

Inquiry into the Operation of the Australian Transport Safety Bureau, and in particular its report on the June 2017 crash of a flight conducted on behalf of Angel Flight Australia

The Evans Head Memorial Aerodrome Committee Inc. (EMAC) thanks The Senate Rural and Regional Affairs and Transport Legislation Committee for the opportunity to comment on the ATSB report on the 28 June 2017 crash of a flight conducted on behalf of Angel Flight Australia.

EMAC has a long-standing interest in aviation safety¹ and felt obliged to make comment on the final ATSB report²:

AO-2017-069 Collision with terrain involving SOCATA TB-10 Tobago, VH-YTM, near 28 Jun 2017 Final 13 Aug 2019
Mount Gambier Airport, South Australia, on 28 June 2017

In particular we will comment on information provided about the pilot, the explanation provided about possible cause of the accident, and provide an alternative explanation for it which may have ramifications for pilot assessment/safety in the future.

In Figure 1 (Figure 1 below) of the ATSB report it is noted that YTM, the aircraft which crashed, descends to 1,000 feet and deviates from the direct route on its way to Mt Gambier to pick up passengers. No comment on, or explanation as to why this “significant deviation” occurs from the direct route from Murray Bridge, the point of origin of the flight. CTAF calls from the aircraft at 0941 and 943 during the “deviation”

Figure 1: Track of VH-YTM approaching Mount Gambier Airport from Murray Bridge, the track deviation and approximate locations when initial CTAF calls were made, and inset, a map of South Australia showing the relative positions of Adelaide, Murray Bridge and Mount Gambier



Figure 1: Graphic captured from the ATSB accident report labelled Figure 1 in that report

¹ For example: <https://www.aph.gov.au/DocumentStore.ashx?id=41b79ac6-424f-4656-91da-569797f04c92>

² <https://www.atsb.gov.au/publications/safety-investigation-reports/?mode=All&q=June%202017>

are noted with the first advising that the aircraft was 7NM from the airport at 1,000 ft., and the second 2 minutes later (ATSB report): “about 5 NM to the north-west of the aerodrome in which the pilot requested the cloud base over the airport”.

“The pilot of an aircraft operating under the instrument flight rules (IFR) that was taxiing out at Mount Gambier Airport, responded that the ‘cloud base is at the minima...we’re departing out to the east where it’s a bit clearer...it’s fairly well fogged in to the west and to the south...you should get in.’ The pilot of YTM replied to this response asking the pilot to confirm that he could get in from the south or west, and the pilot of the IFR aircraft indicated possible better visibility to the north-west”.

What we don’t have in the ATSB report is the full transcript of the interaction between the pilots, only a partial transcript. We are told what the IFR pilot has to say initially, *verbatim*, but then we have a second hand report of what the pilots of YTM and the IFR aircraft had to say, which begs the question, why not include the full transcript and recording of that interaction so that we can decide for ourselves what the nature of that conversation was, but more than that to ascertain whether there was anything in the paralinguistics³ of the YTM pilot which would suggest any sign of distress or disorientation or problem, psychological features which can show up in paralinguistics but which are not evident in a transcript.

We note that in the initial conversation the IFR pilots states that “...it’s a bit clearer to the east...”, and then the ATSB report subsequently states that YTM approaches “....the airport from the south-east”⁴:

After approaching the airport from the south-east, the aircraft made several manoeuvres at a low height, including a series of turns at about 200 ft above ground level (AGL) (Figure 2). Witnesses near the airport reported hearing an aircraft, but due to the low, thick cloud, the aircraft was not visible.

The flight path of YTM is shown in Figure 2 of the ATSB Report (see Figure 2). What is notable from the flight path is that there appears to be a systematic series of turns before and after an initial touch and go on runway 36 with the pilot landing the aircraft on 29, not 24 as he indicated he would on the CTAF communication reported by ATSB. The YTM pilot is also reported as providing a CTAF communication indicating that he was “lining up for [runway] 36” indicating he was attempting a landing on 36 before the subsequent communication regarding his second successful attempt to land.

