter Pilot – only for regional Australia.

These changes only partially satisfied industry concerns.

In general terms, Australian airlines support and call for changes to skilled migration which would allow the recruitment of skilled workers for longer periods of time and the removal of caveats restricting migration to regional areas. The current time limit (of two years) does not provide the security required for many to make the decision to relocate themselves and their families to Australia. It is thought that a residency option should also be considered.

This would provide airlines a means of accessing a larger experienced human resources pool. However, other stakeholders, such as the Australian and International Pilots Association, note that an increased pilot intake through skilled migration provisions is only a 'stopgap' measure which does not address systemic issues.

The Department of Jobs and Small Business is responsible for undertaking regular reviews of the Short-term Skilled Occupation List (STSOL), Medium and Long-term Strategic Skills List (MLTSSL) and Regional Occupation List (ROL) used for prescribing skilled migration eligibility. The next update to the STSOL, MLTSSL and ROL will occur in July 2018.

Pilots, flying instructors and aircraft maintenance engineers applying for skilled migration visas are subject to skills assessment by CASA and must meet equivalent Australian standards.

The Aerial Agricultural Association of Australia noted migration settings were important for its sector, especially in relation to fire-fighting given the rotation of pilots between the northern and southern hemisphere fire-fighting seasons provided an efficient source of qualified and experienced pilots for this particular activity.

As noted previously there was some debate around what methodology was being used for determining skills shortages. The Panel noted the importance of accurately defining the 'shortages'. In the case of pilots, the 'shortage' refers to the availability of skilled and experienced pilots able to fly and command larger multi-engine aircraft.

For example, the number of pilots holding a 'commercial pilots licence' does not provide an accurate measure of the 'shortage', given the significant gap in experience and skills

between pilots holding a commercial pilots licence and that required to fulfil the requirements and needs of Australia's airlines.

Similarly, in the case of aircraft engineers, the 'shortage' refers to the availability of *licenced* aircraft maintenance engineers who are able to check and sign off on aircraft engineering work. Using numbers of 'aircraft maintenance engineers' does not provide an accurate measure of the 'shortage' given the significant gap in responsibilities between these categories of engineers.

4.13 Regulation.

The panel was well aware that the industry was on 'regulatory reform overload' and is keen to see the long-running reform program completed. Important steps are now underway to finish the program and to engage more effectively with industry. The Panel hopes that this review will make a contribution to that process with respect to the urgent need to improve aviation training.

There is much to be done.

Australia has departed from the regulatory approach of major overseas regulators in some important areas (notably recognition of technical qualifications) which has led to issues in relation to the sourcing and training of overseas pilots and engineers, the ability of Australian trained personnel to take up overseas employment and the opportunities for Australian companies to undertake maintenance on overseas registered aircraft in Australia.

There are further ongoing transitioning issues between the old and new regulations which is causing confusion especially in the training area (CASR Part 61).

As noted earlier the resourcing of some areas of CASA appeared inadequate given the organisation's need to undertake mandatory requirements in relation to audits, checks and examinations. As a consequence of the shortage of CASA's flying operations inspectors the industry had experienced delays which in turn has impacted on the ability of airlines to quickly move forward in filling staffing gaps.

The Panel believed the alignment of Australia's maintenance regulations with those of EASA would best support industry expansion, enhance Australia's reputation as an international training provider, and provide smoother employment paths. Consideration of the Federal Aviation Administration (FAA) regulations seemed to be generally the best way forward for the alignment of pilot training. CASA's current regulatory structure already allows for acceptance of EASA standards and qualifications and therefore this avenue could be adopted, again without undue additional effort.

Some stakeholders believed regulatory compliance costs were impacting on the economic viability of some training organisations particularly those smaller operators who are unable to effectively fulfil all new Air Operator Certificate (AOC) requirements with respect to Safety Management Systems and potential Fatigue Risk Management System changes. This is due to having to meet more than one regulatory framework and more actual audits for no real benefit. Under the FAA systems, some flight instructors can conduct training activities (in accordance with the scope of their approvals) without the need for an over-arching AOC construct. This then allows them more flexibility and a lower overhead cost. A similar model could be adopted within the CASA system without large regulatory change.

