

IN THE CORONERS COURT  
OF VICTORIA  
AT MELBOURNE

**LC COR 2020 000950**

**FINDING INTO DEATH FOLLOWING INQUEST**

*Form 37 Rule 63(1)*

*Section 67 of the Coroners Act 2008*

**CORONIAL INQUIRY INTO THE MANGALORE AIRCRAFT ACCIDENT**

<b>Findings of:</b>	Judge John Cain State Coroner
<b>Delivered on:</b>	31 July 2024
<b>Delivered at:</b>	Coroners Court of Victoria 65 Kavanagh Street, Southbank, Victoria, 3006
<b>Inquest Hearing Dates:</b>	25 to 28 March 2024
<b>Counsel Assisting:</b>	Mr Adam Baker of Counsel instructed by Ms Abigail Smith, Senior Coroner's Solicitor, Coroners Court of Victoria

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<b>Civil Aviation Safety Authority</b>	Mr Peter Ward, instructed by the Civil Aviation Safety Authority
<b>John Tucker</b>	Mr John Ribbands, instructed by Gilshenan & Luton Legal Practice
<b>Peninsula Aero Club</b>	Mr Ragu Appudurai, instructed by Peninsula Aero Club
<b>Segev Family and Brianna Sutcliffe</b>	Mr Paul Lamb, instructed by Maurice Blackburn

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## **INTRODUCTION**

1. At approximately 11:24 am on 19 February 2020, a fatal mid-air collision occurred between aircraft registration VH-AEM (**AEM**) and VH-JQF (**JQF**), approximately 8 km south of Mangalore Airport<sup>1</sup> at around 4,100 ft (**the Accident**). At the time of the collision, both aircraft were operating under Instrument Flight Rules (**IFR**),<sup>2</sup> and in non-controlled ‘Class G’ airspace.
2. AEM was conducting a IFR training flight. Mr Peter Phillips was the instructor on board with student, Mr Ido Segev.
3. JQF was conducting an IFR testing flight. Mr Christiaan Gobel was the testing officer on board with student, Ms Pasinee Meeseang. All four occupants of the aircrafts sustained fatal injuries in the collision.
4. Following the accident, the Australian Transport Safety Bureau (**ATSB**) and Airservices Australia<sup>3</sup> undertook investigations into the circumstances that led to the Accident and produced reports entitled:
  - ‘*Mid-air collision involving VH-JQF and VH-AEM Safety Investigation*’ dated 7 December 2020 (**Airservices Report**);<sup>4</sup> and
  - ‘*Mid-air collision involving Piper PA-44-180 Seminole, VH-JQF and Beech D95A Travel Air, VH-AEM*’ dated 31 March 2022 (**ATSB report**).<sup>5</sup>
5. The ATSB also completed an ‘*Aircraft performance and cockpit visibility study*’ dated 22 June 2022.

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<sup>1</sup> Also referred to as Mangalore Aerodrome.

<sup>2</sup> IFR is a set of regulations that permit a pilot to operate an aircraft in instrument meteorological conditions (**IMC**), which have much lower weather minimums than visual flight rules (**VFR**). IFR flying means navigating a plane through rough weather conditions, heavy clouds or under the darkness of night, leveraging cockpit instruments such as altimeters, GPS systems and vertical speed indicators. During training or testing, special goggles or glasses are worn to limit visibility of the pilot to only the control panel of the aircraft, should the conditions not require IFR.

<sup>3</sup> Hereafter referred to as Airservices.

<sup>4</sup> Volume 2 Coronial Brief (**CB2**), Tab 52.

<sup>5</sup> CB2, Tab 54.

## **The deceased**

### Christiaan Gobel

6. Mr Gobel was 79 years of age at the time of the accident. He was semi-retired and was married to Mrs Wilma Gobel for over 50 years. They had two sons together, Anthony (who also passed away as a result of an aircraft accident) and Martin.<sup>6</sup>
7. Mr Gobel held an Air Transport Pilots Licence (**ATPL(A)**) that was issued on 17 July 1978. Mr Gobel also held a flight examiner rating permitting examination of a variety of operational ratings, including an instrument rating and multi-engine aeroplane class rating.<sup>7</sup>
8. On 17 February 2020, two days before the accident flight, Mr Gobel successfully completed an instrument rating proficiency check in a Seminole (the same make of aircraft as JQF).<sup>8</sup>
9. Mr Gobel's instrument rating and multi-engine class rating were valid until 28 February 2021 and his Grade 1 flight instructor rating was valid until 31 December 2021. Whilst Mr Gobel's flight examiner rating had exceeded the renewal date, he was still permitted to be an examiner under an exemption issued by the Civil Aviation Safety Authority (**CASA**) until March 2020.
10. A review of Mr Gobel's logbook showed a total flying experience of about 21,600 hours. The records held by the Civil Aviation Safety Authority indicate that Mr Gobel conducted 194 flight tests in the 2 years prior to the accident flight, of which 34 were for the initial issue of an instrument rating.<sup>9</sup>

### Pasinee (Mia) Meeseang

11. Ms Meeseang was 27 years of age at the time of the accident. Ms Meeseang was a Thai national who had come to Australia to train as a commercial airline pilot. Ms Meeseang lived with her partner, Thapkorn, in Australia and her mother and older brother reside in Thailand.

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<sup>6</sup> Statement of Wilma Gobel dated 10 April 2020 [Coronial Brief Volume 1 (**CB1**), Tab 13].

<sup>7</sup> Statement of Rodney Jouning dated 23 February 2023 pp 4–5 [CB1, Tab 39, pp 4–5] (**Jouning Statement**).

<sup>8</sup> Jouning Statement dated 23 February 2023 p 4 [CB1, Tab 39, p 4].

<sup>9</sup> ATSB Report, pp 5–6 (section entitled '*VH-JQF examiner*') [CB2, Tab 54, pp 12–13].

12. The purpose of the flight was for Ms Meeseang to be examined for an instrument rating, a multi-engine aeroplane instrument endorsement and a multi-engine aeroplane class rating. This was the final component of her training. Ms Meeseang had passed the theory component for the instrument rating on 11 November 2019.<sup>10</sup>
13. Ms Meeseang's mother had flown to Australia and the pair were due to return to Thailand in the days after the test where Ms Meeseang would begin her application to be an airline pilot.<sup>11</sup>
14. Ms Meeseang held a Commercial Pilots Licence (Aeroplane) (CPL(A)) that was issued on 24 June 2019.<sup>12</sup>
15. Ms Meeseang had been enrolled in a diploma course with MAS since February 2017, and although having completed most of the flying program from Moorabbin Airport she was also familiar with operating to and from Mangalore.
16. Ms Meeseang's logbook showed a total flying experience of 244.9 hours to the last recorded flight on 17 February 2020. Ms Meeseang's total flying experience in JQF was 22.2 hours. In the 90 days prior to the accident flight, Ms Meeseang had completed 20.4 hours total flying (all in JQF), and in the last 30 days had completed 4.8 hours flying.<sup>13</sup>

#### Peter Phillips

17. Mr Phillips was 47 years of age at the time of the accident. Peter was married to Mrs Fiona Phillips, and they had two children together.<sup>14</sup> Peter also had an adult child from a previous relationship.
18. Mr Phillips had been the Chief Pilot of Peninsula Aero Club (PAC) since March 2019, and the Head of Operations since April 2019. He held an ATPL(A) issued on 29 January 2004, and a CPL(A) issued on 13 October 1993. Mr Phillips also held a Grade 1 flight instructor rating with endorsements for multi-engine class rating training and instrument rating training.

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<sup>10</sup> ATSB Report, pp 6–7 (section entitled '*VH-JQF pilot under examination*') [CB2, Tab 54, pp 13–14].

<sup>11</sup> Statement of Thapakorn Pongord dated 28 February 2020 [CB1, Tab 11].

<sup>12</sup> Jouning Statement, pp 3–4 [CB1, Tab 39, pp 3–4].

<sup>13</sup> ATSB Report p 6 (section entitled '*VH-JQF pilot under examination*') [CB2, Tab 54, p 13].

<sup>14</sup> Statement of Fiona Phillips dated 2 March 2020 [CB1, Tab 12]; Statement of David Bell dated 25 February 2021 [CB1, Tab 40].

19. Mr Phillips' instrument rating and multi-engine aircraft rating were valid until 29 February 2020, and his flight instructor rating was valid until 30 June 2020. He had previously held an examiner rating covering private pilot licence and night visual flight rules testing endorsements.
20. Mr Phillips' logbook showed a total flying experience of 5,907.2 hours to the last recorded flight on 14 February 2020. In the 90 days prior to the accident flight, Mr Phillips had flown 29.3 hours of which 7.6 hours were in the Beech D95A Travel Air aircraft type (the same make of aircraft as AEM).<sup>15</sup>

#### Ido Segev

21. Mr Segev was 30 years of age at the time of the Accident. He was born in Israel and lived in Australia with his partner, Ms Brianna Sutcliffe. He met Ms Sutcliffe in April 2015 and became an Australian Citizen on 17 November 2016.<sup>16</sup>
22. Mr Segev held a CPL(A) issued on 30 April 2013 and activity endorsements for formation flight, aerobatics and spinning. Mr Segev previously held a Grade 3 flight instructor rating permitting single engine aircraft, night Visual Flight Rules (VFR) and design feature training.
23. Mr Segev's logbook showed a total flying experience of 1,103.1 hours to the last recorded flight on 17 February 2020. His total flying experience in AEM was 6.6 hours. In the 90 days prior to the accident, Mr Segev had flown a total of 60.4 hours, including the 6.6 hours in AEM; and in the 30 days prior to the accident, he had flown 30.3 hours with 2.2 of those hours in AEM. Mr Segev also passed his instrument rating theory examination on 2 October 2019.
24. The available evidence indicates that Mr Phillips and Mr Segev began flying together in October 2019 for the purposes of completing the instrument rating.<sup>17</sup>

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<sup>15</sup> ATSB Report, p 4 (section entitled '*VH-AEM instructor*') [CB2, Tab 54, p 11].

<sup>16</sup> Statement of Yonatan Segev dated 27 February 2020 [CB1, Tab 10]; ATSB Report, pp 4–5 [CB2, Tab 54, pp 11–12].

<sup>17</sup> ATSB report, pp 4–5 (section entitled '*VH-AEM student*') [CB2, Tab 54, pp 11–12].



## The Aircraft

### VH-AEM

25. AEM was a ‘Beech D95A Travel Air’—a two-engine, four to six seat, low-wing and a retractable-tricycle-undercarriage aircraft. AEM was owned and operated by Mr Allan Sydney Richard Schwarze. Mr Segev had hired AEM directly from Mr Schwarze for the purpose of the IFR training flight.<sup>18</sup>
26. AEM was manufactured in the United States in 1966 and it was first registered in Australia by Mr Shwarze on 4 April 1967. Prior to the accident flight, AEM had accumulated 7,400.3 hours in service. AEM had a current Certificate of Registration, Certificate of Airworthiness and maintenance release.
27. AEM was certified for IFR and charter operations and was equipped with dual controls for the student and instructor. AEM was also equipped with a Garmin GNS530 radio communication and GNSS navigation system, together with a second communication radio and an Automatic Dependent Surveillance – Broadcast (**ADS-B**)<sup>19</sup> OUT transponder. AEM did not have any ADS-B receiving equipment.<sup>20</sup>
28. Mr Segev in AEM was equipped with an iPad containing electronic flight bag (**EFB**) software capable of receiving certain traffic information. The ATSB investigators determined that, if the traffic information function on the EFB software was being used before the collision, it was probable that JQF would not have appeared as traffic.<sup>21</sup>

### VH-JQF

29. JQF was a Piper PA-44 Seminole—a four-seat, low-wing, twin-engine light aircraft with retractable landing gear. It was manufactured in the United States in 1979 and first registered in Australia in 1990. Prior to the accident flight, the aircraft had accumulated a total flight time of 11,190.6 hours. The aircraft was owned and operated by Moorabbin Aviation Services (**MAS**).

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<sup>18</sup> <https://www.regosearch.com/aircraft/au/AEM>.

<sup>19</sup> Automatic Dependent Surveillance Broadcast (**ADS-B**): a means by which aircraft, aerodrome vehicles and other objects can automatically transmit or receive data such as identification, position and additional data, as appropriate, in a broadcast mode via data link.

<sup>20</sup> ATSB Report, pp 8–9 (section entitled *Aircraft information – VH-AEM*) [CB2, Tab 54, pp 15–16].

<sup>21</sup> ATSB Report, p 35 [CB2, Tab 54, p 52].

30. JQF had a current Certificate of Registration, Certificate of Airworthiness and maintenance release. The aircraft was certified for IFR and private/airwork operations. It was equipped with dual controls for the student and instructor. JQF was also equipped with a Garmin GNS430 radio communication and GNSS navigation system and a second communication radio, and an ADS-B OUT transponder. JQF did not have any ADS-B receiving equipment.<sup>22</sup>

### **The air traffic controller**

31. Mr John Tucker was the air traffic controller (ATC) who was overseeing the controlled airspace over Mangalore and providing a flight information service for Class G airspace surrounding Mangalore.
32. Mr Tucker has been employed by Airservices Australia since 1989. In 1996, Mr Tucker was issued with ratings for area procedural control and area radar control and an endorsement for the Alpine sector in January 2012.
33. At the time of the Accident, Mr Tucker held a Class 3 medical, appropriate for ATCs, which required him to have a reading correction available which was valid until 6 October 2021. The most recent training completed by Mr Tucker prior to the Accident was compromised separation refresher training on 2 October 2019, and effective scanning training on 26 February 2019.<sup>23</sup>
34. At the time of the Accident, Mr Tucker was exercising his Ovens endorsement within the Alpine Group. Mr Tucker in exercising his Ovens endorsement was providing air traffic services to the volumes of airspace referred to as the Hume, Ovens and Dookie sectors. This airspace included Class C and E controlled airspace, as well as Class G non-controlled airspace.<sup>24</sup>
35. Below is a figure representing the Alpine airspace, including Dookie, Ovens and Hume sectors and key aerodromes.<sup>25</sup>

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<sup>22</sup> ATSB Report, p 9 (section entitled '*Aircraft information – VH-JQF*') [CB2, Tab 54, p 16].

<sup>23</sup> Airservices Report, p 33 [CB2, Tab 52, p 33]; ATSB Report, p 7 [CB2, Tab 54, p 14]; Tucker Statement, pp 1–2 [5]–[10] [CB1, Tab 38, pp 1–2].

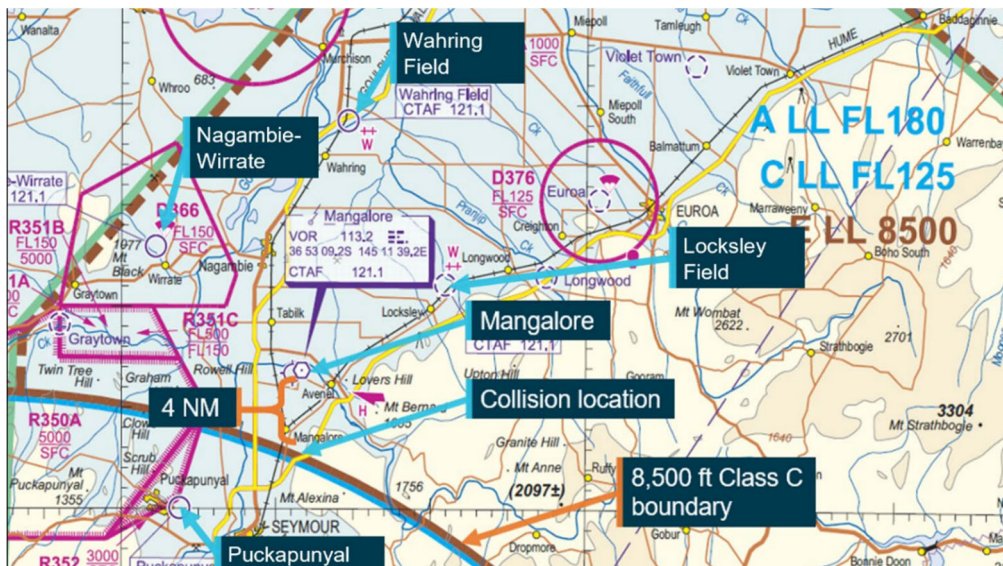
<sup>24</sup> ATSB Report, p 22 [CB2, Tab 54, p 29].

<sup>25</sup> ATSB Report, p 22, Figure 11 [CB2, Tab 54, p 29].



### Mangalore Aerodrome

36. Mangalore is a non-controlled aerodrome that operates on a Common Traffic Advisory Frequency (CTAF) that is shared with four other airfields in the local area—Locksley Field, Nagambie-Wirrate, Warring Field and Puckapunyal.<sup>26</sup> The CTAF is not monitored by Air Traffic Control in Melbourne and is not recorded.<sup>27</sup>
37. below is a diagram setting out the airspace surrounding Mangalore:<sup>28</sup>



<sup>26</sup> Aircservices Report, pp 19–20 (section 3.1.1 Airspace Services – Melbourne (Alpine group) – HUM, OVN and DOK spaces) [CB2, Tab 52, pp 19–20]; ATSB Report, p 10 [CB2, Tab 54, p 17].

<sup>27</sup> ATSB Report, p 28 [CB2, Tab 54, p 35].

<sup>28</sup> ATSB Report, p 11, Figure 6 [CB2, Tab 54, p 18].