The point is that despite the inclement weather he did not put the plane into the ground but continued to fly in what was clearly some form of systematic search pattern and put the aircraft down onto a runway without incident. There is little doubt in our mind that the cognitive load on the pilot during this time would have been significant because of the changing cloud cover but notwithstanding that he executed a number of successful manoeuvres that got him on the ground on the second go. The reason(s) for the touch and

³ Paralinguistics is the part of communication outside of the words themselves – the volume, speed, intonation of a voice along with gestures and other non-verbal cues (Source Google Dictionary).

⁴ Page 4 of the ATSB report

go on the first attempt is not clear or discussed in any detail even though he flew back into the cloud for another go around before landing.

Figure 2: Track of YTM approaching Mount Gambier Airport, low-level manoeuvres, and location of CTAF calls

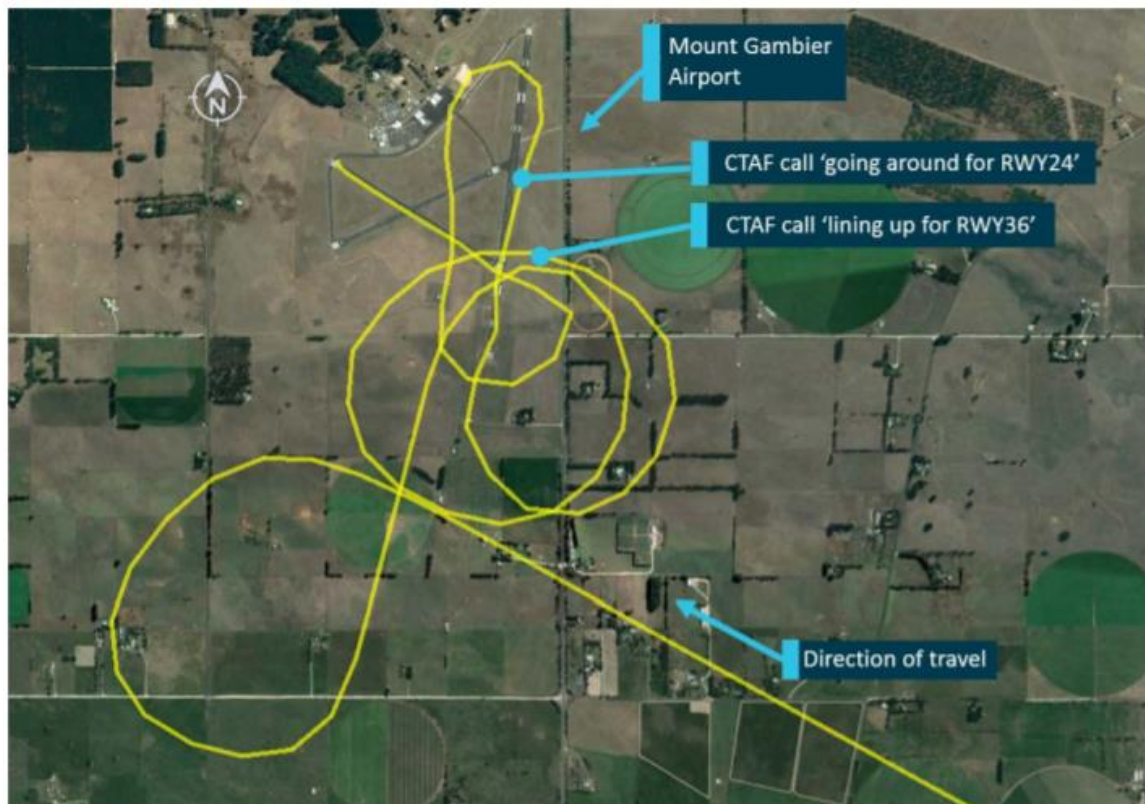


Figure 2: Figure 2 from the ATSB report into the accident showing YTM activity before landing successfully on runway 24

The aircraft is reported to have landed at 1008, 2 hours and eight minutes after he left Murray Bridge. It was only the ground for a short time to load the passengers before departure and then it headed off for Adelaide at 1020, some 12 minutes later. It is not clear if the pilot had any interactions with anyone on the ground, aside from his passengers, who could comment on his physical and psychological status at the time. It is not clear if he even got out of the aircraft to stretch his legs or have a toilet break after his two hour eight minute flight from Murray Bridge. It would appear that the ATSB did not interview anyone from this 'on ground' time to ascertain the physical/psychological status of the pilot. Perhaps there was no-one there other than those to be transported to give eye-witness account.

