



**Australian Government**

**Australian Transport Safety Bureau**

# In-flight break-up involving Cessna 210N, VH-TFT

237 km east-north-east of Katherine, Northern Territory on 24 December 2022

**ATSB Transport Safety Report**

Aviation Occurrence Investigation (Defined)

AO-2022-067

Preliminary – 27 March 2023

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#### Addendum

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# Preliminary report

This preliminary report details factual information established in the investigation's early evidence collection phase, and has been prepared to provide timely information to the industry and public. Preliminary reports contain no analysis or findings, which will be detailed in the investigation's final report. The information contained in this preliminary report is released in accordance with section 25 of the *Transport Safety Investigation Act 2003*.

## The occurrence

On 24 December 2022, a pilot from Katherine Aviation was assigned to operate a Cessna 210N aircraft, registered VH-TFT (TFT), on a charter flight from Gove Airport to Katherine-Tindal Airport, Northern Territory. The flight was arranged to transport a single passenger who was scheduled to be in Katherine over the Christmas period.

At about 0730 local time the aircraft was refuelled with 211 litres of Avgas 100LL. At about 0800 the passenger arrived at the airport in preparation for the flight. Radio transmissions recorded on the Gove common traffic advisory frequency (CTAF) indicated that, at 0812, the aircraft was being taxied for engine run-up checks, and at 0814 the pilot advised that the aircraft had commenced the departure roll on Runway 31. At 0817 a final transmission was recorded on the CTAF indicating that TFT had departed Gove on a direct track to Katherine-Tindal Airport and was on climb to a cruising altitude of 8,500 ft.

At 0841 the operator received a text message from the pilot advising an expected arrival time at Katherine-Tindal Airport of 1024. As the aircraft tracked toward Katherine, mobile phone tower tracing records identified that the aircraft first came into the detectable range of the Bulman cellular tower at 0914.

At 1044 the operator called the pilot's mobile phone and then at 1058 sent a text message seeking confirmation that the flight had arrived at its destination. When the operator did not receive a response, they checked with another company pilot who was stationed at Gove who confirmed that TFT had not returned to the departure airport. The operator then contacted several station properties along the expected route to check whether TFT had been sighted. At around midday, the operator contacted search and rescue officials and advised that TFT was overdue.

An airborne search and rescue response for the aircraft was commenced by the Joint Rescue Coordination Centre (JRCC) that afternoon. On 25 December 2022, at about 1345, a debris field was located by a search aircraft in a remote area of medium-density bushland, approximately 237 km east-north-east of Katherine (Figure 1). Both occupants were fatally injured and the aircraft was destroyed.

**Figure 1: Satellite view of the Northern Territory showing the location of the accident site**



Source: Google Earth, annotated by the ATSB

## Context

### ***Site and wreckage***

The ATSB initiated a field-based investigation following notification from the JRCC that the aircraft wreckage had been located. ATSB investigators attended the accident site on 29 and 30 December 2022. The ATSB's on-site examination of the wreckage and accident site identified that:

- the right wing and its wing tip (which was not attached to the wing) were the first major components in the wreckage trail
- the right wing was located approximately 300 m before the primary point of ground contact, indicating that it had separated from the aircraft fuselage during flight (Figure 3)
- severed tree branches and ground scars were consistent with the aircraft having a trajectory of approximately 35° down from horizontal immediately before colliding with terrain
- almost complete fragmentation of the aircraft structure had occurred on impact with trees and the terrain
- aircraft components were spread over a distance of 80 m from the primary ground contact point. The propeller, engine, left wing, carry-through structure, empennage, nose gear and cabin components were all identified in the wreckage trail
- the general orientation of the wreckage spread was in a north-east direction, opposite to the intended flight path to Katherine-Tindal
- all major sections of the aircraft's structure were accounted at the accident site
- flight control continuity was established where possible
- the wing flaps were assessed to have likely been in the retracted position
- the landing gear was likely in the retracted position
- there was no cockpit voice or flight data recorder, nor was there a regulatory requirement for them to be fitted to an aircraft this size

- the aircraft was not fitted with ADS-B out or in-flight satellite tracking equipment and the aircraft was beyond the range of air traffic control radar.

