AUSTRALIAN SOCIETY OF AIR SAFETY INVESTIGATORS

QUARTERLY JOURNAL

Summer 2022

In this Issue

PRESIDENT'S MESSAGE

Summer 2022

Ladies and Gentlemen,

At last we have a way forward as we progress towards ISASI 2022, our premier international annual seminar. Thank you to the many respondents to our surveys who provided such valuable feedback to the executive team. We are now confident that we can meet the expectations of most members

You have indicated to us that you are comfortable with the ***hybrid*** seminar concept and, subject to any new Covid-19 variants, we are actively planning to gather at the Pullman Hotel in Brisbane between ***30th August and 1st September*** this year. Given the uncertainties with the current situation, we are anticipating the ASASI cohort to be supplemented by only a small number of physically present international delegates.

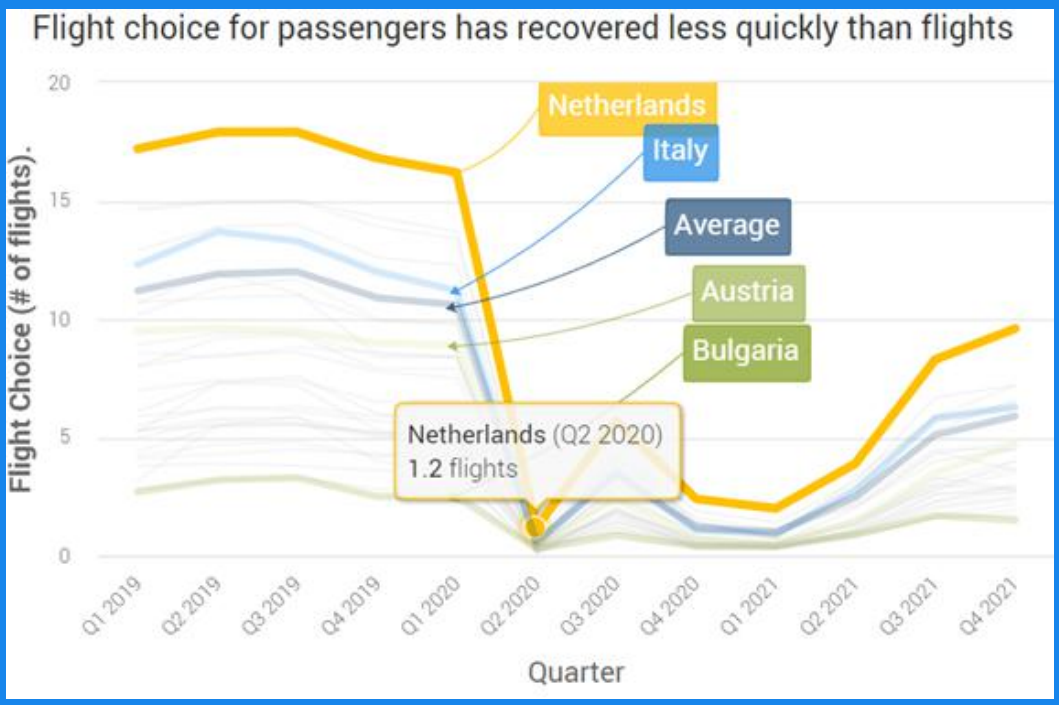
Our program is being structured such that international delegates who elect not to travel to Australia can participate via an interactive platform accommodating both real-time and recorded presentations. These will be designed to minimise the impact of time zone differences with the other international societies. The traditional *tutorial sessions* have been dispensed with for this seminar only and we are unlikely to be providing any companion program at this stage, however this may be introduced at a later stage subject to demand.

The formal ***Call for Papers*** will be broadcast presently so you might start thinking about what you might be able to present, individually or in partnership with others. There is no monopoly on good ideas so please utilise this opportunity to deliver some provocative thoughts, consistent with our theme of ***Current Challenges for Aviation Safety.*** There should be no shortage of subject material for this! Further details related to submission requirements, deadlines and other matters will be sent to you shortly.

There is a lot to be done in a very short time frame so please save the dates and spread the word throughout your part of our industry. It is our objective to deliver a world class seminar, despite the Covid burdens. There will be more information soon on registration processes and costings

Until next time, stay safe.

John Guselli
ASASI President



EUROCONTROL tracks the connectivity available to passengers through a set of connectivity indicators. These are people-focused, covering the whole journey, door-to-door: including travel to and from the airport, available flight connections and cancellations. They're calculated at the district-to-district level.

This Eurocontrol data snapshot focusses on flights recovering to 75% of 2019 levels, but for passengers, the choice of flights to their destination remains low.

The 'flight choice' indicator in the graph shows how many options you have, on average, to get to your destination. Roughly, it's how many options you would see in a booking screen: direct and connecting flights, using different airports and at different times on the day of travel, but ignoring the same flight offered by different carriers and filtering out long connection times.

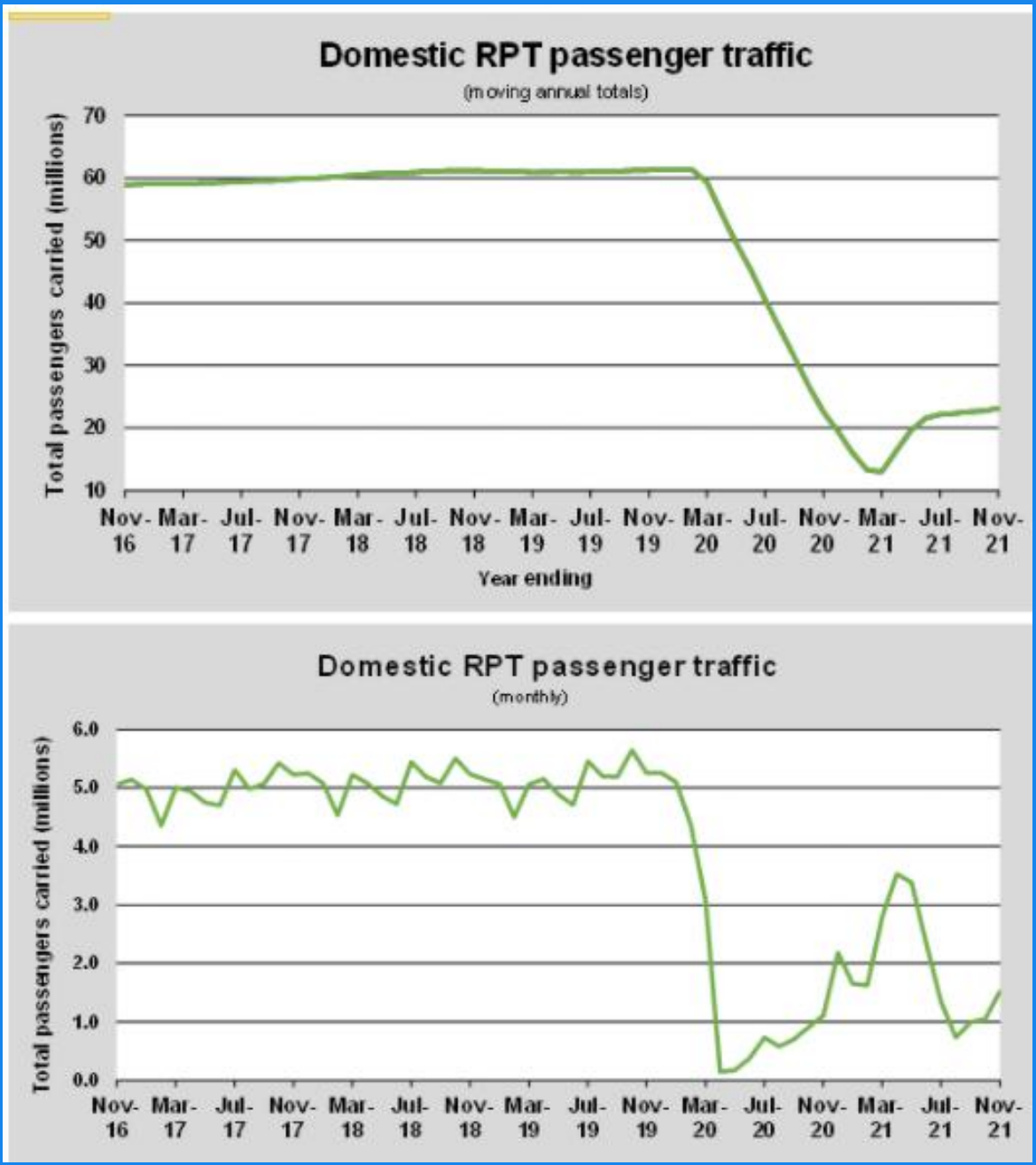
The four data points for 2019 (we calculate the indicators on quarterly samples), show that people in the Netherlands have the widest choice of flights for an average journey within Europe. This is because many of them can easily access Dutch airports, but some can also access airports in neighbouring countries, so they have plenty of options. Bulgarian residents are at the other end of the scale, with fewer of them having good access to busy airports.

As COVID-19 spread, connectivity collapsed by 2020Q2 (measured by 'flight choice' in June). Many routes were unavailable, and flight options were few for those routes that were served: the graph shows most countries with an average 'choice' of around 1 flight. The summer 2021Q3 recovery was short-lived, as it was for flights.

In 2021, the recovery has been more sustained. However, flight choice continues to lag behind the recovery in flights, on average reaching 54% of 2019Q4. For example, in Bulgaria flights reached 73% of 2019 in late November, while flight choice was only 59% of 2019. Similarly, the rich choice available to residents of the Netherlands remains more restricted: in 2021Q4, flights were at 79% of 2019 but flight choice was only 57% of 2019. Austria and Italy both have flight choice at 52% of 2019Q4, while flights are significantly higher at 60-65% and 78-79% respectively. For passengers, a full recovery in connectivity remains in the distance.

Meanwhile the State of Play in Australia

BITRE data (at November 2021 and prior to the Omicron strain) revealed that we were turning a corner. Unfortunately, our progress has been checked. The closed border situation in Western Australia has had a significant impact on all sectors.



For the month of November 2021, Melbourne – Sydney was Australia's busiest RPT route with 241.3 thousand passengers, followed by Brisbane – Cairns with 87.9 thousand passengers and Ballina – Sydney with 58.2 thousand passengers.

Brisbane was Australia's busiest domestic airport with 501.4 thousand passenger movements in November 2021, followed by Sydney with 410.4 thousand passenger movements and Melbourne with 335.4 thousand passenger movements.

In November 2021, there were 1.12 million domestic passenger movements through regional airports, compared to 0.93 million in November 2020 and 2.11 million in November 2019.

Is pilot skills fade another symptom of the pandemic?

By David Kaminski-Morrow24 January 2022

Almost inevitably, the operational and economic havoc wrought by the pandemic was, sooner or later, going to show up as ripples in air safety. The only real question was how large those disturbances might be.

Pilots' experiences submitted to NASA's confidential – and entirely voluntary – aviation safety reporting system might not have the analytical rigour expected from an investigation authority, but the narratives nevertheless give a convincing flavour of unintended consequences.

Source: Sorbis/Shutterstock

Procedural tasks such as following checklists can be relatively easy to forget

"The biggest threat to the flight was that I hadn't flown in a little over a year – zero hours. This was due to Covid-related reduction in flying at my airline," states a July 2021 submission from a Boeing 787 first officer, describing how they had commenced a take-off roll after misinterpreting the clearance given to a regional jet, and been told to abort by the tower.

