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Airspace Review of Hobart

December 2019

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1.0	Final version – Feedback incorporated	December 2019

1 Executive Summary

The Office of Airspace Regulation (OAR) within the Civil Aviation Safety Authority (CASA) has conducted an airspace review within thirty-five (35) nautical miles (NM) of Hobart International Airport to determine if the airspace remains fit for purpose. The review examined the airspace architecture, classifications, procedures and infrastructure from the surface to 12,500 feet (FT) above mean sea level (AMSL).

This review was initiated by a recommendation within the Aeronautical Study of Hobart 2017 (the study) which was completed by the OAR. This review applies CASA's regulatory philosophy which considers the primacy of air safety, whilst considering relevant considerations including the environment, security and cost.

A multifaceted approach was used in conducting this review, including quantitative and qualitative analysis consisting of:

- Aerodrome traffic data including aircraft and passenger movements;
- Airspace design;
- Australian Transport Safety Bureau and Airservices Australia (Airservices) incident data; and
- Stakeholder consultation.

1.1 Observations

The following observations were made as a result of CASA's analysis of the Hobart airspace:

1. Between February 2017 to February 2019, air transport movements and passenger movements for Hobart and Cambridge recorded an average growth of 5.4% and 6.1% respectively.
2. For the 12-month period to February 2019, Hobart passenger movements exceeded 2.7 million. This is an increase of more than 400,000 passengers from the same data recorded in the study.
3. Current passenger movement numbers at Hobart are comparable to locations where Class C ATC services are provided in Australia. However, there are higher air transport movements recorded at these other Class C locations compared to Hobart.
4. Based on combined aircraft and passenger movements at Hobart/Cambridge compared to other Class D and Class C towered locations in Australia, the number of reported incidents is considered low.
5. The western sector at Hobart was considered for aircraft operations. Airline operators identified safety risks to their operations and the western sector was considered not suitable.
6. The Hobart Very High Frequency Omnidirectional Range (VOR) has been relocated and should be available for operational use from November 2019. However, for operations at Hobart, air traffic control will primarily issue satellite-based instrument flight procedures. Aircraft requiring the VOR for operational reasons will be allocated the VOR procedure.

1.2 Summary of Conclusions

The review found:

- The three recommendations from the Aeronautical Study of Hobart 2017 are finalised.
    - The change in airspace architecture north of Hobart, has provided a more effective use of Class G airspace.
    - The monitoring of aircraft and passenger movements for 24 months has been completed.
    - The redesign of flight routes, terminal instrument flight procedures and standard arrival routes (STARs) into Hobart has been completed. Finalised

procedures were promulgated by Aeronautical Information Publication Supplementary (AIP SUP) effective November 2019.

- Total aircraft movements, air transport movements and passenger movements at Hobart and Cambridge aerodromes increased, on average, 6.6%, 5.4% and 6.1% respectively, during the review period.
- Combined air transport movements during the 12-month period to February 2019 at Hobart and Cambridge aerodromes exceeded 27,500. Air transport movements are expected to exceed 30,000 during 2020-2021.
- The airspace classification is fit for purpose.
- There is an opportunity for Airservices to enhance the level of service provided and the efficiency of controlled airspace. This opportunity should be examined to upgrade the level of surveillance, airspace classification and air traffic services at Hobart and the surrounding airspace system.

1.3 Recommendations

The following recommendation is made as a result of CASA's analysis of the Hobart airspace:

Recommendation 1 Airservices should submit an airspace change proposal for the introduction of a Class C tower service supported by Class C terminal airspace within 12 months from publishing this report.

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2 Introduction

In exercising its powers and performing its functions, the Civil Aviation Safety Authority (CASA) must regard the safety of air navigation as the most important consideration.[1]

The Office of Airspace Regulation (OAR) within CASA has carriage of the regulation to administer and regulate Australian-administered airspace, in accordance with section 11 of the *Airspace Act 2007* (Act). Section 12 of the Act requires CASA to foster both the efficient use of Australian-administered airspace and equitable access to that airspace for all users. It requires that CASA must consider the capacity of Australian-administered airspace to accommodate changes to its use and national security. In exercising its powers and performing its functions, CASA must regard the safety of air navigation as the most important consideration.[2]

In February 2017 the OAR published the Aeronautical Study of Hobart (the Study).[3] A number of findings and conclusions were made in the Study including the following three recommendations:

Recommendation 1 The existing airspace classification and architecture (apart from the one controlled airspace (CTA) step lower limit change, which is already the subject of an airspace change proposal) is appropriate and should remain unchanged.

Recommendation 2 CASA should continue to monitor aircraft and passenger movements and incidents at Hobart over the next 24 months to determine whether the trend for growth continues. An aeronautical risk review should then be conducted if necessary.

Recommendation 3 To improve efficiencies and predictability, taking into account PBN requirements Airservices should continue redesign work for flight routes into and out of Hobart, make improvements to existing Terminal Instrument Flight Procedures (TIFPs) and introduce STARs into Hobart.

2.1 Overview of Australian Airspace

Australian airspace classifications accord with Annex 11 of the International Civil Aviation Organization (ICAO) and are described in the Australian Airspace Policy Statement 2018 (AAPS). Airspace is classified as Class A, C, D, E and G depending on the level of Air Traffic Service (ATS) required to best manage the traffic safely and effectively. Government policy allows the use of Class B and Class F airspace however these are not currently utilised in Australia.

The airspace classification determines the category of flights permitted, aircraft equipment requirements and the level of ATS provided. Annex B provides details of the classes of airspace used in Australia. Within this classification system aerodromes are either controlled (i.e. Class C or Class D) or non-controlled (Class G).

2.2 Purpose and Scope

The purpose of the Airspace Review (the Review) is to determine if the airspace architecture is fit for purpose and complies with the Act for the safe operations, efficient and equitable access for airspace users.[4]

The Review analysed the airspace within 35 nautical miles (NM) of Hobart from the surface up to 12,500 feet (FT) above mean sea level (AMSL).

Aircraft operations above 12,500 FT AMSL, aerodrome facilities or developments, and surrounding infrastructure issues are outside the scope unless a significant safety issue on the airspace operations in the review area is found. Airspace related matters that occur outside the airspace review area may be included, subject to the discretion of the OAR.

[1] Civil Aviation Act 1988, section 9A – Performance of Functions
[2] Civil Aviation Act 1988, section 9A – Performance of Functions
[3] Aeronautical Study of Hobart, Civil Aviation Safety Authority, Canberra 2017
[4] The term 'fit for purpose' means the product or service is satisfactory for the purpose it was designed or created for.

Matters relating to the development of a Hobart Airspace Change Proposal (ACP) being undertaken by Airservices Australia (Airservices) is outside the scope of this airspace review.

Where determined, the Review will provide findings, observations and recommendations.

2.3 Objective

The airspace review includes:

- Analysis of aircraft movement data;
- Analysis of the mix of aircraft operations in the area;
- Analysis of the current aircraft movement levels to determine the suitability of existing airspace;
- Analysis of the incidents and occurrences within the review area;
- Identification of threats or risks to the safety of operations within the airspace; and
- Consultation and consideration of feedback from airspace users.

3 Aerodromes

Hobart International Airport (Hobart) is the largest aerodrome located in the Review area. Cambridge aerodrome (Cambridge) is located less than one nautical mile (1 NM) from Hobart. Cambridge is an uncertified aerodrome which is also referred to as an aircraft landing area (ALA).

Other ALAs located within this area include Jericho, Lemont, Triabunna, Lagoon Bay, Sandfly, Darlington and Bruny Island. Darlington ALA is located on Maria Island off the east coast of Tasmania. Bruny Island is approximately 24 NM south-west of Hobart.

These ALAs are important for continued aviation activities within their respective locations, however unless otherwise specified, this Review will not detail their operations. Aircraft and passenger movements are assumed to be below the Class D criteria for analysis within the AAPS. Incidents and occurrences reported at these locations occur periodically and the introduction of the 30-35 NM step has assisted with aircraft accessing the airspace.

This Review will feature Hobart and Cambridge aerodromes and the surrounding airspace.

Figure 1: 35 NM area around Hobart and other identified aircraft landing areas[5]

[5] Source: Visual Navigation Chart (VNC) Hobart and Visual Terminal Chart (VTC) Hobart; Airservices Australia, Canberra effective 23 May 2019

Figure 2: Hobart and Cambridge airports[6]

3.1 Hobart

Hobart is a certified aerodrome operated by Hobart International Airport Pty Ltd and owned by the Tasmanian Gateway Consortium. In 1998, the airport was privatised under a 50-year lease agreement, with an option to extend for a further 49 years, from the Federal Government. Annual passenger movements at Hobart exceed 2.7 million and is projected to increase in the immediate future due to the increasing tourism sector within Tasmania. Hobart does not have scheduled international flights however, Customs and Immigration services are based at the airport for flights entering the country.

Qantas, QantasLink, Jetstar, Virgin Australia and Tiger Airways are the main airlines providing passenger transport operations (PTO) at Hobart. Qantas Freight and Toll operate freight operations. Skytraders provide intercontinental flights during the summer months for the Australian Antarctic Division. Rotor Lift, Royal Flying Doctor Service and business jets are the main users of the general aviation (GA) facilities at Hobart Airport but the majority of GA activity is conducted at Cambridge aerodrome. Defence aircraft, Boeing C17 Globemaster (C17) operates at Hobart.

The majority of aircraft operations at Hobart are conducted using instrument flight rules (IFR).

Hobart Aerodrome Facilities

Hobart has an aerodrome elevation of 13 FT AMSL and has one designated sealed runway 12/30 (RWY12/30) which has the following characteristics:

- Runway length is 2,727 metres (m);
- Runway 12 threshold is displaced 119m from the runway end provided the landing distance available of 2,608m.
- Runway 12 threshold elevation 12 FT AMSL;
- Runway 30 threshold elevation 13 FT AMSL;
- Runway width of 45m; and
- 300m runway strip width (RWS);

[6] Google Earth V 7.3.1.4507 (6 February 2018) Hobart, Tasmania: 42° 50’ 00.20” S 147° 29’ 44.22” E; Eye Alt 6.9 km. DirectX 2018 http://www.earth.google.com [18 March 2019]

The taxiway links the runway to the apron area at the terminal. A full-length parallel taxiway to the runway is not available and aircraft departing and landing are required to backtrack on the runway.

Hobart navigation aids include Distance Measuring Equipment (DME), Very High Frequency Omnidirectional Range (VOR) and an Instrument Landing System (ILS). The VOR was removed from service and relocated in late 2017. It is anticipated that the VOR will be made available for operational use by November 2019.

A Category 7 Aviation Rescue and Firefighting service is available at Hobart.

The Air Traffic Control (ATC) tower controls air traffic for Hobart and Cambridge. The tower is active daily from 0550 hours to 2210 hours (local time). Outside tower hours, Melbourne Centre provides an ATS above 1,500 FT AMSL and Common Traffic Advisory Frequency (CTAF) and Aerodrome Frequency Response Unit (AFRU) are also in operation.

