

29 November, 2023

Director, Aviation White Paper Project Office
Aviation White Paper
Department of Infrastructure, Transport, Regional Development, Communications and the Arts
GPO Box 594
Canberra ACT 2601

Capital Aircraft Services Pty Ltd Response to Aviation Green paper

Dear Director, Aviation White Paper Project Office,

2050 News Headlines could read something like...

“All Australians, no matter where they live, now have access to aviation services including uncrewed, public transport and aeromedical thanks to the 2023 Aviation White paper initiatives.”

Introduction

We appreciate the opportunity to provide a response to the aviation green paper. We understand this opportunity to respond to the aviation green paper is an educational process whereby industry professionals with deep experience in complex aviation areas are able to provide valuable insights for government.

Over the decades we have witnessed what changes have worked and what changes have not. Our opinions in this green paper response are written from a perspective of what we believe to be in our country's people's best interests from a team of highly experienced technical and operational aviation industry professionals.

Capital Aircraft Services is a 30 plus-year-young aviation organisation that its key personnel and founders have well over a century of relevant aviation experience in almost ALL sectors of the civil industry, including emerging technologies.

Aviation Reflections

“Everything that is easy was first hard”. Von Geothe quote. He was definitely correct when it comes to aviation. Nearly every major advancement of aviation has been at the cost of many human lives. To understand this one just needs to read the book The Tombstone Imperative “The truth about Air Safety” by Andrew Weir.

The question is, just how much loss of life does it require to effect a change to aviation safety? This is question is even more complex when different cultures and governments value a human life differently.

These days most aviation incidents are avoidable and that the technology is now not *directly* responsible, if it is being used effectively. It is rather the application of humans to the tasks of the complex nature of aviation that invariably causes most incidents. It makes sense that the government focus should be on aiding the human to perform these critical tasks along with essential oversight but at the same time not over burden them with any unnecessary regulation that could otherwise compromise safety. It could be said that over regulation may be seen as a significant threat to aviation safety. A focus on prevention by training humans to the highest level to perform such complex tasks is arguably a far better investment for the public than over regulation.

A handwritten signature in black ink, appearing to read 'Neil Allen', with a long horizontal flourish extending to the right.

Neil Allen
Managing Director

Responses to Chapter 2 – Likely future directions out to 2050

In our opinion the government could with immediate action, provide immediate quick wins to assist some of the current challenges as follows:

- Enabling Class G airspace for BVLOS Uncrewed operations in regional and remote areas
- Regional and remote airline and primary health aeromedical operations,
- ADS-B Out and In Mandates for Crewed and Uncrewed aircraft
- Airline ownership and anti-competitive behaviour
- Decarbonisation/environmental commensurate with the current technology.
- Resourcing CASA more appropriately.

Regional and remote communities have always suffered when it comes to aviation services. Aviation provides some of these communities with their only source of connection and primary health care. We must do whatever we can to close the gap to provide equity of service for these communities.

Enabling Class G airspace for BVLOS Uncrewed operations in regional and remote areas is critical for service delivery and survival of the uncrewed emerging industry. ADS-B mandates for Crewed and Uncrewed aircraft will result in reducing Mid collisions of existing crewed aircraft and then between crewed and uncrewed.

Airline ownership rules, operational approvals and definition of a state-owned (national) carrier need to be refined and publicly transparent. Airline anti-competitive behaviour needs to be regulated to ensure the public's best interests are served.

A decarbonisation quick win could be if an uncrewed aircraft could do the job of a crewed aircraft in regional or remote areas, then that opportunity should be incentivised and prioritised. Emerging technologies such as use of SBAS for more efficient flight routing for crewed aircraft will reduce carbon footprints.

CASA is deficient in the levels of enforcement activity and relevant experienced personnel including leadership. This will need to change if the regulator is to become more effective to, and respected by, industry.

Response to Chapter 3 – Airlines, airports and passengers – competition, consumer protection and disability access settings

Airlines

Much has changed since the two-airline regulated policy of Ansett and TAA(Australian) Airline days as to where we currently find ourselves. Back then, Qantas only operated Internationally.

Whilst it can be argued that total deregulation allowed for more competition and hence cheaper airfares, we have also witnessed a degradation in some regional services that were once supported by such a system. It may well be the case that some level of regulation is required to support and protect operators that commit to providing regional and remote services and in particular those that bypass major hubs and potentially create new direct routes.

The methodology of using smaller 50-70 seat jets would reduce the load on major airports and provides much more efficient services for travellers in terms of reduced flight times, increased frequency and in contributing to a net zero carbon emissions target. It has added health benefits of

using smaller jet aircraft that's seating capacity is reduced and passengers do not have to intermix with major Hub passengers.

Unfortunately, this model is preyed upon by the incumbent major airlines that offer the public a uneconomical cheaper fare that routes through the major hub. This practice is not just anticompetitive and economically flawed it also increases the carbon footprint per seat mile. Regulations to protect a new regional route operators should be considered to protect from this behaviour. These new regional route operators should also be afforded route protection for an introductory period so long as they deliver the frequency and service that they have promised.

In general, we don't believe in government setting pricing in industry markets. However, if the government believes that aviation is an essential service and that it must be available to as many citizens as possible including remote locations and in particular where it is not economical to provide such services by at least two airlines, then the government needs to consider intervention to ensure such a service is publicly available.

