

Australian Government

Australian Transport Safety Bureau



ATSB TRANSPORT SAFETY REPORT Occurrence Investigation Report AO-2008-063 Final

Controlled flight into terrain 56 km NNE of Scone Airport, NSW 14 September 2008 VH-JDO Cessna Aircraft Co. U206A



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Aviation Occurrence Investigation AO-2008-063 Final

Controlled flight into terrain 56 km NNE of Scone Airport, NSW 14 September, 2008 VH-JDQ Cessna Aircraft Co. U206A

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Published by:	Australian Transport Safety Bureau
Postal address:	PO Box 967. Civic Square ACT 2608
Office location:	62 Northbourne Ave, Canberra City, Australian Capital Territory, 2601
Telephone:	1800 020 616, from overseas +61 2 6257 4150
	Accident and incident notification: 1800 011 034 (24 hours)
Facsimile:	02 6247 3117, from overseas +61 2 6247 3117
Email:	atsbinfo@atsb.gov.au
Internet:	www.atsb.gov.au

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Cover photo and Figure 1 used with owner's permission Figure 2: Google Earth Pro

Abstract

On 14 September 2008, a Cessna Aircraft Co. U206A aircraft, registered VH-JDQ, with a pilot and two passengers on board, was on a private flight under the visual flight rules (VFR) from Bankstown, NSW to Archerfield, Qld with a planned stop at Scone, NSW. The aircraft was reported missing when it did not arrive at Archerfield as expected later that day.

Australian Search and Rescue were notified and, during the subsequent search, the wreckage of the aircraft was located the following day on top of a 3,800 ft ridge in rugged terrain, approximately 56 km (30 NM) north-north-east of Scone Airport. All three occupants were fatally injured and the aircraft was destroyed.

The weather in the area at the time of the occurrence was not suitable for VFR flight and included low cloud, rain showers and high winds. Inspection of the accident site indicated that the aircraft was tracking towards Scone prior to impact with terrain.

The circumstances of this occurrence were consistent with controlled flight into terrain, probably as a result of the pilot encountering instrument meteorological conditions as he attempted to return to Scone.

THE AUSTRALIAN TRANSPORT SAFETY BUREAU

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory Agency. The Bureau is managed by a Commission and is entirely separate from transport regulators, policy makers and service providers.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia that fall within Commonwealth jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to fare-paying passenger operations.

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

Purpose of safety investigations

The object of a safety investigation is to enhance safety. To reduce safety-related risk, ATSB investigations determine and communicate the safety factors related to the transport safety matter being investigated.

It is not the object of an investigation to apportion blame or determine liability. However, 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.

Developing safety action

Central to the ATSB's investigation of transport safety matters is the early identification of safety issues in the transport environment. The ATSB prefers to encourage the relevant organisation(s) to proactively initiate safety action rather than release formal recommendations. However, depending on the level of risk associated with a safety issue and the extent of corrective action undertaken by the relevant organisation, a recommendation may be issued either during or at the end of an investigation.

The ATSB has decided that when safety recommendations are issued, they will focus on clearly describing the safety issue of concern, rather than providing instructions or opinions on the method of corrective action. As with equivalent overseas organisations, the ATSB has no power to implement its recommendations. It is a matter for the body to which an ATSB recommendation is directed (for example the relevant regulator in consultation with industry) to assess the costs and benefits of any particular means of addressing a safety issue.

About ATSB investigation reports: How investigation reports are organised and definitions of terms used in ATSB reports, such as safety factor, contributing safety factor and safety issue, are provided on the ATSB web site <u>www.atsb.gov.au</u>

FACTUAL INFORMATION

History of the flight

On 14 September 2008, a Cessna Aircraft Co. U206A aircraft, registered VH-JDQ, with a pilot and two passengers on board, was on a private relocation flight under the visual flight rules (VFR) from Bankstown, NSW to Archerfield, Qld with a planned stop at Scone, NSW. The aircraft was reported missing when it did not arrive at Archerfield as expected later that day.