38. Mangalore is equipped with a navigation aid known as VOR (VHF Omni-Range) (**Mangalore VOR**) which is a radio navigational system which provides continuous indication of bearing from the selected VOR ground station.<sup>29</sup>
39. The Mangalore VOR is one of four remaining in Victoria and the only one outside controlled airspace in close proximity to Melbourne.<sup>30</sup> This attracts many IFR training flights and means that Mangalore can be quite busy at times.
40. The airspace surrounding Mangalore is Class G from the ground up to 8,500 ft.
41. The precise boundaries of the CTAF are not identified, however, an aircraft is within the vicinity of a non-controlled aerodrome (like Mangalore) if it is within 10 NM and at an altitude that could result in conflict. Accordingly, when flying into Mangalore its pilots should switch their radios to the CTAF channel and inform those monitoring the frequency of the aircraft position prior to being within 10 NM of the aerodrome.<sup>31</sup>

### **Airspace Classification**

42. Airspace in Australia is separated into different classes that may be either controlled (Class A, Class C, Class D, Class E) or non-controlled (Class G). Different services are offered to aircraft that operate in these airspace classes, based on the flight rules the aircraft is operating under.<sup>32</sup>
43. Below is a diagram setting out the various classes of airspace in Australia.<sup>33</sup>

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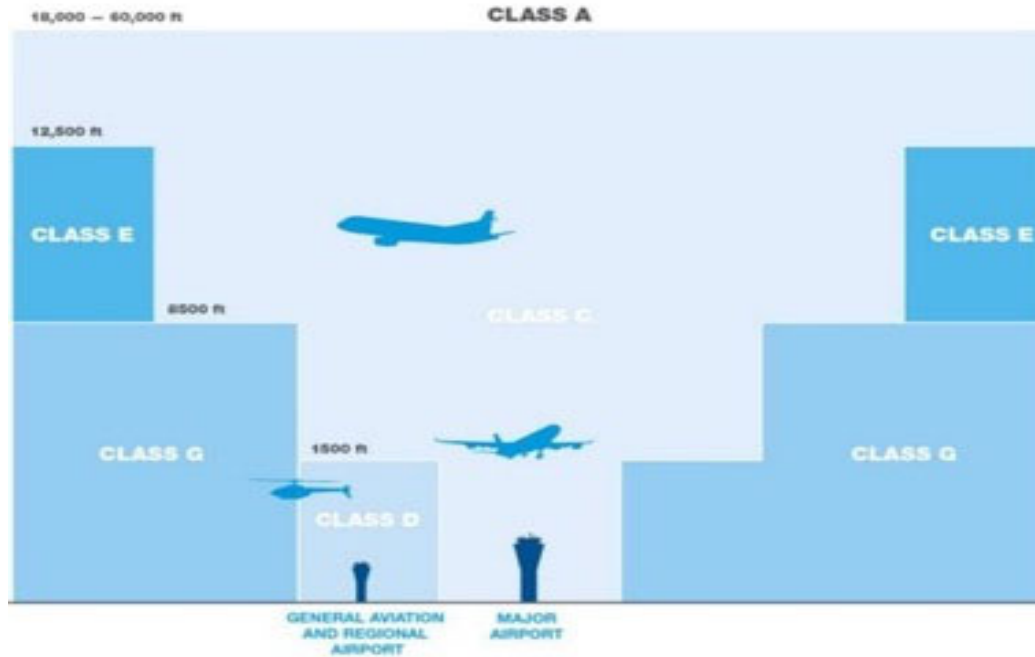
<sup>29</sup> ATSB Report, p 1, footnote 3. See also ATSB Report, p 15 for the Mangalore Runway 23 VOR approach [CB2, Tab 54, pp 8, 22].

<sup>30</sup> Civil Aviation Safety Authority report entitled '*Mangalore Aeronautical Study*' (**CASA Report**), p 10 (section 2.4 Background [CB2, Tab 57, p 10]; ATSB Report, p 15 [CB2, Tab 54, p 22].

<sup>31</sup> ATSB Report, pp 10, 15 (Figure 9, Mangalore VOR Chart annotation '10NM MSA') [CB2, Tab 54, pp 17, 22].

<sup>32</sup> ATSB Report, p 9 [CB2, Tab 54, p 16].

<sup>33</sup> ATSB Report, p 10, Figure 5 [CB2, Tab 54, p 17].



44. In this case, both aircraft were operating in Class G non-controlled airspace under the IFR and were in contact with the Melbourne Centre. In Class G airspace, ATCs provide a flight information service to IFR aircraft about conflicting IFR and observed VFR flights.<sup>34</sup>
45. Mr Tucker, on behalf of Airservices, was providing only a flight information service to AEM and JQF and was not providing an air traffic control service with positive separation. This meant that, as with VFR operations in Class G non-controlled airspace, the pilots were responsible for complying with the rules of the air to ensure they maintained sufficient separation.<sup>35</sup>
46. Part 12 of the *Civil Aviation Regulations 1988* (Cth) sets out regulations detailing pilot responsibilities in relation to rules for the prevention of a collision, operating near other aircraft, right of way and operating in non-controlled airspace. Part 12, Division 2, Subdivision 2 sets the rules for operating on and in the vicinity of non-controlled aerodromes.

<sup>34</sup> ATSB Report, p 11 [CB2, Tab 54, p 18].

<sup>35</sup> ATSB Report, p 12 [CB2, Tab 54, p 19].

## **Air traffic control**

47. Airservices is the national air traffic services provider for airspace within Australia except military administered airspace.<sup>36</sup> A number of different services are provided by Airservices based on the airspace classification and aircraft flight rules, including an air traffic control service and a flight information service.
48. An air traffic control service is provided in controlled airspace, such as Class A, C, D and E airspace in Australia and dependent on the aircraft flight rules (i.e. IFR and VFR). A flight information service is provided in Class G airspace and is defined as:
- ‘A service provided for the purpose of giving advice and information for the safe and efficient conduct of flights.’<sup>37</sup>
49. A flight information service differs from an air traffic control service in that pilots are not provided with positive separation between aircraft, and there are no separation standards for aircraft. Instead, pilots of IFR flights are provided with air traffic information and are required to comply with the rules of the air to maintain their own separation.<sup>38</sup>

## **The air traffic controller’s display**

50. ATCs have multiple screens on their console, displaying information such as a map view of the aircraft in their sector; flight plans of active and future aircraft; weather and NOTAM information.<sup>39</sup> Co-ordination of aircraft passing into their sector may occur either through verbal communication with another controller or through data messages sent between controllers.
51. The ATC has the ability to zoom into sections of the airspace on the display. This gives the ATC the ability to further inspect information available about each aircraft, including callsign, altitude and flight plan information.<sup>40</sup>

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<sup>36</sup> ATSB Report, p 18 [CB2, Tab 54, p 25].

<sup>37</sup> ATSB Report, p 19 [CB2, Tab 54, p 26].

<sup>38</sup> Ibid.

<sup>39</sup> NOTAM (*Notice to Airmen*): A notice distributed by means of telecommunication containing information concerning the establishment condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.

<sup>40</sup> ATSB Report, pp 22–3 [CB2, Tab 54, pp 29–30]; Tucker Statement, pp 7 [63], 8 [67].

## Alerts

52. A Short-Term Conflict Alert (**STCA**) is an aural and visual alert received on a controller's console when two aircraft come within a defined proximity of each other.<sup>41</sup> A STCA is a priority one alert and is a system detected Safety Net critical event requiring immediate intervention by a controller. A STCA presents as both an audible and visual alert to the controller on their ASD. A controller can acknowledge the STCA to silence the audible alert, however, the STCA label will continue to display to the controller while the system alert parameters remain valid between the aircraft. The purpose of the STCA function is to determine all the surveillance track pairs, predicted to be separated by less than the minimum horizontal (4.8NM) and vertical (600 ft) STCA parameters. The EUROCAT system computes the conflict using a three-dimensional forecast (look-ahead) and provides an audio and visual alert if an infringement is determined.
53. STCAs occur in both controlled and non-controlled airspace, with alerts inhibited in some areas. Specifically, STCAs in Class G airspace are inhibited below 4,500 ft in the Brisbane flight information region, but occur to the ground in areas of the Melbourne flight information region.<sup>42</sup> STCA is also employed in Class G airspace volumes, using the enroute STCA parameters with its application extending to the ground level in the Melbourne Flight Data Region (**FDRG**) and to A045 in the Brisbane FDRG (unless specifically allowed for in the system parameters).
54. When two aircraft are assessed by the system as likely to pass within prescribed vertical and lateral parameters in a particular time window, the ATC will receive a pop-up window on their display with aircraft details. The parameters for an alert on aircraft in Class G airspace are the same as the parameters for aircraft in an en-route controlled environment. Aircraft operating below 28,500 ft, under a surveillance service will generate a STCA if they are projected to pass within 4.8 NM and 600 ft in the next 60 to 90 seconds.<sup>43</sup>
55. Both AEM and JQF were included in this, as they were both operating under a flight plan, broadcasting ADS-B data and had both been positively identified by the ATC.<sup>44</sup>

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<sup>41</sup> ATSB Report, p 23 [CB2, Tab 54, p 30].

<sup>42</sup> Ibid.

<sup>43</sup> ATSB Report, p 24 [CB2, Tab 54, p 31].

<sup>44</sup> Ibid.

## **THE PURPOSE OF A CORONIAL INVESTIGATION**

56. The deaths of Mr Peter Phillips, Mr Ido Segev, Mr Christiaan Gobel and Ms Pasinee Meeseang constitute ‘reportable deaths’ under the *Coroners Act 2008* (Vic) (**the Act**), as the deaths occurred in Victoria and the deaths appears to have been unnatural and unexpected.
57. The jurisdiction of the Coroners Court of Victoria is inquisitorial. The role of the coroner is to independently investigate reportable deaths to ascertain, if possible, the identity of the deceased, the cause of death and the circumstances in which death occurred.
58. It is not the role of the coroner to lay or apportion blame, but to establish the facts. It is not the coroner’s role to determine criminal or civil liability arising from the death under investigation, or to determine disciplinary matters.
59. The expression ‘cause of death’ refers to the medical cause of death, incorporating where possible, the mode or mechanism of death.
60. For coronial purposes, the phrase ‘circumstances in which the death occurred’ refers to the context or background and surrounding circumstances of the death. Rather than being a consideration of all circumstances which might form part of a narrative culminating the death, it is confined to those circumstances which are sufficiently proximate and casually relevant to the death.
61. The broader purpose of coronial investigations is to contribute to a reduction in the number of preventable deaths, both through the observations made in the investigation findings and by the making of recommendations by coroners. This is generally referred to as the Court’s ‘prevention’ role.
62. Coroners are also empowered to:
  - a) report to the Attorney-General on a death;
  - b) comment on any matter connected with the death they have investigated, including matters of public health or safety and the administration of justice; and
  - c) make recommendations to any Minister or public statutory authority on any matter connected with the death, including public health and safety or the administration of justice.



63. These powers are the vehicle by which the prevention role may be advanced.
64. All coronial findings must be based on proof or relevant facts on the balance of probabilities. In determining these matters, I am guided by the principles enunciated in *Briginshaw v Briginshaw*.<sup>45</sup> The effect of this and similar authorities is that coroners should not make adverse findings against, or comments about individuals, unless the evidence provides a comfortable level of satisfaction that they caused or contributed to the death.
65. The proof of facts underpinning a finding that would, or may, have an extremely deleterious effect on a party's character, reputation or employment prospects demands a weight of evidence commensurate with the gravity of the facts sought to be proved.<sup>46</sup> Facts should not be considered to have been proven on the balance of probabilities by inexact proofs, indefinite testimony or indirect inferences. Rather, such proof should be the result of clear, cogent or strict proof in the context of a presumption of innocence.<sup>47</sup>
66. Victoria Police assigned Detective Senior Constable Naomi Bennett to be the Coroner's Investigator for this investigation. Senior Constable Bennett conducted inquiries on my behalf and submitted a coronial brief of evidence.
67. As part of this investigation and so that all parties and the court could better understand the operating environment for ATCs and aircraft operating in class G airspace, with the assistance of Air Services Australia (ASA) I and representatives of the interested parties attended ASA centre at Melbourne airport. A simulation of the ATC terminal and workstation was demonstrated with opportunity to ask questions about the general operation of the system operation. This view was invaluable, and I express my gratitude to ASA for facilitating this attendance.
68. This finding draws on the totality of the material obtained in the coronial investigation, that is, the material on the court file, the coronial brief, further material including expert reports obtained by the Court, together with the transcript of the evidence adduced at inquest and the submissions of Counsel Assisting and the interested parties.
69. In writing this finding, I do not purport to summarise all of the material evidence but refer to it only in such detail as appears warranted by forensic significance and narrative

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<sup>45</sup> (1938) 60 CLR 336.

<sup>46</sup> *Anderson v Blashki* [1993] 2 VR 89, following *Briginshaw v Briginshaw* (1938) 60 CLR 336.

<sup>47</sup> *Briginshaw v Briginshaw* (1938) 60 CLR 336 at pp 362–3 per Dixon J.

clarity. It should not be inferred from the absence of reference to any aspect of the evidence that it has not been considered.

70. With an investigation of this magnitude, it is appropriate that I acknowledge the significant work of all who were involved in assisting me.
71. I thank the Coroner's Investigator in this investigation who compiled a comprehensive coronial brief and provided ongoing assistance to the families of the deceased during the course of the coronial investigation.
72. I thank Counsel Assisting, Mr Adam Baker and the counsel and solicitors who represented the interested parties, for their work and comprehensive submissions.
73. I also acknowledge and thank Ms Abigail Smith, Senior Coroner's Solicitor at the Coroners Court of Victoria, who worked diligently and provided me with invaluable assistance through the entirety of this investigation.

## **INQUEST**

74. I convened the Coroners Court of Victoria for the inquest from 25 March 2024 to 28 March 2024 (inclusive).

### **Scope of Inquest**

75. On 4 December 2023, I held a directions hearing in this matter to discuss the Scope of Inquest and other relevant matters.
76. The Scope of Inquest was finalised on 19 December 2023 pursuant to section 64(b) of the Act, as follows:

*'The circumstances which led to the mid-air collision of aircraft registration VH-AEM (containing Ido Segev and Peter Phillips) and registration VH-JQF (containing Christiaan Gobel and Pasinee Meeseang) ('the Aircraft') just south of Mangalore Airport on 19 February 2020 ('the Accident') including:*

- a) the Aircraft operating under the Instrumental Flight Rules ('IFR');*
- b) the combined sectors of controlled and uncontrolled air space on 19 February 2020 and the roles and responsibilities of the air traffic controller;*
- c) the content of the air traffic information provided to the Aircraft;*

- d) *the absence of communication, if any, between the crews of the Aircraft after the air traffic information was provided; and*
- e) *a safety alert not being issued to the Aircraft after the short-term conflict alerts were activated.*

*The reliance on and use of velocity vectors as a tool for:*

- a) *predicting the location and flight path of the Aircraft on 19 February 2020; and*
- b) *predicting the location and flight path of aircraft in uncontrolled (Class G) airspace.*

*Whether the addition of 1000 ft to the minimum altitudes for instrument approach procedures into Mangalore Airport, as recommended in the 'En-Route Supplement for Mangalore Airport' should be mandated or remain discretionary.*

*The use, availability and cost-effectiveness of collision avoidance technologies that could reduce the likelihood of future similar accidents occurring.'*

### **Interested Parties**

77. Six interested parties were granted leave to appear at the inquest. They were:

- Airservices.
- The ATSB.
- The CASA.
- Mr John Tucker.
- Peninsula Aero Club.
- The Segev Family and Brianna Sutcliffe.

### **Evidence**

78. At inquest viva voce evidence was heard from four witnesses:

- Mr John Tucker – the air traffic controller employed by Airservices overseeing the airspace over Mangalore. Mr Tucker gave two witness statements. The first was dated 3 April 2020 and was given for the purposes of Airservices'

investigation. Mr Tucker's second statement is dated 2 July 2020 and was provided in response to a request from the Coroner's Investigator. Mr Tucker gave evidence on the first day of the inquest on 25 March 2024.

- Mr Blair Henderson – the Director of Operations for High Density Services for Airservices. Mr Henderson gave a witness statement dated 19 February 2014 and gave evidence on the second day of the inquest on 26 March 2024.
  - Mr Christopher Hine – Enroute Air Traffic Controller at the Melbourne Centre for Airservices. Mr Hine gave a witness statement dated 19 February 2024 and gave evidence on the second and third days of the inquest from 26 to 27 March 2024.
  - Dr Nathalie Boston – Manager Transport Safety at the ATSB. Dr Boston was the lead investigator for the ATSB in relation to this incident. Dr Boston provided a witness statement dated 20 March 2024 which contained a description of Dr Boston's expertise in human factors, her responsibilities in the ATSB investigation and a number of slides summarising the investigation. Dr Boston also gave evidence on the ATSB's Aircraft Performance and Cockpit Visibility Study. Dr Boston gave evidence on the third day of the inquest on 27 March 2024.
79. In addition, Mr Keith Tonkin and Mr Peter White of Aviation Projects provided expert evidence on the final day of the inquest on 28 March 2024. Mr Tonkin and Mr White also provided me with preliminary observations in June 2023 and supplementary observations in March 2024 which formed part of the coronial brief.
80. Following the inquest, Counsel Assisting and Counsel for all interested parties provided written submissions. In writing this finding, I have considered all of the evidence and the submissions of the interested parties.
81. I also received coronial impact statements from:
- Brianna Sutcliffe – fiancé of Ido Segev;
  - Yonatan Segev – brother of Ido Segev;
  - Martin Gobel – son of Christiaan Gobel;

- Wilma Gobel – wife of Christiaan Gobel; and
  - Fiona Phillips – wife of Peter Phillips.
82. I am very grateful to the family members who provided me with the coronial impact statements which enabled me to better understand the great loss and pain that they and their families have suffered since the tragic accident.

### **Reliability of witnesses**

83. In written submissions, some criticism of the evidence of Mr Hine and Mr Tucker was made by the representatives of the Sutcliffe and Segev families. I interpreted these submissions as suggesting that Mr Hine’s evidence could not be taken as neutral and that he was focussed on absolving his employer. Similarly, that Mr Tucker, was highly motivated to defend his conduct and took implausible positions. It was also suggested that their evidence should be rejected where it conflicts with that of the independent experts, or court documents.
84. I have carefully considered and reflected on the evidence of both witnesses and have concluded that both Mr Hine and Mr Tucker presented as honest witnesses whose evidence was truthful and reliable. Mr Hine is a highly experienced and qualified ATC and I accept Counsel Assisting’s assessment of Mr Hine’s evidence as being considered. As for Mr Tucker, I consider that he appropriately reflected on his decisions made on the day of the Accident. However, in forming my conclusions and findings in this matter, I have balanced the evidence of Mr Hine and Mr Tucker against the evidence of the experts and other material on the court file.

### **MATTERS IN RELATION TO WHICH A FINDING MUST, IF POSSIBLE, BE MADE**

#### **Identity of the deceased, pursuant to section 67(1)(a) of the Act**

##### Christiaan Gobel

85. On 25 February 2020, Mr Christiaan Willibrord Gobel was identified by DNA comparison.
86. Identity is not in dispute and requires no further investigation.

Pasinee (Mia) Meeseang

87. On 26 February 2020, Ms Pasinee Meeseang was identified by circumstantial evidence and DNA comparison.
88. Identity is not in dispute and requires no further investigation.

Ido Segev

89. On 27 February 2020, Mr Ido Segev was identified by circumstantial evidence, dental record comparison and DNA comparison.
90. Identity is not in dispute and requires no further investigation.

Peter Phillips

91. On 27 February 2020, Mr Peter Phillips was identified by DNA comparison.
92. Identity is not in dispute and requires no further investigation.

**Medical cause of death, pursuant to section 67(1)(b) of the Act**

Christiaan Gobel

93. On 25 February 2020, Forensic Pathologist, Dr Melanie Archer from the Victorian Institute of Forensic Medicine (VIFM) performed an autopsy and provided a written report of her findings dated 28 August 2020.
94. The autopsy showed extensive fractures involving the face, chest and abdominal region. There were also extensive injuries to the internal viscera.
95. Dr Archer commented that the injuries were of a nature that would have caused rapid unconsciousness and death. Dr Archer deemed the injuries unsurvivable. The injuries were of the type that would be expected from a high energy incident, such as rapid deceleration following a plane crash.
96. Dr Archer also noted that there was significant natural disease in the form of ischaemic heart disease and that the degree of heart disease would be capable of causing death in isolation from other factors. However, on balance, Dr Archer concluded that the natural disease findings were incidental. There was no evidence of an acute cardiac event having occurred at the time of the incident.