Economic assessment of ALL existing and proposed routes, regardless of size, population or remoteness could be evaluated using parameters that are consistent, adjusted and fit for application.

Where the outcome does support at least two independent operators then there should be no requirement to regulate. Where a route supports only one operator then government intervention needs to be considered.

Airline aircraft defects and dispatch reliability

COVID has resulted in airlines struggling financially and supply chains being adversely affected. The recovery to pre COVID levels is still some ways away. A unintended consequence of COVID has uncovered the "just in time" approach to aircraft parts supply that was introduced by the airline management well before COVID. The "just in time" approach was never intended as a safety enhancement initiative, but rather a financial one. It is a practice that has not been reviewed to adapt to the current supply chain delays. This has created a less than ideal safety environment where aircraft are carrying more defects longer, reducing the serviceability and safety level of the aircraft.

It's in an airlines best interest to carry as little number of defects including but not limited to Minimum Equipment List MEL items or CASA Permissible Unserviceability PUA on the aircraft because it increases its reliability and safety. Some airlines once had a self-imposed limit as to the number and types of defects an aircraft could carry before it was grounded for repair. These days it seems to be limitless the number of defects being carried on domestic and international aircraft that reduce the aircraft's performance capability, dispatch reliability, passenger essential services and sometimes safety.

Those familiar with the James Reason Swiss cheese theory will understand that defects on an aircraft are classified as a "physical failure" which is one layer of Swiss cheese. This removes a barrier to an incident occurring and hence can quickly escalate into a much larger problem.

Whilst it would not be practical to declare the technical nature of every defect on all aircraft to the public, there is a need for some accountability so that the customer can be assured that the airline they are considering, possesses acceptable airline safety levels before they decide to fly and that they have a good chance of departing and arriving on time.

CASA has not helped the situation in that the number of Ramp Surveillance Audits (ramp inspections) being performed is apparently low, most likely because they don't have enough experienced and trained professionals to conduct them.

An initiative could be implemented by CASA in implementing a more rigorous ramp safety inspection audit system or what is internationally known as Safety Assessment of Community Aircraft (SACA). It is similar to one CASA currently uses on visiting international airlines called Safety Assessment of Foreign Aircraft (SAFA).

Such an initiative could look like the following EASA ICAO approved system.

<https://www.easa.europa.eu/en/domains/air-operations/ramp-inspection-programmes-safa-saca>

In Europe the new SAFA/SACA Ramp Inspection Program has replaced the EU SAFA Program and has two major components

1. SAFA ramp inspections (for third country operators); and (*CASA currently uses this for international operators ONLY*)
2. **SACA ramp** inspections for community (or domestic) operators – checked against sovereign standards).

In each Participating State, aircraft of operators under the safety oversight of another Member State or of a third country can be subject to a ramp inspection, chiefly concerned with the aircraft documents and manuals, flight crew licenses, the apparent condition of the aircraft and the presence and condition of mandatory cabin safety equipment. The applicable requirements for these inspections are:

- The ICAO international standards for aircraft used by third country operators
- The relevant EU requirements for aircraft used by operators under the regulatory oversight of another Member State;
- Manufacturers' standards when checking the technical condition of the aircraft; and
- Published national standards (e.g., Aeronautical Information Publications (AIPs)) that are declared applicable to all operators flying to that State.

These checks are carried out in accordance with a procedure which is common to all the participating States. Their outcome is then subject to reports which also follow a standardised format. The SACA program is already in existence and because CASA is currently part of the SAFA program, the SACA program is available to CASA to adopt as an internal Australian program, and able to be altered to suit Australian regulations. The results/reports of such CASA Audit findings could be used by CASA or independently by a government body like the ACCC to inform the public of the compliance status of their selected carrier. Implementation of such a system could produce the following benefits.

- Passengers can be more assured that the carrier is safer, reliable and is more likely to have a superior aircraft serviceability status,
- Airline Management can be better held accountable to deliver a better and safer product to the customer.
- Relieves pressure on key Airline Engineering and Pilot staff, that in turn improves safety, the working environment, staff retention and reducing initial training costs.
- It would produce and maintain a more effective CASA with higher SAFA and SACA Auditor standards and consistency.
- International Harmonisation where it is in our national safety interests.

Major Airports

All major airports have been privatised and monetised for the benefit of the owners of these previously state-owned assets and not for the public or the aviation sector. The airport charges for, international, trunk and regional operations are all now controlled by private organisations, most of which have a monopoly. An idea could be that government provide caps on allowable charges and provide regional or remote passenger services operators some level of financial assistance for using privately owned airports.

Introducing rules to protect the hub bypass interstate regional operators using smaller capacity jet aircraft will also decongest the larger traditional major hub airports and as a result make them more price competitive for operators and less of a monopolised environment.

Airport slots for regional aircraft into major hubs need to be protected so that the regional population can access those services that are not afforded to them in regional areas.

Aviation Market Potential Improvements

Measures that could be taken to ensure Australian aviation markets operate more efficiently, improve competition settings, and deliver optimal consumer outcomes could include the following.

- Economic assessment of existing and proposed routes, regardless of size, population or remoteness could be evaluated using parameters that are consistent and fit for application.
- Where the route does support two operators then there should be no requirement to regulate. Where it only supports one operator or less then government support and or protection measures need be considered.