The departure flight path of YTM before the accident is shown in Figure 3 (Figure 3 of the ATSB report).

There is no report of any CTAF prior to departure or after departure. The plane deviates slightly to the left shortly after takeoff from runway 24 for about 20 seconds then to the right for about 5 seconds and then begins at 200 ft AGL to track further to the left at a sharper angle climbing to 300 ft AGL over the next 20 seconds with a turn to the right in the following five seconds. It then tracks left for the next five seconds while remaining at 300 ft AGL and flies straight ahead straight ahead for the next 15 seconds before descending to 200 ft AGL in

Figure 3: Flight path of VH-YTM after departing runway 24 at Mount Gambier Airport. Each vertical line represents 5 seconds.

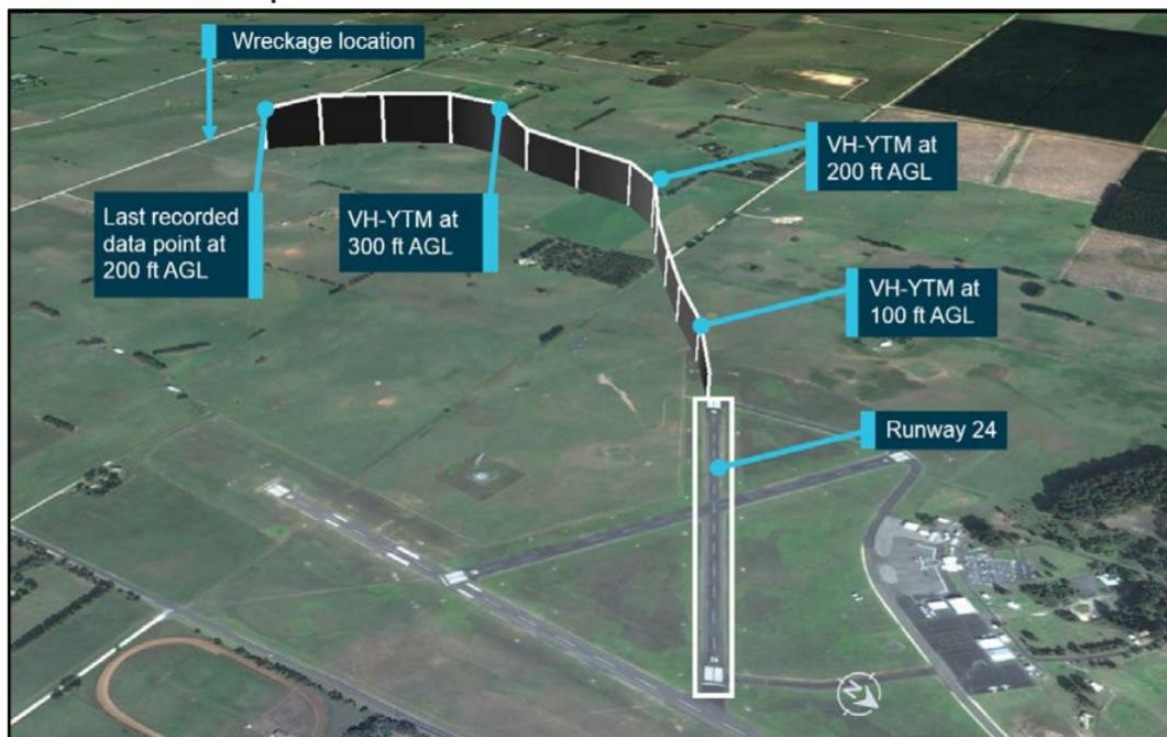


Figure 3: Figure 3 graphic of the final flight path of YTM from the ATSB report

the last five seconds of that path before crashing to the ground in what appears to be a significant deviation to the right in the accident. That crash would appear from the figure to have occurred over a very short time course of somewhere between 5 and 10 seconds. It is notable that the descent to 200 ft AGL from 300 ft AGL does not appear to be precipitous in the graphic.