"I haven't flown at [this airport] for a long time and had forgotten that they normally clear the smaller aircraft to take off before the heavy, due to wake turbulence," the pilot added.

NEW DISTRACTIONS

Other testimonies cite go-arounds with the wrong flap setting, or having difficulty hearing and understanding air traffic control, as a result of being out of practice for several months, or suffering the effects of fatigue brought on by unusual operating patterns.

Even as the pandemic set in, some cockpit crews recalled being preoccupied by concerns. One entry for March 2020 refers to an unstabilised approach caused when the captain, distracted, had to be prompted by the first officer after missing the need to extend the flaps.

"I realised at that moment that I was pondering the economics of this virus on our airline, and thinking about my fears of a furlough," the captain stated. "Had the first officer not said something, I really don't know how long I would have remained distracted... I never imagined that I [could] be distracted at such a vital time."

Researchers from Embry-Riddle Aeronautical University used the NASA database to analyse incident reports, covering the eight months before the pandemic and the eight months after, and found a "significant increase" in the number of events attributed to decreased pilot proficiency.

"Being legal to fly or complying with the minimum regulatory requirements... does not translate into being proficient," the research paper from February 2021 states.

"The present research determined that lack of practice will affect the pilot currency and proficiency during this pandemic. This might pose a risk and affect aviation safety when the demand for air service increases at a faster pace than the industry expects."

Concerns about this potential degradation of skills have started to emerge in formal investigations.

WORKLOAD WORRIES

French and UK investigators probed two serious instability incidents – almost exactly a year apart – respectively involving an Air France Airbus A318 bound for Paris Orly in September 2020 and a TUI Airways 737-800 descending towards Aberdeen in September 2021.

In both cases the inquiries indicated that prolonged absences from flying could have contributed to the aircraft's deviating from the correct flightpath.

French investigation authority BEA attributed the A318's instability to the crew's trying to manage high workload during a shortened approach to Orly. It stated that the captain – who had logged some 4,200h on A320-family jets – had undergone two simulator sessions but flown just 64h, including two take-offs and two landings per month as the flying pilot, over the six months before the incident.

Source: Air France

Air France A318 pilot had flown just 64h in the six months prior to unstable approach at Paris Orly

This amounted to a 75% reduction in normal activity, says the BEA, and a similar depletion level was noted for the first officer. Although the latter was also experienced, with 3,200h on A320s, he had flown only 70h in the same six-month interval. For most of the three or four weeks prior to the incident, neither pilot had flown at all.

French civil aviation regulator DGAC's safety arm, DSAC, analysed some 8,000 occurrence reports in various sectors over a 172-day period from 11 May to 30 October last year, finding that about 7% of them appeared to have a "causal link" with the pandemic and the low activity resulting from it.

Its analysis recommends several actions for aircraft operators, including making pilots aware of the risks of late changes in approach path – one of the contributing aspects of the A318 incident, during which the crew was left with a high workload and less time to reduce the twinjet's energy on descent.

The continuing crisis could lead to a "lasting erosion of skills", it adds, and operators should consider such measures as uniformly raising stabilisation thresholds to 1,000ft, as well as avoiding pairing pilots who have experienced similar levels of absence from cockpit activity.

Although the A318 event occurred after the worst trough of the pandemic crisis, during which the number of European flights dipped by more than 85%, the impact on cockpit skills remains a concern as the drawn-out recovery gradually brings more pilots back into line operations after a prolonged hiatus.

"Never before have so many people needed training all at the same time," says UK cockpit crew association BALPA, which has urged the country's government to provide funding to support this requirement.

REBUILDING RESILIENCE

"Piloting is a key example of a safety-critical job and those returning to the cockpit need to refresh their skills and rebuild resilience. Existing requirements for training and recency were not designed with such a prolonged slowdown in mind."

BALPA general secretary Martin Chalk says pilots' motor skills are "not easily forgotten", but adds: "The need to become resilient, to be able to prioritise and manage workload in the real-world environment, is more challenging and needs both practice and exposure."

The pilots of the TUI 737 involved in the Aberdeen incident – during which the aircraft deviated from its assigned altitude, entering an unexpected descent as it attempted a missed approach – had differences in their recency levels, says the UK Air Accidents Investigation Branch (AAIB), but both had experienced "significant periods without flying" in the previous 18 months.

It states, in a bulletin to raise awareness, that the captain had carried out 10 flights in the month prior to the event, while the first officer was flying for only the fourth time in almost 11 months, having completed two flights with a trainer a week earlier.

Source: AirTeamImages

TUI incident indicates lack of flying time can affect ability to deal with real-world challenges

"Both pilots had completed numerous simulator sessions during the [previous] 18-month period to gain or retain recency or to complete their annual recurrent check," the investigation adds.

The TUI incident exposed a weakness in the regulatory framework for maintaining crew currency.

Investigators point out that crews are required to complete three take-offs and landings within 90 days, in order to operate a commercial transport aircraft, but these can legally be undertaken in a full-flight simulator rather than under real operational conditions.

"Simulators have been used not just for the take-off and landing requirements but also to try and maintain crew skill levels when operating in both normal and emergency situations," says the AAIB.

But it recognises that simulators are limited in their ability to replicate high-workload stresses, such as those arising from constant air traffic communications, the presence of other aircraft, and weather conditions.

"It is possible that [the TUI 737] event illustrates that lack of recent exposure to the real-world environment can erode crews' capacity to deal effectively with those challenges," it adds.

"Although this investigation has not established a link between this event and a lack of line flying... a link is clearly one possibility."

The European Union Aviation Safety Agency (EASA) – jointly with the US Federal Aviation Administration, Eurocontrol, Thales and other aviation partners – highlighted the risks of skills degradation in an August 2021 safety analysis.

EASA stressed that reduced activity not only degrades skills but prevents development of further proficiency through practice and insight. A secondary concern of proficiency decay, it adds, relates to spare mental capacity – carrying out a task correctly demands more effort.

"In aviation, highly skilled personnel rely on spare mental capacity mechanisms to be able to perform a large number of tasks successfully without cognitive overload," the analysis states.

SIGNIFICANT RISKS

Declining proficiency can cause time-management problems, reduce situational awareness, and limit the pilot's ability to assess an emergency, it adds. "Cognitive overload decreases the ability to recover from startle and surprise effects which, in turn, further reduces mental capacity, due to a negative limbic brain response, when left unmanaged."

Pilots face a "highly prescriptive" and "procedure-heavy" environment, it says, which creates a significant risk of slips and lapses.

Source: Michael Gordon/Shutterstock

Pilots have reported difficulties in understanding communications from air traffic control

While complex competencies might be more resistant to decay, if sufficiently internalised, multi-step sequences can be more vulnerable. Procedural tasks, including

checklists, that require specific or declarative knowledge, can be more susceptible to skill decline than decision-making or psychomotor tasks.

"Cognitive shortcuts for procedures decay rapidly, requiring a significant increase in cognitive resources, in particular for procedures that are normally routine," the analysis says.

It highlights the risks of personnel either overestimating their abilities – "high experience alone is not enough for recency", it says – or underestimating them. The captain involved in the A318 incident at Orly, the BEA notes, had testified to wanting to "push himself" to assist with retraining, and the crew had a lack of awareness of the risks associated with continuing an unstable approach.

EASA also points out that, aside from being out of practice, crews potentially have other abnormal pressures – including job uncertainty, work-life imbalance, health concerns and financial strains – arising from the crisis, which can affect their operational capabilities.

The analysis acknowledges the pressure on training resources, particularly full-flight simulators, but argues that the pandemic offers a "timely opportunity" to advance alternative crew-training techniques and innovations in order to mitigate proficiency decay.

Offloading the simulator burden on to other lower-fidelity devices or media – such as virtual reality – can deliver the necessary training and, in some cases, allow the flexibility of remote learning. EASA adds that competency-based training to maintain proficiency, while more of a medium-term solution, is nonetheless effective in maximising the efficiency of simulator time.

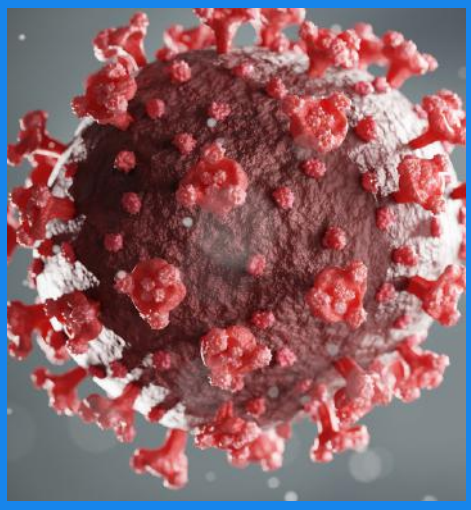
Carriers looking to reintroduce pilots to line flying should consider various strategies: reinforcing training with refresher information on matters such as cockpit preparation, enhancing startle training, and using a safety pilot for a few sectors to support crews returning to operations – while also avoiding assigning challenging routes to pilots with reduced recency.

Operators should also encourage pilots to engage in manual flying. EASA stresses that use of automation "should not be viewed as a mitigation against low proficiency".

Use of automation, it warns, puts "significant demand" on cognitive resources and could increase low-proficiency cognitive-load problems. It adds that automatic systems are still subject to potential failure and that crew must have the necessary skill to fly the aircraft safely by manual means.

Have you recovered from a Coronavirus Infection?

We continue to study daily statistics on infection rates, hospital admissions and sadly fatalities associated with the pandemic.



What about a situation when you might have it; but don't realise it? You could asymptomatic. This condition can be defined “when a person is infected with a virus and will never feel any symptoms at all,” You can feel fine but don't display any of the common markers of Covid-19 such as a lack of taste or smell, dry cough or fever. Despite that, you can still test positive and transmit the virus to family and colleagues.

CASA has recently published aviation specific guidance to help you if you have been unfortunate enough to contract COVID-19. It will help to identify:

- whether you can go back to aviation activities
- whether you will need further follow-up and support.

If you answer no to all of the questions, you:

- can return to your aviation duties
- do not need to be reviewed by a Designated Aviation Medicine Examiner (DAME)
- must continue to follow the relevant public health orders for your state or territory.

If you answer yes to any of the questions, you must visit a DAME before returning to aviation activities.

The checklist also has guidance about residual COVID-19 symptoms and when these warrant a review.

EXPLANATORY NOTES

Residual symptoms

Some people experience mild fatigue, muscle aches and headache for several weeks after recovering from acute COVID-19 illness. If there is no impact on your breathing, sleep or cognitive function, and you do not require medications (other than simple painkillers like paracetamol or ibuprofen), these residual symptoms should not prevent you from returning to aviation duties, as long as you comply with public health orders relevant to your state and/or your GP or DAME medically clears you for work.

If these residual symptoms last longer than 4 weeks after you have finished your isolation period, you must be reviewed by your DAME. If this applies to you, please consider whether you are fit to continue with aviation duties until you have been reviewed.

Coughing

An occasional or very mild cough immediately following COVID-19 is not likely to be a significant health concern. However, if you continue to have a cough for more than 4 weeks – even if it is very mild – you will need a DAME review.