Response to Chapter 4 – Regional and Remote aviation services

Regional and remote communities should be able to access equal levels of aviation services that their urban counterparts enjoy. These include the following

- Regular public transport,
- Primary Health Aeromedical ambulance services and
- Future benefits of uncrewed BVLOS emerging technologies

Unlocking and enhancement of these three key aviation areas for these Australian's is very important for the public closing the gap equity argument.

We have detailed in our response below how the reduction of regulation in some CASA approved single engine turbine powered aeroplanes (ASEPTA) now Prescribed Single Engine Aircraft (PSEA) aircraft operations and the purchase of such aircraft from government supported Aeromedical operators could unlock passenger services to even the most remote communities. Additionally, these aircraft are 50% SAF fuel capable.

Currently no air ambulance operators have suitable data Internet bandwidth for delivery of time critical primary health services on board the aircraft whereas the urban road ambulance that has bandwidth via 4G. There is a now a Inmarsat Swift Broadband and Swift Jet* solution that is already certified on at least 2 aircraft types of Aeromedical aircraft currently in use.

Unlocking Class G airspace for BVLOS uncrewed is the enabler for the Regional and remote communities to be the first to benefit from the new technology. Wow, wouldn't that be a first, the regional and remote communities getting something before their urban counterparts! More on Class

G airspace enablement for BVLOS uncrewed later when we mention our Emerging Aviation Technologies Program (EATP) funding application to do just that!

Regional and Remote Airline Routes

Environmental and economic assessment of ALL existing regional and remote airline routes, regardless of size, population or remoteness could be evaluated using parameters that consistent adjusted and fit for purpose.

Where the outcome does support two operators then arguably there should be no requirement to regulate. Where a route only supports one operator or less, government support and or protection measures may need be considered.

Because aviation by nature operates between different states and territorial boundaries (sometimes multiple) it makes sense that any subsidies should be federal based. It's not to say that states and territories cannot contribute to, or subsidise within their own state or contribute to the federal subsidy efforts for intra state operations, but it seems logical to suggest that operations across borders are federally managed/subsidised.

Uncrewed has the potential to change the way we think and conduct aviation services in regional and remote areas. Why Regional and Remote communities and why now?

- Because all Regional and remote communities are located within Class G airspace.
- Because almost all of the geographical area of class G airspace represents the lowest risk environment to introduce these emerging technologies to regional and remote communities.
- Because the ADS-B enabling technology for sense and avoid between crewed and uncrewed aviation for use in Class G airspace is already CASA approved and available.
- Because Regional and remote communities should have equal access to the benefits of such services and supplies that their urban counterparts already enjoy.
- Because of large cost efficiencies and carbon emission reductions savings by operating an uncrewed verse a crewed aircraft.

Lifesaving Satellite based medical data now available for Aeromedical Aircraft

Currently all urban road ambulances have 4/5G services to provide data bandwidth that provides immediate health care on site to where they travel in order to provide primary health care. This enables immediate access to health patient health records and the bandwidth to send and receive live patient medical data for hospital evaluation/diagnosis. Such medical procedures as CT scan (stroke determination) and ultrasound can be done onsite for positive lifesaving purposes.

Currently all aeromedical aircraft (approx 130 aircraft) that service the regional and remote Australian communities do not have any usable data bandwidth connectivity at all.

There is technology now available that can provide such bandwidth on these aircraft. It should be made available to the remote and regional people of Australia on the basis of the equity argument to access the same level of health services of their urban counterparts. RFDS operates approximately 80 of such aircraft and are currently assessing suitable solutions that can, as soon as federal funding is made available, install and commission such systems on all their aircraft.

Significantly, 60% of RDFS services are used by the indigenous community which should be duly considered as part of “closing the gap” in delivering equity of primary health services to these communities.

Remote Community Airline Services

As stated in the green paper, the economic factors to enable a financially viable air services to remote communities are largely based upon demand for such services. Because these aircraft need to be smaller the seat cost per mile is much higher and cannot be directly compared to a larger airline aircraft. However, there are initiatives that the government can undertake that could make this sector more cost efficient, reduce carbon footprint and safer.

Currently, the operation of ASEPTA/PSEA single engine turbine aircraft is constrained by onerous CASA regulation that makes it unviable to operate a pressurised single engine turbine for regular public transport purposes.

RFDS have operated the Pilatus PC12 aircraft for decades in IFR flight conditions, without a fatal incident and next to zero engine failures. An estimated 9 million PC12 hours flown worldwide in consistently challenging conditions. Doing the quick math shows a PC12 fatal accident rate per 100,000 hours of 0.24(2022).*** Its twin turboprop equivalent, the Beech Kingair B200 in 2012 had a 0.28 fatal accident rate per 100,000 hours*. To date there has not been a single fatal PC12 accident that was attributed to an engine failure, worldwide. Conversely, twin engine piston (unpressurised) aircraft have a much higher engine failure and accident rate and yet they are allowed to operate under a much-reduced regulatory environment. Modern aircraft design and Turbine engines cannot be continued to be compared to piston engines in reliability. For example, an aircraft piston engine fails on average every 3200 flight hours whereas a turbine engine is every 375,000 flight hours**.