97. The toxicological analysis of post-mortem samples did not detect alcohol or common drugs or poisons.
98. Dr Archer provided an opinion that the medical cause of death was *multiple injuries sustained in an aviation incident*.
99. I accept Dr Archer's opinion as to the cause of death.

Pasinee Meeseang

100. On 25 February 2020, Forensic Pathologist, Dr Melanie Archer from the VIFM performed an autopsy and provided a written report of her findings dated 25 August 2020.
101. The autopsy showed multiple fractures and soft issue injuries (including injuries to major organs such as the heart, lungs and brain). These injuries were seen on most regions of the body.
102. Dr Archer commented that these injuries were of a nature that would have caused rapid unconsciousness and death. The injuries were not survivable. Dr Archer also noted that the injuries were in keeping with a high energy incident involving rapid deceleration.
103. There was no significant natural disease that could have caused or contributed to the death.
104. The toxicological analysis of post-mortem samples did not detect alcohol or common drugs or poisons.
105. Dr Archer provided an opinion that the medical cause of death was *multiple injuries sustained in an aviation incident*.
106. I accept Dr Archer's opinion as to the cause of death.

Ido Segev

107. On 24 February 2020, Forensic Pathologist, Dr Melanie Archer from the VIFM performed an autopsy and provided a written report of her findings dated 14 April 2020.
108. Mr Segev was identified following the implementation of a Disaster Victim Identification protocol as the remains were heavily fragmented in keeping with a high energy incident.
109. Dr Archer commented that the injuries were of a nature that would have caused very rapid unconsciousness and death.

110. There were no suitable specimens that could be collected for toxicological analysis.
111. Dr Archer provided an opinion that the medical cause of death was *multiple injuries sustained in an aviation incident*.
112. I accept Dr Archer's opinion as to the cause of death.

#### Peter Phillips

113. On 24 February 2020, Forensic Pathologist, Dr Melanie Archer from the VIFM performed an autopsy and provided a written report of her findings dated 14 April 2020.
114. Mr Phillips was identified following the implementation of a Disaster Victim Identification protocol as the remains were heavily fragmented in keeping with a high energy incident.
115. Dr Archer commented that the injuries were of a nature that would have caused very rapid unconsciousness and death.
116. The toxicological analysis was very limited due to the unavailability of suitable samples. There was no detection of common drugs and poisons.
117. Dr Archer provided an opinion that the medical cause of death was *multiple injuries sustained in an aviation incident*.
118. I accept Dr Archer's opinion as to the cause of death.

#### **Investigations by Airservices and the ATSB**

119. As outlined earlier in this finding, Airservices and the ATSB undertook investigations following the Accident into the circumstances that led to the Accident and produced respective reports.

#### Airservices report

120. The purpose of the Airservices investigation was to determine whether all air traffic control procedures were correctly applied in the provision of air traffic services to IFR aircraft in Class G Airspace.
121. The investigation examined:
- the decision making in relation to the provision of traffic information,



- whether service provision was consistent with documented procedures local and national practices,
  - whether pilot broadcasts were in accordance with the requirement of the Aeronautical Information Package (AIP), and
  - whether the tracking of both aircraft was in accordance with the flight plans and AIP requirements for aircraft operating at aerodromes in Class G airspace.
122. The Airservices report identified a safety factor related to the circumstances of the Accident. The safety factor identified that AEM and JQF acknowledged receipt of mutual traffic information, however, the aircraft continued tracking on conflicting flight paths until the aircraft collided. The safety factor also indicated that as IFR aircraft operating in Class G airspace, the pilots were obligated to see and avoid each other and make broadcasts where reasonably necessary to do so to avoid collision, or the risk of collision and to comply with the rules of the air.
123. The Airservices report also identified five other findings related to the circumstances of the Accident that can be summarised as follows:
- Following the passing of mutual traffic to AEM and JQF, Mr Tucker's assessment and judgement of the traffic picture did not identify a potential collision risk. Mr Tucker's expectation was also that the pilots were communicating, self-separating and updating their situation awareness.
  - Mr Tucker likely first recognised that AEM and JQF were a potential collision risk in the 12-second period leading up to the collision. However, he determined that there was insufficient time available to have issued an effective safety alert before the aircraft would have passed, and consequently no safety alert or traffic avoidance advice was issued to either aircraft.
  - Both AEM and JQF were tracking in accordance with their respective flight plans and AIP requirements.
  - The pilot communications with air traffic control were generally consistent with the required AIP phraseology and the required content was included in the transmissions.

- The use of the enroute STCA parameters in the Melbourne flight information region (**FIR**), where its application in Class G extends to the ground level, is contributing to the higher frequency of nuisance alerts than those experienced in the Brisbane FIR. The prevalence of nuisance alerts increases controller workload and the potential for errors in decision-making.
124. I also note that during the inquest the representatives for the Sutcliffe and Segev families called for a copy of the draft Airservices report which was subsequently provided to the Court. The draft Airservices report identified an additional safety factor regarding the issue of a safety alert or avoiding action not being provided to AEM or JQF after the activation of the STCA. Airservices advised that this safety factor was considered not supported by the evidence and rejected following consultation with the subject matter experts and relevant personnel.

#### ATSB report

125. The ATSB report provides an overview of the circumstances that led to the Accident, a safety analysis, findings and identified safety issues/actions.
126. The findings in the ATSB report are to be read together to ensure that the interaction of the conditions and events on the day of the Accident and the risk of an accident occurring again were there to be similar combination of conditions and events to happen in the future is to be understood.<sup>48</sup>
127. The ATSB report identified four contributing safety factors to the Accident, as follows:<sup>49</sup>
- the pilots did not successfully manoeuvre or establish direct communications on the CTAF to maintain separation, probably due to the collision risk not being recognised;
  - notwithstanding the fact that the aircraft were flying in IFR conditions, the known limitations of the see-and-avoid principle meant that the pilots were unlikely to have seen each other in sufficient time to prevent the Accident;
  - following receipt of a STCA, the controller assessed it in accordance with the required procedure. After considering that the pilots had been passed mutual

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<sup>48</sup> T 322 lines 7–18.

<sup>49</sup> Tab 54, Volume 2, p 68.

traffic information and were required to ensure their own separation in non-controlled airspace, the controller did not intervene further; and

- while the pilots were responsible for self-separation within the Mangalore CTAF area, they did not have access to the same surveillance data, including automatic dependant surveillance broadcast information available to air traffic control. As a result, the pilots were required to make timely decisions to avoid a collision without the best available information.
128. While the ATSB did not identify any safety issues that contributed to this Accident, the ATSB report contains a safety message which relates to the fitment of ADS-B transmitting, receiving and display devices as tools to assist with the identification and avoidance of conflicting traffic.
129. Further, as part of the ATSB investigation, the ATSB identified concerns around the pilots' ability to visually identify the other aircraft in time to take avoiding action. In response to this, the ATSB initiated an aircraft performance and cockpit visibility study to determine at what times the aircraft may have been visible to the crew of the opposing aircraft.
130. The ATSB Visibility Study found that the pilots of both aircraft were unlikely to have acquired the other aircraft visually due to meteorological factors, aircraft closing speed and shielding of the opposing aircraft by cockpit structure. The ATSB Visibility Study also found that neither AEM and JQF were not equipped with ADS-B IN systems and that had the aircraft been equipped with this technology that the pilots would have been alerted to the position of the other aircraft much earlier than by visual acquisition.
131. The ATSB Visibility Study also included a safety message regarding the use of ADS-B IN/OUT technology. Namely that, the proliferation of relatively low-cost ADS-B IN/OUT equipment, whether in-built or, in conjunction with electronic flight bag applications on personal electronic devices can provide significant improvement this capability.

#### **Circumstances in which the death occurred, pursuant to section 67(1)(c) of the Act**

132. There are several complex and interrelated issues that are connected with the circumstances of the Accident which warrant discussion and comment by me. These

issues include those matters set out at points 1 and 2 of the Scope of Inquiry and matters of general public safety.

133. In formulating my findings, recommendations and comments in this matter, I have had regard to all of the relevant evidence, including the coronial brief, viva voce evidence and the written submissions of Counsel Assisting and the interested parties.

#### Factual circumstances of the Accident

134. At about 9:49 am on 19 February 2020, Ms Meeseang submitted a flight plan to Airservices for a round-trip IFR flight from Mangalore via Essendon and Shepparton aboard JQF.<sup>50</sup> JQF's flight plan indicated that it was to depart Mangalore and climb to 7,000 ft while tracking to Lacey to conduct an Instrument Landing System (**ILS**) approach at Essendon before returning to Mangalore for the Visual Omni Range (**VOR**) approach and then to conduct a Non-Directional Beacon approach at Shepparton before returning to Mangalore for an Area Navigation approach.
135. Similarly, at approximately 10:41 am that morning, Mr Segev submitted a flight plan to Airservices for an IFR training flight to Shepparton via Mangalore and returning to Tyabb aboard AEM.<sup>51</sup> AEM's flight plan indicated that AEM was to depart Tyabb directed to Mangalore and to conduct the VOR hold and approach, depart to Shepparton for the Area Navigation Global Satellite System approach, return via Mangalore, Lacey and Harro to Moorabbin for the Area Navigation Global Satellite System approach before returning to Tyabb.
136. Below is a diagram indicating the flight-plan track of JQF to the Lacey waypoint, the flight paths for AEM and JQF and the airspace around Mangalore.<sup>52</sup>

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<sup>50</sup> ATSB Report, pp 13–14 [CB2, Tab 54, pp 20–1]; Airservices Report, p 10 [CB2, Tab 52, p 10].

<sup>51</sup> ATSB Report, p 13 [CB2, Tab 54, p 20]; Airservices Report, p 9 [CB2, Tab 52, p 9].

<sup>52</sup> ATSB Report, p 2, Figure 1 [CB2, Tab 54, p 9].



137. At 11:11:21 am, AEM was approximately 45 NM from Mangalore when JQF reported taxiing on the runway at Mangalore.<sup>53</sup>
138. Mr Segev first made contact with the Melbourne Centre at 11:17:42am.<sup>54</sup> AEM then entered the airspace around Mangalore at 11:18am. AEM was not on the Melbourne Centre frequency when JQF made their taxi call to the Melbourne Centre.<sup>55</sup> Mr John Tucker, the ATC at the Melbourne Centre, advised AEM that there was no IFR traffic for their descent at Mangalore.
139. At approximately 11:19:39 am, AEM was 19 NM from Mangalore when they reported that they were beginning descent for airwork from 6,000 ft.<sup>56</sup> The airwork was to occur between 4,000 ft and ground level. Mr Tucker advised AEM that there was no IFR traffic for not above 4,000 ft.

<sup>53</sup> Airservices Report, pp 11, 46 [CB2, Tab 52, pp 11, 46]; ATSB Report, pp 1, 69 [CB2, Tab 54, pp 8, 76].

<sup>54</sup> Airservices Report, p 11 [CB2, Tab 52, p 11]; ATSB Report, pp 1, 69 [CB2, Tab 54, pp 8, 76].

<sup>55</sup> ATSB Report, pp 1, 69 [CB2, Tab 54, pp 8, 76].

<sup>56</sup> Airservices Report, pp 4, 11, 46 [CB2, Tab 52, pp 4, 11, 46]; ATSB Report, p 69 [CB2, Tab 54, p 76]. Airwork refers to the performance various exercises and skills by the pilot in the aircraft during flight that is not solely related to the transport of the aircraft. See definition of 'Aerial Work' [Airservices Report, CB2, Tab 52, p 44].

140. At 11:20:07 am, Mr Tucker reassessed that JQF as being relevant IFR traffic, and, at a point in time between 11:20:17 am to 11:20:20 am passed amended air traffic information to AEM about JQF, as follows:<sup>57</sup>

*‘Alpha Echo Mike, shortly to depart Mangalore southbound, or via...ah... Lacey, is Juliet Quebec Foxtrot a Seminole, they’ll be on climb to seven thousand.’*

141. This amended air traffic information was acknowledged by AEM. At this stage, AEM was approximately 16 NM from Mangalore.<sup>58</sup>

142. At 11:22:19 am, JQF made a departure call from Mangalore, advising the Melbourne Control Centre that they were passing 2,700 ft on climb to 7,000 ft, as follows:

*‘Juliet Quebec Foxtrot departure at Mangalore two three – three passing ah 2700 on climb to 7000, tracking to LACEY, Mangalore.’<sup>59</sup>*

143. Mr Tucker verified the departure call and provided relevant air traffic information to JQF as well as passing on air traffic information about AEM at 11:22:44 am, as follows:

*‘And Juliet Quebec Foxtrot, ah traffic ah, six miles in your twelve o’clock is Alpha Echo Mike... a ah king air, they’re ah inbound to Mangalore for airwork, passing five thousand on descent to not above four thousand.’<sup>60</sup>*

144. Mr Tucker referred to a ‘King Air’ in the broadcast, when AEM was in fact a Travel Air.

145. At 11:22:42 am, a Short-Term Conflict Alert (STCA)<sup>61</sup> activated on Mr Tucker’s Air Situation Display (**Display**) with respect to JQF and other VFR traffic.<sup>62</sup> It was not in response to a conflict between AEM and JQF.

146. At 11:22:49 am, while Mr Tucker was passing air traffic information to JQF, a STCA vis-à-vis AEM and JQF activated on his Display, then activated again at 11:22:56 am.

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<sup>57</sup> Airservices Report, pp 4, 11, 46 [CB2, Tab 52, pp 4, 11, 46]; ATSB Report, pp 1, 69 [CB2, Tab 54, pp 8, 76].

<sup>58</sup> Airservices Report, pp 11, 46 [CB2, Tab 52, pp 11, 46]; ATSB Report, pp 1, 69–70 [CB2, Tab 54, pp 8, 76–7].

<sup>59</sup> Exhibit 2: Air Traffic Control Transcript p 1 lines 25–7.

<sup>60</sup> Airservices Report, pp 12–13, 46 [CB2, Tab 52, pp 12–13, 46]; ATSB Report, pp 1, 69–70 [CB2, Tab 54, pp 8, 76–7].

<sup>61</sup> See section entitled ‘Alerts’ above.

<sup>62</sup> Airservices Report, pp 11, 46 [CB2, Tab 52, pp 13, 46]; ATSB Report, pp 1–2, 70 [CB2, Tab 54, p 77]. The Air Situation Display is the display used by the controller. See also Airservices Report, pp 51–4 (Appendix B) [CB2, Tab 52, pp 51–4].

147. Mr Tucker acknowledged the STCA at 11:22:51 am and again at 11:22:57 am which silenced the aural alarms with the STCA visual alert remaining.<sup>63</sup>
148. At 11:23:00 am, JQF acknowledged the air traffic information regarding AEM.<sup>64</sup> By this time, JQF was climbing through 3,250 ft, had a ground speed of 81 kt and had commenced a turn to intercept their planned outbound track from Mangalore to Lacey.<sup>65</sup>
149. At the same time, AEM had a ground speed of 187 kt and was descending through 4,918 ft on a track of 354°. At this point, there was 5.4 NM horizontally and about 1,675 ft vertically between the aircraft.<sup>66</sup>
150. At 11:23:17 am, AEM had descended to 4,800 ft.<sup>67</sup> Whilst communicating with other aircraft, Mr Tucker maintained his visual surveillance of both aircraft on the Display.<sup>68</sup>
151. JQF had turned left and had arrested their climb, with the recorded data displaying a holding level at 3,400 ft, and AEM maintaining 4,800 ft. Whilst JQF had commenced turning further left, the crossing point identified by the visual data displayed on the console indicated that JQF would pass behind AEM at that altitude within one minute.<sup>69</sup>
152. At 11:23:36 am, the recorded data showed that AEM was maintaining 4,800 ft and JQF was displaying at 3,500 ft. The distance between the aircraft was now 3 NM and 1,300 ft.<sup>70</sup>
153. At 11:23:40 am, the recorded data indicated that JQF had recommenced their climb and was displaying 3,600 ft and at 11:23:46 am, AEM had recommenced descent and was displaying 4,700 ft.<sup>71</sup>
154. In addition to AEM and JQF, there were six other aircraft either taxiing on the ground at Mangalore, operating in the circuit area, or in the local area monitoring the Mangalore CTAF. Multiple pilots recalled each of the aircraft communicating separately on the CTAF, with one of the crew of JQF making a rolling and circuit departure broadcast and

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<sup>63</sup> Airservices Report, pp 13, 17–18, 46, Figures 6 and 7 [CB2, Tab 52, pp 13, 17, 18, 46]; ATSB Report, pp 2, 26, 70, Figure 12 [CB2, Tab 54, pp 33, 77].

<sup>64</sup> Airservices Report, pp 13, 46 [CB2, Tab 52, pp 13, 46]; ATSB Report, p 2 [CB2, Tab 52, p 9].

<sup>65</sup> ATSB Report, p 2 [CB2, Tab 54, p 9].

<sup>66</sup> Ibid.

<sup>67</sup> Airservices Report, p 13 [CB2, Tab 52, p 13].

<sup>68</sup> Tucker Statement, p 8 [67] [CB1, Tab 38, p 8].

<sup>69</sup> Airservices Report, p 14 [CB2, Tab 52, p 14]; ATSB Report, p 26 [CB2, Tab 54, p 33].

<sup>70</sup> Airservices Report, p 14 [CB2, Tab 52, p 14].

<sup>71</sup> Ibid.

a pilot from AEM making an inbound broadcast. However, none of the pilots in the CTAF area recalled any radio communications to arrange separation between AEM and JQF.<sup>72</sup> For operations within ‘Class G’ airspace, no separation minima apply.

155. At 11:23:51 am, the STCA reactivated between JQF and AEM. Mr Tucker acknowledged the STCA silencing the aural alert at 11:24:09 am, whilst providing air traffic information to another aircraft.<sup>73</sup> Mr Tucker did not issue a safety alert.<sup>74</sup>
156. At 11:23:51 am, when the STCA reactivated between AEM and JQF, AEM was at 4600 ft and JQF was at 3700 ft. The distance between the aircraft was 1.9 NM and 900 ft. At the time of the STCA activation, the velocity vector of JQF crossed the velocity vector of AEM, with JQF predicted to pass closely behind AEM. At the time that occurred, Mr Tucker was communicating with another aircraft. At 11:24:08 am, Mr Tucker changed the ASD range to 97 NM (which indicates that Mr Tucker was zooming in on the screen) and acknowledged the STCA at 11:24:09 am. AEM had descended to 4500 ft and JQF was at 4000 ft. The distance between the aircraft had reduced to 0.9 NM and 500 ft.<sup>75</sup>
157. At 11:24:20 am, AEM and JQF collided, and the Display reverted from a presentation of the track of each aircraft based on surveillance data to the flight planned tracks or velocity vectors.<sup>76</sup> Mr Tucker attempted to contact each aircraft, before declaring a distress phase for both aircraft.<sup>77</sup>
158. Below is a recreation of the flight paths of AEM and JQF, and location of the ground impact of both aircraft.<sup>78</sup>

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<sup>72</sup> ATSB Report, p 3 [CB2, Tab 54, p 10]; Statement of Christopher Gill dated 19 February 2020 [CB1, Tab 25]; Statement of Daryl Robertson dated 19 February 2020 [CB1, Tab 26]; Statement of Callum Burton dated 19 February 2020 [CB1, Tab 27]; Statement of Steven Woodcock dated 19 February 2020 [CB1, Tab 28]; Statement of Roy Vigder dated 19 February 2020 [CB1, Tab 29]; Statement of Joel Handley dated 19 February 2020 [CB1, Tab 31]; Statement of Luke Beverley dated 19 February 2020 [CB1, Tab 33]; Statement of Michael Woodcock dated 25 February 2020 [CB1, Tab 35].