Sense of smell

Being able to recognise a fuel leak, smoke or fumes is important for safety. You can assess your sense of smell and ability to detect similar pungent odours using common household products like household solvents (acetone or turpentine), smoke from a safe source, or kerosene. This requires only the ability to sniff and assess from a safe distance, eg removing the top of the bottle and being able to detect reliably.

Australian Government
Civil Aviation Safety Authority

Self-assessment checklist: Return to normal aviation duties after COVID-19

Please answer yes or no to each of the following questions.

QUESTION	YES	NO
Did your symptoms last for 7 days or more?	☐	☐
Did you require hospital-based care at home, or were you admitted to hospital (this does not include home care provided by your GP)?	☐	☐
Were you treated with antiviral medication?	☐	☐
Were you treated with steroid medication (inhaled, oral or intravenous/IV)?	☐	☐
Did you need oxygen support to breathe?	☐	☐
Did you experience symptoms affecting your heart or lungs (such as shortness of breath, coughing, dizziness, palpitations and chest pain)?	☐	☐
Did you experience any symptoms affecting your brain (such as dizziness, disorientation and 'brain fog')?	☐	☐
Did you experience any symptoms affecting your kidney function (such as abdominal pain and nausea that was severe enough to need medication)?	☐	☐
Did COVID-19 cause complications or other health issues which affected any other major organs?	☐	☐
Do you have any other medical conditions that have been made worse by COVID-19?	☐	☐
Have you experienced any ongoing difficulties such as an impaired sense of smell, breathlessness with exertion, or issues with your memory? (See the explanatory notes below for more information)	☐	☐

If you answered NO to all of these questions, you can resume aviation duties and do not need to be reviewed by a GP or DAME.

If you answered YES to any of these questions, you will need a DAME review before you can resume aviation duties, even if you have no symptoms or have recovered from COVID-19.

2201.4369

No Sign of 5G Interference in Australia - CASA

There's good news for those worried about the fierce debate in the United States about the impact of 5G signals on aircraft safety systems: there are no indications of similar problems in Australia.

The Civil Aviation Safety Authority (CASA) has been closely monitoring the issue and so far we've seen no evidence 5G transmissions are currently affecting aircraft in this country.
U.S. airlines and aircraft manufacturers raised concerns some time ago that a segment of the airwaves to be used by American telecommunications companies for 5G is too close to that utilised by radio altimeters that measure an aircraft's clearance height over terrain.
Measurements by the altimeters are used by other aircraft safety systems and there are concerns the rollout of 5G near U.S. airports would affect aircraft systems such as those used for automatic landings, wind shear prediction and terrain warnings.

While CASA and the Australian Transport Safety Bureau (ATSB) have urged pilots to report any anomalies with radio altimeters near 5G towers, they have yet to see any.

In fact, the ATSB says there have been no reports of radio altimeter incidents linked to 5G since the telecommunications technology rolled out 2 years ago.
One reason for this is that Australian 5G transmissions currently do not extend into the part of the spectrum worrying the U.S. aviation industry.
Radio altimeters operate in 4.2-4.4Ghz range and the 5G transmissions subject to the interference debate are in the adjacent 3.7-4.2GHz spectrum. Australian 5G transmissions currently top out at 3.7GHz, well below the radio altimeter frequencies.

CASA issued its latest airworthiness bulletin on the 5G issue on 17 January 2022. Both agencies are keen to hear from pilots who notice any spurious radio altimeter incidents occurring at altitudes below 2500ft above ground level. You can report any issues via our online form and at the ATSB

Four-year-old Sydney child orders $1,139 of gelato delivered to his father's work

Four-year-old Christian King used his father's phone to order to order more than $1,000 on multiple cakes and tubs of his favourite flavours from Messina on UberEats.

A four-year-old boy left his Sydney family gobsmacked after ordering more than $1,000 worth of gelato on a food delivery app, including a personalised birthday cake and tubs of his favourite flavours.

Christian King used his father's phone to order $1,139 worth of gelato and cakes from Gelato Messina on UberEats on Monday.

His father, Kris King, had given his son his phone to keep him distracted while his sister's touch football match was happening.

He said his son warned him he had "something on the way", but he didn't believe him until an UberEats delivery driver called his wife. It was at that moment he realised what was going on.

"First of all I thought it was $139. And then I really looked at it and it was $1,139 and we almost had a bloody heart attack.

"I flicked through the screen about 30 times. That's how long the order was, it was like 99 cakes." "He actually told me he ordered a birthday cake for himself, and I didn't even believe it.

"I had steam coming out of my ears first of all, screaming his name down the street. He ran to his room before I told him so."
King said the order included multiple cakes and tubs of Christian's favourite flavours from Messina.

"He ordered two of the tiramisu, two of the mushroom cake, the chocolate log, he chose the ones he wanted. He didn't just choose randomly.

“He also ordered eight or nine 1.5 litre tubs of strawberries and cream and double dolche gelato. It’s a little cheeky boy just ordering what he liked.”

Christian’s birthday is in January, but his father believed he was planning ahead.

“We order stuff off UberEats every day, and he’s obviously seen us do it all the time, but he’s never done it and submitted it. $1,200 later, it was a big shock to the system.”

The enormous order was delivered to Newtown Fire Station where King works as a firefighter and had last made an order. The firefighters on duty accepted the order and removed everything they had in the fridge to accommodate it.

UberEats agreed to refund the order when King and his wife explained what had happened.

“[UberEats] weren’t aware of anything wrong, but really we thought there should have been something in place. It was a very unusual order.

“We thought someone would question a $1,000 order of random things, and a personalised birthday cake that said happy birthday.”

King initially told his son Santa wasn’t coming this year as a result of the order, but it appears the situation has changed.

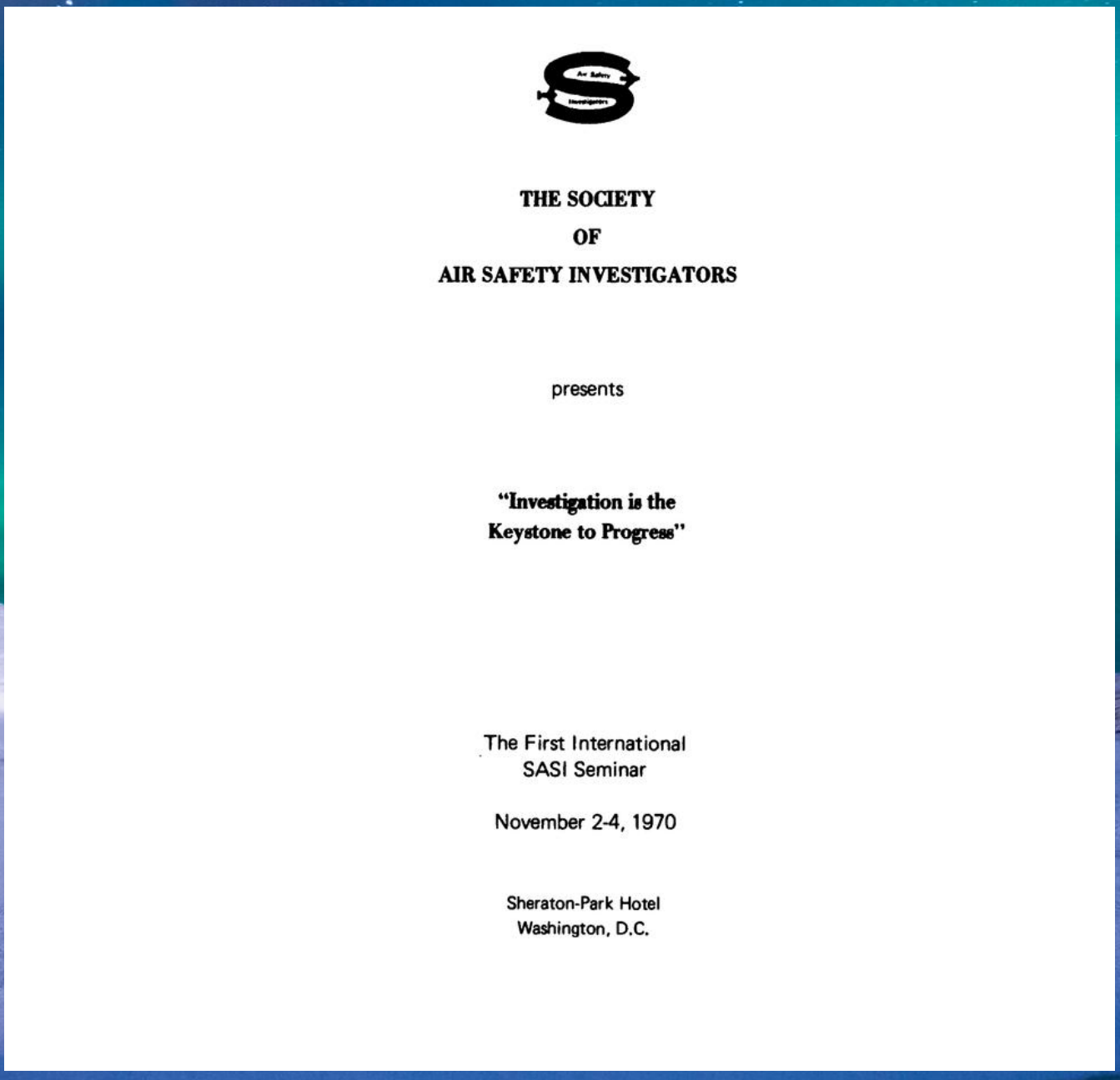
“The icing on the cake was when UberEats said we’ll give you your money back. He’s back in the good books and Santa is coming again.”

Just over 50 years ago, former ASASI member, the late ***Frank Yeend*** was invited to present at the first Society of Air Safety Investigators Seminar in Washington DC. He promoted a simple, but not widely accepted theme that a key facilitator of air safety investigation related to the importance of the incident report.

This event proved to be seminal in the formative stages of contemporary air safety investigation.

The list of speakers and delegates reads like a who's who of aviation safety.

It's also pleasing to note that the gender balance in our industry has been modified in the last fifty two years to incorporate more than just '*gentlemen*'.



THE SOCIETY

OF

AIR SAFETY INVESTIGATORS

presents

"Investigation is the Keystone to Progress"

The First International
SASI Seminar

November 2-4, 1970

Sheraton-Park Hotel
Washington, D.C.

Agenda

MONDAY, NOVEMBER 2

Registration 8:00-9:30 A.M.