Australian Search and Rescue (AusSAR) were notified and a search was initiated. The aircraft wreckage was located on top of a 3,800 ft ridge line in rugged terrain at around midday the following day, approximately 30 NM (56 km) north-north-east of Scone Airport. All three occupants on board were fatally injured and the aircraft was destroyed.

Background information

The pilot had purchased the aircraft on the morning of the accident flight. The previous owner reported meeting with the pilot at 0630 Eastern Standard Time¹ at Bankstown Airport for a handover of the aircraft, including the aircraft documentation. The previous owner stated that he performed a short check flight with the pilot so that the pilot could become familiar with the aircraft. He also stated that he gave the pilot detailed instructions on how to use the panel-mounted Garmin Global Positioning System (GPS) unit fitted to the aircraft.

The previous owner reported discussing the weather with the pilot, as there was a frontal system moving across NSW from the west. He reportedly advised the pilot to track along the coast to avoid any weather problems. Prior to the departure of the aircraft, the previous owner observed the pilot refuelling the aircraft and believed the pilot had completely filled the fuel tanks. He then watched the aircraft depart, which he described as being normal.

The aircraft landed at Scone Airport, where it was met by friends who stated that they had come to the airport to meet the pilot and passengers. One of the friends provided the investigation team with video and still images of the aircraft landing and parked at the airport. The time stamp on the digital photograph² of the arriving aircraft indicated that it landed at approximately 0934. The video and still images showed the weather in the area at the time was overcast with light rain. One of the friends reported that the pilot mentioned he was in rain all the way from Bankstown to Scone. That friend also suggested to the pilot that he could stay at his place overnight if he was concerned about the weather, but the pilot indicated that he wanted to return to Archerfield that day. The friend stated that while he was standing at the door of the aircraft, he observed the pilot enter the co-ordinates for Casino into the aircraft's panel-mounted GPS. The friend later stated that he

¹ The 24-hour clock is used in this report to describe the local time of day, Eastern Standard Time (EST), as particular events occurred. Eastern Standard Time was Coordinated Universal Time (UTC) + 10hours.

² The time stamp on the photo is based on the time setting of the camera and was not confirmed to be accurate or in local time.

believed it was the pilot's intention to use Casino as a waypoint but did not intend to land there.

A picture of the aircraft was taken showing the weather in the approximate direction of the accident flight in the background, shortly before the aircraft departed (Figure 1).

Figure 1: VH-JDQ at Scone Airport



Another pilot who was at Scone Airport at the time, stated that he had to cancel a planned survey flight in the area due to 'poor weather'. He stated that the weather forecast in the area at the time included strong wind gusts up to 25 kts (46.3 km/h), reduced visibility to 3,000 m, and a 400 to 500 ft cloud ceiling. He also stated that he observed the pilot refuel VH-JDQ from the same bowser he had refuelled his own aircraft from. He said there was no water in the fuel he used and he did not have any problems with his engine when he departed in his aircraft later that morning.

The friends reported that they observed VH-JDQ take off. A time stamp on a digital photograph of the aircraft taxiing for takeoff indicated that the time was 0958.

Aircraft details

The aircraft was a high wing, piston engine, fixed undercarriage design, with a seating capacity of six people. The aircraft was not equipped with instrument flight rules (IFR) instrumentation. It had a current maintenance release, which allowed for day VFR operations only.