Remote airline services could be helped enormously by removing much of the operational regulations for such aircraft types. For example, the removal of the CASA CAR135.240 8.08 15-minute mandatory forced landing glide rule would significantly benefit such operations with no measurable reduction in risk. There is no statistical evidence to support any other outcome. Allowing this type of operation would avail new services to the most remote locations and benefits in lowering travel times and carbon footprints.

Use of such turbine aircraft will reduce the operational cost compared to that of a twin-engine turbine and lower carbon footprints. Add to this efficiency gain the PC12 can fly further than its twin counterparts with SAF fuels with blends up to 50%.

For example, In New Zealand they allow the PC12 to operate commercial Regular Public Transport (ATS) services in arguably in far more hostile environments. In fact, the airline (Sounds Air) that operates those services in NZ purchases our old RFDS aircraft!

<https://www.soundsair.com/>

* https://www.westair.com/wp-content/uploads/2013/12/2012_Breiling_Report.pdf

** https://en.wikipedia.org/wiki/Turbine_engine_failure

*** <https://airfactsjournal.com/2022/03/whats-wrong-with-pilatus-pc-12-pilots/#:~:text=There%20have%20only%20been%202022,lower%20for%20US%20Only%20operators.>

Response to Chapter 5 – Maximising aviation’s contribution to net zero

We believe that the following initiatives could be considered

- Setting of carbon footprint seat costs per mile targets and service frequency minimums for operators on all sectors based upon aircraft size, allowing the correct size aircraft to operate on each route. This will incentivise the operators to choose the most efficient aircraft for the route and de-incentivise those who choose to just flood the market with larger seat capacity aircraft with little frequency.
- Create financial incentives/ initiatives for those operators to adopt SAF on a % fuel mix percentage basis.
- Incentivise operators and private owners of piston powered aircraft to change from piston engine aircraft to electrical or hydrogen powered solutions. The private general aviation sector uses almost all of piston engine aircraft in aviation.

Growing jobs and innovation would be a function of implementing the above initiatives, however we already have a huge shortage of technical professionals that cannot be easily filled in the short to medium term.

There are no SAF fuel currently available for the Avgas fuel. There are developments for SAF for diesel piston aircraft fuel that use (Jet fuel).

The introduction of Satellite-Based Augmentation System (SBAS) will unlock more airspace and create environmental efficiencies. Aircraft that have or can be fitted suitable navigation equipment and autopilot systems capable of using SBAS based approaches should be incentivised. Benefits in safety, reduction of air traffic congestion, transit times, and carbon foot prints would all be significant. SBAS should be introduced in 2028 and the following link details that have just been released provides insights to what that may look like.

[https://astra.aero/info/docs/Guidelines for Aerodrome andAircraftOperators forSouthPAN-Enabled APV Implementation.pdf](https://astra.aero/info/docs/Guidelines%20for%20Aerodrome%20and%20Aircraft%20Operators%20for%20South%20PAN-Enabled%20APV%20Implementation.pdf)

Setting of CO2 carbon foot print seat per mile maximums could be a helpful tool in reducing CO2. More generally a CO2 per seat mile level could be set as a future target for all newly manufactured aircraft. The target levels should be the topic of a separate in-depth assessment of what is practical and achievable. Already some new manufacturers such as Otto Aviation are achieving levels as low as 36grams CO2 per seat mile which is similar to some cars. <https://www.ottoaviation.com/>

Minimising aircraft defects that invariably cause delayed departures and disrupt aircraft traffic flows and fuel usage. See previous dialog above.

Any SAF fuel will need to meet the industry ICAO standards.

Net Zero targets provide the perfect platform to implement a BVLOS uncrewed in place of a crewed aircraft when a uncrewed can do the job more efficiently and safely. Information about incentives and guidance for organisations to do just that should be implemented once the majority of Class G airspace is enabled for uncrewed BVLOS.

Response to Chapter 7 – General Aviation (GA)

Policy and regulatory settings do not adequately facilitate the General Aviation sector's evolving role in Australian aviation

The current overly complex Engineering and Pilot licensing regulations/systems are not fit for purpose for this industry sector. We need to evaluate what imposition and detriment these changes have affected the industry and where necessary reassess and potentially wind them back to what previously worked as a starting point.

General Aviation Maintenance Organisations operating under CASA CAR30 are generally content with the regulations that govern them. If CASA imposed emerging 145 and 43 Maintenance rules on this sector it would be a mistake. There is little appetite for more complexity and there is no safety or economic case for such change.

Proposed CAR43 changes would place unreasonable personal unlimited liabilities onto aircraft engineers that would currently be limited in liability by using a PTY LTD company structure and its insurance that it holds as a CAR30 or 145 MRO CASA certificate. A better solution for GA would be to keep the CAR30 type organisation and company structure and revert back to a CASA CAR31 "like" LAME licensing system.

Existing consultation mechanisms, including the General Aviation Advisory Network (GAAN) and CASA-led Aviation Safety Advisory Panel (ASAP) and Technical Working Groups (TWG), are appropriate, but there needs to be continual mandatory turn-over of experienced industry SME's within all groups to ensure their effectiveness.