9:30 A.M. **WELCOME ADDRESS**
Jerry Lederer, *President,* SASI
Russel Watts, ICAO
C. O. Miller, NTSB

10:35 A.M. **SESSION 1**
"Aircraft Accident Investigation . . .
Organization and Planning"
Moderator, C. O. Miller, NTSB

Panel Members:
Mr. R. Fawcett, Canada
Mr. Frank Yeend, Australia
Mr. W. H. Tench, United Kingdom
Mr. P. G. McCabe, Ireland
Mr. Roys Jones, AOPA
Mr. Richard Sliff, FAA

12:00 P.M. **LUNCHEON**
Speaker, Goerge Haddaway, Flight Magazine

2:00 P.M. **SESSION 2**
"Roll of Interested Parties
In Accident Investigation"
Moderator, Jerry Lederer, NASA

Panel Members:
Mr. G. C. Wansbeek, Netherlands
Mr. E. R. Banning, ALPA
Mr. W. Becker, ATA
Mr. Prater Hogue, Boeing
Mr. Roys Jones, AOPA
Mr. J. F. Rudolph, FAA
Mr. G. Haddaway, Flight Magazine

3:30 P.M. **SESSION 3**
"Accident Investigator's Role . . .
Public Relations and the Press"
Moderator, George Haddaway, Flight Magazine

a. "Government Viewpoint," Edward Slattery, NTSB
b. "Press Viewpoint," Jerry Hannifin, ASWA, and Robert Serling, Author

Panel Members:
Mr. Robert Serling, Author
Mr. Vernon Hougland, AP
Mr. W. H. Tench, United Kingdom
Mr. J. R. Greenwood, FAA

5:00 P.M. **ADJOURN**

TUESDAY, NOVEMBER 3

9:00 A.M. **SESSION 4**
"Typical Accident Investigation
and Associated Problems"
Moderator, Carl Christenson, UAL

a. "Accidents occurring in Populated Areas," Van Epps, NTSB
b. "Accidents Occurring in Mountainous Areas," W. Lamb, NTSB
c. "Accidents Occurring in the Sea," T. Saunders, NTSB

(Covers notification, on-the-scene investigation, security, search and recovery, and inquiry.)

10:30 A.M. **SESSION 5**
"Conduct of an Investigation
. . . Part I"
Moderator, Marion Roscoe, NTSB

Panel Members:
Mr. G. R. Baker, NTSB
Mr. P. Guillevic, France
Mr. Prater Hogue, Boeing
Mr. D. Madole, Attorney
Dr. Salas Parra, Venezuela
Mr. Donald Kemp, FAA

12:00 P. M. **LUNCHEON**
Speaker, David D. Thomas, FSF

2:00 P.M. **MOVIE**
Space Shuttle, NASA

2:30 P.M. **SESSION 6**
"Conduct of an Investigation
. . . Part II"
Moderator, B. Doyle, NTSB

Panel Members:
Mr. Lloyd L. Kelly, Singer/Link
Mr. M. Bates, Douglas
Mr. J. Childs, NTSB
Mr. R. Rudich, NTSB
Mr. B. Hopper, NTSB
Dr. Albert Cierbeij, FAA
Mr. Thomas Collins, FAA

5:00 P.M. **ADJOURN**

Reception — Banquet

Cocktails – 6:30 P.M. Dinner 7:45 P.M.

Guest Speakers:
Governor J. Reed, NTSB
Jerry Lederer, NASA

WEDNESDAY, NOVEMBER 4

9:00 A.M. SESSION 7
"Accident Reports . . . Development and Use, Collection, Recording, Retrieval and Dissemination"
Moderator, M. Hollowell, NTSB

Panel Members:
Mr. Russel Watts, ICAO
Mr. David Kelley, NTSB
Capt. M. D. Brandenburg, Germany
Mr. John Carroll, NTSB
Mr. J. Ralph Horn, FAA

10:30 A.M. SESSION 8
"Accident Investigator and His Problems"
Moderator, Frank Yeend, Australia

Panel Members:
Mr. Marion Roscoe, NTSB
Mr. Sam Parsons, NTSB
Mr. W. H. Tench, United Kingdom
Mr. C. Grimes, NTSB
Mr. Frank Yeend, Australia
Mr. A. M. Tibbs, FAA

12:00 P.M. RECESS

2:00 P.M. MOVIE
Aircraft Accident Investigation, Air Force Lunar Landing Training, NASA

2:30 P.M. SESSION 9
"Unusual Investigations and Programs"
Moderator, Frank Yeend, Australia

a. "Apollo 13 Investigation," C. McGuire, NASA
b. "Investigation of Wide Body Jets," E. V. Nelmes, NTSB
c. "Unusual Investigation Situations," Frank Taylor, NTSB

3:45 P.M. SESSION 10
"Special Problems Associated with International Accident Investigations"
Moderator, Robert Froman, NTSB

Panel Members:
Mr. R. Fawcett, Canada
Mr. Frank Yeend, Australia
Mr. P. Guillevic, France
Mr. P. G. McCabe, Ireland
Mr. S. Ohsawa, Japan
Dr. Salas Parra, Venezuela
Mr. W. H. Tench, United Kingdom
Mr. Donald Kemp, FAA

5:00 P.M. ADJOURNMENT

GENERAL INFORMATION

Exhibits	Maryland Suite
Message Center and Reception	Main Lobby
Seminar Sessions	Maryland Suite
*Luncheon & Banquet	Delaware Suite

Restaurants: In addition to dining facilities at the Sheraton-Park, there are several restaurants within walking distance of the hotel.

**Admission by Card Only.*

Seminar Staff:

C. O. Miller	*Seminar Director*
James Childs	*Deputy Director*
E. A. Goff, Jr.	*Program Chairman*
Robert Froman	*Co-Chairman*
Kenneth Scamahorn	*Registration*
Charles Connaway	*Coordinator*
Thomas Collins	*Membership*
Jimmy Behram	*Audio Visual*

SESSION 1

"Aircraft Accident Investigation ...
Organization and Planning"

MR. FRANK YEEND, Australia

Chairman Chuck and gentlemen: May I say first of all what a great pleasure it is to be here for the First International Forum of the Society of Air Safety Investigators; and to see once again so many of my old friends from many countries in such a delightful city as is Washington. I'd like also to join with Russell Watts in congratulating the Society on the initiative and foresight in sponsoring such a forum, and I hope and feel sure this is the first of many more such successful meetings. It is also a great honor for me to be asked to address, even for a short period, such a distinguished gathering as this. I hope that the experience of a very small country "way down under" may prove to be of some interest to you. My older friends will forgive me, I hope, if I attempt to render a slightly different version of what is nevertheless an old Australian theme in the field of air safety - the importance of the incident report.

You may ask how this fits the theme of organization and planning; but I can assure you that if in this field you are serious about accident prevention, you must claim and you must organize in some manner or degree, a system which will accommodate the incident report. No one really takes issue with the proposition that we could and should learn all about safety lessons from incidents, and that, ideally, is what we would all love to achieve. I don't think in my discussions over the years that I have encountered any one person who argues with this proposition. In the existing ICAO Manual of Aircraft Accident Investigation, it is spelled out very clearly - and we all know how long that manual has been in existence - so it is by no means a new thought. It is a matter of some small regret to us, in Australia at least to this point, that an expert team does not recognize the value of the incident report. But I feel that in time there will be some recognition of that, even in that Annex.

We have had a comprehensive incident report investigation in Australia now for 25 years. But I'm not up here to say that we've had a Utopian situation by any means. Although we've been at it for 25 years, we still haven't solved all the problems associated with the administration of such a system, and so I'm not going to suggest to you that "call on us chaps and all your problems will be solved." It is a most difficult administrative problem and we're still a long way from making it work well. But over the years, it has done a tremendous amount of good, and it has contributed significantly to our air safety record. We're proud of our record in Australia. In the most recent calendar year, we had 0.56 accidents in every hundred thousand hours flying, which we think compares favorably with the world figure. The other statistic which is sometimes used around the world is the figure of fatalities per hundred million miles. We were at 0.21 by comparison with the entire figure of 0.53. It's very hard to say how much of this is due to the existence of an incident reporting system, but we who work closely with this system are convinced that it is a very significant part in the achievement of our record.

You may be interested in the size of our operation in Australia. Some of you, or most of you perhaps, have not been there. But in comparison with the immense aviation industry in the United States, for instance, it is a small operation. Just to give you some feel for the size, let me say that we had - and here I refer, of course, to civil aircraft - as of the 30th of June this year, 3,729 aircraft on the register. In 1969-70, that was the fiscal year, we investigated 304 accidents, 30 of which were fatal, involving 70 fatalities. The number of incidents that we investigated in 1969-70 were 6,979.

The definition of an incident is a problem or matter which gives some people who have looked at this problem some concern. We have a very broad definition. In fact, leaving the legalisms out, we define it as an occurrence other than an accident which involves an aircraft and which jeopardizes the safety of its occupants or of other persons. The definition is as simple as that. As you can see, it's a broad definition to allow us a great deal of room for interpretation on the part of the person who might read an accident report and the persons who are going to deal with it. Nevertheless, pilots are encouraged by educational processes to report anything that they believe to be a matter affecting safety. Whether or not it fits the legal definition is not of great concern to us. If a pilot believes he has encountered a situation which affects safety, has affected his safety, and might affect somebody else's in the future, then we say, "Let us have a look at it and see what can be done about it." In so doing, of course, we do get a fair amount of chaff, but we get some grains of wheat in it as well, and this is what we're looking for. We do have, however, in Australia, a situation in which the reporting of an air safety incident is legally mandatory. We have a legal provision, and it might be interesting if I read the terms of it to you. It's Australian Air Navigation Regulation 2741, which says, and I quote: "Where an incident occurs to an Australian aircraft, the pilot-in-command, the owner, the operator, and the hirer, if any, should each be responsible for insuring that a written notification of the incident is furnished to the Director General within 48 hours after the occurrence."

I think I should note in the definition, first of all, that it refers to an Australian aircraft, and this, irrespective of whether it is operating in Australia or anywhere around the world, places the obligation upon the pilot, the owner, and the operator of an Australian aircraft involved in an incident. It has to be a written notification, and it's got to be to the Director General within 48 hours.

The point I'd like to make about this is, you will see, of course, that there is no room for these reports being anonymous in any sense. As an air safety investigator, I do get impatient at times with people who propose anonymous reporting systems. I feel that these must be people who have never had to investigate these things, because how can you possibly investigate an account when you have no recourse to the person who has given you the initiating information? In Australia, we don't believe that an anonymous reporting system can work effectively. Of course, there are reports that we should perhaps get that we do not get. And, so far, I cannot recall any legal or punitive action against a pilot for not reporting an incident. But nevertheless, most pilots, and most of us, have a very large conscience in the safety field. It does work psychologically on the pilot because he knows very well he has a legal obligation to report. If he is found out not reporting, then, of course, his conscience is the fact of his fellow pilots, for it appears that concealing a reportable event is a thing which lies very heavily on him. And

so, if you like, we have the pressure on the pilot to report, and he takes the risk of industry scorn if he is found out not reporting a reportable incident of some seriousness. Forms to report these incidents are widely distributed throughout the aviation network in the country, and pilots are encouraged to drop them at the nearest Department of Aviation post.

One important qualification of the compulsory, or legally compulsory, reporting system is that the Director General has publicly announced that if any pilot submits an incident report which reflects some deficiency in his own skill he will not undertake any punitive action against the pilot, either by way of prosecution or license action. So long as the pilot initiates the report, even though it might reflect some deficiency on his part, no punitive action will be taken by the Director General. This has been said by the Director General publicly and is understood by the pilot community in Australia.

Nevertheless, we still only get a small percentage of the total of reportable incidents. These constitute, for the most part, reports by pilots of things which they see other people do either to them or in the conduct of the airline system. It is still very difficult for us to get the type of report I was referring to a minute ago where a pilot will put his hand up and confess to a weakness in his performance for the benefit of others. This is still a very rare event, although a percentage of them are not very useful when they come. But for the most part, we get reports about the performance of other people. These illustrate weaknesses in our airlines' operations system. We are in this industry, of course, continually faced with new situations, changing situations, involving new aircraft and operating new types of aids over new routes. These usually generate problems which are reported to us through the incident system, and we immediately take steps to have these problems ironed out. We get the air traffic control and flight service people operating ground stations in Australia to participate in the same system. They initiate the reports themselves on the same piece of paper, and it comes into the system and is handled exactly the same way as it may come from a pilot. These reports, as I say, in a year 7,000 of them, come into our organization, and I suppose it's logical to look at what sort of organization we have to deal with these.