Aircraft

Manufacturer	Cessna Aircraft Company
Model	U206A

Serial Number	2060353
Registration	VH-JDQ
Year of manufacture	1965
Certificate of registration	lssue date 7 July 1989
Maintenance Release	Expiry 5 April 2009 or 7,876.4 hrs
Total airframe hours	7,776.9 Before the days flight

Engine

Manufacturer	Teledyne Continental
Model	IO-520-F
Туре	6 cylinder piston engine
Serial Number	553306
Time since overhaul	1,342.2 hrs
Total time in service	Unknown

Propeller

Manufacturer	McCauley
Model	D3A34C404
Туре	3 blade constant speed
Serial Number	930792
Time since overhaul	123.6 hrs
Total time in service	Unknown

Pilot details

The pilot commenced flying training in 2003 and was issued a Private Pilot (Aeroplane) Licence (PPL) in May 2008.

The pilot had logged a total of 112.2 hours flying experience, including 30.1 hours as pilot in command. He had no experience on the Cessna 206 aircraft, apart from the short check flight at Bankstown on the morning of the accident. He logged a total of 41 flight hours in 2008, including 16.3 hours as pilot in command. There was no instrument flying experience noted in his log book, however, it is a requirement that pilots achieve a minimum competency level of instrument flying during PPL training.

The pilot's licence allowed for day VFR flight only. The pilot had a current Class 2 Civil Aviation Medical Certificate.

Medical and pathological information

The post-mortem examination and toxicological testing was completed on the pilot by the relevant state authorities. According to the post-mortem and toxicological reports, the pilot had no pre-existing disease or factors with the potential to have affected his performance. The pilot's post-mortem report indicated that he had succumbed to impact-related injuries.

Flight planning

The route selected by the pilot, to track from Scone to Archerfield via Casino, meant that the aircraft would track over the Great Dividing Range for most of the flight (Figure 2). The topography of most of that area was rugged, with thickly forested, mountainous terrain, at elevations greater than 4,000 ft (1,219 m) above mean sea level (AMSL). The areas available for an emergency landing were limited.

The Aeronautical Information Publication (AIP), issued by Airservices Australia, section ENR 1.10-1 titled *Flight Plan Preparation*, required that, before beginning a flight, a pilot in command must study all available information appropriate to the intended operation.

Airservices Australia confirmed that the pilot did not have a National Aeronautical Information Processing System (NAIPS)³ user identification to enable the pilot to access the system for flight briefing information. Before the trip to Sydney to pick up the aircraft, the pilot reportedly asked a flight instructor from the organisation where the pilot learned to fly, how he would obtain weather information. The instructor told the pilot to give him a call and he would find out the weather for him on the morning of his departure from Sydney. The instructor reported that he did not receive a phone call with a request for weather from the pilot.

Figure 2: Aircraft's proposed track and accident site location



³ The Airservices Australia National Aeronautical Information Processing System (NAIPS) is a multi-function, computerised, aeronautical information system. The services available via electronic medium include pre-flight briefing, area briefing, general meteorological forecast and flight notification.

An alternative route for the flight was via the coast. That route involved relatively simple navigation, above mostly low-level terrain and included many suitable diversion aerodromes along the route. The aircraft agent that brokered the sale of the aircraft to the pilot, in a telephone conversation before the flight, suggested to the pilot not to fly via inland routes. The pilot responded that he intended to visit friends in Scone and would then head back to the coast on the flight.

Visual Meteorological Conditions

The AIP, section ENR 1.2, contained the specific requirements for VFR flight, including that it may only be conducted in visual meteorological conditions (VMC). The VMC requirements applicable to the flight below 10,000 ft above mean sea level (AMSL) were:

- minimum flight visibility of 5,000 m
- clear of cloud 1,500 m horizontally and 1,000 ft vertically

The VMC requirements applicable to the flight at or below 1,000 ft above ground level (AGL) were:

- minimum flight visibility of 5,000 m
- clear of cloud and in sight of the ground or water.

Meteorological information

The Australian Transport Safety Bureau (ATSB) requested a weather report from the Bureau of Meteorology for weather conditions that existed and were forecast for the area for the time of the accident. Relevant extracts of the report have been reproduced below.