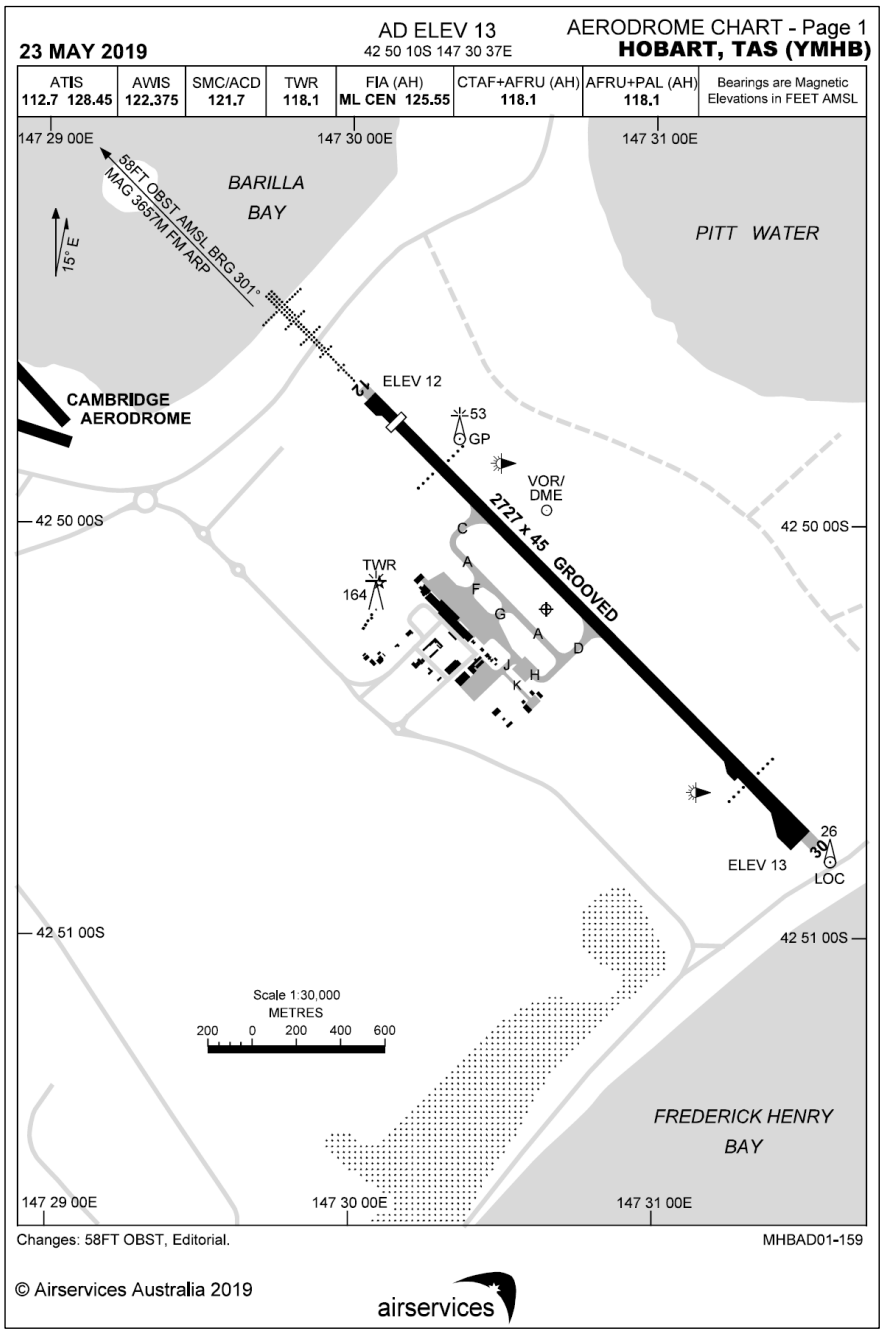

Figure 3: Hobart aerodrome chart[7]

[7] Source: Aeronautical Information Publication (AIP) Departure and Approach Procedures (DAP) amendment 159 effective 23 May 2019, Airservices Australia, Canberra 2019

Terminal Instrument Flight Procedures

The following terminal instrument flight procedures (TIFPs) are published for Hobart airport.[8]

Standard Arrival Routes (STARs)
CLARK FOUR ARRIVAL (RNAV)
IPLET FOUR ARRIVAL (RNAV)

Standard Instrument Departures (SIDs)
KANLI TWO (RNAV)

Instrument Approach and Landing Procedures (IALs)
ILS-Y OR LOC-Y RWY 12
ILS-Z OR LOC-Z RWY 12
RNAV-Z (GNSS) RWY 12
RNAV-Z (GNSS) RWY 30

3.2 Cambridge

Cambridge is an ALA operated by Par Avion, located to the north west of Hobart. Cambridge is used by fixed and rotary winged aircraft less than 5,700 kilograms and is the designated GA facility for Hobart.

Flying training, charter, tourist and fire-fighting aircraft are the main types of flights operated at the aerodrome. There are scheduled PTO aircraft operating at Cambridge however the majority of aircraft operations are conducted using visual flight rules (VFR).

Cambridge Aerodrome Facilities

Cambridge has an aerodrome elevation of 67 FT AMSL and has three designated sealed runways with the following characteristics:

- RWY 14/32:
  - Length is 900m;
  - RWY32 threshold is displaced 125m from the runway end providing a landing distance of 775m;
  - Runway width 18m.
- RWY 12/30:
  - Length is 1,000m;
  - RWY30 threshold is displaced 75m from the runway end provided a landing distance of 925m.
  - Runway width 18m.
- RWY 09/27:
  - Length is 630m;
  - Runway width 18m.

ATC in Hobart tower do not provide separation on the movement area due the tower's geographical location to Cambridge. Landing and take-off clearances are not provided as Cambridge is an ALA, however aircraft must not become airborne until departure instructions are provided.

Outside Hobart tower hours, CTAF procedures apply.

3.3 Aeronautical Information

A review of the published aeronautical information indicated adequate detail for operations at Hobart and Cambridge. Stakeholders reported no known errors or omissions regarding promulgated aeronautical information.

[8] Source: AIP DAP amendment 159 effective 23 May 2019; Airservices Australia, Canberra 2019

4 Airspace

4.1 Airspace Structure

Hobart airspace has the following airspace classes: CTA classes of Class A that has a lower limit (LL) of Flight Level 180 (FL180), Class C, Class D that have varying lower limits and Class E that also has a LL FL180. Non-controlled Class G airspace is located outside these areas. The airspace architecture is centred on Hobart airport and designed in a keyhole like outline to contain the primary air routes whilst enabling access to other airspace users.

The airspace within 35 NM of Hobart and up to 12,500FT AMSL, consists of Class C, Class D and Class G airspace. Class A and Class E airspace both operate at the LL FL180 and outside the scope of this review.

The Hobart Class D Control Zone (CTR) shape reflects a truncated circle with arcs centred from the aerodrome reference point (ARP) or racetrack like pattern. The CTR is 17 NM in length with the arcs aligning the runway 12/30 direction. The CTR extends 8 NM to the north-west and 9 NM to the south-east. The CTR is approximately 12.4 NM wide and the airspace within the CTR is from the surface (SFC) to 1,500 FT AMSL.

Above the CTR are a number of Class D airspace steps which have increasing lower limit intervals of 1,500 FT AMSL to 11 NM TASUM, 2,500 FT AMSL to 16 NM TASUM and 3,500 FT AMSL out to 20 NM and 25 NM TASUM.[9] Overlaying Hobart Class D airspace is Class C airspace that is LL 4,500 FT AMSL out to 30 NM TASUM northwest of Hobart and 36 NM TASUM southeast of Hobart. From 30 NM TASUM to 35 NM TASUM, northwest of Hobart, Class C LL 6,500 FT AMSL applies.

Restricted area (RA) R379 (SFC to NOTAM[10]) and Danger area (DA) D378 (SFC to 1,500 FT AMSL) are located north-east of Hobart, beyond 20 NM TASUM and cover the Buckland Military Training Area. These areas service military non-flying activities such as small arms firing.

D316 (SFC to 5,000 FT AMSL) is a flying training area located to the west of the controlled airspace. D316 is located within Class G airspace. There are two (2) VFR routes for aircraft transiting between D316 and the CTR.

The airspace within the review area is depicted, in whole or in part, on aeronautical charts and described within the Designated Airspace Handbook (DAH). Figure 1 shows the Hobart airspace and the area included in the Review.

Airservices is proposing changes to the aerodrome, approach and airspace system to provide a capability to deliver a Class C aerodrome and a Class C approach service at Hobart and surrounding airspace.

4.2 Surveillance

Air Traffic Control services are provided by Airservices via their Melbourne Air Traffic Services Centre (Melbourne Centre) and the Hobart Control Tower. The control tower provides a procedural tower and a procedural approach control service within the Hobart Class C and Class D airspace 6,500 FT AMSL and below. Outside tower hours, Melbourne Centre operate Hobart Class C and Class D airspace above 1,500 FT AMSL. Below 1,500 FT AMSL becomes Class G airspace and CTAF procedures apply.

Surveillance in the airspace review area is provided by the Tasmanian Wide Area Multilateration (TASWAM) System. TASWAM provides two (2) distinct surveillance capabilities: A wide area multilateration (MLAT) (WAM) service provides a secondary surveillance ‘radar-like’ capability designed to support the Class C airspace, and an Automatic Dependent Surveillance – Broadcast (ADS-B) service. ADS-B is only available to those suitably equipped aircraft. This supports surveillance across Tasmania.

[9] TASUM is the waypoint established where the Hobart VOR/DME was positioned prior to being relocated to its current site.
[10] NOTAM is a Notice to Airmen which alerts aircraft pilots of potential hazards that could affect the safety of the flight.

In Tasmania, TASWAM comprises of 14 remote ground units (RUs). Four (4) RUs are in the immediate vicinity of Hobart airport including three (3) at the airfield and one (1) on Mount Rumney (3 NM west of Hobart VOR). This enables ATC to utilise ADS-B surveillance on suitably equipped aircraft to the ground at Hobart. However, this surveillance does not meet the requirements to provide a terminal area separation surveillance standard.

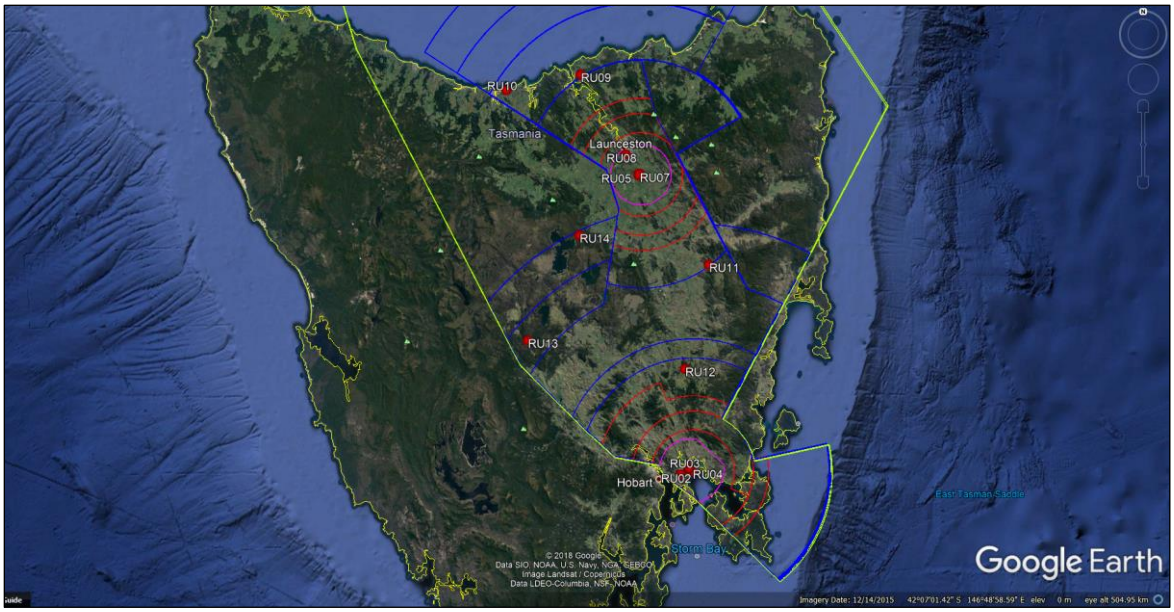

Figure 4: Tasmanian airspace and TASWAM remote ground unit locations[11]

Currently for aircraft operating in Tasmania, TASWAM is used by ATC in Melbourne Centre for enroute surveillance separation to 7,000 FT AMSL. Below this level, a procedural approach service is provided by staff at Hobart tower (or Launceston tower) or by Melbourne Centre outside tower hours of operation.