**Figure 2: Aerial view of the accident site showing the spread of wreckage**



Source: ATSB

**Figure 3: As found position of the right wing approximately 300m from the main wreckage**

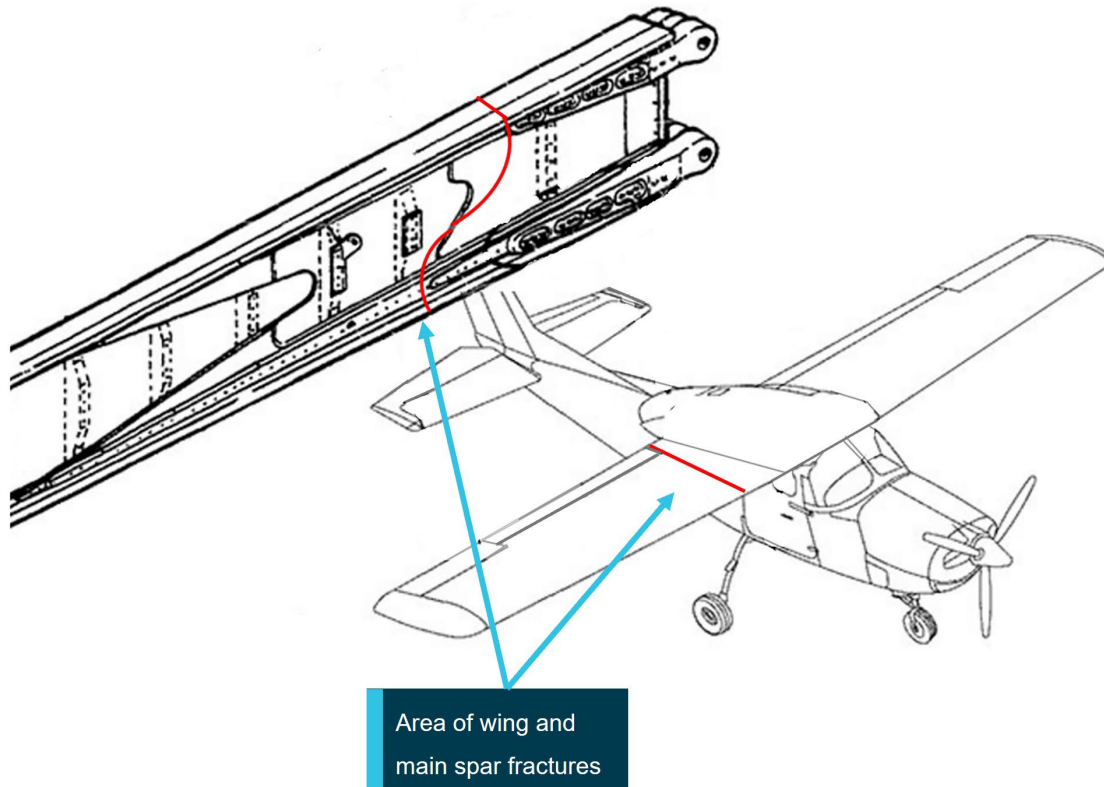


Source: ATSB

**Wing inspection**

The right wing and its wing tip were the first items located in the wreckage trail. On-site examination of the main wing spar identified that it had fractured diagonally, about 30-60 cm from the inboard fuselage attachment points (Figure 4).

**Figure 4: Illustration of the Cessna 210 and the wing and main spar fracture location**



Source: Textron – annotated by the ATSB

Examination of the right wing showed extensive permanent deformation of the wing surface with associated compression rippling to the upper skin. The damage was indicative of substantial upward bending forces applied to the wing prior to its failure and separation from the aircraft (Figure 5).