Synoptic situation

On 14 September 2008, a low pressure trough was extending north from a cold front which was traversing the southern parts of NSW. Meanwhile, a high-pressure system centred over the Tasman Sea extended a ridge along the northern NSW and Queensland coast. The combination of these systems brought strengthening north-westerly winds, widespread cloud and scattered showers over the eastern parts of NSW.

Cloud and precipitation

On the day of the incident, a major cloud mass associated with the trough extended over the eastern half of NSW, including the incident location. These are evident in satellite images taken around the time of the incident (Figure 3).



Figure 3: Infrared satellite image, 14 September 2008, 1030 EST

Wind conditions

Wind analysis at 900 hectopascals (equivalent to approximately 2,000 ft above mean sea level) show winds between 25 and 40 knots and between 40 and 60 knots at 850 hectopascals (approximately 5,000 feet above mean sea level) at the accident location (Figure 4).



Figure 4: 850 hPa Wind Analysis, 14 September 2008, 10:00 EST

Turbulence

Based on the available meteorological information above and the terrain in the incident location, moderate to severe turbulence is likely to have been present at the time of the accident. It is also reasonable to expect mountain waves⁴ in the area.

Forecasts and warnings

The forecast issued prior to and valid for the time of the incident indicated isolated showers and broken low cloud in the area at and around the time of the incident.

Occasional severe turbulence below 10,000 ft was forecast for a broad area covering the incident location. The area forecast also indicated isolated thunderstorms developing in the area covering the incident location, but not at the time of the incident. This was consistent with the actual weather conditions as there was no evidence of thunderstorms in the area at the time of the accident.

The Bureau of Meteorology issues SIGMETs⁵ as required, which are warnings to provide urgent advice to aircraft in flight or prior to departure, of actual or expected weather conditions or trends that are potentially hazardous. SIGMETs for severe turbulence below 10,000 ft were current for the area covering the incident location.

Summary

Forecast low level winds on the Area Forecast valid for the time of the incident were less than the actual winds observed over the area. Otherwise, relevant forecasts and warnings were generally consistent with the weather conditions in the area.

Severe turbulence, strong winds, low cloud, precipitation and reduced visibility are likely to have been present at the time of the accident.

Local weather observations

The owner of the property where the accident occurred, stated that at the time of the accident he estimated he was approximately 500 m from the accident location. He did not see the accident, however, he observed rain with reduced visibility to 30 m and very strong wind gusts from the west, which he estimated to be 70 to 80 km/h.

⁴ Mountain waves – Powerful air mass immediately down-stream of transverse mountain range, rotating about horizontal axis. There can be a succession of such waves. (The Cambridge Aerospace Dictionary).

⁵ SIGMET – A warning issued to provide urgent advice to aircraft in flight, or prior to departure, of actual or expected weather developments or trends within Australian Flight Information Regions that are potentially hazardous (BOM Aeronautical Services Handbook).

Wreckage and site information

The aircraft initially impacted large trees near the top of a ridge line at an elevation of approximately 3,800 ft AMSL. The terrain in the direction of flight was rising at an angle of approximately 3 degrees.

Based on the observed impact damage to the trees, the aircraft's initial angle of entry was no more than approximately 5 degrees into the rising terrain. The angle then increased as the aircraft departed from controlled flight due to impact with several large trees. Numerous parts of the aircraft separated, before the remaining fuselage and engine section struck the ground in a steep nose-down angle.

The wreckage trail was approximately 200 m long and 20 m wide, on an approximate bearing of 190 degrees magnetic, which was close to the direct Casino to Scone track.

Figure 5 shows the impact crater and propeller in the foreground, with the engine and the fuselage assembly in the background. The picture was taken looking in the approximate direction of flight at impact.

Figure 5: Main wreckage



Examination of the wreckage at the accident site accounted for all the major parts of the aircraft, including all flight control surfaces. All structural fracture surfaces were examined on site and there was no evidence of any pre-existing defect with the aircraft that would have contributed to the accident. Considerable disruption to the wreckage precluded a check for continuity of the engine and flight controls. However, the engine and flight control cables and push-pull tubes were inspected at their fracture points, with no pre-impact defects identified.