Hobart Tower has Tower Situational Awareness Display (TSAD) available to the duty controller. The TSAD information displayed in the tower is sourced from the Eurocat system in Melbourne Centre which is then relayed to Hobart tower. As consequence, there is no fall-back position or redundancy in this system and is a 'situational display'. The distinction from a full radar Air Situation Display (ASD), is that a TSAD can't be used for aircraft separation purposes.

Airservices is proposing to upgrade Hobart to a higher level of service than is currently provided. The proposal will implement changes to the aerodrome, approach and airspace system to provide a capability to deliver a Class C aerodrome and a Class C approach service with the use of ADS-B surveillance. This proposal seeks to enhance the level of service provided and the efficiency of controlled airspace.

[11] Google Earth V 7.3.1.4507 (14 December 2015) Tasmania 42° 07' 01.42" S 146° 48' 58.59" E, Eye Alt 504.95km Landsat/Copernicus 2018. http://www.earth.google.com [21 June 2018]

5 Traffic

Hobart and Cambridge facilitate an array of aviation operations including domestic PTO, freight services and GA activities such as flying training, aero-medical services, charter and sight-seeing operations. Virgin Australia and the Qantas Group conduct the majority of PTO at Hobart. Hobart is also the departure point for flight operations to Wilkins Aerodrome in Antarctica.

Cambridge aerodrome is the main flying training aerodrome in the review area. Data shows a noticeable increase in total movements at Cambridge during period between March 2018 to February 2019. This is attributed to flying training and the increased aerial firefighting operations based at the aerodrome for that period.

The following tables detail Airservices data regarding passenger and aircraft movement for Hobart and Cambridge aerodromes from February 2016 to February 2019.

Hobart figures for the 12 months ending					
Month/Year	**Total Movements**[12]	**Air Transport Movements**	**Passengers**	**VFR Movements**	**IFR Movements**
February 2016	26,915	21,374	2,291,063	6,034	20,881
February 2017	26,375	22,643	2,441,520	4,075	22,300
February 2018	28,657	23,557	2,574,545	5,611	23,046
February 2019	29,178	24,370	2,739,966	5,779	23,399

Table 1: Airservices movement data for Hobart, February 2016 to February 2019

The yearly average increase between February 2016 to February 2019 at Hobart:

- Total Movements: 2.8%
- Air Transport Movements: 4.4%
- Passengers: 6.1%

The Airservices' data shows annual passenger and aircraft movements higher than those estimated in the 2015 Hobart International Airport Master Plan that forecasted annual passenger and aircraft movements for the 2019-2020 financial year of 2,687,300 and 20,020 respectively.[13]

Cambridge figures for the 12 months ending					
Month/Year	**Total Movements**	**Air Transport Movements**	**Passengers**	**VFR Movements**	**IFR Movements**
February 2016	25,650	2,158	10,622	24,141	1,509
February 2017	23,166	2,100	10,513	21,675	1,491
February 2018	21,876	2,008	9,626	20,527	1,349
February 2019	33,381	3,201	14,598	31,708	1,673

Table 2: Airservices movement data for Cambridge, February 2016 to February 2019

The yearly average increase between February 2016 to February 2019 at Cambridge:

- Total Movements: 12.4%
- Air Transport Movements: 17.4%
- Passengers: 14.0%

[12] Total movement data includes circuit movements
[13] 2015 Hobart International Airport Master Plan "Air Traffic Forecasts"; Hobart International Airport Pty Ltd 2015

The follow table combines the data from both locations for analysis.

Hobart & Cambridge combined figures for the 12 months ending					
Month/Year	**Total Movements**	**Air Transport Movements**	**Passengers**	**VFR Movements**	**IFR Movements**
February 2016	52,565	23,532	2,301,685	30,175	22,390
February 2017	49,541	24,743	2,452,033	25,750	23,791
February 2018	50,533	25,565	2,584,171	26,138	24,395
February 2019	62,559	27,571	2,754,564	37,487	25,072

Table 3: Combined Hobart and Cambridge movement data February 2016 to February 2019

The yearly average increase between February 2016 to February 2019 at Hobart and Cambridge combined:

- Total Movements: 6.6%
- Air Transport Movements: 5.4%
- Passengers: 6.1%

5.1 Analysis of aircraft movements

Since December 2016 aircraft movements have continued to increase at Hobart however, the complexity of traffic remains similar to those listed in the Study. Approximately 75% of aircraft movements at Hobart are high seating capacity aircraft and 99% of aircraft movements at Cambridge are undertaken by low seating capacity aircraft.

Total aircraft movements at Hobart/Cambridge were steady until June 2018 when there was a noticeable increase as indicated on the following chart. This increase is due to flying training and firefighting activities undertaken by aircraft based at Cambridge.

Based on the higher rate of passenger numbers compared to air transport movements, it is reasonable to assert that aircraft with a greater seating capacity are being used at Hobart to accommodate demand. As aircraft movements continue to increase and aircraft are replaced by those with greater seating capacity and differing performance, this diversity presents a level of risk that will require additional consideration in the future.

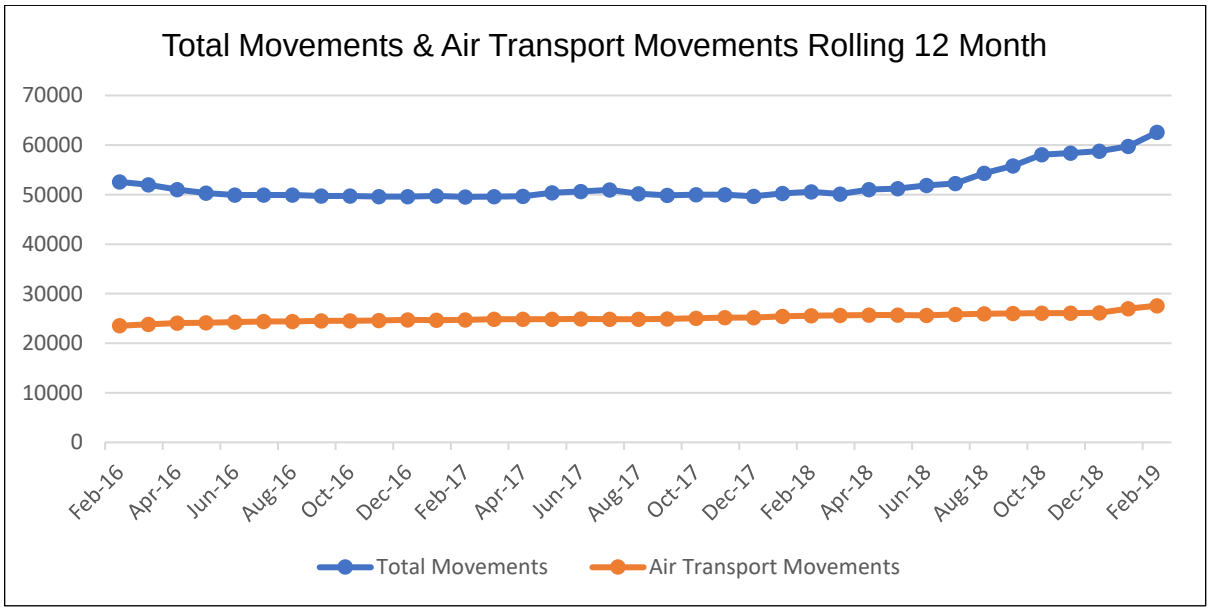

Figure 5: Total movements Hobart/Cambridge December 2016 to February 2019

5.2 Analysis of passenger numbers

Passenger movement data at Hobart has increased each year since the Study. The statistics show an increase from the corresponding month from the previous year. Overall there are continued increases in passenger numbers during the review period.