While the ATSB graphic is useful, it would have been helpful to have included an annotated diagram in the report which set out the actual flight track by location against time from an overhead perspective relative to the runways to get rid⁵ of the potential parallax error⁶ for the reader in the schematic in Figure 3 of the ATSB report where it is difficult to tell the track of the aircraft in the last 5-10 seconds of the flight.

Notwithstanding a potential parallax error from a reader's perspective, it would appear that the crash of the plane was sudden while YTM was negotiating a left hand turn possibly a return to the airfield given direction and descent. From the ATSB schematic it would appear that the plane was tracking SE before the fatal descent to the crash site some "...200 metres south of the last recorded position"⁷. The fact that the plane had started to descend relatively

⁵ How to prevent parallax error: <https://sciencing.com/prevent-parallax-error-10000073.html>

⁶ Parallax error is primarily caused by viewing the object at an oblique angle with respect to the scale, which makes the object appear to be at a different position on the scale. (Source: https://www.google.com/search?q=parallax+error+definition&rlz=1C1SQJL_enAU853AU853&oq=paralax+erro&aqs=chrome.2.69i57j0l5.9437j1j7&sourceid=chrome&ie=UTF-8)

⁷ Page 5 ATSB report

slowly, and then rapidly to impact some 200 metres later in an “inverted position” away from the direction of travel suggests to us some form of ‘catastrophic event’ involving the pilot given that the rest of the accident investigation turned up nothing that would indicate equipment failure⁸.

However, the ATSB has not entertained a catastrophic medical event for the cause of the accident such as sudden cardiac death⁹ (SCD) or sudden unexplained death syndrome (SUDS)¹⁰ which can lead to a rapid loss of consciousness out of the blue, and therefore in this case the loss of control of the aircraft. Both cardiovascular and cerebrovascular accident must be considered here. There are other possibilities but these certainly should, in my view, be at the top of the list. The conclusion to not consider such an explanation would seem to be based on the ATSB review of the pilot’s medical records and post mortem examination which did not identify “any acute or pre-existing medical condition”: *“A review of the pilot’s medical records and post mortem examination results did not identify any acute or pre-existing medical conditions that may have contributed to the accident”*.¹¹

Unfortunately, neither the medical records nor autopsy examination are included with the ATSB report allowing for independent scrutiny of the medical record of the pilot and the autopsy. In our view this evidence should have been made available even if in a redacted form, a significant oversight in this particular accident report

ABSENCE OF EVIDENCE IS NOT EVIDENCE OF ABSENCE

The expression ‘absence of evidence is not evidence of absence’ is a well-known aphorism in medicine and particularly in neurology. Just because there is nothing in the medical record or autopsy does NOT mean there is or has not been a problem. It is just that it hasn’t been identified. There can be many reasons for that outcome including lack of appropriate testing and limitations to the testing regime in place at the time, or in the case of massive injury potentially accompanying a catastrophic accident of this type, a lack of preserved material for review at autopsy.

We note with concern that the ATSB report does not appear to identify the age of the pilot which we understand to be 78 years of age at the time of the accident. Why that information is not available is not clear. Notwithstanding a Class 2 medical examination which the pilot had passed some 22 days previously [an examination not included in the ATSB report] there should have been a raised level of concern about the medical status of the pilot because of increased risks of vascular accident which come with age which might not have been picked up in the assessment. Coronary heart disease and cerebrovascular disease are the first and third leading underlying causes of death in the population in the 75 to 84 year old age group¹². Coronary Heart Disease increases rapidly with age—around 13 times as high in people aged

⁸ Page 40 ATSB report

⁹Schoppe, CH et al. 2015 Pathology of Sudden Natural Death Medscape 17 December.

¹⁰ “an otherwise healthy individual with no cause identified following a complete and detailed autopsy and death investigation” (see footnote 8)

¹¹ Page 40 ATSB report

¹² <https://www.aihw.gov.au/reports/life-expectancy-death/deaths-in-australia/contents/leading-causes-of-death>

75 and over as in those aged 45–54¹³. These conditions can cause acute loss of oxygen to the brain with consequent very rapid decline in consciousness and therefore capacity to act. In some cases of stroke a person may retain consciousness but be unable to act.