<sup>73</sup> Airservices Report pp 15, 47 [CB2, Tab 52, pp 15, 47]; ATSB Report, pp 10, 70 [CB2, Tab 54, pp 17, 77].

<sup>74</sup> Tucker Statement, p 9 [69] [CB1, Tab 38, p 9].

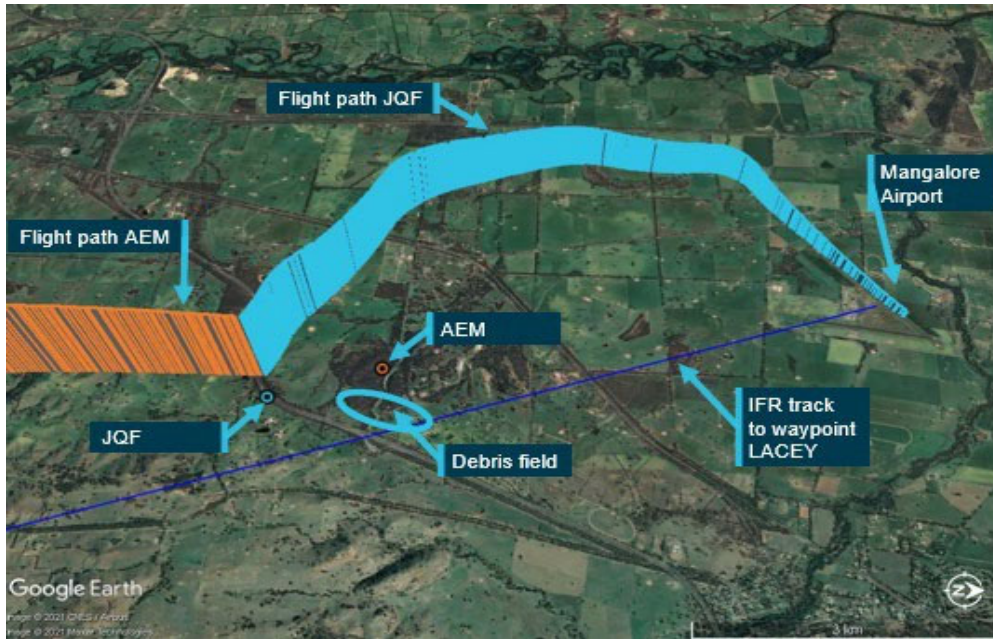
<sup>75</sup> Airservices Report, p 15 [CB2, Tab 52, p 15]; ATSB Report, p 3–4 [CB2, Tab 54, pp 10–11].

<sup>76</sup> ATSB Report, p 3 [CB2, Tab 54, p 10].

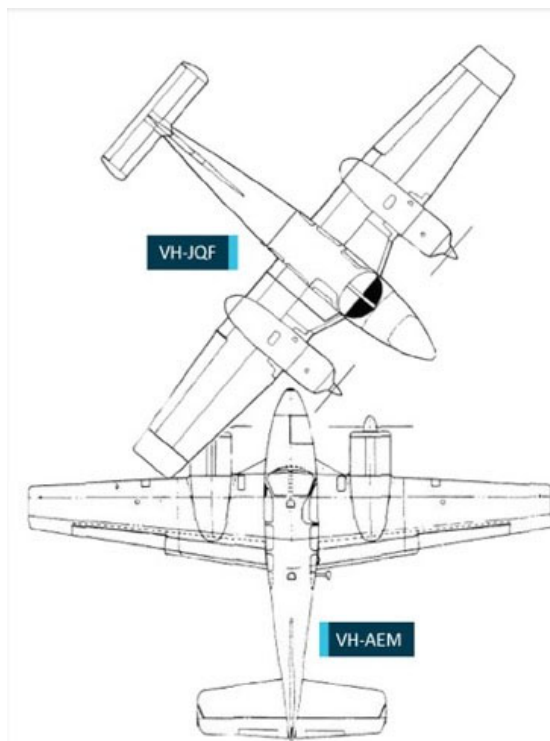
<sup>77</sup> Airservices Report, p 15 [CB2, Tab 52, p 15]; Tucker Statement, p 10 [74] [CB1, Tab 38, p 10].

<sup>78</sup> ATSB Report, p 3, Figure 2 [CB2, Tab 54, p 10].





159. Analysis of the wreckage from each aircraft indicated that the two aircraft came together at an obtuse relative angle with JQF crossing over the top of the AEM.<sup>79</sup>
160. A diagram of the estimated collision aspect based on ADS-B data and wreckage assessment is set out below.<sup>80</sup>

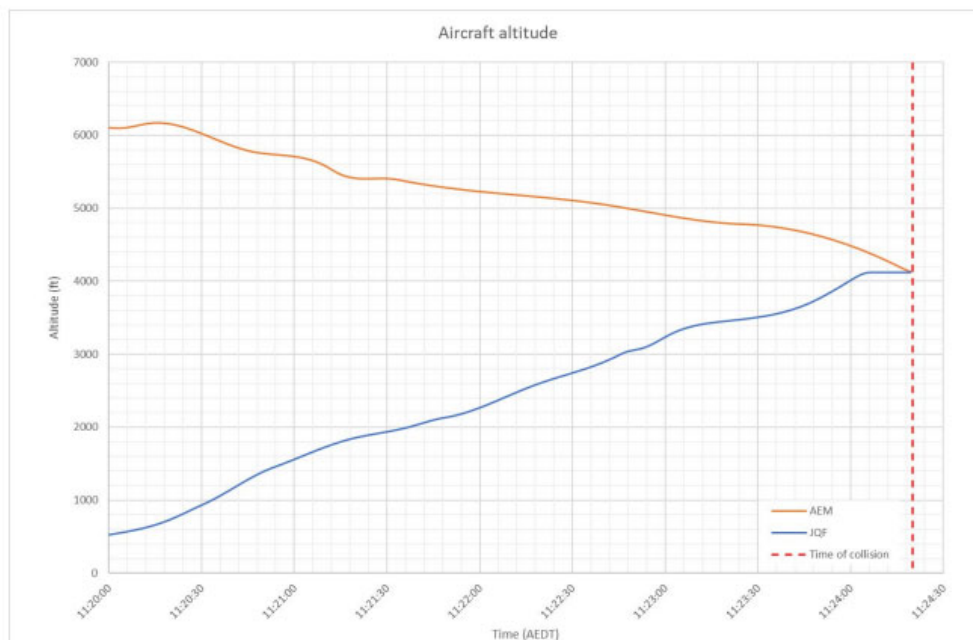


<sup>79</sup> ATSB Report, p 47 [CB2, Tab 54, p 54].

<sup>80</sup> ATSB Report, p 47, Figure 24 [CB2, Tab 54, p 54].

161. The collision occurred about 4 NM (7.5 km) south of Mangalore at around 4,100 ft.<sup>81</sup>

162. Below is a table setting out the vertical profile and timeline for the collision between AEM and JQF:



163. Mr Leslie Claydon and Mr Rodney Mann, who were working at an ammunition depot nearby saw AEM and JQF collide. Both reported hearing a popping sound as the aircraft collided.<sup>82</sup> Mr Claydon saw the impact and Mr Mann observed them in his peripheral vision and then observed them as they came apart.

164. The pilot of a helicopter operating to the south of the collision point, Mr Michael Woodcock, reported seeing AEM descending rapidly, with JQF descending more slowly while spinning.<sup>83</sup> Mr Joshua Hadson, a pilot located on the airfield reported seeing an aircraft spinning toward the ground.<sup>84</sup>

165. At the time of the Accident, the automatic weather station at Mangalore (8 kilometres north of the collision location) recorded two cloud layers, one scattered at 3,467 ft above sea level and a second broken layer at 4,174 ft above sea level.

<sup>81</sup> ATSB Report, p 3 [CB2, Tab 54, p 10].

<sup>82</sup> Statement of Leslie Claydon dated 25 February 2020 [CB1, Tab 36]; Statement of Rodney Mann dated 24 February 2020 [CB1, Tab 34].

<sup>83</sup> Statement of Michael Woodcock dated 25 February 2020 [CB1, Tab 35]; ATSB Report, p 3 [CB2, Tab 54, p 10].

<sup>84</sup> Statement of Joshua Hadson dated 19 February 2020 [CB1, Tab 32].

166. The terms ‘scattered’ indicates the cloud is covering between a quarter and half of the sky and ‘broken’ indicates that more than half to almost all of the sky is covered.<sup>85</sup>
167. Victoria Police Airwing attended Mangalore and provided footage of the conditions (approximately one hour after the collision). Cloud cover can be seen in the airwing footage including the base of a broken layer of cloud at approximately 4,050 ft above sea level with some lower patches of cloud present.<sup>86</sup>
168. Following the collision, JQF travelled for approximately half a kilometre before impacting an open field. The right wing was missing and was later located in a field not too far from the collision location.
169. AEM continued in a northerly direction and impacted a wooded area on a boundary fence of the ammunition depot. The aircraft was destroyed.<sup>87</sup>
170. The two aircraft impacted the ground about 1.3 km apart. Some lighter debris from each aircraft was located at a third location downwind from the collision point. All four pilots were fatally injured in the accident, and both aircraft were destroyed.<sup>88</sup>
171. At 11:25:10 am after communication with another aircraft, Mr Tucker returned to the traffic scenario with AEM and JQF. The data for both aircraft were no longer visible on the screen.<sup>89</sup>
172. At 11:27:44 am, Mr Tucker reported a possible mid-air collision between AEM and JQF. He continued to call both aircraft but neither responded.<sup>90</sup>

#### The aircraft operating under the Instrumental Flight Rules

173. On 19 February 2020, the Bureau of Meteorology (**BoM**) produced a terminal area forecast (**TAF**)<sup>91</sup> for Mangalore Airport and the surrounding area, and a graphical area forecast (**GAF**)<sup>92</sup> for Victoria. The forecast conditions at the time of the accident included scattered cloud at 2,500 ft above mean sea level (**AMSL**) and between 3,500 ft and 6,000

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<sup>85</sup> ATSB Report, p 1, footnote 4 [CB2, Tab 54, p 8, footnote 4].

<sup>86</sup> Airwing footage recordings #1 and #2; Statement of Senior Constable Mikah Heilbronn dated 17 February 2021; ATSB Report, p 39, Figures 18 and 19 [CB2, Tab 54, p 46].

<sup>87</sup> ATSB Report, pp 45–6 (section entitled ‘*Wreckage and impact information*’) [CB2, Tab 54, pp 52–3].

<sup>88</sup> ATSB Report, p 3 [CB2, Tab 54, p 10].

<sup>89</sup> Airservices Report, pp 15, 47 [CB2, Tab 52, pp 15, 47]; Tucker Statement, p 10 [74] [CB1, Tab 38, p 10].

<sup>90</sup> *Ibid.*

<sup>91</sup> CB1, Tab 44.

<sup>92</sup> *Ibid.*

ft AMSL. Visibility was forecast to be greater than 10 km, and the wind from the southwest (230°) at 15 knots at ground level, with gusts up to 25 knots. The grid-point wind and temperature forecast listed the wind at 5,000 ft as from 210° at 32 kt.<sup>93</sup>

174. On the above date, both AEM and JQF were conducting flights under IFR which was recorded in their flight plans that were submitted to Airservices.<sup>94</sup> The weather forecast around Mangalore, indicated that there would be instrument meteorological conditions between 2,500 ft and 6,000 ft requiring flying under IFR.<sup>95</sup>
175. It is generally accepted that given the meteorological conditions on the day of the Accident, there were significant limitations to the ‘see and avoid’ principle of the rules of the air.<sup>96</sup> The ATSB Visibility Study concluded that the cloud cover likely obscured the aircraft up until the collision, or until immediately before the collision, meaning that the pilots had insufficient time to visually acquire the opposing aircraft before the collision.<sup>97</sup> In addition, even in clear conditions, given the closing speed of the aircraft<sup>98</sup> and visual restrictions in the cockpit, it is unlikely that the pilots would have been able to visually locate one another and manoeuvre in sufficient time to avoid a collision.<sup>99</sup>
176. At inquest, Dr Boston gave unchallenged evidence to the effect that visual observation could be ruled out as a means for preventing the accident and that the pilots of AEM and JQF were unlikely to have been able to see and avoid each other even in visual conditions.<sup>100</sup> Dr Boston also confirmed that neither AEM nor JQF took evasive manoeuvres prior to the Accident.<sup>101</sup>
177. Mr Tonkin and Mr White agreed that while the ‘see and avoid’ principle is the fundamental principle for pilots in non-controlled airspace, given the instrument meteorological conditions, it would have been difficult for AEM and JQF to see each other on the day of the accident.<sup>102</sup> Mr Tonkin also indicated that there are fundamental

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<sup>93</sup> Airservices Report, p 20 [CB2, Tab 52, p 20]; ATSB Report, p 37 [CB2, Tab 54, p 44].

<sup>94</sup> CB2, Tab 43.

<sup>95</sup> CB 1, Tab 44; CB2, Tab 54, p 44; T 399 lines 1–2.

<sup>96</sup> CB2, Tab 54, p 56.

<sup>97</sup> CB2, Tab 58, p 142.

<sup>98</sup> CB2, Tab 54, p 50; Tab 58, p 62.

<sup>99</sup> CB 2, Tab 58, p 142.

<sup>100</sup> T 331 line 31 – T 332 line 1.

<sup>101</sup> T 330 lines 11–16 and line 30.

<sup>102</sup> T 399 lines 13–25.

limitations on the ‘see and avoid’ principle regardless of cloud which make it difficult to see surrounding air traffic.

178. Mr Tonkin also gave evidence to the effect that if aircraft are faced with the same flying conditions as the pilots of AEM and JQF on the day of the Accident, aircraft would self-separate through being aware of the other aircraft, through the systems available to the pilots and where possible, arranging with those other aircraft to fly and maintain separation.<sup>103</sup>

179. Mr Tonkin further stated that the modes of ensuring self-separation are time and space, allowing the two aircraft to self-separate vertically or laterally to a safe extent.<sup>104</sup> According to Mr Tonkin, this does not necessarily require two aircraft to communicate with each other noting that:

*‘...if both aircraft are aware of their location and the...other aircraft’s trajectory...[then] one of the aircraft in absence of communication with the other can on their own operate their aircraft either in time or space to avoid the other one.’<sup>105</sup>*

180. In written submissions, Counsel Assisting submitted that there were significant limitations on the ‘see and avoid principle’ on the day of the Accident and that self-separation would have needed to occur without relying on visual reference of the aircraft. Counsel Assisting therefore submitted that:

*‘...it is considered unlikely, given the instrument meteorology conditions and the disclosed IFR flights that the pilots of JQF and AEM would have assumed that they would be able to rely, to any material extent, on ‘see and avoid’ as a means to self-separate.’<sup>106</sup>*

181. Airservices submitted that AEM and JQF operating under IFR was not *per se* a circumstance which led to the Accident. Airservices noted that the instrument meteorological conditions diminished any reliance of the ‘see and avoid’ principle for the pilots of AEM and JQF. As a result, greater reliance would have been needed on:

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<sup>103</sup> T 400.

<sup>104</sup> Ibid.

<sup>105</sup> Ibid.

<sup>106</sup> Counsel Assisting submissions p 4.

- communications between AEM and JQF;
  - the aircraft obtaining as much situational awareness as could be gathered from the CTAF communications; and
  - agreed deconfliction actions between AEM and JQF to ensure self-separation.
182. Airservices also submitted that it is important to emphasise that meteorological conditions (instrumental or visual) do not change the type of service by an ATC in uncontrolled airspace.<sup>107</sup>
183. Mr Tucker’s representatives agreed that on the day of the Accident the instrument meteorology conditions would have meant that the pilots of AEM and JQF would have assumed that the ‘see and avoid’ principle could not be relied upon. However, they also submitted that this reinforces the primary obligation of self-separation in uncontrolled airspace and the need for IFR aircraft to communicate on the CTAF.<sup>108</sup>
184. The representatives for the Sutcliffe and Segev families agreed that given the unchallenged evidence of Dr Boston, that visual observation can be ruled out as a way to preventing the Accident, the only possible ways of preventing a collision were therefore the pilots’ situational awareness, i.e. their ability to identify each other’s predicted path through three-dimensional space with no visual cues, or intervention by ATC.<sup>109</sup> Similarly, PAC submitted that the ‘see and avoid’ principle was not an option available to the crews of AEM and JQF.
185. Having considered all of the available evidence on this issue and the written submissions of the interested parties, I have come to the following conclusions:
- a) given the meteorological conditions on the day of the Accident, there were significant limitations on the ‘see and avoid’ principle;
  - b) it is unlikely that the pilots would have relied upon the ‘see and avoid’ principle as a means to self-separate;
  - c) even in clear conditions, given the closing speed of the aircraft and the visual restrictions in the cockpit, it is highly unlikely that the pilots would have been

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<sup>107</sup> T 441 lines 3–9.

<sup>108</sup> Tucker closing submissions p 2.

<sup>109</sup> Written submission of Segev and Sutcliffe p 3; CB2, Tab 54, p 8.

able to visually locate one another and manoeuvre in sufficient time to avoid the collision; and

d) this is not a circumstance that caused or contributed to the Accident.

**Finding 1:**

**Given the meteorological conditions on the day of the Accident, there were significant limitations on the ‘see and avoid’ principle and it is unlikely that the pilots would have relied upon the ‘see and avoid’ principle as a means to self-separate.**

**Even in clear conditions, given the closing speed of the aircraft and the visual restrictions in the cockpit, it is highly unlikely that the pilots would have been able to visually locate one another and manoeuvre in sufficient time to avoid the collision and therefore, this is not a circumstance that caused or contributed to the Accident.**

The combined sectors of controlled and uncontrolled airspace on 19 February 2020 and the roles and responsibilities of the air traffic controller

186. On the day of the Accident, Mr Tucker was the ATC who was overseeing the controlled airspace over Mangalore and providing a flight information service for Class G airspace. At the time of the Accident, Mr Tucker was exercising his Ovens endorsement within the Alpine Group.
187. The issues of the combined sectors of controlled and uncontrolled airspace, and whether Mr Tucker’s workload was manageable on the day of the Accident were considered at inquest.
188. In the preliminary observations provided by Mr Tonkin and Mr White, a general comment was made about the operating arrangements for ATCs where a combination of sectors of airspace and the provision of service by ATCs to aircraft in sectors that also have controlled and uncontrolled airspace occurs.<sup>110</sup>
189. This comment was addressed by Mr Hine in his evidence. In his statement dated 19 February 2024, Mr Hine stated that ATCs are trained to provide air traffic control services in combined sectors of airspace and combined classes of airspace and ‘*have done*

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<sup>110</sup> CB2, Tab 61, section 1.6.