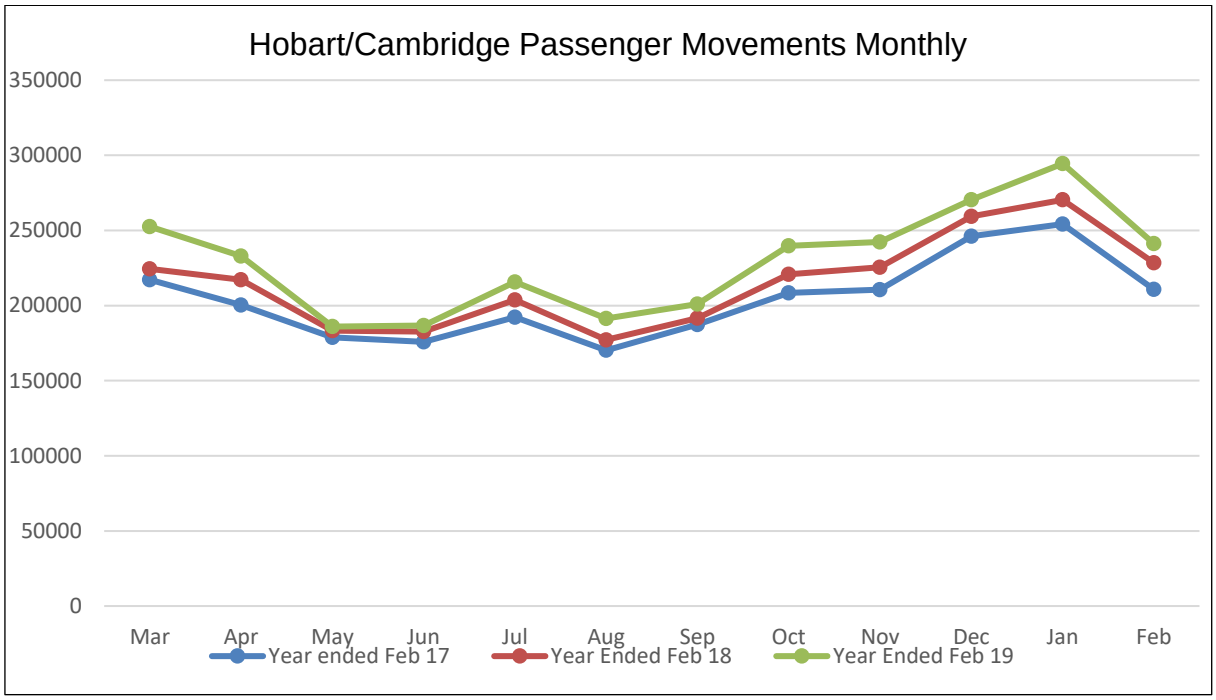

Figure 6: Hobart/Cambridge Passenger Movements monthly

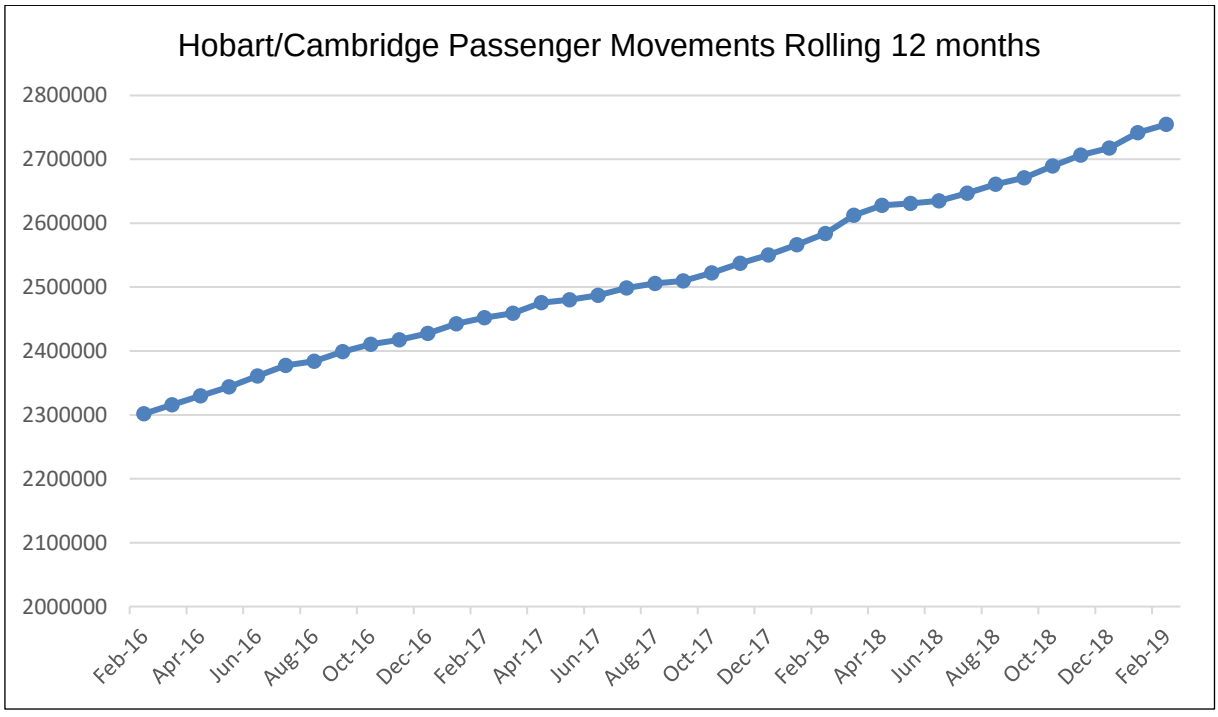

Figure 7: Hobart/Cambridge Passenger Movements 12 months rolling

5.3 Comparison with other Controlled Aerodromes in Australia

The current airspace classification within the review area at Hobart consists of varying levels of Class D overlaid with Class C. Each airspace classification in controlled airspace provides a different level of ATC service and procedures. A description of the airspace and summary of services is shown in Annex B.

Data from Hobart/Cambridge and other Class D and Class C aerodrome locations is tabled in Annex C. A comparison of this data shows that Hobart/Cambridge has the highest number of passengers recorded at all Class D towered locations. Total aircraft movements are lower than other Class D aerodromes (such as Bankstown, Moorabbin and Parafield).

In comparison to other Class C aerodromes, Hobart/Cambridge aircraft movements are lower than other Class C aerodromes (such as Cairns, Darwin, Gold Coast, Townsville or Canberra) but has comparable passenger movements.

6 Aviation Incident Reports

All incidents and accidents involving Australian registered aircraft, or foreign aircraft in Australian airspace must be reported to the ATSB. The ATSB receives incident information via pilot reports, Airservices' Corporate Integrated Reporting and Risk Information System (CIRRIS) reports and the Australian Defence Forces' Aviation Safety Occurrence Reports.

The ATSB maintains its own database, the Safety Investigation Information Management System (SIIMS), in which all reported occurrences are logged, assessed, classified and recorded. The information contained within SIIMS is dynamic and subject to change based on additional and/or updated data. Each individual report is known as an Aviation Safety Incident Report (ASIR) and for identification purposes is allocated its own serial number. Each ASIR is detailed as an incident, serious incident or accident and assigned one of the following Level 1 descriptions:

- Airspace – includes airspace infringements, loss of separation (LoS), loss of separation assurance, breakdown of coordination/information error, error by ANSP instruction or pilot actions, encounter with a remotely piloted aircraft system (RPAS);
- Consequential Events – includes aircraft conducting missed approaches, fuel dumping, diverting or returning to aerodrome;
- Environment – most common description for a bird strike, evidence of bird strike after landing or locating animals during runway inspections but also includes lightning strikes and turbulence issues;
- Infrastructure – such as runway lighting, approach lighting and radio frequency failures;
- Operational – considers pilot actions and runway incursions (resulting in events including LoS), ground proximity warnings, terrain collisions, crew and cabin safety, smoke or fumes events, avionics and equipment issues; and
- Technical – includes airframe, systems such as landing gear indications and power plant matters e.g. engine running rough, engine failure.

The ATSB's primary focus is the safety of the travelling public. The ATSB prioritises its investigations based on accidents and the most serious incidents that are considered most likely to enhance aviation safety.[14] Between December 2016 and May 2019, the ATSB conducted five investigations into incidents that occurred in Tasmania. None of the incidents were airspace related or involved aircraft operating on the Hobart SIDs or STARs.[15]

CASA receives incident data for the purpose of improving safety. Airspace related incidents that occurred within 35 NM of Hobart from December 2016 to May 2019 were reviewed. None of the recorded occurrences were attributed to the airspace design or classification within the review area. Incidents relating to the publication of new SIDs and STARs at Hobart were recorded between September 2017 and March 2018. These incidents involved aircraft not adhering to requirements published in these procedures. Changes to SIDs, STARs and the availability of additional TIFPs, effective 7 November 2019 are expected to reduce the number of similar incidents occurring.

6.1 ATSB Aviation Safety Incident Reports

During the December 2016 to May 2019 period, there were 107 occurrences reported within the review area. A table of ATSB occurrences is in Annex E.

- Between December 2016 to November 2017, there were 27 reported occurrences;
- Between December 2017 to November 2018, there were 57 reported occurrences; and
- Between December 2018 to May 2019, there were 23 reported occurrences.

[14] Source: Australian Transport Safety Bureau website http://www.atsb.gov.au/publications/2014/aviation-investigations-in-aust/ 26 June 2019
[15] Source: Australian Transport Safety Bureau http://www.atsb.gov.au/publications/safety-investigation-reports/?mode=Aviation 26 June 2019

Environmental (43%), Operational (41%) and Airspace (8%) were the three most common types of occurrences reported within the review area. The following table further examines each airspace occurrence and includes total aircraft movements for that period.

Airspace Occurrence	Number of Occurrences		
	Dec 2016 to Nov 2017	Dec 2017 to Nov 2018	Dec 2018 to May 2019
Aircraft Separation	2	3	0
Encounter with RPA	0	0	1
Operational non-compliance	1	1	0
Total Airspace Incidents	**3**	**4**	**1**
Total Aircraft Movements [16]	**50,001**	**58,350**	**17,539**

Table 4: ATSB ASIR Airspace Occurrence Description Hobart Review

A summary of each incident is included in section 6.3.

6.2 Airservices CIRRIS data

Between December 2016 and May 2019, there were 81 CIRRIS reports made for incidents occurring within the review area. A table of the CIRRIS reports is in Annex E.

The highest type of occurrence reported was an operational deviation (22%). This type of incident includes the non-compliance of published information, aircraft operating on an incorrect frequency or not complying with an ATC instruction.

6.3 Airspace Incident Analysis

An analysis of the airspace occurrences within the review area showed that additional surveillance or a change to the airspace classification may have prevented some occurrences. However, a number of airspace incidents occurred within the surveillance area that involved a failure to comply with height requirements nominated in a SID/STAR procedure.

Between December 2016 to May 2019, there were eight ATSB airspace occurrences recorded and the total aircraft movements for that period was 125,890.

The Aeronautical Study of Hobart 2017 identified that during 2014-2015 period there were four recorded airspace occurrences and 101,622 total aircraft movements.

An analysis of the ATSB airspace occurrences is detailed below:

- Incident September 2017: the Brasilia aircraft departing Hobart and did not adhere to the height requirements of the KANLI 2 SID. Surveillance to a lower level or changes to airspace classification would not have prevented the incident.
- Serious incident October 2017: a Cessna 206 (C206) during an approach to Cambridge observed another aircraft on a crossing path and in close proximity. The C206 crew took evasive action to maintain separation. The incident occurred within the Hobart Class D CTR. The matter was not investigated by the ATSB. It is not known if surveillance to a lower level would have prevented the incident. Changes to the airspace classification that would increase the level of ATC service may have reduced the likelihood of this incident occurring.
- Incident November 2017: During descent into Hobart, the inbound Boeing 717 (B717) failed to meet the height requirement of the IPLET 1 STAR, resulting in a loss of separation assurance with the outbound A320 on a crossing track. The incident occurred within surveillance coverage. Surveillance to a lower level would not have prevented the incident.

[16] Data based on recorded information for the tabled period. Movement data includes up to February 2019 and incident data recorded up to May 2019.

- Incident December 2017: During approach into Hobart, the A321 descended below the altitude restriction resulting in a loss of separation with the outbound A320 on a crossing track. The incident occurred within surveillance coverage. Surveillance to a lower level would not have prevented the incident.
- Incident January 2018: During climb, departing from Hobart, the crew of the A320 misunderstood an ATC instruction and climbed above the restricted level resulting in a loss of separation with the inbound A321 on a crossing track. The incident occurred in Class C CTA and within the surveillance area. Surveillance to a lower level would not have prevented the incident.
- Incident February 2018: During the departure from Hobart, ATC applied the incorrect separation standard to both aircraft, a Kawasaki BK177 helicopter and an Airbus A319 which were on the same track, resulting in a loss of separation assurance. The incident occurred within the Hobart CTR. Surveillance to a lower level may have prevented the incident.
- Incident March 2018: The A320 aircraft did not adhere to the height requirements of the KANLI 2 SID. Surveillance to a lower level would not have prevented the incident.
- Incident January 2019: Passing 980 FT AMSL on approach, the crew of the B737 observed a remotely piloted aircraft pass 20 FT above the aircraft. The incident occurred within the Class D CTR. Changes to the airspace classification or surveillance to a lower level would not have prevented the incident.

6.4 Hobart SID STAR occurrences

The Hobart SID/STAR procedures were common elements in a number of reported incidents that had occurred. Between September 2017 and May 2019:

- There were 14 occurrences recorded involving the SIDs or STARs at Hobart;
- Eleven occurrences were reported between September 2017 and February 2018;
- Ten occurrences were due to operational deviation where aircraft have failed to comply with height limitations published on each procedure.
- Two occurrences resulted in a loss of separation or loss of separation assurance.