The flaps appeared to be set in the fully retracted (zero) position and the elevator and aileron trim were set in the neutral position.

The propeller fractured and separated at the rear of the propeller hub. All of the propeller blades showed signs of rotational damage and one of the blades was turned around 180 degrees, indicating a broken internal actuator linkage; it was also bent around on itself at its tip (Figure 6).

Figure 6: Propeller assembly



A large branch with a propeller cut was located approximately 100 m into the wreckage trail (Figure 7). The hardwood branch measured 10 cm across. It had propeller paint transfer marks through the majority of the cut which corresponded with marks on one of the propeller blades. Several other smaller tree branches with evidence of propeller blade strikes were located along the wreckage trail. The damage to the propeller and the cut tree branch indicated that the engine was producing significant power at the time of the accident.



The engine (Figure 8) was inspected externally for damage, with no pre-impact defects identified. The engine-mounted vacuum pump was removed and inspected. The pump had seized, but the drive had not sheared, indicating that it was operating to the point of impact.

Figure 8: Engine assembly



Given that the onsite evidence indicated the engine was supplying significant power to the propeller at the time of the accident, no further testing or inspection of the engine was considered necessary.

Both of the aircraft's fuel tanks had ruptured at impact. There was a small amount of fuel evident in one of the ruptured tanks and a strong fuel smell in the area of the fuel tanks.

The disruption to the cockpit area precluded any accurate identification of switch settings. The aircraft altimeter setting⁶ indicated 1011 hPa.

The aircraft was fitted with an emergency locator transmitter (ELT), as required by the Civil Aviation Regulations (CARs). The ELT had separated from the aircraft and was destroyed by impact forces; as a consequence, the ELT did not operate.

A number of aircraft documents were recovered from the aircraft wreckage, including receipts for fuel at Bankstown and Scone on the day of the accident. There was no evidence of any weather forecasts or pre-flight briefing material. Two pieces of the same aeronautical chart were located in the wreckage. The chart

⁶ When there is no official local QNH available at an airfield and the site elevation is known, the local QNH can be derived by setting the altimeter sub-scale when the aircraft is on the ground so that the altimeter indicates the known airfield elevation. The Scone terminal area forecast for the time of the aircraft's departure indicated a QNH of 1012. The QNH barometric setting is referenced to mean sea level so that an aircraft altimeter will indicate the height above mean sea level.

covered the area of NSW and Qld and had red lines drawn on it to indicate direct tracks from Bankstown to Scone, Scone to Casino, and Casino to Archerfield.

Survival aspects

The disruption to the aircraft cockpit and cabin area and the deceleration forces sustained by the aircraft occupants, meant that the accident was not survivable.

Airworthiness and maintenance

A review was carried out on the maintenance documentation available for the aircraft. The aircraft had a current maintenance release in the VFR private category and a Certificate of Registration. The current maintenance release showed that Airworthiness Directives (AD) AD/Inst/8, AD/Rad/43 and AD/Rad/47 inspections were overdue by 2 weeks and that the ELT batteries were overdue for scheduled replacement.

AD/Inst/8 is an inspection for integrity and accuracy of the airspeed indicators, altimeters, pitot/static systems, fuel quantity gauges and compasses.

AD/Rad/47 is a functional test of the transponder system.

AD/Rad/43 is a check of the mode C altitude function of the transponder system.

There were no outstanding defects entered on the aircraft's maintenance release and all other scheduled maintenance requirements had been carried out.