*it for a very long time and do it daily every time they are plugged into a console'*<sup>111</sup>. He also considered that Mr Tucker's workload on the day of the Accident was manageable and appropriate. At inquest, Mr Hine told the court that the traffic and workload were light, such that it could not be said that Mr Tucker was overloaded.<sup>112</sup>

190. In his viva voce evidence, Mr White agreed that it was appropriate for Mr Tucker to have been overseeing the sectors of airspace for which he was responsible on the day of the Accident. Mr White did not consider that it was an issue that should be considered as having caused or contributed to the Accident.<sup>113</sup>
191. In written submissions, Counsel Assisting submitted that this issue was not a contributing factor to the Accident. Airservices submitted that I should find that the fact Mr Tucker was providing air traffic control services to combined sectors that had different classes of airspace within each sector did not have any role in the incident.
192. Having considered the available evidence, including the expert evidence on this issue, I am satisfied that Mr Tucker's workload was manageable and appropriate on the date of Accident and that this issue was not a contributing factor to the Accident.

**Finding 2:**

**Mr Tucker's workload was manageable and appropriate on the day of the Accident, and this was not a contributing factor to the accident.**

**The fact Mr Tucker was providing air traffic control services to combined sectors that had different classes of airspace within each sector was not a contributing factor to the Accident.**

The content of the air traffic information provided by the air traffic controller to the Aircraft

193. As discussed earlier in this finding, on the day of the Accident, AEM and JQF were flying in and around Class G airspace. Mr Tucker was providing a 'flight information service'

<sup>111</sup> CB1, Tab 41, pp 6–7 [22].

<sup>112</sup> T 273 lines 15–16; T 274 lines 2–3.

<sup>113</sup> T 401–2.



to the Aircraft which included the provision of air traffic information to assist pilots comply with the rules of the air and maintain separation.<sup>114</sup>

194. As part of the ‘flight information service’ in the Class G airspace around Mangalore by Mr Tucker he provided air traffic information to assist pilots comply with the rules of the air and maintain separation.<sup>115</sup> This included two calls to AEM and JQF (respectively) on the day of the Accident:

- a) a call to AEM at 0020:19 advising them of JQF (**0020:19 Call**); and
- b) a call to JQF at 0022:44 advising them of AEM (**0022:44 Call**).

195. The appropriateness and content of these calls was considered at inquest as well as an additional issue in relation to whether Mr Tucker should have passed further traffic information about AEM to JQF after the 0020:19 Call. I will deal with each of these issues in turn.

#### 0020:19 Call

196. At 0020:19, Mr Tucker provided the following traffic information to AEM about JQF:<sup>116</sup>

*‘Alpha Echo Mike, shortly to depart Mangalore southbound or, ah, via LACEY is Juliet Quebec Foxtrot, the Seminole. They’ll be on a climb to 7,000.’*

197. The 0020:19 Call was made shortly after AEM had informed Mr Tucker that they were descending from 6,000 ft to below 4,000 ft for airwork.<sup>117</sup> The 0020:19 Call was acknowledged by AEM.<sup>118</sup>

198. Mr Tonkin and Mr White considered that the 0020:19 Call contained sufficient information for AEM to understand that JQF would be crossing their track.<sup>119</sup> In his statement to the Court, Mr Hine agreed with this proposition.<sup>120</sup>

199. At inquest, Mr Tonkin explained to the Court that the upon receiving the 0020:19 Call from Mr Tucker, that if he would have wanted to know which runway JQF was departing

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<sup>114</sup> Exhibit 1: Agreed Facts [79]–[80].

<sup>115</sup> Ibid.

<sup>116</sup> Exhibit 2: Air Traffic Control Transcript p 1 lines 18–20.

<sup>117</sup> Exhibit 2: Air Traffic Control Transcript p 1 lines 9–10.

<sup>118</sup> Exhibit 2: Air Traffic Control Transcript p 1 line 21.

<sup>119</sup> CB2, Tab 61, p 4.

<sup>120</sup> CB1, Tab 41, p 75.

from and their departure time he could have requested this information. He also explained that the pilots in AEM did not seek to obtain that information from Mr Tucker or make a call directly to JQF, but that it could have also been obtained from listening to the CTAF.

200. In written submissions, Counsel Assisting submitted that no criticism of the 0020:19 Call can reasonably be made. Airservices supported the submission of Counsel Assisting and considered that the 0020:19 Call contained sufficient information. Mr Tucker's representatives submitted that the first call to AEM was appropriate and also acknowledged by AEM.<sup>121</sup>
201. PAC submitted that it cannot be assumed that AEM heard Mr Tucker's communications with JQF after its departure. PAC also submitted that had the 0022:19 Call been heard by the crew of AEM, upon either interpretation, there was then no urgent need to arrange separation from JQF.<sup>122</sup>
202. Having considered the available evidence on this issue, I accept the submissions of Counsel Assisting and the interested parties. I find that the content of 00:20:19 Call was appropriate in the circumstances and contained sufficient information.

**Finding 3:**

**The content of 00:20:19 Call to AEM was appropriate in the circumstances and contained sufficient information.**

0022:44 Call

203. At 0022:44, Mr Tucker made a call to JQF to provide traffic information about AEM, as follows:<sup>123</sup>

*'And Juliet Quebec Foxtrot, traffic six miles in your twelve o'clock is Alpha Echo Mike, a King Air. They're ah inbound to Mangalore for airwork, passing 5000 on descent to not above 4000.'*

204. This was the first time that Mr Tucker had provided flight information to JQF about AEM. However, AEM had been aware of JQF since the 0020:19 Call.

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<sup>121</sup> Tucker closing submissions p 2.

<sup>122</sup> PAC written submissions p 4.

<sup>123</sup> Exhibit 2: Air Traffic Control Transcript p 1 line 31 – p 2 line 3.

205. For the sake of completeness, I acknowledge that in the 0022:44 Call, Mr Tucker referred to AEM as a King Air, not a Travel Air. Mr Tonkin's evidence on this point was that this was not a material error by Mr Tucker that would have affected the assessment by JQF about AEM's location.<sup>124</sup>

206. In the preliminary observations of the court appointed experts, Mr White was critical of the 0022:44 Call and stated that:

*'This abbreviated traffic statement does not contain sufficient information for the pilot of JQF to determine where AEM was coming from, what they were planning to do and whether an actual conflict was occurring.*

*"traffic six miles in your twelve o'clock" was likely provided given the indications of the velocity vectors and the possibility that JQF could turn in front of AEM.*

*The full traffic statement to JQF should have been:*

*"JQF traffic is AEM, Travel Air inbound to Mangalore from the south ETA 1126, on descent from 6000".'*

207. In his evidence at inquest, Mr White stated that he was not absolutely critical of the 0022:44 Call, but that there could have been more information provided.<sup>125</sup> The call that Mr White proffered was '*JQF traffic is AEM travel air inbound to Mangalore from the south. ETA 11.26, on descent from 6,000*'. Mr White also stated that with the benefit of hindsight, that when AEM and JQF received the traffic information, they did not understand the criticality of the situation.<sup>126</sup>

208. Mr Tonkin did not consider that the 0022:44 Call would have created any ambiguity in JQF's understanding of the need to self-separate from AEM. He considered that the 0022:44 Call was sufficient to alert JQF that there was urgency in de-conflicting itself from AEM and the pilot in JQF would have understood that they had one to one-and-a-half minutes to self-separate.<sup>127</sup> Mr Tonkin did not consider that if he had received the

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<sup>124</sup> T 414 lines 16–19. See also CB2, Tab 54, p 40.

<sup>125</sup> T 415 lines 10–11.

<sup>126</sup> T 415 lines 28–31.

<sup>127</sup> T 415 line 25.

call proffered by Mr White that it would have made a material difference to the analysis of JQF.<sup>128</sup>

209. In addition, it was Mr Hine's evidence that the 0022:44 Call was compliant with the applicable rules.<sup>129</sup>
210. In written submissions, Counsel Assisting submitted that while there were alternative ways of expressing the 0022:44 Call, that it cannot be said in any way that the information provided by Mr Tucker was ambiguous regarding the orientation of the AEM and JQF. Airservices supported the submission of Counsel Assisting that the 0022:44 Call was not ambiguous about the orientation of the aircraft to each other.
211. Counsel Assisting further submitted that upon receipt of the information from Mr Tucker, JQF ought to have taken steps to self-separate and as such, there should be no criticism of the 0022:44 Call. Airservices submitted that there is no basis to find that the content of the traffic information provided to AEM and JQF in the 0020:44 Call was a circumstance which led to the Accident. Mr Tucker's representatives submitted that the provision of traffic information to JQF was appropriate and acknowledged by JQF.<sup>130</sup>
212. Having considered all of the evidence on this issue and the submissions of Counsel Assisting and the interested parties, I accept the evidence of Mr Tonkin that the 0022:44 Call was sufficient to alert JQF that there was urgency in de-conflicting itself from AEM and the pilot in JQF would have understood the need to self-separate.<sup>131</sup> In this regard, I do not make any criticism of the 0022:44 Call and do not consider that it was a circumstance that led to the Accident.

**Finding 4:**

**The provision of information provided by Mr Tucker to JQF in the 0022:44 Call was appropriate, and I do not consider that the 0022:44 Call was a causal or contributing factor to the Accident.**

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<sup>128</sup> T 415 lines 16–21.

<sup>129</sup> CB1, Tab 41, p 20 [92].

<sup>130</sup> Tucker closing submissions p 2.

<sup>131</sup> T 415 lines 5–21.

Should additional traffic information have been provided after the 0020:19 Call?

213. Following the 0020:19 Call, there was a STCA in respect of JQF and another aircraft around Mangalore.
214. A further issue considered at inquest was whether Mr Tucker should have passed additional traffic information to JQF about AEM after the 0020:31 STCA was resolved.
215. In his statement to the Court, Mr Hine stated that once the 0020:31 STCA had been resolved that traffic information should have been passed to JQF about AEM.<sup>132</sup>
216. Mr Hine stated that there were three options available to Mr Tucker:<sup>133</sup>
- a) immediately pass traffic to JQF, or
  - b) await JQF to make its departure call and then pass traffic to JQF about AEM, or
  - c) to call AEM and ask AEM to confirm when they are in two-way communication with JQF.
217. In relation to point a) above, Mr Hine said that he would discount that option because JQF was in its initial climb phase which is a critical phase of flight and that he would not interrupt an aircraft in this situation unless it was safety critical. Mr Hine did not consider it to be necessary for an ATC to interrupt JQF to pass traffic information.
218. At inquest, Mr Tonkin agreed with Mr Hine's assessment and the proposition that it would distract the pilot.<sup>134</sup> Mr White also agreed with Mr Hine's assessment from the perspective of an ATC.<sup>135</sup>
219. In relation to point b) above, Mr Hine stated that given the aircraft disposition at this point in time, he considered the second option to be the most appropriate in the circumstances. This option would have only required a single radio call to JFQ. This is the option that Mr Tucker chose, and Mr Hine stated that this is the option he would have chosen if he had been the ATC '*plugged in at the time*'.<sup>136</sup>
220. At inquest, Mr White agreed that from the perspective of an ATC, given it is not appropriate to communicate with an aircraft during the critical phase of flight during the

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<sup>132</sup> CB1, Tab 41, p 18 [81].

<sup>133</sup> CB1, Tab 41, p 18 [82]–[83].

<sup>134</sup> T 406 lines 4–7.

<sup>135</sup> T 406 line 11.

<sup>136</sup> CB1, Tab 41, pp 18–19 [83].

initial climb, another option is to await the departure call from JQF before passing on that traffic information.<sup>137</sup>

221. In relation to point c) above, this option would have required a call from Mr Tucker to AEM requesting that confirmation be provided when they are in radio contact with JQF *and* then a call to JQF advising them of AEM once Mr Tucker had received JQF's departure call. Mr Hine stated that this option is not commonly used but agreed in viva voce evidence that this was a valid option that Mr Tucker, exercising his best judgement, could have taken.
222. At inquest, Mr Tonkin gave evidence to the effect that he could not recall receiving a call such as the one proposed in option three. Mr White did agree with option two being preferred over option three.
223. In written submissions, Counsel Assisting submitted that Mr Tucker should not have made an additional call to AEM on the basis that AEM and JQF were flying in Class G airspace, and they were required to organise self-separation. Given that the 0020:19 Call was appropriate and provided sufficient information to AEM about JQF, it should have been apparent to AEM that JQF was an aircraft that it could come into potential conflict with.
224. Mr Tucker's representatives submitted that the CTAF is a critical component in the system, and it is the frequency that allows aircraft in the immediate area to communicate freely with each other and that it is the obligation of a pilot to ensure that communication is transmitted on the CTAF. Mr Tucker's representatives further submitted that it is not the obligation of an ATC (nor should it be) to ensure that each pilot does what is required of them in uncontrolled airspace. In this regard, Mr Tucker's representatives agreed with the submission of Counsel Assisting and submitted that a further call to AEM by Mr Tucker was neither required nor warranted.
225. Airservices agreed with Counsel Assisting's submissions that there is no basis to find that the disposition of AEM and JQF or the circumstances were such as to have required Mr Tucker to have made an additional call to AEM.

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<sup>137</sup> T 407 lines 5–8.

226. Having considered the available evidence on this point, I accept the evidence of Mr Hine and Mr Tonkin that an additional call from Mr Tucker to AEM was not required nor warranted once the 0020:31 STCA had resolved.

**Finding 5:**

**Mr Tucker having made the 0022:44 Call to JQF, I am satisfied that no further call to AEM was required nor warranted.**

227. I note that Mr Gobel in his submissions states that *'there was only one appropriate time for issuing of traffic on AEM to JQF and that was at the point of their Taxi report prior to their departure'*.<sup>138</sup> This issue was not addressed in evidence at inquest or in submissions from other parties or Counsel Assisting so I make no other comment about it other than to note that this is an alternate view expressed by the Gobel Family.

The apparent absence of communication, between the crews of the Aircraft after the air traffic information was provided

228. A further issue considered at inquest was the absence of communication, between the crews of AEM and JQF after the air traffic information was provided. Following on from this, I also heard evidence on whether Mr Tucker should have confirmed that AEM had switched to the CTAF on the approach to Mangalore. I will deal with each of these issues in turn.

Communication between AEM and JQF

229. At the time of the Accident, radio transmissions on the Mangalore CTAF were not recorded, nor were they required to be. While there is evidence before the Court that AEM and JQF had communicated on the CTAF, there is no evidence that the pilots of AEM or JQF spoke to directly to each other on the CTAF to arrange self-separation prior to the Accident.<sup>139</sup>

230. It is also generally accepted that neither AEM nor JQF took evasive manoeuvres at any time before the Accident and that the pilots of the aircraft were generally experienced

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<sup>138</sup> Submissions of Gobel Family.

<sup>139</sup> CB2, Tab 54, p 35.

and careful navigators. I also consider it highly unlikely that the pilots would have been likely to disregard a known separation issue.

231. The ATSB report states there is no evidence to suggest that AEM or JQF had selected the incorrect radio frequency. While the radios in AEM were too badly damaged to be analysed, other evidence obtained by the ATSB (including notes from the cockpit and witness statements) indicated that it was likely that AEM had broadcast on the correct CTAF frequency. In addition, the two radios in JQF were recovered and analysed by the ATSB and showed that one radio was set to the Melbourne Centre frequency and the other to the Mangalore CTAF. The audio panel configuration was found in a position consistent with the pilots of JQF either broadcasting or intending to broadcast on the CTAF.<sup>140</sup>

232. In the preliminary observations of the court appointed experts, Mr Tonkin stated that it was inexplicable why the pilots of AEM and JQF did not arrange separation once they became aware of each other.<sup>141</sup> Mr Tonkin also stated that:

*‘...notwithstanding an expectation of ATC oversight regarding collision avoidance, when operating under the IFR in Class G airspace, it is still the pilot’s primary obligation to ensure separation from other aircraft.’*

233. At inquest, Mr Tonkin gave evidence to the effect that when aircraft are operating under the IFR, particularly in non-controlled airspace, where the pilot has a lot more responsibility for that separation, *‘the main way to understand the traffic disposition is to listen’*.<sup>142</sup> Mr Tonkin also commented there is no hard and fast rule about when aircraft would start listening to the CTAF, but indicated that early and conscientious listening to the CTAF at least by 30 nautical miles inbound to an uncontrolled aerodrome would be appropriate.<sup>143</sup>

234. Mr Tonkin also considered that it was significant that there was no communication between JQF and AEM after the 0022:44 Call. Mr Tonkin noted that he would have expected there to be evidence that JQF had contacted AEM to communicate that they were manoeuvring to arrange self-separation.<sup>144</sup> Mr Tonkin stated that upon receipt of

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<sup>140</sup> CB2, Tab 54, p 36.

<sup>141</sup> CB2, Tab 61, p 19

<sup>142</sup> T 451–2.

<sup>143</sup> T 445.

<sup>144</sup> T 418 line 24 – T 419 line 3.



the 0020:19 Call he would have expected that AEM would have contacted JQF on the CTAF. However, he also considered that it was open to AEM to listen to the CTAF to hear the calls made by JQF such that they may have been able to self-separate without necessarily communicating directly with one another.<sup>145</sup>

235. In written submissions, Counsel Assisting stated that the obvious conclusion to be drawn from the absence of evidence of communication between JQF and AEM was that they did not consider there to be a potential conflict. Counsel Assisting also noted that if the 0022:44 Call caused any confusion that this would be understandable, however, there is no evidence that this was the case. Airservices submitted that on the evidence as it stands:

*‘...there is no explanation as to why both aircraft did not perceive a conflict and initiate deconfliction arrangement.’<sup>146</sup>*

236. Counsel Assisting further submitted that with the greatest respect to the deceased, the pilots’ failure to communicate with one another is a significant, if not material, factor that led to the Accident and if JQF and AEM had been in contact with one another, that it would have become apparent that self-separation was required, and certainly by the 0022:44 Call that it was urgent and critical.

237. Airservices agreed with Counsel Assisting’s submissions noting that ruling out the air traffic information as a circumstance which led to the Accident, unfortunately focuses attention on the actions or inactions of the pilots as an explanation for the Accident. Similarly, Mr Tucker’s representatives, also with respect to the deceased, agreed with the submissions of Counsel Assisting.

238. PAC submitted that the Court cannot find with any certainty that communication to arrange separation did not occur and that there is no justification whatsoever for the submission of Counsel Assisting.

239. The representatives for the Sutcliffe and Segev families submitted that given the evidence before the Court, the inescapable conclusion is that neither AEM nor JQF were aware of each other and that they were likely unaware of such a risk given that:

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<sup>145</sup> T 403 lines 7–20.