Response to Chapter 8 – Fit-for-purpose agencies and regulations

CASA Leadership and Culture

Post COVID the industry and CASA seems is struggling to maintain required professional technical staff levels. A regulator of technical nature arguably needs to be led by leaders with adequate relative knowledge if they are to earn the respect of their staff in which they intend to lead.

Current CASA technical personnel are falling in numbers and hence CASA's experience pool is diminishing. The recent industrial action by CASA staff has raised questions about the ability of CASA to be an effective enforcement agency. Technical personnel levels and experience settings within CASA need to be examined and adjusted to ensure the effectiveness and respect of the agency is kept by the industry and indeed the public.

Global Harmonisation of aviation rules and the International Civil Aviation Organisation (ICAO)

CASA seems to be largely influenced in moulding regulations for the major airlines, unions and harmonising with foreign regulators. This approach has left all other non-airline sectors of the industry with "Airline" regulations that are far from fit for purpose.

Australia has attempted to harmonise regulations with EASA and FAA but all too often at the expense of our own sovereign interests. We could be adopting a more pragmatic policy of harmonise where it is beneficial but not to the detriment of our own sovereign aviation interests.

It is important to acknowledge that harmonisation should only occur when there is a clear and measurable benefit to Australia in either safety and or bi lateral acceptance of standards between the harmonising nations or ICAO.

Instead of trying to harmonise with foreign sovereign regulators we could be looking more toward an organisation like ICAO which has a key role in international standards harmonisation. ICAO is often dominated by Europe and USA finding technical and operational solutions that suit their unique environment. For example, Europe and USA have high density and high cost environments whereas the rest of the world including Australia has a different perspective. Australia (CASA) could better to engage at the technical level with ICAO and the international standards setting organisations like the Radio Technical Commission for aeronautics (RTCA) and European Organisation for Civil Aviation Equipment (Eurocae). We must have CASA and Industry Subject matter Experts representatives attend these critical meetings where the technical compromises are decided. If we don't we will have to cope with solutions better suited for Europe & USA that don't take into account our unique environment like our large and low density airspace – with lower ability to pay for expensive solutions.

When harmonisation is desired Australia could initially explore ICAO. Harmonisation with any other sovereign nation's regulator doesn't always produce ideal outcomes for CASA/Australia. There are often commercial aspects to regulations that each sovereign entity pushes toward their own interests/agendas.

ADS-B regulations and mandates

The Green paper has noted, to some extent, the benefits of ADS-B deployment. We contend that significant further benefits and resultant opportunities exist as discussed below in the following areas:

ADS-B & Air Traffic Control

Decommission enroute radars (Keep Terminal area radars)

If all aircraft in controlled airspace were equipped with ADS-B then there is scope to reduce the number of expensive enroute radars. No matter what stage of life of the radars, there is always a significant cost of ownership including maintenance costs, documentation costs, training costs as well as the planning for replacement costs.

Australia has already decommissioned 2 radars in lieu of ADS-B (Paraburdoo & Boyce) and this could be extended further. It is argued by some that ADS-B alone is inadequate to support surveillance controlled airspace but that is what we do now for most of the country (there is more ADS-B only controlled airspace than radar airspace). Failure of aircraft ADS-B avionics is already managed.

We do not propose that radars in busy terminal areas be decommissioned.

VFR flights are today conducted inside controlled airspace without ADS-B with cost burden. In some locations (eg Perth) non ADS-B equipped VFR are used as a reason to maintain the existing enroute radars in the region as a contingency in case the terminal area radar fails. If the all VFR aircraft operating in controlled airspace were equipped the argument to maintain as many existing expensive radars would be significantly reduced.

Reduction of accident investigation and Search and Rescue (SAR) costs

If all aircraft were equipped with ADS-B then additional data would be likely available for SAR and accident investigation.

Improve coverage and benefit to ground level using satellite-based ADS-B(Aerion).

ADS-B provides more extensive ATC coverage across the country. In addition, if Airservices Australia uses Space based ADS-B, then ATC will have ADS-B coverage across the whole continent and across the Australian controlled oceans. Space based ADS-B is used operationally by controllers in PNG, India, Singapore, UK NATS, NAVCANADA but surprisingly not Australia.

Space based ADS-B also allows ATC visibility to ground level whereas ground based ADS-B only provides low level coverage very close to the ground station.

Space based ADS-B already “sees” Royal Flying Doctor aircraft landing at remote airstrips but this isn’t provided to ATC.

Whilst normally Space based ADS-B requires a top and bottom antenna (as used already on airliners and those like RFDS), there is less expensive fully FAA certified ADS-B avionics available suitable for GA which is compatible with Space based ADS-B.

Interestingly, Australia Maritime Safety Authority(AMSA) contacts Aerion when an aircraft has crashed as they know that the Aerion satellites will have a much more accurate record of where the last known position of the aircraft as opposed to terrestrial ground based ADS-B stations.

ADS-B & General aviation

Support air-air surveillance (see & be seen doesn’t work)

If all crewed aircraft were equipped with ADS-B, then safety would be improved because these aircraft would be visible on ADS-B IN displays – in both controlled and uncontrolled airspace. ADS-B IN can provide either visual or aural alerts of nearby traffic reducing the risk of collision. See and be seen relies on the human eye which is not as effective or consistent as ADS-B.