On a positive note it is also clear that an important part of the reform program is the way CASA is working with industry and the better consultative mechanisms that are now in place. The Panel acknowledges in recent times CASA has changed its approach to regulatory reform and industry engagement to a more positive process but the Panel also acknowledge the significant amount of work that remains to be done.

4.14 Diversity

The industry is mindful of the need to encourage greater diversity in employment opportunities in the aviation sector which is at present heavily male dominated.

This situation must change.

Currently 3 per cent of commercial pilots and less than 1 per cent of aircraft engineers worldwide are women and the industry has not done well tapping into this very large source of potential skills. If female participation rates could be raised to 10 per cent it would be a significant increase and assist the aviation/aerospace industries to meet its skills demand.

The Australian Helicopter Industry Association represents an area of the industry which has been seriously affected by skilled shortages and has suggested more has to be done by industry and government in Years 11 and 12 at school to attract female students. Female commercial pilots and engineers would be invaluable in selling this message. It was noted that the proposed Qantas pilot training academy was aiming to achieve 40 per cent female new pilot graduates by the first 10 years of operation.

The Panel noted the work that has occurred to establish The Australian Indigenous Aviation Foundation which aims to facilitate the training of young indigenous men and women who wish to pursue a career in aviation.

The Panel recommends that a concerted strategy to encourage diversity be developed as part of the implementation of revised aviation training schemes.

5. Training overseas pilot and engineering students

The growth in aviation in the Asia Pacific and the demand for aviation professionals provides a very significant opportunity for Australia to build on our reputation as an advanced aviation country.

Austrade has recognised the important opportunity that exists to market Australia's aviation expertise and the training facilities which are available.

While there are a number of companies and organisations involved in training throughout Australia, there is a view in industry that the magnitude of the demand for aviation professionals requires a new approach and that scale of training operations and facilities will be an important factor.

In the maintenance training area the development of workforce capability and career paths to meet the impending maintenance skills shortfall and developing a maintenance training export industry will require the:

- Expansion of training both in the skills required to work on existing aircraft and innovative techniques to work on next generation aircraft;
- Retention of as many as possible of the present generation of aircraft maintenance engineers;
- Reform and the rebuild maintenance repair organisation (MRO) training to ensure that the new generation of qualified engineers will be available to replace the current generation as they retire; and
- Harmonisation of training and career paths across sectors (civilian, defence, airline and general Aviation).

The most important issue is to develop the training capacity required to build an innovation-oriented aircraft maintenance workforce, and to ensure that maintenance training makes a significant contribution to Australia's education exports.

The Panel did not have the time or resources to explore this issue in detail other than to conclude that there is a significant opportunity here for Australia and that more work needs to be done.

There are precedents where the Federal Government has taken the initiative to respond to urgent skills and capability shortages such as in the area of cyberspace security. The Panel believes that the Department of Infrastructure, Regional Development and Cities and the Department of Education and Training should bring together industry stakeholders and education institutions, and arrange a forum to discuss potential opportunities to develop a number of aviation training centres of excellence, especially in regional Australia.

6. Recommendations

The Panel makes the following recommendations to Government and to industry for further consideration.

Short term recommendations to industry

Careers in the industry

The Panel recommends the development of an industry wide career pathway program from initial training through early flying experience to transitioning to the major airlines. This will address the development of industry partnerships, the interchange of personnel with the regulator, the promotion of careers as pilots and engineers and the involvement of experienced personnel prior to or after retirement. The Panel believes that this represents an opportunity for industry to take a leading role and urges the main commercial airlines through the industry body A4ANZ to consider this recommendation.

Airline training programs

Given the clearly identified inability of the traditional 'ecosystem' to provide the numbers of appropriately qualified individuals required by the various levels of the industry, it is imperative that all employers, particularly the major airlines, take greater responsibility for the production of their skill needs.

A4ANZ is asked to convene a forum of industry stakeholders to discuss the following issues:

- Steps that can be taken to develop an industry workforce plan which provides better data on the training needs of the industry for the foreseeable future.
- The development of a career pathway for pilots and engineers that offers greater employment opportunities.
- The major airlines continue to commit to greater levels of training for their own pilot and engineering requirements.
- The alignment of training programs with actual flying and engineering experience required by industry.
- The promotion of the industry as a career especially to women.