The number of occurrences reported between September 2017 and February 2018 was rare for Hobart. The introduction of the SID/STAR procedures in September 2017 resulted in a number of operational deviations where published height requirements were not observed. Operational deviations are not an uncommon reported occurrence however the number recorded during this period of time resulted in ATC adjusting their processes to reduce the number of incidents while aircraft comply with the published procedures.

The responsibility for the flight and compliance with the procedures being flown remains with the Pilot in Command who should be aware of the height limitations on each procedure.

New SIDs and STARs are expected to be effective 7 November 2019. The new procedures are expected to address the current height requirement at PAGPO (SID) and LAOS (STAR), improve aircraft operating efficiency for Continuous Climb Operations (CCO) or Continuous Descent Operations (CDO) and reduce the number of reported airspace occurrences involving SID or STAR procedures.

6.5 Other Incidents

There were nine ATSB occurrences where aircraft conducted a missed approach primarily caused by weather events.

Eleven TASWAM failures were recorded between March 2017 and March 2019. There were no separation issues resulting from these failures.

There was one CIRRIS incident that identified restricted visibility of Cambridge operations due to the low level of the sun and blinds available in the tower. Changing the airspace classification would not prevent this incident from occurring however increasing the surveillance capability at the tower is likely to increase awareness of operations at Cambridge.

6.6 Aviation Incident Summary

The Review has identified the number of reported airspace occurrences has increased when compared to data in the Aeronautical Study of Hobart 2017. The introduction of SID/STAR at Hobart has resulted in an increase of reported airspace occurrences where aircraft have not complied with the height requirements nominated in these procedures.

There were some occurrences identified where increased surveillance or changing the airspace classification may have prevented the incident from occurring.

The number of airspace incidents reported at Hobart remains low.

Based on the combined movements at Hobart and Cambridge compared to other Class D and Class C towered locations, the number of incidents is assessed as low.

7 Consultation and stakeholder feedback

Stakeholders were contacted and invited to provide comment or input to issues relating to Hobart airspace. Various onsite meetings were conducted with Airservices Australia, airlines and airspace users, aerodrome operators and the community. A list of stakeholders invited to contribute to this review can be found in Annex C. Feedback to CASA was also enabled through the CASA Consultation Hub.

At the commencement of stakeholder consultation, Airservices advised that they were removing Hobart from Tranche 3 of their Airspace Modernisation Program[17] and planned to upgrade Hobart tower to Class C.

Feedback from gliding operators was positive in relation to a previous ACP that enabled access to Class G airspace between the 30 to 35 NM TASUM step.

Airline operators provided feedback on the western sector approaches and departures highlighting safety risks to their operations. The western sector includes the most populated area in Hobart and the highest terrain (Mt Wellington).

Community feedback targeted the consultation process from Airservices about airspace and air route changes and aircraft noise. Additionally, concerns about a lack of community consultation on the recent ACP by the OAR were raised.

7.1 CASA

Input was gained through CASA staff members from the OAR, Aerodromes, Communications, Navigation, Surveillance / Air Traffic Management (CNS/ATM) and Aviation Safety Advisors. Their responses are included in this review.

7.2 Airservices Australia

Input received from Airservices provided the new airspace design around Hobart, which extends the airspace steps thought to the north east of Hobart and was the north-east of Hobart, was published in November 2019.

There was extensive consultation undertaken as part of that process. Industry feedback included utilising a western sector area for approaches and departures. Industry identified and articulated a number of safety issues for their operations should the western sector be used for approaches or departures. The reasons for unsuitability were the same reasons why the eastern area was the most suitable to airline operations. As a result, Airservices presented a single concept design for consultation.

During community consultations, feedback was received and amendments made to the concept design such as changing the concept overwater route back over land. There was significant work undertaken to consult with the community on the concept design. The final report was prepared, the ACP was submitted and approved by CASA OAR.

The Aircraft Noise Ombudsman has noted the efforts by Airservices aimed at enhancing the presentation and distribution of information about its proposed changes in Hobart.

The new SIDs provide unrestricted climb for aircraft. Runway 12 departures between non-jet and jet traffic will provide 5 NM separation between these types of aircraft. Jet aircraft will initially track over water and should be more than 6,000 FT AMSL when crossing land.

The Hobart VOR will be operational, available planning purposes and published in AIP-DAP. IFR aircraft are required to use satellite navigation and will be assigned an RNP-AR, RNAV (GNSS) or visual termination via the STAR for arrivals into Hobart. When an aircraft requires the use of the VOR for operational reasons, the VOR procedure will be allocated. The VOR will be able to be used for aircraft below 5,700 kilograms for flying training.

RNP-AR procedures are under development with the consulted design. The expectation is for these procedures to be effective 7 November 2019.

[17] Source Airservices Australia: http://www.airservicesaustralia.com/projects/airspace-modernisation/ 26 June 2019

Airservices has updated the feedback provided during the Study.[18] Airservices has developed an Airspace Modernisation Program. Hobart was removed from Tranche 3 of the program to contribute to this Review.

Airservices is proposing to provide Hobart a Class C aerodrome service and a Class C approach service within the surrounding airspace. This proposal will provide Terminal Control Area surveillance separation standards for the approach service and tower service using ADS-B surveillance.

7.3 Qantas Group & Virgin Australia/Airline Operators

The following points were common between the major airline operators at Hobart:

- The airlines were consulted by Airservices Australia in relation to Hobart.
- The western sector approaches and departures which were not supported based on safety and feedback was provided. Risks associated with the western sector included turbulence, icing, consideration of controlled flight into terrain (CFIT), the availability of an acceptable manoeuvring area for aircraft, the likelihood of an unstable approach and take-off climb performance considerations during one-engine inoperative operations. These risks are unacceptable for their operations.
- The position is unlikely to change in the foreseeable future, should western sector operations be considered again.
- The reasons provided above are the same why the eastern sector is preferred by airlines i.e. reduced risk of turbulence, icing, CFIT, the availability of acceptable manoeuvring areas for aircraft and the establishment of a stable approach etc.
- The SIDs, STARs and approach procedures provide for CCO and CDO enabling predictability and efficiency of operations.
- The introduction of Class C into Hobart CTR is in principle supported however additional details are needed.

7.4 Aerodrome Operators

Cambridge airport reported there had been a significant increase in movements due to flying training and the aerodrome was used as a base of operations during firefighting activities.

Hobart airport did not report any airspace issues. The airport's master plan exposure draft is expected to be made available for public comment in 2019. Hobart airport will be introducing a push-back system for aircraft. This will increase the capacity of aircraft operations at the terminal gate. Hobart airport also noted that the introduction of runway identification has assisted with situational awareness i.e. aircraft using runway 12/30 at Cambridge refer to these runways as runway 12 Cambridge or runway 30 Cambridge.

7.5 Australian Airline Pilots' Association

The Australian Airline Pilots' Association (AusALPA) represents more than 7,100 professional pilots within Australia.

AusALPA noted that the Hobart 2017 study recommended the redesign of the flight routes into and out of Hobart, improvement to existing terminal instrument flight procedures (TIFPs) and to introduce STARs into Hobart. Whilst these have been actioned, the report did not specify how this was to be achieved and some detrimental effects have resulted. Further industry consultation with relevant stakeholders may have been appropriate to ensure that the relevant changes were fit for purpose and not an unnecessary impost on operations and to the industry. The changes out of the 2017 study resulted in an increase in flight times and track miles flown which have impacted on the efficiencies related to cost and time, whilst also having negative environmental impacts such as extra fuel burn and the concentration of noise to specific corridors.

[18] Aeronautical Study of Hobart 2017 Annex E Stakeholder Consultation/Feedback Register; Office of Airspace Regulation, Canberra 2017

AusALPA supports the 2019 changes for the extra controlled airspace to the north-east of Hobart, as well as the associated SIDs and STARs.

AusALPA does not support the Tranche 3 proposals of Airservices' Airspace Modernisation Project. AusALPA is disappointed and frustrated with Airservices' repeated pursuit of some proposals despite contrary outcomes from previous industry consultations.

Although Hobart has been removed from Tranche 3, comment is provided due to the reoccurring nature of Airservices' proposals for Class E over Class D aerodromes. The Airservices' proposal was consulted upon 12 months prior, was rejected by industry, Airservices communicated that this proposal was not going ahead yet it was again proposed.

Australian and international pilot associations have for many years opposed the introduction or expansion of Class E over Class D aerodromes. AusALPA reiterates our firm view that this airspace model constitutes a real deterioration in safety. Class E is an inherently less safe model of airspace classification to that of Class C. Any suggestion that the same levels of safety can be maintained when airspace is changed from Class C to Class E are simply false. Furthermore, Class E airspace at lower altitudes results in more of a challenge to maintain acceptable levels of safety because of the increase prevalence of VFR traffic at lower altitudes when compared with higher altitudes.

AusALPA supports the change of airspace classification for Hobart from Class D to Class C however this must also occur with surveillance capabilities too. The Ministerial Directive 2004 is yet to be achieved and the use of the TASWAM technology should be considered to meet the intent of the Directive. Currently this technology is not available for use below 7000 FT AMSL.

7.6 Airspace Users

Tasmanian Hang Gliding and Paragliding Association

The Tasmanian Hang Gliding and Paragliding Association (THPA) operates at several sites in Tasmania including two positions from Single Hill (the closest to Hobart and Cambridge aerodromes), Mount Wellington, the Midlands region of Tasmania and Eaglehawk Neck.

Operations are conducted in Class G airspace and the addition of the 6,500 FT AMSL step to the north of the airspace at 30-35 NM TASUM has proved to be great value. More pilots are able to operate in the increased volume, navigating over terrain and operate for longer periods of time.

To date, there have been no issues with proximity with other airspace users however there could be future issues regarding aircraft operating between Cambridge and Strahan via the Upper Derwent Valley in Class G airspace.

For THPA operations within Class G, the airspace is well managed and safe.

Par Avion

The current airspace can be tolerated however if surveillance to lower levels is available, this is likely to assist their operations and therefore supported. However procedural separation in Class C airspace would cause delays and limit or restrict their operations due to the priority of flights.

The current SIDs and STARs into Hobart provide them access to clearances within the CTR because of the altitude requirements. Because aircraft into and out of Hobart are above the levels required for operating at Cambridge, clearances are given and operations are generally unimpeded.

Cockpit operations and workload are not necessarily appreciated by ATC. The equipment in their fleet is not the same as major airline operators, therefore when ATC request estimates for up to 3 waypoints, this needs to be done manually. It takes time and removes the pilot's awareness from flying. An estimate for one waypoint is reasonable but when additional waypoints estimates are required when being vectored, this unnecessarily increases the cockpit workload.

Movements at Cambridge have increased due to flying training, sea plane and helicopter activities.

Since the 2017 study there has been an improvement in accessing the airspace. Previously departures from Cambridge were not able to set course until 20 NM away, this has improved.

Par Avion IFR fleet are all ADS-B equipped and the majority of the VFR aircraft are currently fitted. Par Avion are expanding their fleet numbers within the next 12 months.

Currently the Hobart VOR is not able to be used. Training is being conducted at Launceston. The reintroduction of the VOR and procedures including the DME/GNSS Arrival procedures would assist in training activities and Cambridge operations.

Reviewing the route lowest safe altitudes should be done. These haven't been reviewed for some time and would assist aircraft arriving or departing the area.

Rotorlift

The Class E over Class D proposal sounded like the same proposal that was previously presented by Airservices. The presentation, from an airspace user's safety point of view, did not make sense. However, that change was not a major concern with regard to the operations conducted by Rotorlift i.e. most operations are VFR.