What the ATSB had to say about the accident

“.....the ATSB found that shortly after take-off, while in low level cloud, the pilot likely experienced a loss of visual cues and probably became spatially disorientated, resulting in loss of control of the aircraft and collision with terrain¹⁴”.

Certainly, the ATSB interpretation of the data is one which ought to be entertained given the circumstances at the time where the pilot was flying in poor weather. However, in our view, the behaviour of the pilot prior to landing at Mount Gambier, where he executed a number of successful and systematic manoeuvres which allowed him to put the aircraft on the ground in similar bad weather circumstances, would suggest that the ‘spatial disorientation’ factor is an unlikely explanation for the primary cause of the crash on take-off, and that other explanations needed canvassing.

The weather circumstances would most likely have increased the cognitive load on the pilot which could have also ramped up demand on his vascular system with concomitant potential for a vascular event leading to loss of consciousness or inability to act on the part of the pilot. In other words, spatial disorientation may have been a contributing factor to outcome but in our view a catastrophic vascular event must be considered as a likely main causal factor of the accident given the history of the event and the pilot’s age.

Recommendation

It is our recommendation that an *Amicus Curiae*¹⁵ be appointed to review independently the medical evidence relating to this accident and other accidents such as the Essendon Airport DFO crash¹⁶, and that in that review attention is not only paid to the medical evidence but also the epidemiology of ageing and risks of vascular accident and related clinical neuropsychology¹⁷ of brain/behaviour relationships which might help explain some of the clear risk taking associated with this accident and decline in performance associated with others. Further, review requires assessment through interview of others known to the pilot to ascertain whether or not there had been behaviour/cognitive changes noted in the pilot

¹³ <https://www.aihw.gov.au/reports/heart-stroke-vascular-diseases/cardiovascular-health-compendium/contents/how-many-australians-have-cardiovascular-disease>

¹⁴ Page 42 ATSB report

¹⁵ An *Amicus Curiae* is someone who is not a party to a case and may or may not have been solicited by a party and who assists a court by offering information, expertise, or insight that has a bearing on the issues in the case; and is typically presented in the form of a brief. (Source: Wikipedia)

¹⁶ https://www.atsb.gov.au/publications/investigation_reports/2017/aair/ao-2017-024/

¹⁷ Clinical neuropsychologists’ understand brain structure, function and dysfunction, and the effects of multiple factors on cognitive, behavioural and emotional functions. An assessment typically provides a detailed profile of a client’s cognitive strengths and weaknesses, and is recognised as a sensitive tool for the diagnosis of cognitive impairment, particularly in cases where changes in behaviour are subtle and not evident on CT scans. (Source: <https://www.psychology.org.au/for-the-public/about-psychology/types-of-psychologists/Clinical-neuropsychologists>)

prior to the event which may have been indicative of cognitive decline or increase in risk-taking often associated with decline in frontal lobe function¹⁸.

It is well known that there can be a decline in higher order cognitive capacity in the absence of obvious changes to ability to interact with others, or changes to a CT scan. Sometimes well-learned verbal skills in those with a high-level, cognitive skills can hide a multitude of cognitive deficits and concomitant neurological impairment which may not be picked up on medical examination. Having a chat with a someone for review doesn't necessarily tell you much about their other cognitive skill set or deficit.

One of the purposes for asking for an independent review is to determine whether or not there should be a higher level of scrutiny for those over the age of 70 as happens for road transport and heavy vehicle licence renewals in many countries and States in Australia¹⁹. And we ask the question whether that protocol should include a preliminary neuropsychological assessment for pilots carrying passengers beyond the standard medical review to examine higher order functions congruent with appropriate decision-making including capacity for assessment of risk in complex circumstances.

We have heard it said that the process of obtaining an IFR rating may act as an appropriate screening tool to sort out those with a cognitive problem but unfortunately success in gaining such a qualification may not necessarily rule out risk-taking behaviour or risk of sudden death from vascular accident. So, you can have someone who reaches IFR status only to find that they are still risk-takers. But at least they have the necessary skills to deal with the VFR into IFR problem identified in the ATSB report.

In our view the *Amicus Curiae* should also tackle the problem of risk-taking and identification of risk-takers for purposes of screening. Both the professions of medicine and related neuropsychology/psychology should be engaged for such a review.