The inboard end of the right wing-spar remained attached to the fuselage carry-through structure. The left wing remained attached to the carry-through and was located within the primary wreckage area. Examination of the fracture surfaces from the right wing-spar identified evidence of ductile overstress. The on-site assessment did not identify any regions of fatigue cracking or other pre-existing damage that might have weakened the spar caps, straps, or web.

The outboard tip section from the right wing was found about 70 m from the right wing. Black contact marks on the tip surfaces indicated that the outboard tip impacted the rubberised leading-edge protection on the tail during the break-up sequence.

The inboard end of the right wing-spar and the corresponding fracture surfaces from the separated right wing were retained for further detailed examination at the ATSB technical facilities in Canberra.

**Figure 5: Separated right wing assembly showing damage associated with significant upward bending forces**



Source: ATSB

***Propeller assembly***

On-site inspection of the propeller identified that the propeller hub had separated from the engine crankshaft due to overstress fracture under predominantly bending loads. One propeller blade had fractured from the hub at its base. All of the blades had sustained forward bending and rotational abrasion damage. One of the blades displayed chordwise twisting and compound bending. The damage signatures indicated that the engine was likely to have been driving the propeller with significant power when the aircraft collided with terrain.

**Figure 6: Propeller assembly as removed from the ground impact crater**



Source: ATSB

### ***Aircraft***

VH-TFT was a 210N, manufactured in the United States in 1978 by the Cessna Aircraft Company and first registered in Australia in 1989. The aircraft was capable of seating six-people including the pilot and had been designed with a high cantilever wing and a single-engine operating a variable-pitch three-blade propeller. The aircraft was equipped with retractable tricycle landing gear.

The operator’s maintenance records indicated that the aircraft had accrued about 15,100 total flight hours. The most recent scheduled maintenance was a 100-hourly inspection that was completed in accordance with the Civil Aviation Safety Authority maintenance Schedule 5, about 2 months (95 flight hours) prior to the accident. A number of detailed wing inspections were conducted during the last 100 hourly. They included:

- Federal Aviation Administration Airworthiness Directive 2012-10-04 (*inspection for cracking of the main spar lower cap*)
- Cessna Special Inspection Document (SID) operation 33 – *Inspection of the wing lower spar cap*
- SID operation 35 – *Inspection of the carry through spar lower surface*
- SID operation 37 – *Inspection of the wing spar carry through attachment lugs.*

A maintenance release was issued in the night visual flight rules and charter operational categories. The current maintenance release was found in the aircraft wreckage with the daily inspection certified on the day of the accident. No defects or overdue maintenance were recorded on that document.

### ***Weather and environmental information***

The Bureau of Meteorology (BoM) advised that, on the morning of 23 December 2022, the day prior to the accident, tropical cyclone Ellie crossed the coastline to the west of Darwin and tracked to the south. Later that evening, Ellie was downgraded to a tropical low, however heavy rain and



strong to damaging winds were expected to impact large parts of the greater Northern Territory top-end.

BoM analysis of satellite imagery<sup>1</sup> indicated that on the morning of 24 December 2022, convective cloud started to develop along the expected flight path of the aircraft, near to the accident site. At around 0900, the cloud development strengthened into thunderstorms, with the first observations of lightning recorded between 0940 and 0950. The satellite imagery in the vicinity of the accident site is shown in Figure 7 and Figure 8. That imagery showed the formation of a thunderstorm near to the accident site from about 0910 and its progression through to 1000. The system persisted for several hours after that initial formation.

The BoM further advised in their analysis of the weather conditions that a thunderstorm could result in severe turbulence, severe icing and wind shear with outflows of strong and gusty winds, not only in the immediate vicinity but also at some distance away from the storm. An automated weather station at Bulman, approximately 20 km to the south of the accident site, recorded 12.4 mm of rainfall between 0930 and 1030 that morning.