In the Air Safety Investigation Branch in Australia, there are six regional offices and a central office. We have a total staff of 40 persons. This is investigating persons, of course. In addition to that, there are supporting clerical and office staff as well, which probably amount to the same number again. Investigating officers amount to forty. This means, of course, by simple arithmetic, about one investigator to every 100 aircraft. We estimate that the handling of incidents in Australia involves about ten man years for 7,000 incidents. In other words, 25 percent of the total investigation in Australia is devoted to 7,000 incidents.

To conclude, the lessons that may be drawn from the Australian experience of the Ministry in this reporting system. Now first of all, it is not necessary to define an incident as precisely as some would have you believe. Secondly, we believe that an anonymous reporting system is

not the answer. It does provide some information, but it is completely frustrating from an investigation point of view. There are significant advantages, we believe, in a compulsory system, even though this may or may not necessarily lead to prosecutions. The vast majority of incidents demand very little time in investigation, but they provide useful statistics in many cases for useful study. Finally, the method that we have found most successful in getting the best response in incident reporting is by education, and we do this through the publications which I think most of you have seen.

Thank you very much, gentlemen.

During an evening temperature of 39 degrees Celsius, our editor vividly recalled an accident that occurred at Sydney Airport during the evening of February 21st 1980. This tragic event took the lives of all thirteen occupants.

Extracts from the formal investigation report (***802-1017***) prepared by the Air Safety Investigation Branch of the Department of Transport Australia, revealed a series of events which compounded to produce this disaster.

1 Factual Information

1.1 HISTORY OF THE FLIGHT

Beech Super King Air 200 aircraft, VH-AAV, was operated by Advance Aviation Pty Ltd, trading as Advance Airlines of Australia. The operator held a current exemption, under Air Navigation Regulation 203, to operate a regular public transport service without holding an airline licence. The holder of the certificate of registration for the aircraft was Landura Pty Ltd. At the time of the accident the aircraft was engaged in a scheduled service, designated Flight DR 4210, from Sydney to Temora and Condobolin, within the State of New South Wales. The scheduled departure time was 1845 hours.

At 1844 hours the pilot of VH-AAV contacted Sydney Airport Clearance Delivery by radio and requested his airways clearance. The airways clearance issued was a Standard Instrument Departure (SID), titled '25 Katoomba Two'. That SID specified that radar headings would be assigned after take-off from Runway 25. The pilot correctly acknowledged the airways clearance.

At 1848 hours the pilot contacted Sydney Ground Control and requested clearance to taxi. This was granted and the aircraft was taxied to the holding point for Runway 25. The pilot reported to Sydney Aerodrome Control at 1858 hours that he was ready for take-off. Due to other traffic, the aircraft was not cleared to line up until 1906 hours. VH-AAV then entered Runway 25 and stopped about 50 metres from the threshold. At 1907 hours VH-AAV was cleared to 'maintain runway heading, maintain 3000 (feet), clear for take-off'. This was correctly acknowledged and VH-AAV commenced take-off.

The aircraft became airborne and crossed the intersection with Runway 16/34, at a height of about 100 feet above ground level (AGL) at 1908:19 hours. The landing gear was retracted. Observers then noted the aircraft level off at about 150 feet AGL and commence a shallow banked turn to the left. As this was contrary to the departure instructions, Aerodrome Control was about to query the pilot when, at 1908:33 hours, he advised: '. . . we've lost er, the left engine. Request landing, ah, landing on runway three four immediately please.' This was acknowledged and Aerodrome Control cleared VH-AAV for a visual approach to a left base for Runway 34.

During these transmissions, VH-AAV continued its left turn through approximately 90 degrees, onto a southerly heading. It had maintained a height of about 150 feet AGL and the left propeller was probably in the process of feathering.

At 1908:44 hours, Aerodrome Control queried '. . . do you have the seven two seven in sight on short final.' At 1908:49 hours, the pilot of VH-AAV replied, 'Affirmative'.

The other aircraft referred to by Aerodrome Control was an Ansett Airlines of Australia Boeing 727, VH-RMO, which was on approach for Runway 34.

1

Shortly after passing over the shore of Botany Bay, VH-AAV entered a steady descent and then levelled off just above the water. The left turn was continued and the aircraft converged towards the western side of the sea wall enclosing the extension of Runway 16/34.

At 1908:50 hours, Aerodrome Control asked, '. . . will your approach and landing be normal.' The reply, eight seconds later, was 'Alpha Alpha Victor negative'.

At 1909:08 hours, Aerodrome Control activated the crash alarm system. In addition, VH-RMO was directed '. . . go around, correction, st . . . stay on the runway and expedite. We have a landing, er, right behind you . . . one engine out.' The initial direction was made prior to visually assessing the Boeing 727's situation, but when, during the transmission, it was noted that the aircraft was on the ground and well established in its landing roll sequence, the 'expedite' instruction was substituted.

At 1909:20 hours, Aerodrome Control cleared VH-AAV to land. This was not acknowledged.

The final segment of the flight was at an extremely low altitude and in a nose-high attitude. The right propeller, on at least one occasion, probably contacted the water and the tail either furrowed the water or induced a wake.

VH-AAV struck the sea wall in a nose-up attitude, banking to the left and skidding to the right. The left wing of the aircraft disintegrated. The resultant fuel spillage ignited and a 'fire ball' explosion occurred. The right engine and the outboard section of the right wing both separated and were thrown across the ground adjacent to the runway. The remainder of the aircraft bounced over the sea wall, landed inverted on a taxiway and slid backwards.

The accident occurred in daylight at 1909:22 hours. The elevation of the point of initial impact was 6 feet and the location was Latitude 33°58′ South, Longitude 151°10′ East.

1.2 INJURIES TO PERSONS

Injuries	*Crew*	*Passengers*	*Others*
Fatal	1	12	—
Serious	—	—	—
Minor/None	—	—	—

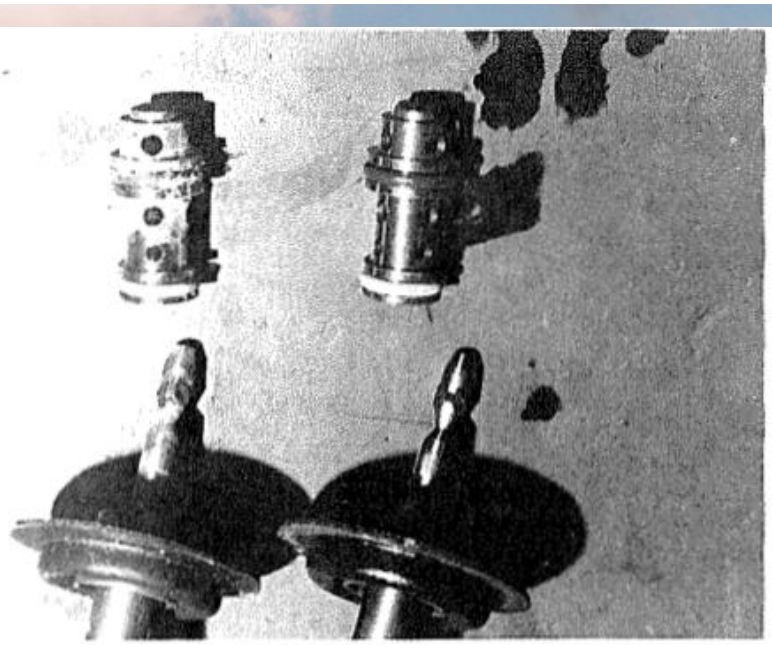
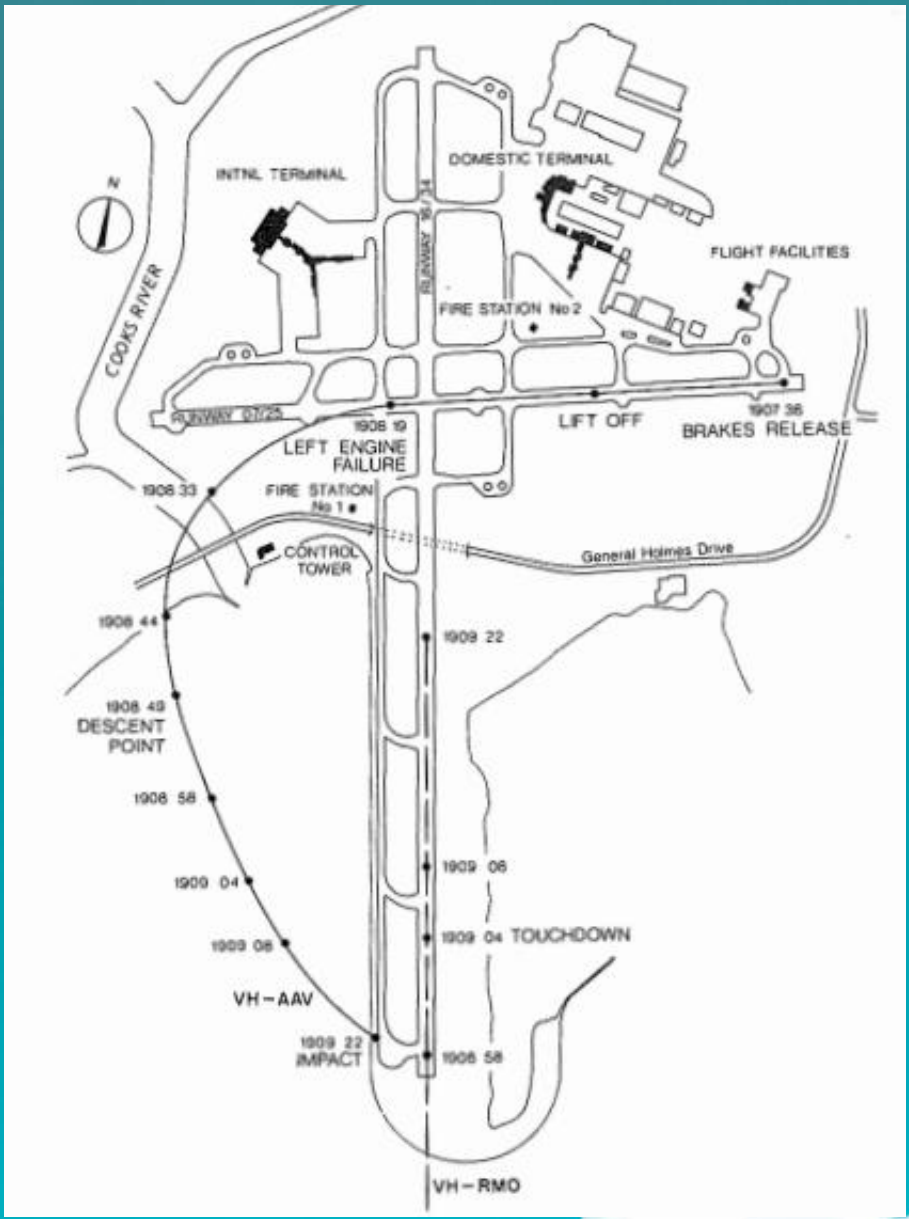


Fig. 4. Bypass valve and sleeve assemblies of left and right engine FCUs. The left engine components show considerable rusting and deposits. The gelatinous deposit on the left engine sleeve assembly has dried to a white powdery material.