Short term recommendations to government

Regulation

The Panel recommends government should prepare an overview which assesses the impact of Australia's aviation regulations on the sustainability of the industry including the alignment with EASA for maintenance and FAA for pilot training, regulatory prescription, transitioning from old to new regulations and shortages of specialist regulatory personnel is a major contributing factor which is inhibiting the supply of suitably qualified personnel.

The Panel agrees that the regulatory reform program be completed as soon as practicable and suggests to CASA's Aviation Safety Advisory Panel that it set up a working group with

industry to make recommendations to identify ways to reduce the regulatory impact on training and encouraging streamlined pathways to achieving flight examiner qualifications.

CASA is asked to consider the following issues:

- The number of flight examiner positions is inadequate and is proving to be a bottleneck to checking pilots to line. It is suggested that this issue be referred to the Aviation Safety Advisory Panel so that the regulations can be streamlined.
- Adopt the European Aviation Safety Agency maintenance regulations to harmonise Australian regulations with major aviation countries.
- Review if the flying experience of RAAus pilots can be recognised in part as experience for progression into the commercial industry.
- Consider the implementation of a system for small training organisations similar to that operated by the FAA so that training could occur outside the requirements of holding an AOC (and the requirements for SMS and FRMS) systems).
- The CASA CEO and the Aviation Safety Advisory Panel review the flight examiner upgrade pathways and examiner/instructor qualifications and streamline the regulatory process with a view to encouraging more pilots to take up these roles.

Policies impacting on aviation

During this review the Panel has noted various areas of government policy which have impacted on the industry, often with unintended consequences, such as the 457 visa issue, the ATO indemnity, the recent proposed changes to student loans and the current dispersed nature of industry education and training.

The Federal Government is asked to:

- Provide greater coordination of decision making and consultation with industry so that the unintended consequences referred to in this review can be minimised.
- Continue with the ATO indemnity insurance scheme.
- Ensure migrant eligibility list match the needs of industry and extend the residency option for aviation positions in short supply.
- Examine what steps can be taken to provide some financial relief for flying schools principally involved in flight training.

Short to medium term recommendations to the government

Education and Training

The Panel believes that the whole system of industry training by various State and Federal government stakeholders needs complete reform if it is to be able to meet current and future challenges. This would include the delivery of current training programs, the direction of government assistance, the costs of training and the encouragement of diversity. While many organisations are involved there are overlaps and areas of potential duplication and no one organisation seems to have responsibility for the aviation training system.

Australia's system of providing aviation training needs major reform.

The Department of Education and Training is asked to:

- Take a lead role to significantly reform, rationalise and update Australia's aviation training systems.
- Take steps together with their state-based delivery partners to make the certificate 1V course compliant with CASA regulations.
- Coordinate and align the ASQA auditing charter with CASA regulations to ensure qualifications and licences obtained by graduates are able to be recognised by international standards.
- Raise the VSL limit for trainee pilots to \$150,000 and ensure the VET scheme is more tightly targeted.
- Establish a VET scheme for maintenance engineers.
- Review the VET cap which currently applies to RTOs and how that cap is calculated.
- Expand the definition of competency to include a broader definition where knowledge, behaviour and attitude (decision making and safety) were other key components.

Potential for larger scale aviation training in Australia

The Panel believes that there is considerable scope for Australia to develop a much larger aviation training capability including opportunities to grow the aviation training export market.

The Panel recommends that further work occur on this issue with a view to the establishment of larger scale aviation centres of excellence which have the potential to provide substantial financial benefit to Australia.

The Department of Infrastructure, Regional Development and Cities and the Department of Education and Training, in conjunction with other government agencies, are asked to:

- Arrange a forum of industry stakeholders and education training providers to explore the establishment of a small number of centres of excellence to build upon Australia's aviation expertise and existing cadet flying academies and to maximise the opportunities for Australia in the training of aviation professionals in the Asia Pacific.

The Department of Infrastructure, Regional Development and Cities continue to monitor national and international developments in respect of the pilot and engineer shortage.

Appendix 1: The Terms of Reference for the Expert Panel was as follows:

Purpose: To recommend strategies for a sustainable and successful aviation training sector to:

- Support the adequate training and retention of aviation professionals, focusing on pilots and maintenance personnel, for all sectors of Australia's aviation industry; and
- Build a foundation for Australia to be the leading exporter of aviation training and skills services for the Asia-Pacific region.