Regulatory requirements

The CARs stated that an aircraft cannot legally fly with scheduled maintenance requirements overdue. The following relevant CAR extract refers:

CAR 133 (1) (C) PART 11 CONDITIONS OF FLIGHT

Division 1 General

133 Conditions to be met before Australian aircraft may fly

(1) Subject to regulation 317 and regulation 21.197 of CASR, the pilot in command of an Australian aircraft must not commence a flight if each of the following requirements is not satisfied:

(d) any maintenance that is required to be carried out before the commencement of the flight, or that will be required to be carried out before the expiration of the flight, to comply with any requirement or condition imposed under these Regulations with respect to the aircraft has been certified, in accordance with regulation 42ZE or 42ZN, to have been completed;

VFR into IMC occurrences

In June 2004, the ATSB published an aviation research paper titled, *General Aviation Fatal Accidents: How do they happen? A review of general aviation accidents, 1991 to 2000.* The data reported in the paper showed that there were 163 fatal aeroplane accidents in the 10-year period, of which 22 or 13.5 % were

identified as VFR into IMC. Those 22 accidents resulted in 52 fatalities, which corresponded to 15.7 % of the 331 fatalities.

In 2005, the ATSB published an aviation research investigation report titled *General Aviation Pilot Behaviours in the Face of Adverse Weather*⁷. That report explained that:

Weather-related aviation accidents remain one of the most significant causes for concern in aviation safety. This is despite over half a century of work by aviation professionals and human factors researchers aimed at understanding the reasons behind accidents such as those involving Visual Flight Rules flight into Instrument Meteorological Conditions ('VFR into IMC').

The report, in part, considered different pilot responses to adverse weather, discussed pilot decision making and highlighted the well known dangers associated with VFR flight into IMC.

A VFR pilot may exhibit a range of behaviours when faced with adverse weather. For example, at the first hint that conditions are deteriorating, a pilot may decide that discretion is the better part of valour and immediately return to their point of departure and recount their brush with danger to an instructor or to fellow pilots in the clubrooms. At the other extreme, a pilot may 'press on' into deteriorating weather, either unable or unwilling to see the increasing danger of their actions, until the aircraft suddenly enters IMC and they have only minutes to rue their reckless behaviour before the flight ends in disaster. A more typical scenario might involve a pilot who, in response to deteriorating conditions, initially continues the flight as planned, but subsequently decides to return, divert, or perhaps even carry out a precautionary landing.

However, whatever the pilot's response to deteriorating weather, the final outcome of a safety-related occurrence will depend on a myriad of factors, and in the final analysis chance can play a significant part.

This research reinforces the significant dangers associated with VFR flight into IMC - 76% of VFR into IMC accidents involved a fatality. The chances of a VFR into IMC encounter increased as the flight progressed until they reached a maximum during the final 20% of the flight distance. This result highlights the danger of pilots 'pressing on' to reach their destination.

The results emphasise that a safe pilot is a proactive pilot and that dealing with adverse weather is not a one-off decision but a continually evolving process.

VFR into IMC accidents continue to occur at a high rate. A similar accident occurred⁸ on 16 August 2007 when the pilot of a Pacific Aerospace Corporation Cresco 08-600 aircraft, registered VH-XMN, departed from Ingham, Qld on a ferry flight under the VFR to Tully. The aircraft did not arrive at Tully and the next day the pilot and aircraft were reported missing. The aircraft wreckage was located on the morning of 18 August 2007. The aircraft had impacted mountainous terrain in a state forest 24 km south of Tully. The pilot was fatally injured and the aircraft was destroyed.

The circumstances of that occurrence were consistent with controlled flight into terrain resulting from VFR into IMC. The investigation determined that the aircraft probably entered an area of weather that deteriorated below VMC and for which the

⁷ General Aviation Pilot Behaviours in the Face of Adverse Weather- Australian Transport Safety Bureau Aviation Research Investigation Report B2005/0127.

⁸ Australian Transport Safety Bureau Aviation Occurrence Report AO-2007-037.

pilot was not experienced or qualified. The pilot probably became unsure of his position in poor visibility, leading to controlled flight into terrain, fatally injuring the pilot and destroying the aircraft.