Management of firefighting zones

Due to the random nature of bush fire locations a terrestrial based ADS-B system is not always usable for crewed and uncrewed aircraft separation in the fire zone. Firefighting operations would largely benefit if the use of satellite based ADS-B surveillance were used. The use of a satellite based ADS-B solution in a fire zone in any location to create a pop up portable mini ATM’s for such aircraft would be of great safety value to the fire control services.

Safety statistics

If the GA fleet were equipped with ADS-B it would be possible for CASA and those studying airspace congestion to have reliable statistics of the number of aircraft in an airspace volume. Today there is often very little knowledge by the authorities of the number of flights in some areas, because there is no surveillance.

Supports Uncrewed Detect and Avoid (DAA)

ADS-B OUT on crewed aircraft can be used to support BVLOS uncrewed operations in class G by allowing uncrewed to sense and avoid nearby crewed aircraft. Equally the uncrewed fleet needs to be equipped with ADS-B OUT and IN so that they can see and be seen by crewed aircraft. The performance required only needs to be as good as the human eye to improve safety, and ADS-B is so much better than that. There remains some risk that the crewed industry and government will delay

and rather wait for a perfection solution that in the mean time would save lives and unlock a new uncrewed industry.

ADS-B Safety for all

ADS-B fitment of the remaining VFR fleet will benefit other operators because :

- In controlled airspace these aircraft will be visible to ATC and these aircraft become visible on ADS-B IN systems of other aircraft
- Outside controlled airspace, these aircraft become visible on ADS-B IN systems of other aircraft, and would be visible to ATC for use in contingency events

ADS-B Harmonisation with USA and New Zealand

USA & New Zealand already require GA (VFR & IFR) to be ADS-B equipped with full performance ADS-B out when entering controlled airspace. It is an anomaly of history that Australia did not require ADS-B in VFR aircraft operating inside controlled airspace.

The cost of ADS-B avionics has since dropped, and the benefits of ADS-B are now much clearer – so it is an appropriate time to “complete the job” of ADS-B avionics deployment.

ADS-B Support for remote Australia

Safety for agricultural operations (crewed & uncrewed)

If agricultural operations (crewed and uncrewed) were ADS-B equipped there would be benefits in monitoring, safety (SAR, detection of abnormal situations, co-ordination with management etc etc), and “other traffic” awareness.

Support indigenous communities using UNCREWEDs for urgent freight

Increased BVLOS operations would likely be possible if UNCREWEDs could rely on ADS-B based sense and avoid in Class G. This in turn would benefit remote areas when timely and cost effective delivery of urgent freight is otherwise not economically viable.

ADS-B Products and services are available today at reasonable cost for the following applications.

- Uncrewed ADS-B IN and OUT some useable by Space based ADS-B
- Low cost GA ADS-B OUT useable by Space based ADS-B
- Low cost ADS-B IN products to display traffic on tablets
- Low cost ADS-B out and ADS-B IN for less than \$1K for GA aircraft for air-air surveillance

Recommendations and Mandates

That the Government plan for ADS-B out to be available on all aircraft, and IN when operating in Class G airspace.

- Certified ADS-B OUT for all crewed and uncrewed aircraft in controlled airspace
 - Certified ADS-B OUT and Detect and Avoid for all AAM
 - ADS-B OUT and IN electronic conspicuity devices for all GA aircraft *
 - ADS-B OUT and IN electronic conspicuity devices for BVLOS uncrewed*
- *EC devices as a minimum standard. Certified ADS-B should be used in controlled airspace or where appropriate.

That the Government plan for the decommissioning of expensive enroute radars for civilian use, but continue to support radars in the terminal areas to support contingency situations. ADS-B only surveillance is already used over most of Australia, extending this to within existing enroute radar coverage should be achievable.

Airservices should expedite the use of already available Space based ADS-B to provide ADS-B surveillance across the whole Australian continent and ocean areas at all altitudes.

ADS-B Mandate for VFR crewed aircraft to a minimum of EC level to help avoid mid-air collisions of crewed aircraft and allow BVLOS uncrewed REOC holders access to Class G airspace to ignite the commercialisation of the uncrewed industry.

Response to Chapter 9 – Emerging aviation technologies

Creation of an airspace environment such as Class G airspace for BVLOS uncrewed commercial use including designated testing areas would help showcase Australia's strengths in the uncrewed industry, provide employment and stimulate international industry investment.

Enablement of Class G airspace for suitable BVLOS uncrewed Remotely Piloted Operators Certificate (ReOC) holders to operate is an essential next step. Management of this risk is part of our EATP RD2 funding proposal to identify and mitigate the risks of enabling Class G for this purpose. The biggest risk we have is not an incident but rather CASA not allowing it to happen in the first instance. Government may need to manage that risk.

The introduction of such a mandated ADS-B based class G airspace will improve safety outcomes for crewed aviation in that it will reduce the incidences of mid-air collisions currently experienced by crewed GA aircraft. For example, in Queensland alone there have been 3 fatal mid-air collisions in the past 12 months.

Similar skill sets are required to the crewed sector and if it is to operate in the same airspace then the same crewed aviation standards should apply.

Australian Government could foster a supportive environment for investment in manufacturing of these technologies by offering even more generous R&D tax incentives than the existing scheme.

Government policies and regulations will need to be funded appropriately for the large uncrewed changes ahead. Once the new sector has a foothold it has the potential to fund CASA more than any other sector.