<sup>146</sup> Airservices Submissions p 4 [16].

- a) it is possible that JQF's departure call to Melbourne Centre overlapped with AEM's inbound call on the CTAF<sup>147</sup>;
- b) the exchange from the time of JQF's departure call until Mr Tucker passed traffic information to JQF about AEM, lasted around thirty seconds. If AEM's pilots missed some of this, they may have lacked critical information about JQF. Similarly, if they missed all of the exchange, they may not have known JQF was airborne; and
- c) calls to one aircraft may not be heard by pilots listening for their callsign<sup>148</sup> and the calls might not be heard or correctly understood while monitoring two radios during high workload.<sup>149</sup>

240. The Gobel Family in their written submissions suggest that *'just because such transmissions went unheard or weren't recalled by pilots or other aircraft on the CTAF does not necessarily indicate that they did not occur'*.<sup>150</sup>

241. My conclusions with respect to this issue are detailed below.

*AEM switching to the CTAF*

242. As noted above, at inquest, I heard evidence on whether Mr Tucker should have confirmed that AEM had switched to the CTAF. In his statement dated 2 July 2020, Mr Tucker stated that inbound aircraft *sometimes* report switching to the CTAF when they are within 10NM of Mangalore. However, sometimes they do not. Nonetheless, Mr Tucker had assumed that AEM and JQF were communicating with each other on the CTAF after receiving the flight information to avoid conflict.<sup>151</sup>

243. Mr Hine's evidence at inquest was to the effect that there are busy periods for ATCs where they required *'all the air time they can get'* and that by making an additional call to request confirmation that an aircraft has switched to the CTAF would take up time and be a burden for ATCs, particularly if they are required to follow up with pilots if they have not already alerted the ATC that they have switched or are monitoring the CTAF.<sup>152</sup>

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<sup>147</sup> See CB2, Tab 54, pp 39, 61.

<sup>148</sup> T 94 lines 21–5.

<sup>149</sup> CB2, Tab 54, p 62; CB1, Tab 42, p 60.

<sup>150</sup> Written Submissions of Gobel Family.

<sup>151</sup> CB1, Tab 38, pp 5–6 [53].

<sup>152</sup> T 188 lines 9–12.

244. Mr White and Mr Tonkin also respectively addressed this issue in their viva voce evidence. Mr White confirmed that an ATC would not need to confirm that aircraft were in two-way communication on the CTAF.<sup>153</sup> Mr Tonkin furthered this opinion and agreed that an ATC would have a reasonable expectation to rely on the fact that aircraft are talking to each other to arrange their self-separation.<sup>154</sup>
245. In written submissions, Counsel Assisting submitted that:
- a) given that both AEM and JQF appeared to have been monitoring the CTAF, a call from Mr Tucker to confirm that they were would have served no purpose;
  - b) Mr Tucker was entitled to assume that AEM would switch to the CTAF as they were required to do so within 10NM of the Mangalore Aerodrome, or that both AEM and JQF were monitoring both the CTAF and the Melbourne Centre;
  - c) it cannot be said that the absence of a call to AEM to confirm that it had switched or was monitoring the CTAF was a contributing factor to the Accident.
246. Airservices submitted that while an ATC (such as Mr Tucker) will not hear or know about information transmitted on CTAF, it does not diminish an ATC's expectation that the aircraft are in communication with each other for their own situational awareness.<sup>155</sup> Airservices further submitted that the use of the CTAF by pilots and the expectation of an ATC the CTAF will be used and monitor by aircraft is '*integral to safe airspace in or about uncontrolled aerodromes*'.
247. Mr Tucker's representatives submitted that it was not unreasonable for Mr Tucker to assume that AEM and JQF were self-separating and that expectation that the aircraft were fulfilling the obligations which were imposed upon them was fairly made.
248. Counsel Assisting also submitted that it should not be the practice, in general, that ATCs request confirmation from aircraft that they have switched to or are monitoring the CTAF. This submission was agreed to by Airservices.
249. Having considered all of evidence on this issue and the written submissions of the interested parties, I accept that it is possible that JQF's departure call to Melbourne

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<sup>153</sup> T 449 lines 7–12.

<sup>154</sup> T 449 lines 13–18

<sup>155</sup> Airservices Written Submissions p 3.

Centre overlapped with AEM's inbound call on the CTAF, but that it was reasonable for Mr Tucker to assume that AEM and JQF were self-separating.

250. I also find that:

- a) having considered the available evidence and the written submissions of the interested parties and family members, and with the greatest respect to the deceased, I cannot avoid the conclusion that the absence of or lack of effective communication between the pilots in AEM and JQF on the CTAF is a material factor that contributed to the Accident.
- b) it cannot be said that the absence of a call from Mr Tucker to AEM to confirm that the aircraft had switched or was monitoring the CTAF was a contributing factor to the Accident.

**Finding 6:**

**I find that:**

- a) **The absence of communication or lack of effective communication, between the pilots in AEM and JQF on the CTAF after the traffic information was provided by Mr Tucker is a material factor that contributed to the Accident.**
- b) **Mr Tucker was entitled to assume that AEM and JFQ were self-separating and it cannot be concluded that the absence of a call from Mr Tucker to AEM to confirm that the aircraft had switched or was monitoring the CTAF was a contributing factor to the Accident.**

A safety alert not being issued to the Aircraft after the short-term conflict alerts were activated

251. The further issue considered at inquest was whether Mr Tucker should have issued a safety alert after the activation of the STCA at 0020:21 and 0022:49 (respectively). My findings, comments and conclusions that I have reached in relation to this point and associated issues are set out in further detail below.

Relevant guidelines

252. The National ATS procedures manual (**NAPM**) sets out the prioritisation of alerts for Air Traffic Control and identifies the STCA as one of the highest priority alerts, indicating a system detected safety net critical event, requiring immediate attention.<sup>156</sup>

253. The response procedure for a controller receiving a STCA was:

14.1.3.1 Alert integrity

On receipt of a STCA:

1. Assess its integrity; and
2. Issue a ‘Safety Alert’ or ‘Avoiding Action’ advice when appropriate.

254. The process for ‘assessing integrity’ of a STCA is not defined in the NAPM or elsewhere.<sup>157</sup>

255. The relevant information for controllers in the NAPM regarding safety alerts is:<sup>158</sup>

9.1.4.1 Vigilance

Remain vigilant for the development of safety alert or traffic avoidance advice situations.

9.1.4.2 Responsibility

Do not assume that because another controller has responsibility for an aircraft that an unsafe situation has been observed and a safety alert or traffic avoidance advice has been issued.

9.1.4.3 Issuing a safety alert

Unless the pilot has advised that action is being taken to resolve the situation or that the other aircraft is in sight, issue a safety alert prefixed by the phrase ‘SAFETY ALERT’ when you become aware that an aircraft is in a situation that places it in unsafe proximity to:

- a. Terrain;

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<sup>156</sup> ATSB Report, p 24 [CB2, Tab 54, p 31].

<sup>157</sup> Ibid.

<sup>158</sup> Ibid.

- b. Obstruction;
- c. Active restricted or prohibited areas; or
- d. Other aircraft

#### 9.1.4.3.1 Airspace classes – safety alerts

You may issue safety alerts, including those based on visual observation, in all classes of airspace both within and outside ATS surveillance system coverage.

#### STCA between JQF and VFR aircraft

256. At 0020:21, a STCA activated between JQF and another aircraft around Mangalore. This occurred just after JQF had taken off from Mangalore and Mr Tucker had provided traffic information to AEM. A safety alert was not issued by Mr Tucker in respect of that STCA. This issue was not considered in any detail at inquest.
257. It was submitted by Counsel Assisting that a safety alert was not required to be issued in respect of that STCA and that it was not a contributing or causal factor to the Accident. I accept the submissions of Counsel Assisting.

#### STCA between AEM and JQF

258. At 0022:49, a STCA activated between AEM and JQF. From a review of the recorded playback of Mr Tucker's Display (**Console Playback**), STCA occurred while Mr Tucker was passing traffic information to JQF about AEM at 0022:44 Call. During that period of time, JQF continued to turn left while climbing and AEM continued to descend.
259. At inquest, after reviewing the Console Playback, Mr Tucker told the Court that this was not how he remembered the sequence. The evidence suggests that this inconsistency was likely due to the Console Playback not being a perfect recreation of the sequence that would have been shown to Mr Tucker on the Display as the audio heard in the Console Playback being recorded separately and overlaid. While I accept that the Console Playback may not be a perfect recreation of the Mr Tucker's Display, I am satisfied that the 0022:49 STCA did occur around the time that Mr Tucker made the 0022:44 Call to JQF.
260. Immediately prior to the 0022:44 Call by Mr Tucker, JQF made a departure call from Mangalore. The content of the JQF departure call became a significant consideration in the discussion about the decision by Mr Tucker not to issue a safety alert to AEM and

JQF after the 0022:49 STCA as it indicated that JQF had taken off to the south-west on runway 23 at Mangalore and in the departure call, the pilot of JQF states that the aircraft was ‘tracking to Lacey’.

261. The rule AIP ENR 1.1 paragraph 10.6.4 states that:

*‘If the pilot transmits the departure report before intercepting the departure track the report must include advice that the aircraft is manoeuvring to intercept the departure track.’*

262. Given the operation of the above rule, Mr Hine’s evidence was that departure call made by JQF communicated that the aircraft was, at that point in time, on the track to Lacey and not tracking to intercept the track to Lacey.<sup>159</sup> In effect, this means that JQF would be flying directly to Lacey from the point of the departure call rather than on the IFR airway. This is shown by Figure 8 in the ATSB report which includes a blue line indicative of JQF flying directly to Lacey and the yellow line being the IFR airway.<sup>160</sup>

263. At inquest, Mr Tucker’s evidence was that he did not make an assumption as to the track of JQF after receiving the departure call.<sup>161</sup> However, it was normal for aircraft to take off in a south-westerly direction at Mangalore and turn left<sup>162</sup> and that he expected that JQF would turn at some point.<sup>163</sup>

264. Mr Hine gave evidence to the effect that JQF were communicating that they were not on the IFR departure track to Lacey but, from their current position, that JQF would have been tracking in a straight line to Lacey.<sup>164</sup>

265. Mr Tonkin’s opinion was that that if an aircraft is not on track, then the departure call should state that aircraft is tracking to intercept. Mr Tonkin stated that if an aircraft are *‘on track, then on the face of it, they should be on track between Mangalore and Lacey’* and that if he was listening to the departure call from JQF he would have expected that JQF was on track rather than manoeuvring to intercept it.<sup>165</sup> Mr White agreed that JQF’s

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<sup>159</sup> CB1, Tab 41, p 19 [86]; T 195 line 8 – T 196 line 8.

<sup>160</sup> CB2, Tab 54, p 21.

<sup>161</sup> T 45 line 27 – T 48 line 10.

<sup>162</sup> T 43 lines 23–7.

<sup>163</sup> T 45 lines 27–9.

<sup>164</sup> Counsel Assisting Submissions, footnote 59.

<sup>165</sup> T 411.

departure call was incorrect and noted that the departure call should have specified that JQF was either ‘*tracking direct to*’ or ‘*tracking to intercept*’.<sup>166</sup>

266. Further, it is generally accepted that AEM and JQF were undertaking IFR flights on the day of the Accident and in turn were following the IFR rules of the air which require an aircraft to be established on the IFR track to the next waypoint by 5NM from the airfield.
267. In his statement dated 7 July 2020, Mr Tucker stated that to the best of his recollection the velocity vectors for AEM and JQF indicated that they were going to pass (i.e. that there was sufficient separation between AEM and JQF) and that it was not appropriate to issue a safety alert.<sup>167</sup> At inquest, Mr Tucker accepted that putting aside the altitude of the aircraft that laterally the tracks of AEM and JQF were likely to cross at some point in time.<sup>168</sup>
268. Mr Hine’s assessment was that it was reasonable for an ATC to infer that at this point in time that AEM and JQF were not in unsafe proximity and no safety alert was required to be transmitted.<sup>169</sup> Mr Hine noted that:

*‘An ATC would also reasonably expect that JQF and AEM would pass in proximity to each other. This does not necessarily indicate unsafe proximity...’*<sup>170</sup>

269. However, Mr Hine also stated that despite his expectation as to JQF’s direct track to LACEY, that AEM and JQF were displayed as crossing laterally, by around a minute before they did.<sup>171</sup>
270. In relation to the altitude of the aircraft, the evidence shows that JQF was climbing to 7000 ft and AEM was descending to not below 4000 ft which meant that it was likely that the altitudes of the two aircraft were to cross at some point in time. At the time of the STCA between AEM and JQF, Mr Tucker had interacted with the aircraft around 15 seconds earlier and they appeared to be in level or close to level flight and there was more

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<sup>166</sup> Ibid.

<sup>167</sup> CB1, Tab 38, pp 7–8 [64]–[65].

<sup>168</sup> T 85 lines 29–31.

<sup>169</sup> CB1, Tab 41, p 21 [94].

<sup>170</sup> CB1, Tab 41, p 21 [95].

<sup>171</sup> T 240 line 25.



than 1300 ft vertical displacement between them at the time that he last observed and interacted with the aircraft.<sup>172</sup>

271. Figure 12 of the ATSB report suggests that AEM had maintained approximately 4,800 ft between 0023:16 and 0023:46, and JQF were at approximately 3,400 ft from 0023:13 to 0023:31 before climbing to 3,600 ft until 0023:49. In Figure 12, the changes in altitude are reflected as 100 ft increments as is shown in the Console Playback. The only indicator of change in altitude shown on an ATC Display is a chevron pointing upwards for aircraft that are climbing and downwards for descending aircraft, which is what Mr Tucker would have seen. In addition, the Figure 21 of the ATSB report, shows a vertical profile of AEM and JQF which shows that the rate of climb for both aircraft slowed between 0023:00 and 0023:30 but AEM and JQF did not level off.
272. At inquest, Mr Tonkin gave evidence to the effect that pilot minimum separation levels when aircraft are trying to self-separate would be 1,000 ft.<sup>173</sup> Mr White's view was that from the perspective of an ATC that 500 ft separation would be appropriate.
273. Mr White also gave evidence to the effect that regardless of whether there was a period of levelling off between AEM and JQF that Mr Tucker should have expected that the altitudes of the aircraft would converge and that there was nothing to suggest that they were level for any significant period or deconflicting themselves. Mr White considered that it would have been appropriate to make a call to either AEM or JQF, if a call had not already been made to provide more information about the location of each aircraft.<sup>174</sup>
274. In written submissions, Counsel Assisting submitted that I should find that the JQF departure call was incorrect and while Mr Tucker did not make an assumption as to the track of JQF following the departure call, on the basis of Mr Hine's evidence and the evidence of the experts, an ATC or pilot listening to the departure call most likely would have.
275. Counsel Assisting also submitted that I consider making a recommendation to CASA to take steps to reiterate the content of AIP ENR 1.1 paragraph 10.6.4 and reinforce the importance of accurate departure calls. Mr Tucker's representatives agreed with the proposed recommendation of Counsel Assisting but also submitted that the

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<sup>172</sup> CB1, Tab 41, pp 24–5 [105].

<sup>173</sup> T 424.

<sup>174</sup> Ibid.

recommendation should be extended to reiterate the *‘necessity for pilots who have received traffic information within 5 nautical miles of an aerodrome to communicate with other relevant aircraft on the CTAF’*.<sup>175</sup>

276. CASA did not object to the proposed recommendation of Counsel Assisting.<sup>176</sup> Airservices supported the proposed recommendation of Counsel Assisting.<sup>177</sup>

277. In relation to whether Mr Tucker should have issued a safety alert the AEM and/or JQF, Counsel Assisting submitted that:

- it was open to Mr Tucker to issue a safety alert to either AEM or JQF after the activation of the 0022:49 STCA;
- no firm conclusion can be made by the Court as Mr Tucker’s decision-making occurred in real time and he did not have the benefit of time to conduct the detailed analysis that occurred at inquest; and
- Mr Tucker was entitled to rely on the information that JQF provided about their track, and the fact that in Class G airspace, aircraft have a responsibility to self-separate.

278. Counsel Assisting also submitted that on the information available to Mr Tucker at the time, that on one level it was not unreasonable for him to assume that AEM and JQF were self-separating. However, that this assumption should be balanced against the following:

- a) JQF was not flying in the direction indicated in their departure call by continuing to turn left;
- b) AEM’s call was that they were descending from 6,000 ft to not above 4,000 ft, and it had not made any change to that call; and
- c) JQF’s departure call was that it was climbing to 7,000 ft and there had not been any change to that call.

279. Counsel Assisting did not consider that Mr Tucker should be criticised for the decision not to issue a safety alert after the activation of the 0022:49 STCA between AEM and

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<sup>175</sup> Tucker Closing Submissions pp 4–5.

<sup>176</sup> CASA Closing Submissions pp 7–8.

<sup>177</sup> Airservices Submissions p 5.

JQF. Airservices and Mr Tucker's representatives accepted and supported this submission.

280. PAC submitted that the issuing of a safety alert, or even making an enquiry of the crew of either aircraft, at any time between 0022:49 and 0023:51 was both warranted and essential in the circumstances. PAC also submitted that the circumstances that led to this Accident, constitute the type of scenario in which a safety alert, or avoiding action call ought and should be made in response to a STCA in Class G airspace in the vicinity of a busy aerodrome.

281. Having considered the evidence outlined above and written submissions of Counsel Assisting as well as the interested parties, I have formed the following conclusions:

- a) the JQF departure call was incorrect and did not comply with AIP ENR 1.1 paragraph 10.6.4;
- b) that while Mr Tucker did not make an assumption as to the track of JQF following the departure call, an ATC or pilot listening to the departure call most likely would have;
- c) a safety alert issued at this time would have provided the best opportunity to prevent the accident by allowing sufficient time for each aircraft to take evasive action to separate. I accept that Mr Tucker considered the situation carefully taking into account all the information he had and decided not to issue the safety alert. I am acutely aware that in considering this issue I must avoid allowing hindsight bias to influence my conclusion. It was open to Mr Tucker after the 0022:49 STCA to issue the safety alert and he decided based on his assessment of the situation at the time to not issue the alert. In these circumstances, I make no criticism or adverse comment about this decision and accept that it was a judgement call made in real time and that he was not able to conduct the detailed analysis that has occurred in the course of this inquest.