Other shortcomings of the ATSB Report

We agree with others who have criticised the ATSB accident report with regard to its statistical analysis of occurrences and inappropriate comparisons showing that Angel Flight has much higher incidence of accidents compared with other groups. While it is legitimate to ask that question, it is important to have the correct methodology in place for such a comparison so that false conclusions are not reached. We will not canvas further criticism in this report in this area but will raise a matter which comes from this inquiry and others relating to aviation safety and which has been of concern for a long time to us and that is the nature of the risk model which the ATSB and CASA are using in their assessment of risk in aviation. The current model seems to be an affordable risk model for RPT where it has been decided that it is acceptable to have a certain number of accidents if the probability of accident is low, based on accident statistics. The problem with this model is that while it may be acceptable to allow say 4 accidents per million take off and landings, a political decision, the model cannot predict

¹⁸ For early writings on this topic consult A.R. Luria. *Higher cortical functions in man*. 2nd Edition Basic Books. New York. There is a vast

¹⁹ <https://roadsafety.transport.nsw.gov.au/stayingsafe/ontheroad-65plus/licences.html>

when those four accidents might happen. The assumption seems to be that it will be later and not now and that if it should happen, we will have to wear the cost!

Such a model is different from a risk model which says that we will do everything in our power to reduce the threat of risk to aviation which seems to be being applied in the case of Angel Flight. In our view CASA and the ATSB and the parent department need to spell out very clearly and consistently what model risk they are using across aviation. The reason for clarity not only relates to matters of equity of treatment but also to make sure that the public interest in being looked after appropriately so that risk minimisation is top of the decision tree and not economic consideration as would seem to be the case with risk management at our airports where development is encroaching on the safety of aviators, passengers and the public.

Finally, we note the recommendation that where possible, commercial flights be used for movement of patients. We agree but there are many factors which preclude this from happening in regional Australia where there are major problems using RPT including exclusion by airlines of certain kinds of patients. The author of this report has first hand experience of this problem and suggests that recommendations of this kind require much closer scrutiny particularly in view of the disadvantage for those living in the regions who have much poorer medical services delivery.

Summary Remarks

The ATSB report on the Angel Flight accident at Mt Gambier fails to entertain other explanations for the primary cause of the crash beyond the spatial disorientation hypothesis when, given the age of the pilot who was 78, other potential aged-related catastrophic events possibly of a vascular nature, should have been included in the evaluation process. Absence of evidence to support a medical problem does not necessarily mean evidence of absence of a medical problem. The fact that the pilot was able to successfully manoeuvre to a landing through inclement conditions not consistent with VFR would suggest that less weight should be given to this factor in the analysis and that it should possibly be treated as a contributing factor through cognitive load which could have increased the demands on his vascular system leading to a catastrophic event notwithstanding a Class 2 medical pass. Our report suggests that consideration now be given to more rigorous medical/neuropsychological assessments of pilots over seventy or 75 but ONLY following an independent *Amicus Curiae* report which examines in detail this complex area and the adequacy of current investigative procedures in ascertaining accident cause.

Our report also has concerns, canvassed by others, about the adequacy and appropriateness of the statistical analysis of accidents reflected in the ATSB inquiry into Angel Flight and the recommendations which flow from that. In view of the fact that VFR into IFR accidents are a problem across the board, a requirement for an IFR rating for Angel Flights might be a useful interim measure but this does not deal with the problem of those who are risk takers and the increased frequency of vascular events with age which might lead to catastrophic failure while at the controls of an aircraft as a lone pilot.

We are also not clear about the risk models being used by ATSB, CASA and the parent department in assessment of accident and accident risk. It would appear that different models are being used which in some cases may be putting the public at risk and disadvantaging others. We ask that a clear statement be made with regard to risk assessment for aviation and that this statement be assessed independently in the *Amicus Curiae*. Our particular concern relates to the fact that economic consideration may be being put ahead of public safety with regard to risks to aviation in certain circumstances. There does not appear to be equity in assessment of risk.

We are prepared to discuss our report if it would be useful in improvement of aviation safety in Australia.

A/Prof. Gordon Richard Gates, MSc., PhD.

President

Evans Head Memorial Aerodrome Committee Inc.