Operations by Rotorlift are mostly VFR. Night operations involve using night vision goggles and IFR operations are primarily training and testing exercises.

Since the 2017 study, facilitating clearances has improved. Hobart (PTO) traffic arrives and departs in blocks. This can result in delays in getting back into the CTR, if they are operating outside the CTR. Holding at Maria Island for 15 minutes has been experienced. Helicopter operations can be as much as 4x the cost compared to flying a fixed-wing aircraft. Delays cost them more money and impact their operations.

IFR training is undertaken at Launceston due to the Hobart VOR not being able to be used.

Rotorlift helicopters are ADS-B equipped. If surveillance was available in Class C airspace, this would provide flexibility for their operations. Rotorlift generally operate at below the current surveillance level so a surveillance service would be beneficial. However, if procedural separation was required in Class C, the current airspace procedures should remain unchanged.

Non-jet SIDs and STARs would help. Jet aircraft depart north, this does not benefit aircraft tracking to Perth or Adelaide or to the west of Tasmania. The STARs don't provide for aircraft operating in visual conditions.

The current airspace works well and the staff in the tower are excellent and provide a great service. VFR operations do not experience real delays.

7.7 Defence

Defence advised that there were no issues with the current airspace, or the new airspace effective November 2019. Defence advised that D378 is no longer required however R379 is to remain for use. Defence are responsible for amendments to these areas. It is anticipated that D378 will be removed in accordance with business as usual processes.

7.8 Community

CASA OAR met with a group of community members during the consultation process. Whilst a number of their issues were outside the scope of the Review, they have been included for completeness.

The following points were raised by this group:

- The group believe that there has been a lack of consultation undertaken by Airservices throughout this process and changes have been dictated and not suggested.

- The group believe that the actions by Airservices have been duplicitous in that one thing is said to them and another thing said internally at Airservices.
- There was a lack of community consultation conducted by CASA OAR on the ACP submitted by Airservices Australia. The changes in the ACP would have been opposed.
- The main issue raised was in relation to aircraft noise. This included the number of aircraft operating in the airspace, the increase in noise levels and the lack of noise sharing options.
- Changes to the flight paths have resulted in development projects being halted due to aircraft noise. This has financially impacted people in the area.
- The community sees a link between the flight path changes and number of safety incidents occurring i.e. the airspace is not safe to operate in.
- Airservices did not seek to progress the establishment of a western sector at Hobart.
- Amending or moving D316 would enable western sector operations.
- Airservices advised that RNP-AR procedures are being implemented and that about 70% of the aircraft would use these procedures.
- Hobart airport becoming an international airport again had necessitated the change to Class C airspace.
- Airspace classification does not change the air routes, instrument flight procedures or the number of aircraft operating in the area.
- There are continued increases in passenger numbers and Hobart airport forecast a doubling of aircraft movements over the next 10 years.
- Tourism is part of the economy for the area, however aircraft should be able to take different paths for noise sharing. People who live closer to the airport should expect more aircraft noise, than those further away.

CASA also invited feedback on the Review through the CASA Consultation Hub and 14 responses were recorded.[19] Feedback was received from people involved in the aviation sector and, the majority of responses were from the community. This included comments that:

- The navigation aid has not been re-established and therefore can't be used in the back-up network.
- The SIDs and STARs create a rigid system that does not offer the same flexibility as the visual arrivals and departures which were used in the past.
- Airservices designed a system that contains dangerous cross-over sections and has resulted in a massive increase in safety incidences. To fix this problem Airservices has introduced a manual process that the control tower uses to ensure separation.
- There appears a suggestion that safety assurance has declined since SIDs and STARs commenced in September 2017. A significant spike in safety incidents, subsequently reduced by removal of the automated component of SIDs and STARs would seem to confirm this.
- Airservices failed to include the massive increases in flights at Cambridge Aerodrome. There is no radar in the area and separating these aircraft from the jets is nearly impossible. The current process is based on visual separation by the Hobart control tower.
- Procedural control solely by RNP1 SIDs and STARs does not appear to be fit for purpose due to the limited size of the airspace and lack of alternatives such as radar, visual approaches and ground-based navigation.
- Redesign flight paths to be much closer to Hobart airport including using the western sector. Redesign D316 and move it south to provide access to the western sector.

[19] Source: https://consultation.casa.gov.au/ 26 June 2019

8 Overview of Changes since the previous Aeronautical Study

The following provides a summary of the changes and findings that have occurred since the previous aeronautical study.

- Total aircraft movements, air transport movements and passenger movements, have increased.
- An analysis of the annual traffic levels and airspace review criteria thresholds tabled in the AAPS, identified the following:
    - Total aircraft movements remain below the AAPS threshold criteria of 400,000.
    - Air transport movements remain below the AAPS threshold criteria of 30,000 (expected to exceed the threshold by 2020-2021).
    - Passenger movements: continue to exceed the AAPS threshold criteria of 1,000,000. Passenger movements have increased since the Study.
- Aircraft and passenger movement statistics exceed the estimates published in the 2015 Hobart International Airport Master Plan. The draft 2020 Master Plan for public consultation is expected to be released in 2020.
- There were 107 ASIRs and 125,890 total aircraft movements recorded during the December 2016-May 2019 period. The number of reported occurrences remains low.
- Operational occurrences are the highest type of reported ATSB occurrence in the review area. Airspace related matters account for 7.5% of reported ATSB matters.
- There were 8 airspace incidents recorded between September 2017 and May 2019. Five of these matters occurred between September 2017 and March 2018 and related to Hobart SIDs and STARs. None of these matters were investigated by the ATSB.
- The removal of the VOR from operational use in 2017 resulted in the RNAV (GNSS) procedure being the only instrument approach and landing procedure available for runway 30. There has been no change to the final approach path being flown by aircraft.
- The relocated VOR is expected to be operational in 2019.
- An airspace change proposal submitted by Airservices Australia was approved by CASA OAR and is expected to be effective November 2019. Operations in the western sector were considered but did not proceed due to potential risks to the safety of aircraft.
- Revised SIDs, STARs and approach procedures are expected to be effective November 2019.

8.1 Recommendation update – Aeronautical Study of Hobart 2017

All recommendations from the Study have been addressed and are now considered closed. Any recommendations made in this review supersede the previous recommendations.

9 Summary of Issues, Recommendations and Observations

The following issues, recommendations and observations have been identified.

Hobart Airspace Classification, Architecture and Surveillance

The existing airspace structure is a Class D CTR overlaid by Class C airspace. Since the Study the introduction of a CTA step located between 30 NM – 35 NM north of Hobart has provided a benefit to users outside controlled airspace. An approved ACP that extends CTA north east of Hobart and reduces CTA in the south west by one nautical mile that will be effective 7 November 2019 does not significantly alter the airspace classification.

Users have reported an improvement in accessing the airspace, that ATC staff in Hobart tower provide a high level of service and that the airspace is safe.

There has been no change to the level of surveillance in the review area. Airservices is proposing to introduce an increased level of surveillance at Hobart.

Movements and Incidents

Data has shown an increase in aircraft and passenger movements however there has been no change in the complexity of air traffic in Hobart i.e. the types of aircraft operating in the area remain similar.

Between February 2016 and February 2019 there has been positive yearly growth in annual traffic levels. Air transport movements are expected to reach or exceed 30,000 by 2020-2021. Annual passenger movements in February 2019 were 2,754,564. This exceeds the airspace review criteria threshold in the AAPS.

Approximately 74% of aircraft operating at Hobart are larger jet aircraft with a high seating capacity. Approximately 98% of aircraft operating at Cambridge are smaller aircraft with a low seating capacity. This identifies a variation of aircraft type and performance operating within the review area at each location.

Between 1 December 2016 and 1 May 2019, 107 ATSB occurrences were recorded within the lateral limits of the review area. 41.1% were operational occurrences, 32.7% related to bird or animal strikes and 7.5% were airspace related matters. Total aircraft movements equalled 125,890 for the same period.

Movement data at Hobart/Cambridge was compared to other Class D and Class C towered locations in Australia. This analysis showed that passenger movements were comparable to other Class C towered locations such as Darwin, Townsville and Williamtown.

Analysis of the occurrences determined that changing the airspace classification or the application of a surveillance service at lower levels may have prevented some incidents from occurring. However, the non-compliance with height requirements on the SID/STAR would not have been prevented.

Revised SIDs, STARs and terminal instrument flight procedures are expected to be promulgated in November 2019. These procedures do not require a change in the current airspace classification.

Airlines provided that the SIDs and STARs provide predictability and increased efficiencies through flight planning and conducting stabilised approaches.

Hobart does not have a parallel taxiway and aircraft are required to backtrack after landing or for departure. This increases runway occupancy time and limits the number of movements at the airport.

Based on the analysis of data including the total number and types of ASIR and CIRRIS occurrences, total aircraft and passenger movements, feedback from stakeholders and services provided within the area, the existing airspace classification is fit for purpose. However, continued growth in air transport movements through aircraft with differing performance abilities and increased seating capacity presents a level of risk that will require additional consideration in the future. The opportunity for Airservices to examine a solution

by implementing a higher level of service than currently operates at Hobart, thereby enhancing services, should be considered.

Western Sector consideration

The western sector is not appropriate for PTO operations.

The western sector was considered by Airservices before the draft concept airspace design was publicly consulted. Feedback from the airlines highlighted significant safety issues that were not acceptable to their operations including aircraft being subjected to turbulence, icing and insufficient manoeuvring areas. The safety of passenger transport services is the most important priority in airspace administration and based on the issues provided by the airlines, the draft concept design did not include the western sector.

It is noted that:

- The western sector includes significant terrain.
- There are no TIFPs that manoeuvre aircraft in the western sector.
- TIFPs assist in the segregation operations at Hobart and VFR operations at Cambridge.
- Hobart airport is located to the east of Cambridge. The majority of the aircraft operating at Hobart are larger passenger turbofan aircraft. Utilising the western sector would impact operations at Cambridge, reduce the efficient use of and equitable access to the airspace.
- Aircraft operating at Cambridge are small aircraft with low seating capacity and require a smaller manoeuvring area. Operations are predominantly conducted in visual conditions and do not interfere with operations at Hobart.
- There are a number of VFR routes that enable aircraft access into and out of the CTR, including access to D316 for flying training.

Classification of Hobart Airport as a regional airport

Hobart airport is a capital city aerodrome that has a Class D control zone. The 2017 Study did not refer to Hobart as a regional airport and statements indicating that the OAR still classifies Hobart as a regional airport are incorrect.[20].

Airspace classification is not applied due to the location of a capital city or regional location. Airspace classification and architecture is based on risk and is achieved through the analysis of aircraft and passenger movement data, reviewing incident and occurrence reports, consultation with stakeholders including Airservices, airspace users, airlines and aerodrome operators, and observing traffic movements.

9.1 Recommendations

Recommendation 1:

Airservices should submit an airspace change proposal for the introduction of a Class C tower service supported by Class C terminal airspace within 12 months from publishing this report.

[20] Just Plane Wrong. Why It's Wrong [ONLINE] Available at https://www.justplanewrong.org/wrong-for-hobart-airport [Accessed 26 June 2019]

10 Conclusion

The airspace review determined that the airspace is fit for purpose and complies with the requirements of the *Airspace Act (2007)*, Airspace Regulations (2007), the Australian Airspace Policy Statement (2018), the Minister's Statement of Expectation (2019) and CASA's Regulatory Philosophy.