**Finding 7:**

**It was open to Mr Tucker after the 0022:49 STCA to issue a safety alert, however his judgement call at the time was to not issue the alert and I make no criticism of him for this.**

**Recommendation 1:**

**I recommend that CASA develop and disseminate educational material for the aviation industry aimed at reinforcing the importance of accurate departure calls being made by pilots in command of aircraft. It is a matter for CASA to determine the process by which the educational material is disseminated to the aviation industry.**

*Aural reactivation of STCA between AEM and JQF*

282. At 0023:51, the STCA reactivated between AEM and JQF. At that time, of the aural reactivation of the STCA, AEM was at 4600 ft and JQF was at 3700 ft. This meant that the distance between the aircraft was 1.9 NM and 900 ft.
283. In the immediate period of time that followed, Mr Tucker continued to deal with other aircraft before returning to AEM and JQF. Mr Tucker subsequently zoomed in on the screen and acknowledged the STCA silencing the aural alert. AEM had descended to 4500 ft and JQF was at 4000 ft. The distance between the aircraft had reduced to 0.9 NM and 500 ft.
284. Mr Tucker stated that he recalled zooming in on AEM and JQF's position. Mr Tucker noted that JQF had departed from its velocity vector and appeared to have taken a left-hand turn whilst climbing and AEM continued to descend. At this point in time, Mr Tucker acknowledged that the aircraft were very close. He stated that:
- 'It was too late for me to say anything to them, and I believed that JQF must have had a visual and was manoeuvring to pass behind AEM.'*<sup>178</sup>
285. Mr Tucker also considered that if he did communicate with AEM or JQF that it would have caused distraction to the pilots in a critical stage of flight.<sup>179</sup>
286. At inquest, Mr Tucker also gave evidence to the effect that at the time of the aural reactivation of the STCA, there would not have been enough time to issue a safety alert at that point.<sup>180</sup> However, Mr Tucker agreed that at this point that there were various

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<sup>178</sup> CB1, Tab 36A, p 10 [68].

<sup>179</sup> CB1, Tab 38, p 10 [71].

<sup>180</sup> Ibid.

communications that he could have tried with AEM and/or JQF to confirm whether or not they had the other aircraft in sight if the communication was warranted which he did not consider it to be at the time.<sup>181</sup>

287. In his statement to the Court, Mr Hine observed that between 00:23:56 and 00:24:09, the vertical displacement between AEM and JQF changed significantly and rapidly noting that the aircraft were in an unsafe proximity and at risk of collision. Mr Hine's assessment was that there was no time to communicate with AEM and JQF and affect the outcome. Mr Hine stated that:

*'...as an ATC I would not want to distract or confuse the aircraft in a critical phase of flight. There still exists a reasonable expectation that the aircraft may be in two-way communications on the CTAF.'*<sup>182</sup>

288. However, at inquest, Mr Hine accepted that a safety alert should have been issued around 20 seconds before the collision.<sup>183</sup>

289. Further, in their preliminary observations, Mr Tonkin and Mr White opined that section 9.1.4.3 of the Manual of Air Traffic Services (in place at the time of the Accident) required that a safety alert be issued unless the pilot has advised that action is being taken to resolve the situation. In this case, Mr Tonkin and Mr White agreed that no such pilot report was received.<sup>184</sup>

290. Mr Tonkin's evidence at inquest was that a typical pilot in the situation of AEM and JQF would not be distracted by receiving a further communication from an ATC after the aural reactivation of the STCA and would rather benefit from having received the further information from the ATC. Similarly, Mr White agreed that at the time of the aural reactivation that if a call had not already been made to either aircraft that it would have been appropriate to do so.<sup>185</sup>

291. In written submissions, Counsel Assisting submitted that given that AEM and JQF collided at about 0024:20 which was 29 seconds after the reactivation of the STCA, Mr Tucker and Mr Hine's analysis concerning the decision not to issue an avoiding action

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<sup>181</sup> T 102–3.

<sup>182</sup> CB1, Tab 41, p 25 [107].

<sup>183</sup> T 252 lines 3–13.

<sup>184</sup> CB2, Tab 61, p 5.

<sup>185</sup> T 426–7.

alert is reasonable. Airservices also submitted that Mr Tucker's decision not to issue an avoiding action alert was reasonable.

292. Having considered the available evidence on this issue, I prefer the evidence of Mr Tonkin and Mr White that it would have been appropriate for Mr Tucker to issue a safety alert following the aural reactivation of the STCA. However, given the proximity of the aural reactivation to the time of the collision, I am unable to say with any certainty that issuing the safety alert would have changed the outcome of the Accident.

**Finding 8:**

**It would have been appropriate for Mr Tucker to issue a safety alert following the aural reactivation of the STCA at 0023.51. However given the proximity of the aural reactivation to the time of the collision, I am unable to say with any certainty that issuing the safety alert would have changed the outcome of the Accident.**

*STCAs in non-controlled airspace*

293. A further issue that was considered at inquest was how STCAs are responded to by ATCs in non-controlled airspace.
294. In preliminary observations of the experts, they state that:

*'the NAPM describes the duty of a controller. When a controller becomes aware of information such that it would be reasonable to conclude an unsafe situation has, or may occur, it would be expected that all necessary action is taken to remove that risk.'*<sup>186</sup>

295. At inquest, Mr White agreed that this system is designed to cover possibilities and probabilities of unsafety not just clear unsafety and that if a situation arises where the ATC believes that an unsafe situation may exist that they should say something.
296. Mr Tucker stated that continual false nuisance and unwanted alerts, ATCs are desensitised to STCAs which may result in the dismissal of a STCA when, in fact, it

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<sup>186</sup> CB2, Tab 61, p 17.

should be acted upon, and further that STCAs are not fit for purpose in Class G airspace.<sup>187</sup>

297. At inquest, Mr Tucker indicated that he would no longer use the word desensitised.<sup>188</sup> It was suggested to Mr Tucker by Counsel Assisting that he had moderated his view to which he responded that it was not so much a change of view, but rather, poorly expressed.<sup>189</sup> Mr Tucker did not consider that he had a change of view, but rather, that his statement was poorly expressed.<sup>190</sup> Mr Tucker explained that he was referring to treating STCAs differently in controlled and non-controlled airspace and that he was not expressing a bias against issuing a safety alert or avoiding a safety alert in uncontrolled airspace.<sup>191</sup>

298. Mr Tucker also gave evidence at inquest with respect to the way that STCAs are treated in controlled and non-controlled airspace. In relation to controlled airspace, Mr Tucker stated:

*‘...if you have two aircraft that are fully under air traffic control...you’re telling them exactly what to do at all times...and a stacker goes off, well that’s an indication that something has seriously gone wrong...that’s the time when you’re most likely to ah perform the avoiding action because you can [because] the aircraft are controlled...you can instruct them to take avoiding action.’<sup>192</sup>*

299. In relation to non-controlled airspace, Mr Tucker stated:

*‘...it’s a different sort of reaction...because...it’s based on the five-mile standard which doesn’t apply outside controlled airspace...you have a different sort of reaction to a stacker outside controlled airspace to inside controlled airspace.’<sup>193</sup>*

300. For the sake of completeness, I also acknowledge that for Class G airspace, there is a difference between the Melbourne ATSC and Brisbane ATSC as to when stackers are

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<sup>187</sup> CB2, Tab 38, pp 7–8 [64].

<sup>188</sup> T 64 line 31 – T 65 line 1.

<sup>189</sup> T 64 line 27.

<sup>190</sup> Ibid.

<sup>191</sup> T 67.

<sup>192</sup> T 65 lines 3–12.

<sup>193</sup> T 65 lines 13–19.

activated. Namely, that in the Brisbane ATSC STCAs are not activated in the volume of airspace between 0 ft and 4,500 ft and STCAs are inhibited at these levels. However, Mr Hine confirmed that Airservices is currently taking steps to standardise the approach to STCAs which will see the Brisbane ATSC align with the settings for STCAs that are current in place in the Melbourne ATSC. This is expected to take place by the end of 2024.<sup>194</sup>

301. In written submissions, Counsel Assisting submitted that Mr Tucker did not provide a satisfactory reason for his change of view about the way that STCAs are treated by ATCs in uncontrolled airspace, but that it should not materially affect the way in which his evidence is to be treated. In response, Mr Tucker's representatives submitted that the suggestion that Mr Tucker had a *change of view* as to his evidence is an unfair characterisation of what occurred. It was further submitted that Counsel Assisting's submission that Mr Tucker failed to provide a satisfactory reason for the change of view is unfair and that he plainly maintained his view but changed the word that he used to describe it.
302. I do not consider that he failed to provide a satisfactory reason for the change of view, and I am not critical of Mr Tucker for providing a different characterisation of his evidence at inquest.
303. In written submissions, Counsel Assisting submitted that given the state of the evidence it would be appropriate to consider whether there should be different protocols for assessing STCAs within 5 nautical miles (being the distance from the aerodrome that aircraft are required to establish their outbound track) of aerodromes with similar aircraft movements to Mangalore. Counsel Assisting also submitted that I should consider making a recommendation that Airservices conduct a review of the protocols for assessing STCAs that activate within 5NM of aerodromes with similar aircraft movements to Mangalore.
304. In response to the proposed recommendation from Counsel Assisting, Airservices submitted that the proposed recommendation is not appropriate for three significant reasons summarised as follows:

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<sup>194</sup> CB1, Tab 42, p 9.



- a) the phenomenon of false or nuisance STCAs had no role to play in the events which occurred on 19 February 2020.
- b) if it is accepted that false or nuisance alerts in uncontrolled airspace or near aerodromes could be a source of frustration, ATCs are trained to assess the integrity and operational relevance of STCAs. A protocol cannot cover all the possible ways in which operational relevance is assessed in determining whether a safety alert or avoiding action transmission is required.
- c) Mr Hine's evidence that the Brisbane ATSC will soon harmonise with the Melbourne ATSC which will likely see an increase in the number of STCAs in the Brisbane ATSC. In turn, the move to harmonise Australia's two ATSCs makes a uniform approach to STCAs in all classes of airspace even more important.

305. In respect of point c) above, Airservices submitted that the proposed recommendation of Counsel Assisting would unnecessarily confuse the approach towards harmonisation.

306. Having considered all of the evidence on this issue and the written submissions of the interested parties, I am not persuaded that I should make the recommendation suggested by Counsel Assisting. However, mindful that Brisbane ATSC and Melbourne ATSC are soon to harmonise, Airservices should take the opportunity to provide additional training to ATC's on managing and responding to STCAs within 5 nautical miles of aerodromes with similar aircraft movements to Mangalore.

**Recommendation 2:**

**Airservices, in anticipation of harmonisation of operating requirements for Brisbane ATSC and Melbourne ATSC, provide additional training to ATCs on managing and responding to STCAs within 5 nautical miles of aerodromes with similar aircraft movements to Mangalore.**

**OTHER MATTERS CONNECTED WITH THE DEATHS PURSUANT TO SECTION 67(3) OF THE ACT**

307. My conclusions in this matter with respect to items 3 and 4 of the Scope of Inquiry are comments within the meaning of section 67(3) of the Act.

308. Section 67(3) of the Act provides:

*‘A coroner may comment on any matter connected with the death, including matters relating to public health and safety or the administration of justice.’*

309. The meaning of the words ‘connected with the death’ were considered in *Thales Australia Limited v Coroners Court of Victoria & Ors.*<sup>195</sup> In that matter, Beach J stated that whilst the words connected with are capable of describing a spectrum of relationships ranging from direct and immediate to tenuous and remote, his Honour agreed with the interpretation of these words given by Muir J in *Doomadgee v Cements*<sup>196</sup> where Muir J noted that:

*‘...there was no warrant for reading “connected with” as meaning only “directly connected with” ...something connected with a death may be as diverse as the breakdown of a video surveillance system, the reporting of the death, a police investigation into the circumstances surrounding the death, and practices at the police station or watchhouse concerned.’*

### **The reliance and use of velocity vectors in Class G airspace**

310. An issue that was considered at inquest was the appropriateness of relying on velocity vectors in Class G airspace and specifically, in the circumstances that led to the Accident.

311. According to the ATSB report, velocity vectors are viewed on the ATC Display and are a line that extends from the surveillance track symbol to the estimated future position of the track at a selected time interval into the future. A velocity vector is based on a present track and does not account for future variations in tracking. A velocity vector is punctuated with dots to show the track’s estimated progress along the vector at regular intervals of time. The direction of the vector indicates the track heading, while the length of the vector gives an indirect indication of the track speed.<sup>197</sup>

312. In their preliminary observations, Mr Tonkin and Mr White made the observation that velocity vectors are used to the same standards in controlled airspace with aircraft that are under positive control and in uncontrolled airspace where aircraft are not under

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<sup>195</sup> [2011] VSC 133.

<sup>196</sup> [2006] 2 Qd R 352.

<sup>197</sup> CB2, Tab 54, p 9, footnote 7.

positive control and can manoeuvre without reference to the controller. In controlled airspace where the aircraft are under positive control, the velocity vector is consistent with controller expectations of aircraft movements, including deviations (or not). However, outside controlled airspace, where the aircraft is not under the positive control of the ATC, other factors need to be taken into consideration when making a judgement of where an aircraft may be positioned a short time later when the movement of that aircraft is not consistent.

313. Mr Tonkin and Mr White opined that there are limitations on the reliability of velocity vectors when aircraft are manoeuvring after take-off to intercept the outbound track.
314. Further in their supplementary report, Mr Tonkin and Mr White stated that the system tools provided to the ATC, including velocity vectors, were designed for use in controlled airspace where aircraft do not normally deviate from planned and/or cleared tracks and that those system tools would be reliable for that purpose. Mr Tonkin and Mr White also noted that to rely on a velocity vector in Class G airspace to determine where the aircraft will be in 5NM or 10NM could result in an incorrect traffic disposition (picture) in the mind of the ATC.
315. At inquest, Mr Hine did not agree with Mr Tonkin and Mr White and their opinion that velocity vectors are more reliable in controlled airspace when compared to uncontrolled airspace.<sup>198</sup> However, he did concede that velocity vectors are not as reliable when an aircraft is in a turn.<sup>199</sup>
316. Mr Tucker agreed that he was relying on velocity vectors in the course of monitoring JQF and AEM. It was not put to Mr Tucker that he incorrectly assessed the velocity vectors, nor is there evidence that he did so.
317. In written submissions, PAC drew my attention to questions asked of Mr Tucker about his reliance of velocity vectors in his assessment of the STCA between AEM and JQF.<sup>200</sup> However, I am of the view that this exchange does not infer that Mr Tucker was unaware of the limitations of velocity vectors in Class G airspace or that he incorrectly assessed them.

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<sup>198</sup> T 299 lines 17–22.

<sup>199</sup> T 299 lines 22–4.

<sup>200</sup> T 121–2.

318. In written submissions, Counsel Assisting submitted that:
- a) in the same way that there are limitations to the utility of STCAs within 5 NM of an aerodrome in Class G airspace, the same limitations apply to the use of and reliance on velocity vectors in these circumstances; and
  - b) consideration should be given as to whether it is appropriate for an explicit warning to be given to ATCs not to rely on velocity vectors within 5 NM of an aerodrome in Class G airspace.
319. Counsel Assisting also proposed that I make a recommendation that Airservices should issue an ATC Group Circular reminding ATCs that velocity vectors should not be relied upon within 5 NM of an aerodrome in Class G airspace.
320. Airservices did not agree with the submissions of Counsel Assisting. In this regard, Airservices submitted that it would be wrong to do away with reliance on velocity vectors within 5NM of an uncontrolled aerodrome in uncontrolled airspace for substantive reasons as it presumes that reliance on velocity vectors for that purpose is inappropriate. Airservices contend that this is not supported by Mr Hine’s evidence of the actual use of velocity vectors and the known limitations of such.
321. Airservices further submitted that the opinion of Mr Tonkin and Mr White that aircraft movements in uncontrolled airspace compromise the reliance on velocity vectors is ‘*too narrow and restrictive an assessment*’. Airservices contend that countless counterexamples could be drawn to illustrate non-random or planned movements of IFR aircraft in uncontrolled airspace which would make reliance on velocity vectors within 5NM of an aerodrome beneficial.<sup>201</sup>
322. Having considered all of the available evidence on this issue and the written submissions of Counsel Assisting and the interested parties, I am not minded to make the recommendation proposed by Counsel Assisting as I can see the utility in having velocity vectors available to ATCs, however I can see that there is a possible need to provide some additional training particularly focused on the use of vectors by ATCs and also any limitations on their use that may exist.

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<sup>201</sup> Airservices Submissions pp 9–10.

**Recommendation 3:**

**Airservices should consider providing additional training to current and prospective Air Traffic Controllers on the use of velocity vectors in Class G airspace. It is a matter for Airservices to determine how this training is developed and facilitated.**

**Whether the addition of 1000 ft to the minimum altitudes for instrument ILS approach procedures into Mangalore as recommended in the En Route Supplement for Mangalore should be mandated or remain discretionary**

323. The ATSB report identified a safety issue regarding the En-Route Supplement Australia (ERSA) for Mangalore, with respect to the addition of 1000 ft to the altitudes for instrument approaches to the Mangalore.<sup>202</sup> Namely, that the procedure did not detail whether the height was applied to the minimum descent altitude or to all approach altitudes. The ATSB's finding in its report was that the ambiguity in the ERSA was another factor that increased risk. However, it was not clear that it was a material factor in the Accident.
324. The ATSB issued a safety recommendation to CASA on 31 March 2022 which recommended that CASA address the ambiguity in the ERSA requirement to amend, remove or clarify the requirements for the addition of 1,000 ft to the prescribed altitude to reduce variation in application and risk of traffic conflicts.<sup>203</sup> This safety recommendation was resolved by CASA in the Mangalore Aeronautical Study which was delivered in October 2022.
325. At inquest, Mr Tonkin gave evidence to the effect that whilst he did not consider that there was necessarily any ambiguity in the document, that any ambiguity had been removed with the update to the ERSA. Dr Boston confirmed that with the amendments to the ERSA having been made, that the entire approach to Mangalore should be flown 1,000 ft higher than published for practice flights.
326. In written submissions, Counsel Assisting submitted that the extent to which the varied application of the addition of 1000 ft to altitude for instrument approaches at Mangalore

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<sup>202</sup> CB2, Tab 54, pp 48–9.

<sup>203</sup> CBT, Tab 54, p61

contributed to the Accident is not clear, and that this ambiguity has been addressed in the updated ERSA for Mangalore. CASA agree with this submission in part.

327. While CASA accepted that there was an ambiguity in the ERSA for Mangalore, it considered that Counsel Assisting's submission left open the possibility that the ambiguity was a contributing factor to the Accident, at least to some extent. In this regard, CASA draw a distinction between the contributing factors and other factors that increased risk as outlined in the ATSB report. CASA contend that the ambiguity in the ERSA was not a 'contributing factor' to the Accident.<sup>204</sup>
328. CASA further submitted that on the basis of the ATSB report and Dr Boston's evidence, that I should find that the ambiguity in the ERSA for Mangalore was not a contributing factor at all to the circumstances of the Accident. CASA also submit that any ambiguity with the ERSA for Mangalore has been resolved following the amendment to that document.
329. Airservices agreed with the closing submission of Counsel Assisting as did PAC and the representatives of the Sutcliffe and Segev families.<sup>205</sup>
330. Having considered the available evidence on this issue as well as the written submissions of Counsel Assisting and the interested parties, I accept that there was an ambiguity in the ERSA for Mangalore Aerodrome at the time of the Accident and that this ambiguity has since been resolved. I also accept that it was not a contributing factor to the Accident.