The review will be industry-led and conducted within a three-month timeframe, focusing on practical, implementable measures, and on setting the scene for reform. This includes:

- Examining current data to understand likely trends for aviation skills into the future, and implications for the aviation industry, government and training providers;
- Identifying short-term opportunities for improvements to the Australian aviation training system, and how longer-term issues can be addressed;
- Identifying where the training system is working well, including examples of successful aviation training providers and how lessons from their experience can be applied elsewhere;
- Reviewing aviation training strategies that have worked in other industries and countries;
- Describing aviation career pathways and strategies to promote career development, retention and sustainability;
- Developing strategies to improve diversity within the industry;
- Identifying structural and regulatory barriers to improving training performance and the career prospects of Australian aviation professionals, including opportunities to harmonize Australia's aviation regulations with those of the major international regulators;
- Explore the role of organization scale and investment as it relates to training delivery performance including in General Aviation;
- Exploring opportunities for the delivery of aviation training in regional Australia, including consideration of regional and local community benefits and impacts; and
- Setting the scene for future policy development by describing what success looks like.

Appendix 2: Membership of the Expert Panel

The Expert Panel was formed in April 2018 and met in April and June and held meetings with government and industry stakeholders in May 2018.

The Panel membership comprised:

- Chair:* Greg Russell, Chair, The Australian Aviation Associations Forum.
- Member:* Chris Hine, Chair, Rex Flight Training Academy.
- Member:* David Trevelyan, Managing Director, Basair Aviation College.
- Member:* Mark Thompson, Technical Training Manager, Aviation Australia.
- Member:* Mike Higgins, Chief Executive Officer, Regional Aviation Association of Australia.
- Member:* Adrian Young, Head of Flying Operations and Chief Pilot, QantasLink.
- Member:* Stuart Aggs, Director of Group Flight Operations, Virgin Australia Group.
- Member:* Aaron Keevers, Process Improvement Co-ordinator, Aircraft Structural Contractors.

Appendix 3: A brief note on Licences and Ratings.

Commercial Pilot Licence: The minimum requirement for any pilot seeking employment in the industry. Holders are licenced to fly typically only a single engine aircraft in good weather conditions.

Multi Engine Command Instrument Rating: Almost all career pilots require this rating, as it permits the holder to fly a multi-engine aircraft under instrument conditions (poor weather conditions.) It would be very rare for working pilots not to need this requirement, although some agriculture pilots might fly only single engine aircraft during their careers.

Flight Instructor Rating: This rating is required for pilots who want to become instructors. It is also required by pilots in airlines who want to become Check & Training Captains, and also pilots who want to become Flight Examiners for CASA. It should be noted that the areas in the industry currently suffering the most acute shortages are pilots that need this rating; instructors, Check & Training Captains and flight examiners.

Agricultural Rating: Required for pilots who want to work in the agriculture industry (eg crop-dusting.) Note that this rating is not currently provided in Australia by any RTO with VSL as students typically have exhausted their FEE HELP Loan Limit in obtaining earlier qualifications. This has caused concern in the agriculture sector of a lack of pilots coming through with this rating.

Multi Crew Co-Operation: A short course on simulators that is required for all new airline pilots after August 2018.

Appendix 4: Consultation with additional stakeholders

In addition to the stakeholders represented on the Panel, consultations were undertaken with the following additional stakeholders:

- Civil Aviation Safety Authority
- Department of Education and Training
- Australian Skills Quality Authority
- Flight Training Adelaide
- Royal Aeronautical Society Australian Division
- University of New South Wales
- University of Southern Queensland
- Innovation & Business Skills Australia
- Swinburne Institute of Technology
- Small to medium General Aviation maintenance companies
- New South Wales Department of Industry
- Aerial Agricultural Association of Australia
- Australian Helicopter Industry Association
- Recreational Aviation Australia
- Royal Federation of Aero Clubs
- Skills Canberra, Chief Minister, Treasury and Economic Development Directorate, ACT Government
- Queensland Department of Education and Training
- Workforce Development & Training (Skills Tasmania), Department of State Growth
- Western Australia Department of Training and Workforce Development
- NT Department of Business
- SA Department of State Development
- VIC Department of Education and Training

Information on the International Air Transport Association's approach to the skill shortages was also considered by the Panel.

Appendix 5: Government agencies involved in aviation education and training