Disclaimer. Capital Aircraft Services has applied for a EATP RD2 funding to assist the industry, regulator and the department with researched technical data to support the integration of BVLOS UNCREWED into the majority of class G airspace using existing ADS-B technology.

Achieving a balance between mitigating the negative impacts of BVLOS uncrewed operations and AAM while realising the potential benefits is best addressed as follows.

- Regional and Remote Class G airspace operations
- Urban and or larger City operations

Enabling Class G airspace now for BVLOS uncrewed and AAM for regional and remote operations is doable now with relatively low risk and the highest potential of public benefits.

We are some ways away from a large scale “urban” Flight Information Management System (FIMS) style uncrewed UTM. The current crewed air traffic management system would struggle to support large numbers of uncrewed aircraft in an urban setting with current technology. The development of a UTM FIMS solution for uncrewed operating in urban areas is most likely decades away, if at all. Interestingly, the trial in Canberra of Wing BVLOS uncrewed delivery services has been discontinued because of the lack of public acceptance.

Mitigation of risks of third-party damage from uncrewed accidents could adopt the same philosophy as flying any current crewed aircraft.

What frameworks does the Australian Government need to ensure community acceptance as the sector continues to develop, and particularly if it reaches some of the more optimistic growth projections is a great question. Possibly the balance of public benefit over disruption and hence acceptance will be most contentious. One could use the example of the use of Emergency Services or Police helicopters over urban areas as being acceptable. However, the same community may not want non-essential services flying around their urban setting disrupting their lifestyle. Whereas in Class G airspace in regional and remote areas the communities would most likely welcome the new services, potential business and employment opportunities.

Response to Chapter 10 – Future industry workforce

Current and Future Industry Workforce (Pilots and Engineers Shortages)

Engineers

COVID has amplified the shortage of aviation technical professionals. It’s nothing new to those who have been in the industry for a few decades but COVID has taken the problem to a whole new dire level. From a GA perspective it is further exacerbated by the fact that the larger airlines can pay more for the same skill set that the regional and GA operators.

There are no quick fixes as it takes many years to train a pilot and even more to train a multi discipline Licensed Aircraft Maintenance Engineer (LAME) to levels that are safe. The level of responsibility, study and training required to become either, then the lifestyle these careers demand is not attractive when compared to the average income and conditions available in similar less technical based industries.

Engineers have traditionally been trained in 5 trades of Airframe, Engine, Electrical, Instrument and Radio each had its own 4 years trade training requirement. That’s how engineering licences were once categorised prior to the introduction of the current CASA Part 66 EASA style license. Arguably, the new part 66 license system with just two categories (Mechanical B1 and Avionic B2) is a watered-down content version of the old system so that training to a lower level can be achieved in the same 4-year term. Bending to the demands of airlines, unions and trying to harmonise with foreign regulators, CASA has allowed the licensing system to become insanely complex and virtually unusable for most except maybe the larger airlines.

CASA has also played a negative role in the change to the licensing system for engineers and pilots that make the path to licensing one that is overly complex and confusing. This has had a negative effect on the engineering apprentices with some finding it too hard and complex to navigate. CASA are currently reviewing these regulations but it will be years away from implementation when the problem is now.

Previous licensing systems were far simpler, clearer, more flexible and applicable to the Australian environment. CASA should consider reverting back to the older system's framework to aid in flexibility to help the struggling industry. There was no safety case or legitimate reason for changing personnel licensing in the first instance, it was changed primarily as a result of airline engineers union action, airline commercial interests and foreign regulation harmonisation reasons.

The green paper has quite correctly identified that engineers will need even more technical disciplines such as Hydrogen and Electrical power plants and propellers etc. Whilst new technologies come along it does not mean that we don't still need to train for the old technology. In aviation it can take decades for succession to take effect. Hence, there will be a need for even more engineering training in the short term, exacerbating the current problem.

Government financial assistance in removing educational and associated costs for successful Engineers and Pilots in a similar manner to what the Victorian government offered to nurses and their training could be of immediate benefit. Whilst subsidies under the Australian Apprenticeships Incentive System are positive, they don't go far enough.

A solution to help the regional airline and GA operators fight the disadvantage of larger airlines being able to pay more for staff could be in a similar approach to the way governments financially supports regional doctors that in turn support regional/remote communities.

Aviation Development Engineers.

Australia will have difficulty having a leadership role if the role of developmental engineers continues to be diminished by the government agencies. These engineers are often the catalyst and drivers towards deployment of new technologies. Agencies like Airservices Australia have consciously diminished the role of engineers in acquisition and support of new technology. If this trend continues the innovation brought by these change specialists will diminish rather than increase.

Pilots

The current pilot shortage was predicted more than five years ago and not much has been done to address this. The COVID period certainly exacerbated the situation but cannot be used as an excuse.

Retirement age has finally forced many experienced pilots out of the industry which has only served to dilute the experience base. This, on the back of poorly paid GA pilots is not supplying the airline industry with sufficient and experienced crews.

Airlines have always been able to offer higher salaries because they have a capacity to pay based on the product revenue they achieve. As mentioned, the skill set that airline pilots have are similar (if not the same) as they are in GA, so why the huge disparity?