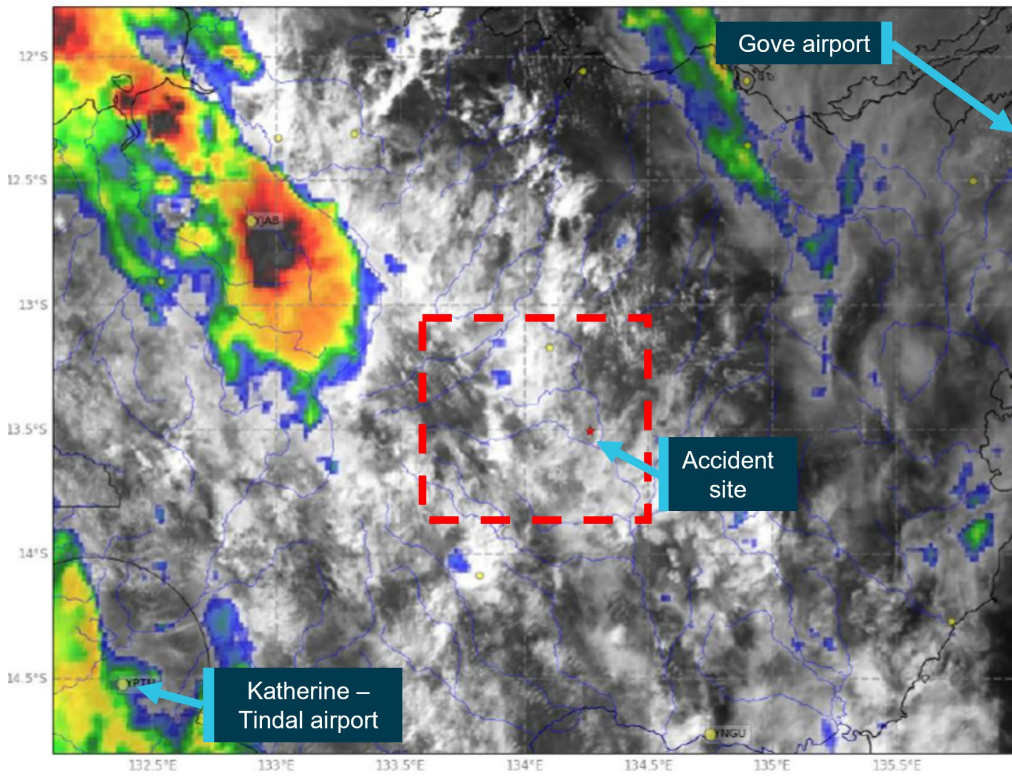
The development of the severe weather was consistent with the forecast conditions in the Northern Territory Graphical Area Forecast (GAF) that was issued by the BoM at 0135. In the region of the aircraft's expected flight path the GAF predicted cloud coverage between 5 and 7 oktas<sup>2</sup> at the accident site location around the time of the accident, with an effective ceiling of 1,000 feet above ground level (AGL). There were no breaks predicted between subsequent cloud layers, with cloud tops predicted to be the same as each subsequent cloud base to above 10,000 ft AGL. Further, areas of heavy and moderate rain were predicted with reduced visibility between 500 and 2,000 metres from convective clouds including towering cumulus and cumulonimbus, each with associated severe turbulence.

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<sup>1</sup> Satellite images were processed by the Bureau of Meteorology from the geostationary meteorological satellite Himawari-8 that was operated by the Japan Meteorological Agency