3 Conclusions

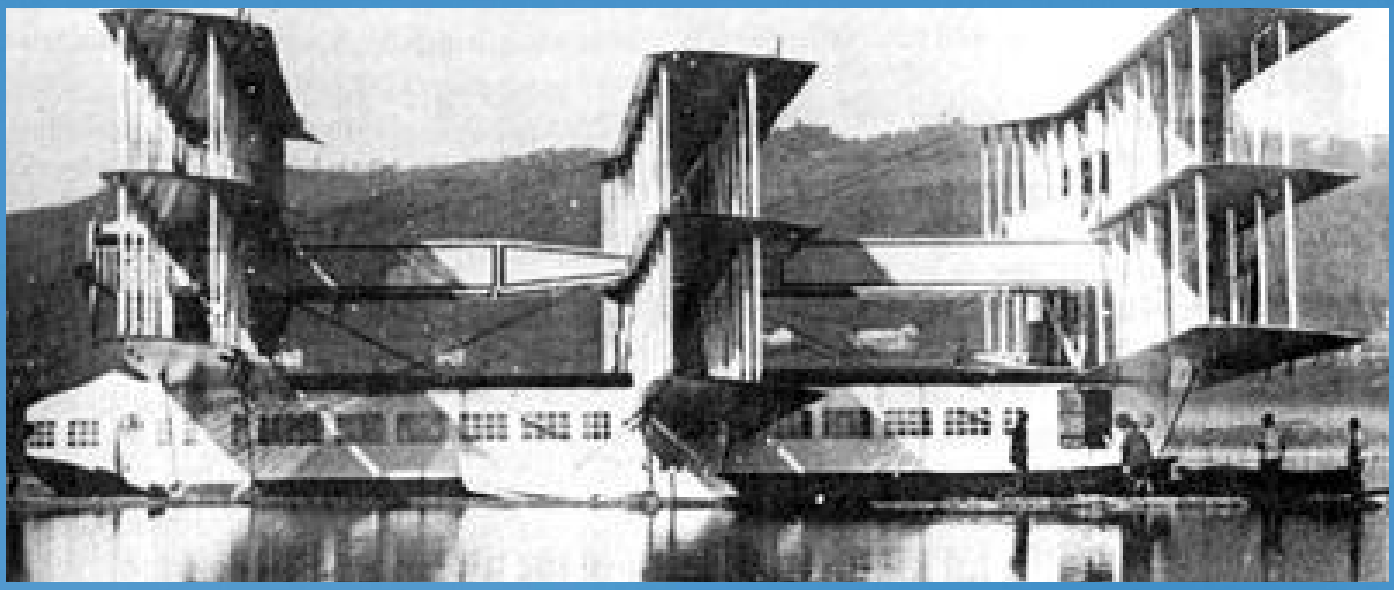
1. The pilot of the aircraft was appropriately qualified and licensed.
2. The air traffic control personnel in Sydney Tower were either appropriately qualified and licensed or, in the case of the two trainees, directly supervised by appropriately qualified and licensed personnel.
3. There was a current Certificate of Airworthiness for the aircraft. No evidence was found of pre-existing mechanical defect or malfunction that might have contributed to the accident.

4. During the preparation of aircraft loading documentation, the pilot employed a company practice in respect of standard passenger weights which was contrary to ANO 20.16.1 and had not been approved by the Department of Transport.
5. The aircraft operating weight used by the company did not make allowance for all the equipment carried on the aircraft.
6. Although details of passengers, baggage and freight were accurately compiled on appropriate manifests, the pilot used estimated figures for these loads when preparing the aircraft Weight Sheet, apparently rather than await completion of the manifests. The Weight Sheet incorrectly indicated that the aircraft was loaded within the maximum permitted limit.
7. The fuel load figure used by the pilot was in error by some 50 kg. The reason for this error could not be established.
8. The centre of gravity of the aircraft was within limits. Its weight at take-off was approximately 128 kg above the maximum permitted limit. This extra weight would have caused a reduction in the aircraft's performance capability.
9. Relevant airport facilities complied with prescribed standards. There was no evidence of defect or malfunction of these facilities which might have contributed to the accident.
10. The weather was fine, but the air temperature was 39°C and this would have caused a major reduction in the aircraft's performance capability.
11. The sun was six degrees above the horizon on a bearing of 249° magnetic. Although behind a thin layer of cloud, it still created a strong, diffuse glare that might have affected the pilot's vision during the take-off and initial flight from Runway 25.
12. The company's Operations Manual contained a requirement to take off at an ITT of 700°C instead of the Flight Manual limit of 750°C. This procedure was intended to extend engine life but insufficient consideration had been given to its effects upon aircraft performance under high weight and high temperature conditions and upon pilot workload in critical situations. The variation to the Flight Manual had not been approved by the Department of Transport, nor had a copy of the relevant Operations Manual amendment been provided to the Department.
13. A take-off at the company limit of 700°C reduced the power available by approximately 23 per cent and, under the ambient conditions, reduced the single-engine performance to a critical level.
14. Officers of the Department of Transport were aware of the unapproved practices in respect of standard passenger weights and reduced power take-offs but action had not been taken to regularise the company's operations.
15. Although the aircraft was equipped with an auto-feather system, it was company policy, in the interests of fleet standardisation, not to use the system.
16. The take-off was probably made with power set at the company limit of 700°C ITT.
17. At a height of about 100 feet AGL the left engine failed, probably due to the ingestion of water-contaminated fuel.
18. Following engine failure, the aircraft was levelled at about 150 feet AGL. It then entered a gradual turn with some 10–15 degrees angle of bank to the left.
19. During the turn, the pilot reported the left engine failure to Aerodrome Control and requested an immediate landing on Runway 34. He did not indicate that a critical situation existed or that an accident was imminent.

20. A Boeing 727 was on approach to land on Runway 34. This was drawn to the attention of the pilot of VH-AAV. In view of the relative positions of the two aircraft and the expected operation of VH-AAV, the Boeing 727 was allowed to continue its approach.
21. Shortly after turning through some 90 degrees and straightening, VH-AAV descended to just above the water of Botany Bay.
22. At this time, the pilot of VH-AAV, in response to a question from Aerodrome Control, reported that his approach and landing would not be normal.
23. The aircraft remained in flight, at an extremely low height and turning slowly to the left, until close to the extension of Runway 34. The right propeller then probably struck the water, the aircraft yawed left and struck the sea wall.
24. Following the pilot's advice that his approach and landing would not be normal, Aerodrome Control activated the crash alarm and instructed the Boeing 727 to go around. The situation was then reappraised and, as the Boeing 727 was on the ground and established in its landing roll sequence, a correct decision was taken to amend the instruction in order to expedite the landing and runway clearance.
25. The source of water contamination of the left fuel system of VH-AAV was not established but elemental analyses indicated the water had been present in the fuel system for some time.
26. The Beech 200 fuel system incorporates a number of sumps designed to trap the normal accumulation of water and prevent its ingestion by the engines. It could not be determined where the water in the left fuel system of VH-AAV had accumulated or by what means it travelled to the left engine.
27. It was not established whether or not the pilot had carried out a fuel drain check prior to the accident flight. It was, however, established that such checks had been regularly carried out, including two occasions on 21 February 1980, and no significant water contamination had been found.
28. The reason for the abnormal performance by VH-AAV was not determined, but was consistent with the right engine being operated at 700°C ITT and the use of 10–15 degrees angle of left bank, which would have placed the aircraft in a regime of negative climb potential.
29. At the time of engine failure, a high cockpit workload situation existed. This workload would have been significantly reduced had there not been the need to increase power, manually feather and use a hand-held microphone.
30. Airport emergency services promptly attended the accident and controlled the post-impact fire. This was not, however, a survivable accident.

4 Cause

The cause of the accidcnt has not been determined, but the most likely explanation is that the aircraft was operated in a reduced power configuration which, under the prevailing conditions, reudered its single-engine performance critical in respect to aircraft handling.



The ***Caproni Ca 60 Noviplano***, dubbed the 'Capronissimo', was an absurd aircraft which featured three sets of triplane wings set above a giant fuselage which resembled some sort of luxury houseboat.

The Caproni Ca 60 was designed by Count Gianni Caproni of Italy. Caproni was a prolific aircraft designer, and the Ca 60 was probably the most unusual of all his creations.

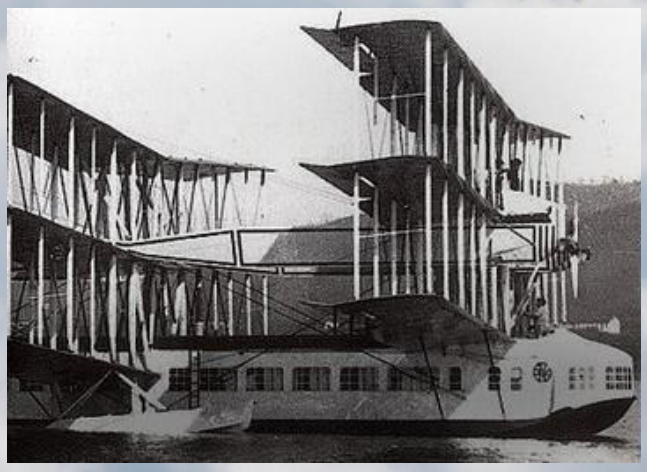
The Caproni Ca 60 was powered by eight 400 horsepower Liberty V12 engines. Four of the engines were mounted on the leading set of wings, while the other four were located on the third row of wings and helped push the aircraft along.

Originally it was hoped that the Caproni Ca 60 would carry up to 100 passengers back and forth across the Atlantic. However during the aircraft's first flight on 4th March 1921 it crashed back into the water after only reaching a height of around 60 ft (18 meters).

Fortunately the pilot survived the impact and partial breakup of the aircraft. Perhaps even more fortunately for the pilot - and any future passengers - he never had to fly it again as it caught fire and was completely destroyed while it was being rebuilt.

Caproni Ca 60 dimensions:

Length: 23.45 metres
Wingspan: 30 metres
Height: 9.15 metres
Weight: 26,000 kg



Rolls-Royce is building the world's largest airliner engine

The Trent Ultrafan

Howard Mustoe - The Telegraph, London

The Trent UltraFan will be 25 per cent more fuel efficient than its 1990s-era predecessor. It does so by being very big - its diameter is slightly smaller than that of a London Underground tunnel - and shifting more air through a larger fan, improving efficiency. Photo: Supplied

Buried deep inside the Rolls-Royce plant at Filton in Bristol is a bare brick room where the Olympus engines that powered Concorde and the Pegasus fans for the Harrier jump jet were put through their paces.

Now it is testing a generator the size of a washing machine drum designed to burn green fuels and produce enough electricity to power the passenger planes of the future.

The challenge is to radically reduce the amount of carbon dioxide produced by aviation. While carmakers and other industries can move at speed, the problem for planes is neatly summarised by Rolls-Royce's chief project engineer, Adam Newman. "If your hybrid Jaguar needs to pull over to the roadside, that's one thing, but things like that can't happen at altitude."

The Ultrafan engine dwarfs the regular engines on a testbed Boeing 747. Photo: Jonathan Green

Rolls-Royce plans to get around these issues by introducing more efficient jet engines for the next generation of passenger planes to cut the amount of carbon released per passenger per mile.