**The use, availability and cost effectiveness of collision avoidance technologies that could reduce the likelihood of future similar accidents occurring**

331. The final issue considered at inquest was the use, availability and cost effectiveness of collision avoidance technologies that may prevent future similar occurrences.
332. As outlined in the ATSB report, JQF and AEM both met the equipment requirements for flight under the IFR, including the carriage of ADS-B equipment.<sup>206</sup> The use of an external ADS-B receiver significantly increases the frequency of updated traffic

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<sup>204</sup> CASA Submissions p 3; CB2, Tab 54, pp 68–9.

<sup>205</sup> Airservices Submissions p 10.

<sup>206</sup> CB2, Tab 54, p 15. A means by which aircraft, aerodrome vehicles and other objects can automatically transmit or receive data such as identification, position and additional data, as appropriate, in a broadcast mode via data link.

information and receives ADS-B broadcasts directly from ADS-B OUT equipped aircraft within range of the receiver.<sup>207</sup>

333. At the time that ADS-B equipment became mandatory for IFR aircraft, there was no requirement for aircraft to be fitted with ADS-B receiving equipment. The ATSB report further states that it is possible for aircraft to receive ADS-B information from another aircraft directly if they are fitted with such a receiver (ADS-B IN) which can be configured with a cockpit display of traffic information to identify where other aircraft are relative to their position.
334. In this regard, JQF and AEM were fitted with ADS-B OUT transmit capabilities only. Neither aircraft was fitted with a system to receive ADS-B information directly from another aircraft, nor were they required to be.
335. Further, on the day of the Accident, Mr Segev, who was aboard AEM, was using an 'AvPlan' EFB software installed on an iPad. EFB software is a reference to various apps and programs that are available on tablet devices like an iPad, which can contain the functionality to provide traffic information to the user – i.e. to show nearby aircraft on the display. EFBs are widely available and commonly used. The EFB software that was used by Mr Segev had an option to display traffic information overlaid on the map display. Traffic information is either obtained by having an external ADS-B receiver attached or using the AvPlan live feature. The EFB software had no capability to identify aircraft using other EFB software, or non-ADS-B equipped aircraft.
336. It was agreed between the interested parties that as AEM did not have any ADS-B receiving technology, that it would not have shown JQF on the display. Whilst there are accepted limitations to the EFB software technology, iPads such as the one being used by Mr Segev can be fitted with an external ADS-B receiving unit that will provide this additional information, and in some cases aural alerting from ADS-B broadcasting aircraft.
337. Given the weather conditions on the day of the Accident, which placed significant limitations on the ability of the pilots of JQF and AEM to rely on the 'see and avoid' principle, the ATSB concluded that this type of technology *could* have prevented the

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<sup>207</sup> CB2, Tab 54, p 42.

Accident from occurring and more generally, it provides a valuable enhancement to the long-established procedures for maintaining separation in non-controlled airspace.

338. At inquest, Dr Boston, Mr Tonkin and Mr White gave evidence about the availability of relatively low-cost (i.e. approximately \$1000) of portable ADS-IN devices.<sup>208</sup> Mr Tonkin stated that notwithstanding the fact that the pilots of each aircraft were alerted to the presence of the other aircraft by voice, an ADS-B IN device attached to a compatible EFB program would have assisted the aircraft in maintaining situational awareness of the other each.<sup>209</sup> Both Mr Tonkin and Mr White considered that it would be appropriate to conduct further cost-benefit analysis of such low-cost portable ADS-B IN devices. However, Mr Tonkin did accept that the primary responsibility of separation still rests with the proper use of the CTAF and pilots looking out for other aircraft when flying outside controlled airspace.<sup>210</sup>

339. Mr David Punshon, Manager of Continued Operational Safety, National Operations and Standards Division at the CASA, provided two statements to the Court dated 19 and 22 March 2024 (respectively) addressing this issue. Mr Punshon was not called to be examined at inquest, however, a summary of Mr Punshon's evidence is as follows:

- a) CASA has not been involved in any research or other projects relating to the use, availability, and cost-effectiveness of collision avoidance technologies for light and recreational aircraft in Australia;
- b) an Aircraft Collision Avoidance System (**ACAS**) is designed to monitor the airspace around an aircraft for other aircraft and warn flight crew of other aircraft of the threat of collision;
- c) the size and cost (in excess of approximately \$10,000) of an ACAS does not make it a viable solution for General Aviation (**GA**) aircraft to prevent mid-air collisions at this time;
- d) ADS-B are surveillance systems in which an aircraft determines its position via satellite navigation and periodically broadcasts its position and other data called

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<sup>208</sup> T 352.

<sup>209</sup> T 430–1.

<sup>210</sup> T 454 lines 14–20.



ADS-B OUT, so the aircraft can be tracked by ATC, or tracked by other aircraft fitted with ADS-B IN equipment;

- e) the Australian Government has a rebate scheme in operation for registered operators that equip their VFR aircraft with ADS-B;
- f) ADS-B equipment is impacted by latency issues when processing and displaying the traffic information;
- g) to maximise the potential for ADS-B it would require the ADS-B equipment to be fitted to all aircraft, including sport and recreational aircraft;
- h) having a display of ADS-B traffic information is not a panacea to mid-air collisions and may encourage pilots to be ‘heads-down’ in the cockpit, which could cause distractions;
- i) portable ADS-B OUT/IN devices are available for use in aircraft. While these devices improve the ‘electronic conspicuity’ of aircraft, they have limitations;
- j) if the depiction of other aircraft on an electronic flight bag display is simply a moving symbol on a screen, this could significantly increase the percentage of pilot mental processing spent on interpreting how the depiction applies in the dynamic 3D environment and then determining whether the pilot needs to take action; and
- k) CASA’s current policy is to encourage the industry to install ADS-B equipment (OUT and/or IN) without the use of a legislative mandate.

340. Further, in December 2021, the Department of Infrastructure announced a \$30 million fund to provide rebates to general aviation aircraft operators to fund up to \$5,000 or 50% of the cost of installing ADS-B transponder technology in their aircraft. Further, on 14 May 2024, the Federal Government announced, as part of the federal budget, an additional \$3.6 million over three years to extend and expand the ADS-B rebate program, supporting general and recreational aviation operators to install ADS-B devices in their aircraft, bringing about improved airspace management and safety.<sup>211</sup> It is noted that the rebate only relates to VFR aircraft and has not been extended to IFR.

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<sup>211</sup> [Investment to deliver a future made in Australia | Ministers for the Department of Infrastructure.](#)

341. At inquest, Dr Boston confirmed that the ATSB, in conjunction with other agencies (including CASA) have promoted this rebate in various publications and through demonstrations at flying schools.<sup>212</sup> The ATSB subsequently confirmed that the agency has been working with the Australian Maritime Safety Authority (AMSA) to promote voluntary uptake of ADS-B in Australian-registered aircraft and a joint safety promotion campaign including an educational video which was published on 15 April 2024. The ATSB also acknowledged CASA's participation in the joint industry messaging on the voluntary fitment of ADS-B devices with reference to CASA's Flight Safety Australia publication of 22 April 2024.<sup>213</sup>
342. In written submissions, CASA drew my attention to the UK Civil Aviation Authority safety research paper published on 16 November 2023 (**UK CCA paper**). Whilst the UK CCA paper was not in evidence at inquest or included in the coronial brief, it is a publicly available document to which I have had regard. With respect to the UK CCA paper, CASA submitted that from the research that the portable electronic conspicuity devices that are presently available, are '*no more than an adjunct to the primary obligation of pilots to maintain adequate look out and separation via communication on the CTAF*'.<sup>214</sup>
343. CASA also submitted that:
- a) while there is some evidence as to the availability of low cost, portable ADS-B IN devices of the kind that may be used in conjunction with EFB software, there was no evidence from the witnesses that any such device would have changed the outcome of this event;
  - b) that the presently available technologies have significant limitations, including that they are only an adjunct to proprietary EFB applications and that they depend significantly upon the availability of mobile telephone network coverage for some of the EFB functionality;<sup>215</sup> and
  - c) the findings in the UK CCA paper are consistent with the ATSB's final report which stated that, '*...even when ADS-B receiving equipment is fitted, radio*

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<sup>212</sup> T 351–2.

<sup>213</sup> ATSB Submissions p 5; CASA website: accessed 23 April 2024. <<https://www.flightsafetyaustralia.com/2024/04/see-you-see-me-ads-b/>>.

<sup>214</sup> CASA Submissions p 4.

<sup>215</sup> CASA Submissions p 6.

*communications should remain the primary method for pilots operating in non-controlled airspace to arrange separation with other pilots in the vicinity’.*<sup>216</sup>

344. In written submissions, the ATSB submitted that aircraft operating under IFR are required to be equipped with ADS-B OUT technology and aircraft operating under VFR that are equipped with ADS-B IN will be able to detect every IFR aircraft as well as every VFR aircraft equipped with ADS-B OUT operating in the same airspace. Whilst the ATSB acknowledged that ADS-B IN will not show in every aircraft that is operating in the same airspace, there is a safety benefit in that it improved situational awareness for pilots by supporting decision-making based on all information available.
345. The ATSB further submitted that there are comparative advantages of portable ADS-B devices to supplement aircraft position information available to pilots. The ATSB noted that ADS-IN receives all ADS-B transmissions of sufficient power within line of sight of the device, regardless of what application (electronic flight bag) or display device (such as an i-Pad) that the pilot may be using. The ATSB also noted that these devices can also operate outside of ATC surveillance coverage and with no interaction with ATC which means that aircraft voluntarily fitted with these devices will have significantly better traffic altering capability than by visual acquisition.<sup>217</sup>
346. In this regard, the ATSB stated that it would support any safety action pursued from this inquest including the voluntary fitment of electronic conspicuity technology such as a portable ADS-B device equipment is available for voluntary installation at relatively low cost.
347. Further, in written submissions Counsel Assisting also submitted that given the availability of low-cost ADS-B IN devices attached to EFBs, that further analysis should be conducted into the cost-effectiveness and inter-operability of ADS-B IN technologies for aircraft certified to fly under IFR, rather than General Aviation and recreational aircraft more broadly. Counsel Assisting proposed that I consider making a recommendation to CASA to conduct a cost-benefit study of requiring the installation of ADS-B IN devices in aircraft certified to fly under IFR.

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<sup>216</sup> CASA Submissions p 5; CB2, Tab 54, p 65.

<sup>217</sup> ATSB Submissions p 5.

348. CASA contends that such a proposal is unnecessary and impracticable at this time for the following reasons:

- Mr Punshon’s unchallenged evidence that CASA is monitoring the development and use of emerging aviation technologies such as EFB devices is unchallenged;
- it is impracticable because CASA could only conduct such an analysis if that which is potentially to be mandated could be defined for legislative purposes to meet a prescribed (or prescribable) standard; and
- that the undisputed evidence is that there are currently no international standards for ADS-B IN configurations (EC device with EFB application) as described above.<sup>218</sup>

349. CASA also submitted that given the lack of international standard and significant problems in the efficacy of the technology, it is presently not appropriate for such technologies to be mandated, even if they are relatively inexpensive. However, CASA did concede that is not to say that the use of low-cost devices should not be encouraged as an adjunct to assist pilots to maintain situational awareness.

350. Airservices submitted that while CASA is best placed to respond to this proposed recommendation, that from the perspective of an air traffic service provider whose core value is safety, Airservices would generally support further analysis into the feasibility and potential benefits of mandating the installation of ADS-B IN devices in IFR-certified aircraft. PAC also accepted Counsel Assisting’s submissions and the proposed recommendation.

351. I also acknowledge the proposal submitted by the representatives for the Segev and Sutcliffe families that I should consider recommending that CASA give further consideration to the mandatory use of ADSB-IN devices by light aircraft operating in IFR conditions.

352. Having reviewed the available evidence on this issue and the written submissions of the interested parties, I accept the proposed recommendation of Counsel Assisting and acknowledge the proposal of the Sutcliffe and Segev families.

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<sup>218</sup> Evidence of Dr Boston at T 376 lines 15–18.

353. Whilst I acknowledge the concerns raised by CASA that the proposal of Counsel Assisting is unnecessary and impracticable at this time, I am of the view that cost-effectiveness and inter-operability of ADS-B IN technologies in aircraft certified to fly under IFR warrants further investigation. I am also of the view that while no firm conclusions can be drawn as to whether the use of ADS-B technology would have changed the outcome of this Accident, it would have at the very least given the pilots of each aircraft a greater awareness of the risk of collision.
354. I commend the additional pledge given by the Federal Government to extend and expand the ADS-B rebate program. However, I am of the view that consideration should be given to further expanding the program to IFR aircraft.
355. I also commend the ATSB and AMSA for the joint agency work in promoting the voluntary uptake of ADS-B technology in Australian-registered aircraft. I urge the ATSB and AMSA to continue the work on these important initiatives and encourage CASA to consider ways in which it can contribute to the work being done by the ATSB and AMSA including through facilitating industry engagement and awareness of ADS-B technology.
356. My recommendations on this issue are outlined below.

**Recommendation 4:**

**I recommend that the ATSB, AMSA and CASA continue to work together to promote the voluntary update of ADS-B technology in Australian-registered aircraft. It is a matter for the ATSB, AMSA and CASA to determine how to best promote this initiative in the aviation industry.**

**Recommendation 5:**

**I recommend that CASA conduct a cost-benefit study into the feasibility and potential benefits of requiring the installation of ADS-B IN devices in IFR-certified aircraft.**

**Recommendation 6:**

**I recommend that the Minister for the Commonwealth Department of Infrastructure give consideration to expanding the ADS-B rebate program to extend to Australian registered IFR aircraft.**

## **FINDINGS**

357. Having held an inquest into the deaths of Christiaan Gobel, Pasinee Meeseang, Ido Segev and Peter Phillips, I make the following findings, pursuant to section 67(1) of the Act:

- a) the identities of the deceased were:
  - i. Christiaan Gobel, born 14 March 1940;
  - ii. Pasinee Meeseang, born 1 January 1993;
  - iii. Ido Segev, born 2 September 1989;
  - iv. Peter Phillips, born 19 May 1972;
- b) the deaths occurred on 19 February 2020 at Mangalore, Victoria;
- c) the cause of death for each deceased was *multiple injuries sustained in an aviation incident*;
- d) given the meteorological conditions on the day of the Accident, there were significant limitations on the ‘see and avoid’ principle and it is unlikely that the pilots would have relied upon the ‘see and avoid’ principle as a means to self-separate. Even in clear conditions, given the closing speed of the aircraft and the visual restrictions in the cockpit, it is highly unlikely that the pilots would have been able to visually locate one another and manoeuvre in sufficient time to avoid the collision and therefore, this is not a circumstance that caused or contributed to the Accident;
- e) Mr Tucker’s workload was manageable and appropriate on the day of the Accident, and this was not a contributing factor to the accident. The fact Mr Tucker was providing air traffic control services to combined sectors that had different classes of airspace within each sector was not a contributing factor to the Accident;
- f) the content of 00:20:19 Call to AEM was appropriate in the circumstances and contained sufficient information;
- g) the provision of information provided by Mr Tucker to JQF in the 0022:44 Call was appropriate, and I do not consider that the 0022:44 Call was a causal or contributing factor to the Accident;

- h) Mr Tucker having made the 0022:44 Call to JQF no further call to AEM was required nor warranted;
- i) the absence of communication or lack of effective communication, between the pilots in AEM and JQF on the CTAF after the traffic information was provided by Mr Tucker is a material factor that contributed to the Accident. Mr Tucker was entitled to assume that AEM and JFQ were self-separating and it cannot be concluded that the absence of a call from Mr Tucker to AEM to confirm that the aircraft had switched or was monitoring the CTAF was a contributing factor to the Accident;
- j) it was open to Mr Tucker after the 0022:49 STCA to issue a safety alert, however his judgement call at the time was to not issue the alert and I make no criticism of him for this;
- k) it would have been appropriate for Mr Tucker to issue a safety alert following the aural reactivation of the STCA at 0023.51. Given the proximity of the aural reactivation to the time of the collision, I am unable to say with any certainty that issuing the safety alert would have changed the outcome of the Accident; and
- l) the deaths occurred in the circumstances set out herein.

### **TABLE OF RECOMMENDATIONS**

Pursuant to section 72(2) of the Act, I make the following recommendations:

**Recommendation 1:**

I recommend that CASA develop and disseminate educational material for the aviation industry aimed at reinforcing the importance of accurate departure calls being made by pilots in command of aircraft. It is a matter for CASA to determine the process by which the educational material is disseminated to the aviation industry.

**Recommendation 2:**

Airservices, in anticipation of harmonisation of operating requirements for Brisbane ATSC and Melbourne ATSC, provide additional training to ATCs on managing and responding to STCAs within 5 nautical miles of aerodromes with similar aircraft movements to Mangalore.

**Recommendation 3:**

Airservices should consider providing additional training to current and prospective Air Traffic Controllers on the use of velocity vectors in Class G airspace. It is a matter for Airservices to determine how this training is developed and facilitated.

**Recommendation 4:**

I recommend that the ATSB, AMSA and CASA continue to work together to promote the voluntary update of ADS-B technology in Australian-registered aircraft. It is a matter for the ATSB, AMSA and CASA to determine how to best promote this initiative in the aviation industry.

**Recommendation 5:**

I recommend that CASA conduct a cost-benefit study into the feasibility and potential benefits of requiring the installation of ADS-B IN devices in IFR-certified aircraft.

**Recommendation 6:**

I recommend that the Minister for the Commonwealth Department of Infrastructure give consideration to expanding the ADS-B rebate program to extend to Australian registered IFR aircraft.

I convey my sincerest sympathy to the family members impacted by this Accident for their loss.

Pursuant to section 73(1B) of the Act, I order that this finding be published on the Coroners Court of Victoria website in accordance with the rules.

I direct that a copy of this finding be provided to the following:

Hendrika Gobel, senior next of kin for Christiaan Gobel

Supinya Meesaeng, senior next of kin for Pasinee Meeseang

Fiona Phillips, senior next of kin for Peter Phillips

Brianna Sutcliffe and the Segev family, Maurice Blackburn

Keith Tonkin, expert witness

Peter White, expert witness



Airservices Australia, HWL Ebsworth

Australian Maritime Safety Authority, Chief Executive Officer

Australian Transport Safety Bureau, Patrick Hornby, ATSB

Civil Aviation Safety Authority, Josephine Park, CASA

The Minister, Commonwealth Department of Infrastructure

John Tucker, Gilshenan and Luton Legal Practice

Peninsula Aero Club, Luke Bramston, Peninsula Aero Club

Detective Senior Constable Naomi Bennett, Coroner's Investigator

Signature:



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Judge John Cain  
State Coroner  
Date: 31 July 2024

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NOTE: Under section 83 of the *Coroners Act 2008* ('the Act'), a person with sufficient interest in an investigation may appeal to the Trial Division of the Supreme Court against the findings of a coroner in respect of a death after an inquest. An appeal must be made within 6 months after the day on which the determination is made, unless the Supreme Court grants leave to appeal out of time under section 86 of the Act.

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