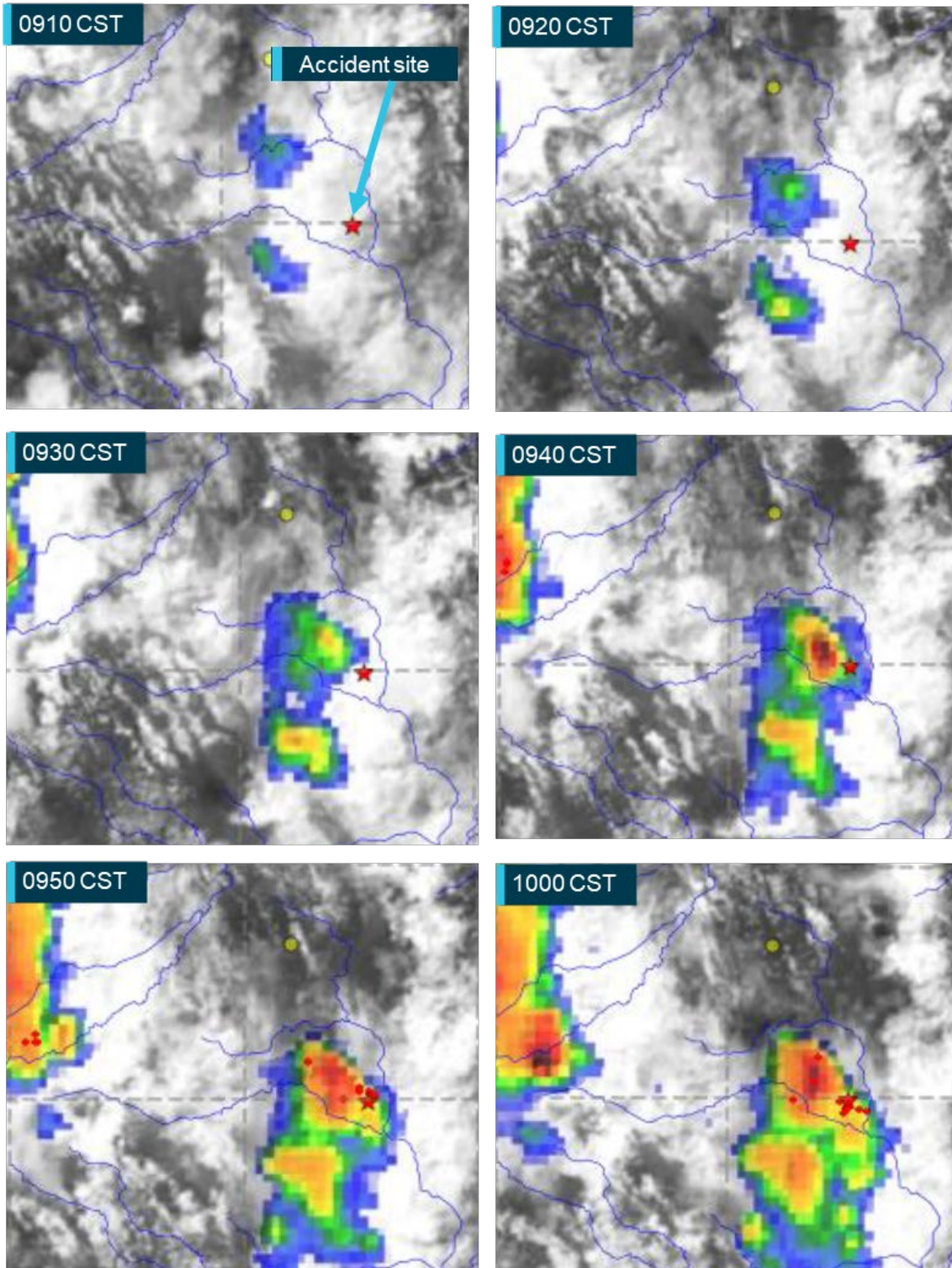
<sup>2</sup> Cloud cover observations are measured in oktas (eighths). A completely clear sky is recorded as zero okta, while a totally overcast sky is 8 oktas. Any trace of blue on an otherwise cloudy sky is recorded as 7 oktas.

**Figure 7: Weather satellite imagery showing cloud and convective activity over the region of the accident site at 0900. Subsequent changes in convective activity (within the boxed region) are further highlighted in Figure 8**



Source: Bureau of Meteorology, annotated by the ATSB

**Figure 8: Close-up montage of satellite imagery and convective activity overhead the accident site from 0910 to 1000**



Red dots in the above images at 0940 Central Standard Time (CST), 0950 CST and 1000 CST are recorded lightning strikes. The accident site is represented by a red star.  
Source: Bureau of Meteorology, annotated by the ATSB

### ***Pilot information***

The pilot commenced their flight training in June 2021 and in late January 2022 they obtained a commercial pilot license (aeroplane). The pilot obtained a multi-engine aircraft instrument rating in February 2022. The pilot also held a Class 1 aviation medical certificate, valid until May 2023.