To enhance and improve the level of service operating in the review area, a recommendation for Airservices Australia to submit an ACP within 12 months to introduce a Class C tower service supported by Class C terminal airspace has been made.

The recommendations from the 2017 Hobart aeronautical study are now closed. The next detailed documented review of the Hobart airspace should be undertaken by 2024 or as part of the post implementation review of changes made by Airservices. This is subject to factors that could initiate another review within that timeframe.

Annex A Acronyms and Abbreviations

Acronym/abbreviation	Explanation
AAPS	Australian Airspace Policy Statement 2018
ACP	Airspace Change Proposal
Act	Airspace Act 2007
ADS-B	Automatic Dependent Surveillance - Broadcast
Airservices	Airservices Australia
ALA	Aircraft landing area
ALARP	As Low as Reasonably Practicable
AMSL	Above Mean Sea Level
ANSP	Air Navigation Service Provider
ASA	Aviation Safety Advisor
ASIR	Aviation Safety Incident Report
ATC	Air Traffic Control
ATS	Air Traffic Services
ATSB	Australian Transport Safety Bureau
CASA	Civil Aviation Safety Authority
CCO	Continuous Climb Operations
CDO	Continuous Descent Operations
CTA	Control Area
CTAF	Common Traffic Advisory Frequency
CTR	Control Zone
DA	Danger Area
Defence	Department of Defence
DME	Distance Measuring Equipment
ERC	En Route Chart
ERSA	En Route Supplement Australia
FT	Feet
FL	Flight Level
GA	General Aviation
IAL	Instrument Approach and Landing
ICAO	International Civil Aviation Organization
IFP	Instrument Flight Procedure
IFR	Instrument Flight Rules
IMC	Instrument Meteorological Conditions
km	Kilometre
kt	Knot
LL	Lower Level
MLAT	Multilateration
NOTAM	Notice to air men
NM	Nautical Miles
OAR	Office of Airspace Regulation
PT	Passenger transport
PTO	Public Transport Operations
RA	Restricted Area
RAPAC	Regional Airspace and Procedures Advisory Committee
RFC	Request for Change
RNAV	Area Navigation
RPAS	Remotely Piloted Aircraft Systems
SFC	Surface

Acronym/abbreviation	Explanation
SID	Standard Instrument Departure
STAR	Standard Arrival Route
TAC	Terminal Area Chart
TASWAM	Tasmanian Wide Area Multilateration
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions
VNC	Visual Navigation Chart
VTC	Visual Terminal Chart
WAM	Wide Area Multilateration

Annex B Australian Airspace Structure

Class	Description	Summary of Services/Procedures/Rules
A	All airspace above Flight Level (FL) 180 (east coast) or	Instrument Flight Rules (IFR) only. All aircraft require a clearance from Air Traffic Control (ATC) and are separated by ATC. Continuous two-way radio and transponder required. No speed limitation.
B	IFR and Visual Flight Rules (VFR) flights are permitted. All flights are provided with ATS and are separated from each other. Not currently used in Australia.	
C	In control zones (CTRs) of defined dimensions and control area steps generally associated with controlled aerodromes	• All aircraft require a clearance from ATC to enter airspace. All aircraft require continuous two-way radio and transponder. • IFR separated from IFR, VFR and Special VFR (SVFR) by ATC with no speed limitation for IFR operations. • VFR receives traffic information on other VFR but are not separated from each other by ATC. SVFR are separated from SVFR when visibility (VIS) is less than Visual Meteorological Conditions (VMC). • VFR and SVFR speed limited to 250 knots (kt) Indicated Air Speed (IAS) below 10,000 feet (FT) Above Mean Sea Level (AMSL)*.
D	Towered locations such as Bankstown, Jandakot, Archerfield, Parafield and Alice Springs.	• All aircraft require a clearance from ATC to enter airspace. For VFR flights this may be in an abbreviated form. • As in Class C airspace all aircraft are separated on take-off and landing. All aircraft require continuous two-way radio and are speed limited to 200 kt IAS at or below 2,500 FT AMSL within 4 NM of the primary Class D aerodrome and 250 kt IAS in the remaining Class D airspace**. • IFR are separated from IFR, SVFR, and provided with traffic information on all VFR. • VFR receives traffic on all other aircraft but is not separated by ATC. • SVFR are separated from SVFR when VIS is less than VMC.
E	Controlled airspace not covered in classifications above	• All aircraft require continuous two-way radio and transponder. All aircraft are speed limited to 250 kt IAS below 10,000 FT AMSL*, • IFR require a clearance from ATC to enter airspace and are separated from IFR by ATC and provided with traffic information as far as practicable on VFR. • VFR do not require a clearance from ATC to enter airspace and are provided with a Flight Information Service (FIS). On request and ATC workload permitting, a Surveillance Information Service (SIS) is available • within surveillance coverage.
F	IFR and VFR flights are permitted. All IFR flights receive an air traffic advisory service and all flights receive a flight information service if requested. Not currently used in Australia.	
G	Non-controlled	• Clearance from ATC to enter airspace not required. All aircraft are speed limited to 250 kt IAS below 10,000 FT AMSL*. • IFR require continuous two-way radio and receive a FIS, including traffic information on other IFR. • VFR receive a FIS. On request and ATC workload permitting, a SIS is available within surveillance coverage. VHF radio required above 5,000 FT AMSL and at aerodromes where carriage and use of radio is required.

Annex C Comparison of Class D and Class D aerodromes

Airport	Total Movements	Air Transport Movements	Passengers
	AAPS Class C Threshold 400,000	AAPS Class C Threshold 30,000	AAPS Class C Threshold 1,000,000
Hobart/Cambridge	**62,559**	**27,571**	**2,754,564**
Launceston	23,577	19,151	1,417,000
Sunshine Coast	57,627	18,276	1,319,888
Avalon	13,392	8,107	959,839
Mackay	28,250	20,286	885,996
Alice Springs	23,838	16,167	679,967
Broome	34,148	24,469	622,178
Rockhampton	24,271	16,590	624,740
Karratha	22,838	19,848	572,376
Hamilton Island	22,229	12,373	467,136
Coffs Harbour	27,975	9,089	423,696
Albury	41,481	11,962	276,369
Archerfield	198,006	8,192	44,498
Bankstown	276,107	27,095	175,676
Camden	107,086	2,074	8,661
Jandakot	207,827	18,651	116,247
Moorabbin	270,888	16,038	82,578
Parafield	246,989	2,524	8,861
Tamworth	81,135	10,628	222,424

Table 5: 12 months to February 2019 recorded data at Class D aerodromes

Airport	Total Movements	Air Transport Movements	Passengers
	AAPS Class C Threshold 400,000	AAPS Class C Threshold 30,000	AAPS Class C Threshold 1,000,000
Hobart/Cambridge	**62,559**	**27,571**	**2,754,564**
Cairns	107,066	79,966	5,239,656
Darwin*	80,149	55,192	2,189,997
Gold Coast	95,889	49,956	6,511,297
Canberra	63,224	43,233	3,277,154
Townsville*	61,831	35,036	1,825,628
Williamtown*	56,400	20,400	1,226,200
Adelaide	106,162	103,072	8,554,116
Brisbane	211,487	210,890	23,897,116
Melbourne	246,514	246,300	37,805,025
Perth	132,291	131,130	13,356,295
Sydney	347,086	334,584	44,635,395

* Defence provide a Class C service at military aerodrome

Table 6: 12 months to February 2019 recorded data at Class C aerodromes

Annex D Aircraft movement by seating capacity

Aircraft movement data was divided according to seating capacity to identify common aviation operations being undertaken. Aircraft with a seating capacity less than 10 are typically piston engine or small turboprop aeroplanes or helicopters. These aircraft can also include business jets which are known to operate at Hobart, however the majority are used for flight training. Aircraft with a seating capacity of 10-30 and 30-70 are typically larger in size and capability and include turboprop and larger business jet aircraft. These represent the least number of movements at Hobart and Cambridge. Aircraft with a seating capacity greater than 70 are typically larger passenger turbofan aircraft; these aircraft account for air transport movements at Hobart.

Hobart Indicative Aircraft Seating Capacity for the 12 months ending				
Month/Year	**<10**	**10-30**	**30-70**	**>70**
February 2017	20.4%	2.7%	0.1%	76.8%
February 2018	22.7%	2.8%	<0.1%	74.5%
February 2019	23.8%	2.2%	<0.1%	73.9%

Table 7: Indicative percentages of aircraft type based on seating capacity for Hobart

Cambridge Indicative Aircraft Seating Capacity for the 12 months ending				
Month/Year	**<10**	**10-30**	**30-70**	**>70**
February 2017	99.8%	0.2%	0%	0%
February 2018	99.3%	0.7%	0%	0%
February 2019	97.6%	2.3%	<0.1%	<0.1%

Table 8:Indicative percentages of aircraft type based on seating capacity for Cambridge

The aircraft movement data shows that large seating capacity aircraft record the highest number of movements at Hobart and aircraft with low seating capacity record the highest number of movements at Cambridge.

Annex E ATSB and Airservices reported occurrences

The following table list the number of ATSB incident reports by the occurrence description recorded during the review period.

Level 1 Occurrence Description	Number of Occurrences							
	Dec 16 – Nov 17			Dec 2017 – Nov 18			Dec 18 – May 19	
	Dec to Mar	Apr to Jul	Aug to Nov	Dec to Mar	Apr to Jul	Aug to Nov	Dec to Mar	Apr to May
Airspace	0	0	3	4	0	0	1	0
Consequential Events	0	0	0	0	0	0	0	0
Environment	4	1	4	14	4	7	9	3
Infrastructure	0	0	0	0	1	0	0	0
Operational	7	3	4	6	6	11	7	0
Technical	1	0	0	3	0	1	3	0
Number of occurrences	**12**	**4**	**11**	**27**	**11**	**19**	**20**	**3**
Total Occurrences	**27**			**57**			**23**	