The overly complex regulations that CASA introduced in December 2021 have only served to confuse and make progression through the career pathway for pilots more difficult and costly. HECS and VET Student loans do not go far enough. Full subsidies for the process of gaining a Commercial Pilot Licence and the associated ratings that upskill such as Multi Engine, Instrument, Instructor, Airline Transport Pilot Licence theory, Multi Crew Cooperation should be considered.

Recently COVID created an opportunity for the vast amount of highly experienced pilots leaving the industry because of the deteriorating working conditions, close to retirement age or being made redundant is alarming. Many of these people would make excellent flight examiners, however, the regulatory hurdles required to qualify for a Flight Examiner Rating is, in most cases, prohibitive and expensive. This is despite these people having previously held high level check and training and examiner status within a particular airline - a great loss to the industry that can ill afford it.

How to fix this problem? Firstly, subsidising the cost of training new pilots must be prioritised along with engineers. The other point to remember is that we don't want to just have the cost of training as a feature, but retention in the General Aviation industry is paramount. Not only does this provide resources for communities and the economy (such as the RFDS, freight, agriculture, remote area transport to name a few), but to allow pilots to gain valuable experience to carry forward and in turn provide experience and mentoring to the next generation of pilots.

At present, the experience levels of pilots entering parts of the industry is dangerously low. This is occurring in both GA and airlines. We need to retain them in GA to build that experience. Why not offer experienced retired pilots an incentive to be retrained as an instructor? The major legacy carriers should reduce the gap in salary between the 'mainline' group and regional pilots by recognising the skill set and using their enormous group profits to distribute fairly. Some carriers have a 'fleet pay' system where the salary was the same regardless of the type of aircraft you flew, therefore there was no financial incentive to move.

Enforcing a training bond period that airlines adopt internally could be utilised in the GA industry to enable you to qualify to exercise the privileges of an ATPL. This would serve to assist stabilise and manage pilot demand. The RAAF have a minimum return of service of 11 years for this exact reason. If, let's say, you must remain in GA for at least 3 years after you pass all the ATPL exams, then the drain on GA would slow and other employers in the industry benefit from a larger experience base.

Aviation Training and Career Comments

Governments and industry need to prepare Australian workers for the new skills required for the technological transition by adding them to the curriculum like we have for all the past technological advances in aviation we have witness over the decades. Most recent major technology changes have been in avionics as the jet engine and airframe have not changed since the 1960-70's, however now we are seeing new more environmentally friendly types of propulsion systems.

Training in areas of powerplant such as hydrogen and electric will be in GA, not airlines. The changes in these areas whilst required, are not going to be large in scale. Our view is that it will grow organically in an incremental way.

We know that women in aviation technical roles typically perform very well. However, nature dictates otherwise when a family is desired the demands of working for an airline just doesn't fit most family models. From our experience in working in airlines, the late 80's did have an element of subordinate abuse across all genders. This has abated and from the late-90s onward where the current working environment has generally been much more harmonious.

The awareness of aviation as a career path is not well promoted at secondary schools. Industry and Government could do better in having aviation included in all careers days held in all secondary schools that lead to a TAFE course described below.

Attracting anybody who is non-technical orientated or cannot work outside 9-5 weekdays can be challenging due to the shift work requirements and the high technical complex nature of aviation. As a result, it could be an idea to consider an introductory aviation careers-based TAFE course that may some help young people leaving school understand the industry and then be better equipped to make an informed decision about a career in aviation. This would attract the right STEM minded persons and in turn the industry may have a better chance of retaining them. Aviation is certainly not for everybody.

Diversity should not be the focus for an industry that's primary function is safety in a very complex technical environment. It should be considered and applied wherever possible but never to the detriment of capability or safety.

Skilled migration pathways can play an immediate role in easing current aviation personnel shortages. There is potential scope to allow for harmonisation of Pilots and Engineer qualifications between Australia and some select Asian countries that have a proven track record of producing a similar level of competency and aviation safety levels.

Recognition of overseas training qualifications need to be trained in CASA approved training organisations. How CASA individually approve such training organisations is in our opinion more the question. Having adequate ICAO based harmonisation could be a helpful.

Response to Chapter 11 International Aviation

Foreign Aircraft Operations and Foreign investment in Australian Airlines

There is a common belief amongst Australians that we must have and protect QANTAS as our national carrier. We would challenge this view in that QANTAS is far from controlled or owned by the Australian government as many state airlines are. QANTAS is no longer a state own asset and is only just controlled by Australian private share-holders. For example, Air New Zealand is 51% owned by the NZ Government and hence is controlled by that government. Fiji Airways is 52% owned by the Fiji government and hence controlled by that government. The message here is, unless the government owns enough to control an organisation for the nations people then it's status as national carrier is brought into doubt.

Virgin and Bonza ownership are 100% foreign owned with Australian registered aircraft/operations and have CASA oversight. They operate domestically and, in some cases, internationally under Australian CASA regulations and Australian company structures but ultimately, they are foreign owned entities.

Interestingly, Australia allows foreign registered aircraft to operate commercially to conduct a range of commercial work within Australia including domestic freight operations, fire bombing and charter services with little if any CASA oversight.

Alarmingly, the most recent two largest aircraft crashes (C130 and B737) that have occurred in Australia have involved foreign registered aircraft operating on a government funded contract that had next to zero CASA oversight.