The pilot commenced flight training with Katherine Aviation in August 2022, completing 14 proficiency flights in a Cessna 210 during the induction period and passing the company line check on 20 September. The pilot was then employed by the operator, completing passenger-carrying charter flights from Katherine-Tindal to remote locations within the Northern Territory top-end (totalling 76 hours). At the start of December, the pilot was restationed to the operators base in Gove, East Arnhem, completing an additional 45 hours until the day of the accident. They had recorded a total of 364 flying hours before the accident flight.

### ***Witness information***

The expected track for the flight between Gove and Tindal-Katherine was over remote sections of the Northern Territory. No witnesses to the accident have been identified.

### ***Audio information***

Examination of the recorded CTAF radio transmissions for Gove on 24 December 2022 revealed 3 transmissions from the pilot:

- during the ground run-up checks
- during taxi for departure
- shortly after take-off.

No additional recordings regarding the operation of the flight have been identified.

### **Further investigation**

To date, the ATSB has examined the accident site and wreckage, interviewed personnel associated with the operation of the aircraft, collected meteorological and air traffic control radar data, and reviewed the aircraft maintenance and pilot records.

The investigation is continuing and will include further review of the:

- aircraft wreckage and recovered electronic devices
- environmental influences including analysis of the meteorological data
- pilot qualifications, experience, and training
- operator training policies and procedures
- passenger records
- similar occurrences in Australia and internationally.

Should a critical safety issue be identified during the course of the investigation, the ATSB will immediately notify relevant parties so appropriate and timely safety action can be taken.

A final report will be released at the conclusion of the investigation.

### **Acknowledgements**

The ATSB acknowledges the assistance provided by the Bureau of Meteorology, Airservices Australia, the Northern Territory Police Force and Heli-Muster Pty Ltd in supporting the ATSB's onsite team, and for providing information through the evidence collection phase of the investigation.

# General details

## Occurrence details

Date and time:	24 December 2022 – between 0930 and 1030 Central Standard Time	
Occurrence class:	Accident	
Location:	237 km east-north-east of Katherine, Northern Territory	
	Latitude: 13° 30.473' S	Longitude: 134° 15.569' E

## Aircraft details

Manufacturer and model:	Cessna 210N	
Registration:	VH-TFT	
Operator:	Katherine Aviation	
Serial number:	21063448	
Type of operation:	Charter	
Activity:	Passenger	
Departure:	Gove Airport	
Destination:	Tindal Airport	
Persons on board:	Crew – 1	Passengers – 1
Injuries:	Crew – 1 fatal	Passengers – 1 fatal
Damage:	Destroyed	

# Australian Transport Safety Bureau

## About the ATSB

The ATSB is an independent Commonwealth Government statutory agency. It is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers.

The ATSB's purpose is to improve the safety of, and public confidence in, aviation, rail and marine transport through:

- independent investigation of transport accidents and other safety occurrences
- safety data recording, analysis and research
- fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia, as well as participating in overseas investigations involving Australian-registered aircraft and ships. It prioritises investigations that have the potential to deliver the greatest public benefit through improvements to transport safety.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, international agreements.

## Purpose of safety investigations

The objective of a safety investigation is to enhance transport safety. This is done through:

- identifying safety issues and facilitating safety action to address those issues
- providing information about occurrences and their associated safety factors to facilitate learning within the transport industry.

It is not a function of the ATSB to apportion blame or provide a means for determining liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the ATSB endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner. The ATSB does not investigate for the purpose of taking administrative, regulatory or criminal action.

## Terminology

An explanation of terminology used in ATSB investigation reports is available on the ATSB website. This includes terms such as occurrence, contributing factor, other factor that increased risk, and safety issue.