Table 9:ASIR Occurrences Hobart Review Area Dec 2016 to May 2019

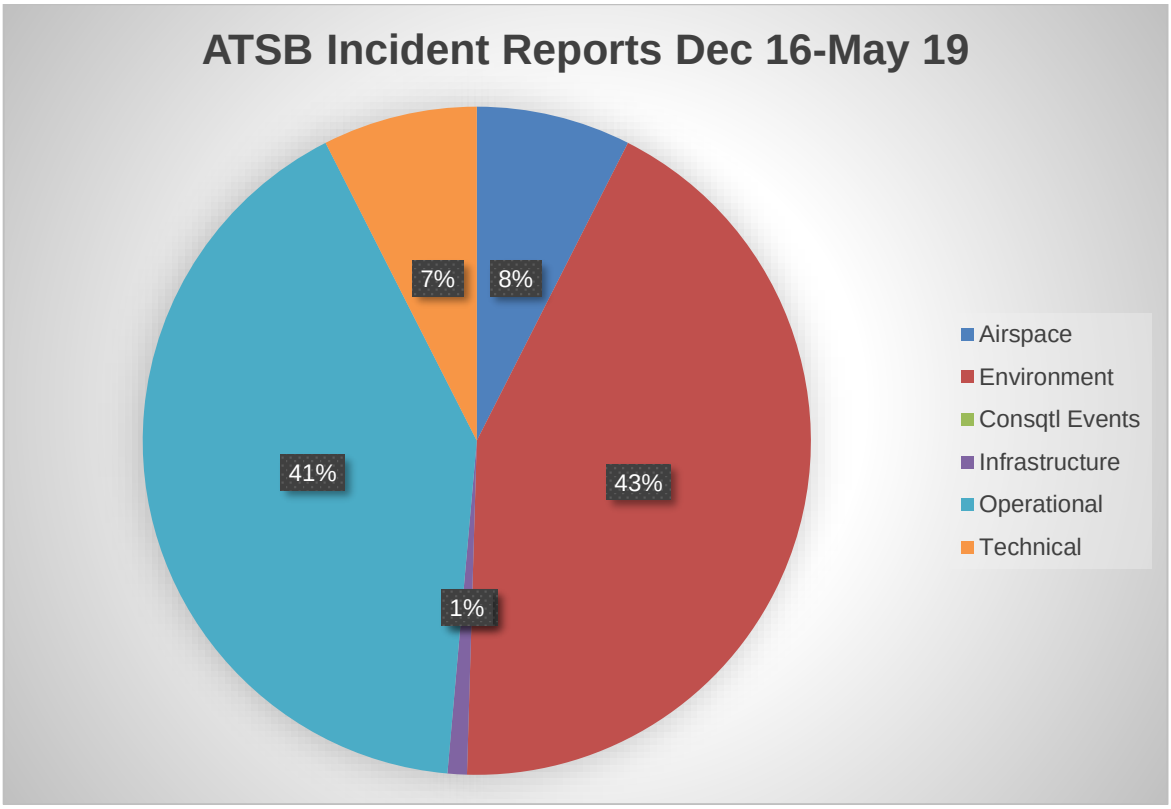

Figure 8: ATSB total occurrences within 35 NM of Hobart

The following table list the number of CIRRIS reports by the occurrence type recorded during the review period.

Primary Occurrence Type	Number of Occurrences			
	Dec 16	2017	2018	May 19
Aircraft Accident	0	2	1	0
Airspace Infringement	0	4	7	2
Emergency Ops & IFER	0	1	2	0
Information Error	0	4	2	1
Loss of Separation/Assurance	0	1	2	0
Malfunction of Aircraft System	0	1	0	0
Operational Deviation	2	11	4	1
Laser		5	5	0
Facility Issue	1	9	4	1
Other – Safety/Non-Safety	0	4	1	3
Total number of occurrences	**3**	**42**	**28**	**8**

Table 10: CIRRIS data reported by Airservices Australia Dec 2016 to May 2019

Annex F Stakeholders

The following organisations were contacted and contributed to this review.

- CASA
- Airservices Australia
- Department of Defence
- Hobart Airport
- Cambridge Airport/Par Avion
- Qantas
- Qantas Link
- Jetstar
- Virgin Australia
- Rotor-Lift
- Australian Airline Pilots' Association (AusALPA)
- Tasmanian Regional Airspace and Procedures Advisory Committee
- Various members of the Tasmanian community

Annex G References

Airspace Act 2007 Australian Government, Canberra

Airspace Regulations 2007, Australian Government, Canberra

Department of Infrastructure, Transport and Regional Development 2018. Australian Airspace Policy Statement 2018, Canberra. https://www.legislation.gov.au/Details/F2018L01386

Department of Infrastructure, Transport and Regional Development 2019. Statement of Expectations for the Board of the Civil Aviation Safety Authority for the Perion 15 July 2019 to 30 June 2021, Canberra. https://www.legislation.gov.au/Details/F2019L00977

Airservices Australia; Australia En-Route Chart Low L1 Effective 23 May 2019 Airservices Australia;

Airservices Australia; Australia Terminal Area Chart Hobart Launceston Effective 23 May 201Airservices Australia;

Airservices Australia Visual Navigation Chart Hobart Effective 23 May 2019 Airservices Australia;

Airservices Australia Visual Terminal Chart Hobart Effective 23 May 2019 Airservices Australia;

Airservices Australia. Departure and Approach Procedures (DAP) East Amendment 159 Effective 23 May 2019 Airservices Australia

Airservices Australia. En Route Supplement Australia (ERSA) Effective 23 May 2019 Airservices Australia

Airservices Australia, Projects, Airspace Modernisation (2019 February 08) retrieved 14 March 2019 from http://www.airservicesaustralia.com/projects/airspace-modernisation

Airservices Australia, Projects, Hobart Airport Standard Arrivals and Departures (2019, March 13) retrieved 14 March 2019 from http://www.airservicesaustralia.com/projects/flight-path-changes/hobart-airport-standard-arrivals-and-departures

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Australian Transport Safety Bureau; Aviation safety investigations and reports from http://www.atsb.gov.au/publications/safety-investigation-reports/?mode=Aviation retrieved 26 June 2019

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Aircraft Noise Ombudsman 2018; Investigation into complaints about the introduction of new flight paths in Hobart, April 2018; Canberra

Civil Aviation Safety Authority, Office of Airspace Regulation (2017). Aeronautical Study of Hobart, February 2017;

Just Plane Wrong. Why It's Wrong [ONLINE] Available at https://www.justplanewrong.org/wrong-for-hobart-airport [Accessed 26 June 2019]

Annex H Stakeholder Consultation/Feedback Register

The following sections are the consolidation of comments or responses received from the draft document, the OAR's response and disposition to actions to the Hobart Airspace Review.

Stakeholder and Reference

Airservices Australia: Section 9 and Section 10

Comment

Text in either section addresses the same topic however read differently.

CASA Response and disposition

Text in Section 10 has been amended to be consistent with the recommendation.

Stakeholder and Reference

Australian Federation of Air Pilots: Section 9

Comment

"Airservices (Australia) is proposing to introduce an increased level of surveillance at Hobart." What does this mean; TASWAM, Lower ADS-B, RADAR? AFAP support the increase in surveillance for Hobart however these should be reliable and fill in the gap from 7,000ft down to the surface.

The conclusion has an aspect that lacks detail as the airspace does not comply with the Ministerial Direction 2004. The conclusion is somewhat selective. It is important to mention the still active Ministerial Direction 2004 regardless whether it is a comfortable truth or not. There is an indication that Airservices may be fulfilling the intent of the Ministerial Direction for Hobart. This should be noted.

CASA Response and disposition

The level and type of surveillance is yet to be determined. Airservices has indicated, through preliminary stakeholder meetings, that surveillance will be a combination of TASWAM and ADS-B. Radar is not included.

The support to increase the level of surveillance for Hobart is noted.

No change is made to the conclusion. The comment is noted and listed.

Stakeholder and Reference

Airlines of Tasmania: Recommendation

Comment

I am writing with concerns to the reclassification of Class C around Hobart airspace, in particular the Control Zone being classified Class C. There is no rationale provided in how an airspace classification change will make any significant impact upon safety, and the separation of IFR / VFR will result in a significant reduction in the ability of VFR aircraft to operate at Cambridge.

Presumably, aircraft will be separated to either a 3 or 5nm separation standard, considering that Hobart and Cambridge airports are closer than this, how will the two airports be able to operate concurrently as they have for many years? Also presumably helicopter operations at Rotorlift at Hobart Airport would also have to be suspended while a jet was operating at Hobart.

We would support a lowering of Class C airspace to support the lowering of surveillance airspace, however the vast majority of VFR traffic at Cambridge, enters or departs Hobart airspace at the Control Zone boundary (i.e., to / from the training area, or tracks to/from

Tasman Bridge or southwest Tasmania… by implementing Class C, I can not see how Cambridge can continue to operate with the relative freedom (through opposite direction circuit patterns) that it has for many years, without incident.

In summary, we would support Class D Tower, with Class C surveillance airspace above (such as Bankstown).

CASA Response and disposition

The Review noted that based on risk, the airspace classification is fit for purpose. An opportunity to enhance the level of service and airspace efficiencies has been provided by Airservices. This enhancement will require the proponent to consult with stakeholders during the ACP process where your listed concerns should be noted and addressed.

The comments have been recorded for future reference. There is no change to the recommendation.

Stakeholder and Reference

Airspace User (name held on file): Executive Summary, Section 9 and Section 10

Comment

I am a member of Victorian RAPAC and while I do not have any immediate involvement with the Hobart CTR it concerns me that your review stated; "The airspace review determined that the airspace is fit for purpose and complies with the requirements of the Airspace Act (2007), Airspace Regulations (2007), the Australian Airspace Policy Statement (2018), the Minister's Statement of Expectation (2019) and CASA's Regulatory Philosophy."

Yet you have made the following recommendation: "To enhance and improve the level of service operating in the review area, a recommendation to introduce a Class C tower service supported by Class C terminal airspace within 12 months has been made."

This appears to be along the lines of one size fits all apart from the forecast increase in all traffic. Each location has its own needs and requirements and Hobart is certainly in that category.

The net result will be enormous delays and restrictions to the GA operations at Cambridge due to the change in separation requirements resulting from the change to Class C airspace and will not be improving the level of service.

Enhancement it may be, but what surveillance is to be introduced at the same time as any change to Class C?

While the priority system in Australian airspace is in drastic need of overhaul, the ability of ATC to regulate traffic in the Hobart Control Zone without a legal means of surveillance being available is without doubt exceptional. Long may it continue but without the draconian separation standards required by Class C.

In case I haven't made myself clear, I am against your recommendation to institute Class C airspace at Hobart in 12 months or ever.

CASA Response and disposition

The level and type of surveillance is yet to be determined. Airservices has indicated, through preliminary stakeholder meetings, that surveillance will be a combination of TASWAM and ADS-B. Radar is not included.

There has been no evidence provided in this submission to support the statement the of 'one size fits all'.

The ACP process will be followed and this includes stakeholder engagement where concerns are noted and addressed. Your comments regarding the operations at Hobart and Cambridge are noted.

CASA rejects the assertion that ATC regulate traffic in the Hobart Control Zone without a legal means of surveillance. The separation standards used within each class of airspace is compliant with the ICAO standard.

The objection to the recommendation is noted.

Stakeholder and Reference

South East Coast Lifestyle Association: Recommendation

Comment

The single recommendation is somewhat ambiguous but am guessing *(it is)* in line with our conversation.

Due to various constraints, SECLA was unfortunately unable to compile any detailed comments by the cut-off time. However, we note that Hobart Airport is issuing a new draft masterplan for consultation in early 2020. Figures provided to us at the recent CACG are significantly higher than forecast in the 2015 plan: now 4.7 vs 2.75 million passengers per year by 2030.

Given broad industry, community and Airservices support for Class C, plus the obvious safety and efficiency benefits, it is difficult to understand CASA's recalcitrance to back Class C. However, we do sincerely appreciate your ongoing willingness to engage with us.

CASA Response and disposition

Comments and information noted.

Stakeholder and Reference

Jetstar: new flight procedures effective 7 November 2019

Comment

The initial segment of the new RNAV RWY30 procedure at Hobart has aircraft descending from 4,000 feet above mean sea level (AMSL) to 2,200 feet (AMSL) over four nautical miles. The descent profile does not provide for continuous descent operations (CDO) and the aircraft configuration results in higher aircraft noise over this area. An opportunity for improvement during a review of this procedure could provide the benefits of CDO and reduce the required descent currently provided in this segment.

CASA Response and disposition

The comment is noted. Information has been forwarded to CASA CNS/ATM section for their attention.