Its next model, the UltraFan, will be 25 per cent more fuel efficient than its 1990s-era predecessor. It

does so by being very big - its diameter is slightly smaller than that of a London Underground tunnel - and shifting more air through a larger fan, improving efficiency.

Theoretically another 20 per cent to 30 per cent of fuel efficiency can be squeezed out of the turbofan jet engine design, says Alan Newby, director of aerospace technology and future programmes, although size limits and high temperatures make that ever more challenging.

While aviation accounts for about 2.5 per cent of carbon emissions, flying is still limited to a relatively small proportion of the global population and the industry is under pressure to move towards zero emissions by 2050.

Step two is to move to greener fuels for existing engines. These will start as biofuels, but to make them greener synthetic fuels will be used.

"E-fuels" will be made using electricity from renewable sources to generate hydrogen, which will itself be bonded to carbon dioxide to produce aviation fuel. This fuel can be used in engines with a few modifications, mainly ensuring the seals still work, and Rolls hopes to have both existing and new engines using these latest fuels by 2030. As well as recycling carbon dioxide, the synthetic fuel produces fewer particles that are blamed for helping warm the Earth.

Along the way, airlines will seek to make shorter, more efficient routes rather than the dog-leg path they sometimes take today, and to reduce contrails, considered another warming factor as the soot combines with ice to retain heat from the planet.

The third step is the new technology the company is now developing, including its new generator. Strapped to a jet engine it can supply more than 800 amps of current at 3,000 volts AC, hence the inches-thick cables.

The idea is to act as a stepping stone technology, much like the hybrid of the car world. Rolls envisions a plug-in electric plane that can operate on battery power for some of the journey and then turn to fuel for the rest.

Theoretically another 20 per cent to 30 per cent of fuel efficiency can be squeezed out of the turbofan jet engine design.
As with cars, the sheer weight of batteries poses a challenge for aviation. And for a machine aiming to defeat gravity, this is a problem neatly summed up by Newby. "If I take kerosene as my reference point, weight for weight, hydrogen is three times better, batteries are 60 times worse," he says. "That's the challenge for batteries."

To put that in context, a long-range plane such as an A380 might have about a third of its weight taken up by kerosene-based jet fuel.

"Fundamentally that's the challenge. So that's why you will see all electric solutions at a smaller, shorter range at the moment. But what you can do is enhance that with some kind of hybrid solution."

The world's fastest all-electric vehicle, The Spirit of Innovation, reached a record speed of 622 km/h last month.

For smaller craft, including helicopter-style taxis, batteries are an option, especially as new chemical mixes are developed and the amount of power per pound of weight increases.

Rolls-Royce's single-seat battery-powered plane reached a top speed of 622 km/h in tests last month, making it the world's fastest all-electric vehicle. The Spirit of Innovation averaged 555 km/h over three kilometres, beating the existing record by 212 km/h.

The aircraft was powered by a 400kW motor with a battery pack that Rolls-Royce says has the best power density of any used in aviation. Breaking the record was very exciting, says Newby, "but for us, the attraction of that is learning how to integrate electrical motors and batteries, in particular, the thermal management of batteries" - that remains a big challenge.

The company is building on innovations like these to find quick solutions to each category of flight.

Back in the test centre at Bristol, the shiny metal generator is being put through its paces to ensure it meets the technical and safety demands of powering an aircraft carrying dozens of people.

Connected to an Allison 2100 turboprop engine, its performance is monitored from a room behind the test bed, gathering up to 2 million pieces of data per second as it scrutinises information on heat and vibrations.

Rolls made four of the machines as prototypes, taking three of them to pieces, one of which was tested "destructively", says Newman, in a bid to fully understand the generator. It plans for the hybrid to be made available for commuter and regional planes that seat up to 50 passengers.

As for hydrogen, storing the gas, keeping components cool and gathering enough of the stuff are all challenges that can be overcome in the long term.

The gas is seen as an attractive alternative because when burnt efficiently it produces only water as a by-product. Used in high-temperature environments like a jet engine, it can produce nitrogen dioxide, another gas policymakers want cut because it is linked to damage in lung health.

Companies such as ZeroAvia in Britain are developing hydrogen-driven smaller aircraft using fuel cells to generate electricity. But for Rolls-Royce, hybrids and greener fuels will be the stepping stone.

The biggest planes such as the Boeing 777 that have two aisles, will be a tougher nut to crack, says Newby. "Particularly in the near term, and almost certainly for the foreseeable future, for wide-bodies, you will need sustainable aviation fuel."

As well as acting as a range extender, the hybrid design gives aircraft designers many options. They can have more rotors driven by the same power plant, as splitting off cables for electric motors is far easier and lighter than installing gears to distribute mechanical power. The generator can also be used to give the plane an acceleration boost when needed.

The unit could even be used alone with no batteries if a fuel is developed that is zero-carbon

"We don't quite know how these markets are going to develop," adds Newby. "But what we're trying to make sure is we've got the technology building blocks in place, so that when the markets develop, we're ready to respond."

Renewables beginning to take off

- Aviation accounts for about 2.5 per cent of carbon emissions
- The industry is under pressure to reach zero emissions by 2050
- Rolls has made four prototype generators
- Strapped to a jet engine the generator can supply more than 800 amps of current at 3,000 volts AC
- It plans for the generator to be part of a hybrid solution for commuter and regional planes that seat up to 50 passengers
- Rolls-Royce's single-seat battery-powered plane recently reached a top speed of 387 miles an hour

Meet our New Members

In each edition we attempt to demonstrate the diversity of practical and academic expertise within our Society. For this Summer Bulletin, ASASI is delighted to introduce our newest members.

Each new member brings a different facet of specialisation to ASASI and we look forward to meeting them and sharing their experiences. Please make them welcome as we look forward to their individual contributions.

Tash Shayer

The ongoing ASASI partnership with *Women in Aviation - Australian Chapter (WAI)* has seen Tash awarded a complimentary membership for the 2022 year. We are delighted to have Tash join us.

She has provided us the brief background below in order to get to know her.

My intrigue for aviation developed as a teenager, when I was gifted a gliding joy flight for my 16th birthday.
Since then, I've enjoyed involvement in gliding and private flying, going on to work nearly 8 years as an AME for Virgin Australia after the successful completion of their Aircraft Maintenance Engineering Apprenticeship Program. This developed a healthy curiosity for the more investigative side of aviation and the search for a related role.
2021 presented the opportunity to be a part of *Sharp Airlines* as the Safety and Quality Coordinator, where I currently work on the analysis and rectifications required by safety occurrence reports within the company.

Tim Clark

Tim commenced his commercial airline career with the Ansett regional airline, Kendell Airlines and was even checked to line by one of our past members, the late Captain Ian Brown. He later joined *Qantas* on the Boeing 767 before taking up expatriate life in Hong Kong with Cathay Pacific on the Airbus fleet.

In 2012, he returned home to Brisbane to gain valuable experience in safety investigation and flight data analysis within *Virgin Australia* Safety Systems.

For the last five years, he has worked with the Australian Transport Safety Bureau (ATSB) as a Senior Transport Safety Investigator.

Are you Linked In?

If you are not already a member of LinkedIn then simply search for this **ASASI** group and click on 'Request to Join'. Our group administrator (currently Neil Campbell) will approve the request (in due course!). Alternatively, simply click the LinkedIn icon to be directed to our ASASI group. The current policy is that non-members of ASASI are allowed to join the group as this will allow us to reach out to more people with an interest in air safety and to better promote the society and events such as conferences.

A Town Like Alice

Those of us that have our motor vehicles valet parked are familiar with just handing over the keys. It's not quite the same experience at Alice Springs though.

Asia Pacific Aircraft Storage (APAS) stores Boeing 737, 777, 787; Airbus A320/321, A330, A350, A380; and ATR aircraft at its Alice Springs, Northern Territory facility. Alice Springs offers the perfect environment for the preservation of aircraft. The facility benefits from an arid desert environment characterised by an average year round humidity of approximately 25%, outside Australia's cyclone zone, low rainfall, and with low lying in situ vegetation providing additional dust suppression qualities.

Parked Aircraft

Engine Protection

Underbelly Protection

Wheel Well Protection

777 Storage

Fleet Varieties

Mining operators join BARS safety programme
Asian Aviation - 26/12/2021

The contract aviation industry is furthering the adoption of a single international aviation risk standard, with mining giants Mineral Resources (MRL) and SSR Mining joining the Flight Safety Foundation's Basic Aviation Risk Standard (BARS) Programme as BARS Member Organisations (BMOs). Prior to joining BARS, MRL and SSR Mining's operations utilised the services of a range of aircraft operators (AO) across the globe to transport their employees. As there are wide variations in how companies assess the safety of outsourced air operations, AOs are subject to multiple audits annually.

BARS Programme Director David Anderson said the Program is one of only three standards globally recognised in aviation and the only standard applicable for contracted aviation suppliers. "Implementing a single standard reduces the audit burden on the operator, provides consistency and standardisation, and saves both the mining sector and the aviation suppliers a significant amount of money and time," Anderson said. "Our standard comes from the industry, and we have become a conduit of collaborative information to promote safety among companies on the other side of the world, which is why we are so pleased to be seeing next year in with more Members on board for the BARS Programme."

Headquartered in Australia and USA respectively, MRL and SSR Mining's global footprint spans USA, Turkey, Canada, Australia, and Argentina.

SSR Mining Director Health, Safety and Risk, Andrew Lewin said he saw joining the Programme as an investment in improving aviation safety within the mining industry. "BARS provides an opportunity to raise standards across our aviation partners in managing the risk to our employees and contractors," Lewin said.

MRL Exploration Safety Superintendent Alistair Christie said backing a consistent and globally recognised aviation standard is aligned with the company's commitment to supporting the safety of its employees. "MRL's success is driven by our people, including our committed fly-in-fly-out workforce across our iron ore and lithium operations," Christie said. "We look forward to working with the Flight Safety Foundation to continue strengthening aviation safety across our business and the mining industry in general."

As BMO's MRL and SSR Mining and their aircraft operators will contribute audit and incident data to identify safety risks (non-conformities) and develop solutions to advance the safety of the contract aviation industry. The BARS Programme released data this year demonstrating that the onshore resource sector is on a downward trend in fatal accidents. The dataset includes all known accidents associated with the mining sector and covers all aviation activities, including passenger operations, aerial mustering, survey, helicopter sling loads, powerline construction and cargo.

Anderson said the downward trend demonstrates the impact of organisations implementing a consistent global standard. "The Flight Safety Foundation, through the BARS Program, is proud to be a part of this ongoing investment in improving aviation safety within the mining industry and the aircraft operators supporting this sector," he said.

Airservices and Skykraft to Trial Space-Based Surveillance and Communications

The rapid transition from terrestrial based communication and navigation systems to future systems continues to accelerate.

In the past, air safety investigators required some unique and sometimes unusual skills to get the job done. Based on the recent announcement by our national ATS service provider, it might also involve ***rocket science*** very soon.

Airservices Australia has partnered with space services company, Skykraft, to support the development of a space-based communication and surveillance air traffic management capability.

Under the collaboration, Airservices will share its air navigation technical engineering and air traffic management expertise to support design, development, and validation of the system, as well as support Skykraft to conduct space-based proof-of-concept trials of the satellite constellation from June 2022.

Airservices Chief Customer Experience & Strategy Officer Peter Curran said Airservices was increasingly looking to the integration of space-based technologies to enhance air traffic management services.

"This is a great opportunity to support an Australian company develop new sovereign capability that has the potential to provide near continuous surveillance reporting and higher fidelity communications that not only benefits Airservices and our customers, but the global aviation industry," said Curran.

"Space-based technologies provide significant opportunity to enhance safety, efficiency, predictability and capacity, while reducing overall infrastructure costs associated with the current ground-based networks."

Skykraft Executive Chairman ***Air Vice Marshal (retd) Mark Skidmore*** said the partnership would support the rapid maturation of Skykraft's satellite constellation which enables surveillance and communication with aircraft at all altitudes and across land and sea.

We look forward to continuing to work closely with Airservices to demonstrate Skykraft's capability to deliver commercial space-based surveillance and communication technologies for air traffic management," said Skidmore.

"Airservices' understanding of the ATM requirements and needs will help us design and develop the constellation, as we prepare a 300kg payload for a SpaceX launch in June 2022, to commence our proof-of-concept trials, and strive towards a constellation launch in 2023."

This collaboration builds on the December 2020 Memorandum of Understanding between Airservices Australia and Skykraft which saw the organisations establish how they will work together in a collaborative operating model.

Proposed amendments to TSI Regulations

The Australian Transport Safety Bureau (ATSB) is seeking views from the aviation and marine industry, and other interested stakeholders, on proposed amendments to the Transport Safety Investigation Regulations 2021 (TSI Regulations). The proposed amendments to the TSI Regulations are set out in the Exposure Draft for the Transport Safety Investigation Amendment (2022 Measures No. 1) Regulations 2022 (the Exposure Draft).

The Exposure Draft proposes to make the following changes to the TSI Regulations:

- For the purpose of accident and incident notification, aircraft operations are put into four categories (Category A, B, C and D) based on the types of accident and incidents they will have to report. Consistent with the Minister's Statement of Expectations to the ATSB, the greatest focus is on receiving reports where the information is most likely to be used for the greatest public safety benefit.
- Align aircraft operation categories and updating definitions consistent with flight operations rules administered by the Civil Aviation Safety Authority (CASA) which commenced on 2 December 2021.
- Align key concepts such as accident, serious aircraft incident and aircraft incident, as well as kinds of examples, with International Civil Aviation Organization (ICAO) equivalents as best as practicable.
- Removing prescriptive lists of individual kinds of incidents and defining occurrence concepts more broadly, with guidance material supplementing examples of matters to be reported.
- Clarify that certain aircraft incidents are to be reported as serious aircraft incidents, due to their relative importance in identifying safety risks.
- Clarify that occurrences during repositioning flights prior to conducting a passenger transport operation or non-passenger commercial operation are reportable as part of the planned operation.
- Prescribe additional persons who are responsible for reporting in the aviation industry (aircraft insurers and sport aviation bodies) and marine industry (pilotage service providers and vessel traffic service providers) to increase the ATSB's safety coverage.
- Improve ATSB's administration of the occurrence reporting framework by making other minor, technical or clarifying changes.

To assist readers, an unofficial compilation of the TSI Regulations incorporating the Exposure Draft amendments – as if it had commenced – is available for reference at ***https://www.atsb.gov.au/media/5780728/annex-1-unofficial-compilation-tsi-reg-2021-plus-2022-amendment.pdf***

To provide a holistic view of the proposed changes and how it might be implemented, a draft version of updates to the Aeronautical Information Publication (the AIP) is also available at ***https://www.atsb.gov.au/media/5780729/annex-2-aip-reportable-matters-2022.pdf***

The AIP is guidance material published by Airservices Australia and the ATSB has responsibility for updating content on occurrence reporting. In large part, it is not expected that the proposed changes will have significant impact on industry participants, which are already required to report occurrences to the ATSB by telephone and/or by written reporting. For the aviation industry, the alignment of aviation occurrence reporting terminology and concepts with CASA's flight operations rulesets will provide more, rather than less, clarity on how different kinds of aircraft operations are treated for the purposes of occurrence reporting.

The amendments are proposed to be made by 30 June 2022, which aim to provide 6 months of lead time before commencement on 1 January 2023.

Australian Government
Australian Transport Safety Bureau

We would like to thank our generous sponsors who have supported us despite the impact of COVID-19 on their organisations:

Macarthur Job Scholarship 2021

The ASASI - Flight Safety Foundation ***Macarthur Job Scholarship*** for 2021 has been awarded to Madeline Higgins, a Bachelor of Aviation student attending the University of Southern Queensland. Her paper, titled *The Impact of Pilot Currency and Recency on Aviation Safety during the COVID-19 Pandemic* was judged by the Foundation.

The ASASI - Flight Safety Foundation Macarthur Job Scholarship provides an annual allocation of up to AUD$2000 to support return travel, accommodation and registration at the annual ANZSASI Seminars held in Australia or New Zealand. (Details on the student area of the ASASI website).

Due to current COVID-19 complexities, this scholarship will be transferred to the ISASI 2022 Seminar to be held in Brisbane between 30th August and 1st September this year.

CASA Flight Safety Australia Scholarship

As a result of COVID-19 impacts on the academic institutions in Australia, no award has been made for the 2021 scholarship.

This scholarship will be carried over into the 2022 program. Further details will be provided during April.

ISASI 2022 Conference – Brisbane

The Pullman Hotel Brisbane will be our venue for the international conference between ***30th August and 1 September 2022***.

The conference will comprise three days of technical programs and focus on the theme of ***Current Challenges for Aviation Safety.***

Brisbane is a great venue and there are many options for social activities for partners. Further details will be provided later in the year.

Things to do in Brisbane

- **Moreton Island**
- **Story Bridge Climb**
- **Brisbane River Cruise**
- **Stradbroke Island**
- **Wheel of Brisbane**
- **Lone Pine Koala Sanctuary**
- **Tangalooma**

ISASI 2022
Brisbane Australia

"Current Challenges for Aviation Safety"

Call for Papers

ISASI 2022 will be a fully interactive "*hybrid*" conference for delegates to meet either face to face at the Pullman Hotel, King George Square, Brisbane, Australia or, to register and participate "on-line"

August 30 to September 1, 2022

The committee welcomes the offer of presentations that will address the challenges for contemporary aviation safety in the "new normal" including:

- *Recent accident/incident investigations*
- *Novel and new investigations techniques*
- *Data investigation and analysis*
- *Future technological developments for aviation safety*
- *Investigator training and contemporary selection criteria*
- *Wreckage recovery and analysis*
- *Developments in analysis and understanding of human performance with specific reference to pandemics*

Abstracts should include the author's current short CV and be sent to ***ISASI2022@isasi.org*** or if you have any questions ***pmayes@isasi.org***

April 20th Closing date for receipt of abstracts

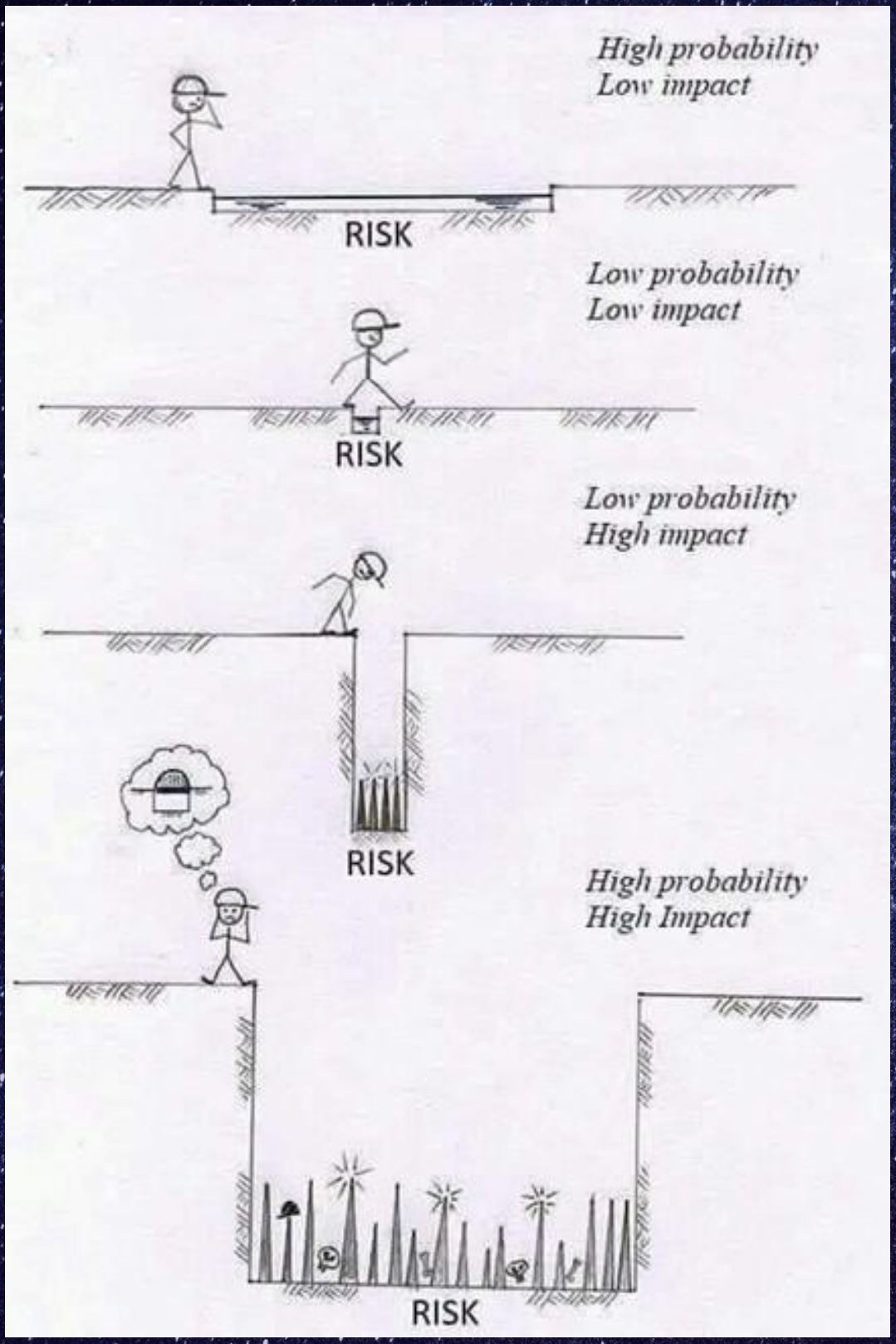
May 30th Presenters informed of successful selection and instructions for final papers issued

July 20th Completed paper and power point presentation required

A Simple Demonstration of Risk

How often have you been asked to give an interpretation of the concepts of risk management? Sometimes simplicity rapidly disappears and the topic becomes a scientific exercise with multiple formulae and big numbers.

This illustration translates the basic process without the bells and whistles. It could be useful.



ASASI Contact Details

President: John Guselli 0419 015684
Vice President: Alf Jonas
Secretary/Treasurer: Paul Mayes asasiexecutive@gmail.com
Email: contactasasi@asasi.org
Post: P.O. BOX 399 Bowral NSW 2576

Disclaimer: ASASI News does not endorse or guarantee the veracity of any items supplied from external sources to this journal.