Further information on the aviation research papers and other relevant occurrence investigations can be found on the ATSB website at <u>www.atsb.gov.au</u>.

VFR into IMC risk controls

The *Day VFR Syllabus - Aeroplanes*, published by the Civil Aviation Safety Authority (CASA), contained the competency standards for private and commercial aeroplane licences, including a number of competencies and elements that could be related to the management of VFR into IMC risk. Issue 4 of the syllabus, effective from 1 March 2008, contained new units of competency including threat and error management and single pilot human factors. CASA advised that assessment of the new units will commence on 1 January 2009.

Threat and error management (TEM) is a relatively new operational concept applied to flight that includes the traditional role of airmanship and provides a structured and proactive approach that pilots can apply to identify and manage threats and errors that could affect the safety of flight.

Single pilot human factors is a new competency that includes the following skills:

- maintaining effective lookout
- maintaining situational awareness
- assessing situations and making decisions
- setting priorities and managing tasks
- communications and interpersonal relationships.

Guidance regarding the new competencies was included in Civil Aviation Advisory Publication (CAAP) 5.81-1(0) *Flight Crew Licensing Flight Reviews*, dated November 2007. The biennial assessment of a pilot's skills and knowledge was to include discussion and application of threat and error management and single pilot human factors.

A risk control introduced on 10 March 2000 was the private IFR rating. In its most basic form, the rating allowed flight under the IFR for enroute navigation, but was limited to visual conditions for climb and descent below the lowest safe altitude.

CASA has produced two media discs to address weather-related decision making. *Weatherwise* is an interactive presentation to enhance the ability of pilots to identify hazardous weather conditions. The *Weather to fly* disc features interviews with senior pilots and human factors experts, and in-flight footage of specific locations.

ANALYSIS

Introduction

The aircraft was inspected on site, with no pre-impact defects identified. There were indications of significant engine power from the propeller damage and the branches that the propeller cut during the accident sequence.

The circumstances of this accident were consistent with controlled flight into terrain, after encountering instrument meteorological conditions (IMC). The following analysis examines the development of the accident sequence.

Controlled flight into terrain

Based on the information regarding the weather in the area of the accident, it is likely that the pilot was attempting to remain below the cloud base to maintain visual reference with the ground. The aircraft's approximate heading at the time of impact indicated that the pilot may have been attempting to return to Scone due to the adverse weather conditions.

The aircraft's wreckage trail indicated that the aircraft was travelling at approximately cruise speed and descending at a fairly low rate, if at all, when it impacted rising terrain at 3,800 ft above mean sea level (AMSL). That evidence indicated that the aircraft was most likely in controlled flight at the time it impacted with trees.

VFR into IMC

There was no evidence that the pilot had accessed any pre-flight weather forecast or subsequent forecast updates from the National Aeronautical Information Processing System (NAIPS). Nevertheless, the pilot would have been aware, generally, of the weather situation from observations during the flight from Bankstown, and at Scone. What the pilot might not have appreciated, however, was that the route he had chosen from Scone to Archerfield via Casino was likely to involve more extreme conditions and expose the aircraft to a combination of high and rugged terrain, strong winds, and reduced visibility. It is possible that the pilot took some level of assurance following completion of the flight from Bankstown to Scone, that he could safely complete the Scone to Archerfield leg.

It is possible that, as the flight approached higher terrain in the area of the accident, the pilot encountered conditions of reduced visibility due to rain and/or low cloud and elected to conduct a 180 degree turn. If those conditions were accompanied by moderate or severe turbulence, the pilot's workload would have been high. It is possible that the pilot inadvertently entered cloud and was unaware of the rising terrain ahead of the aircraft.

Route selection

The route chosen by the pilot to track from Scone to Archerfield via Casino meant that the aircraft would travel for a considerable distance over the Great Dividing Range, with mountainous terrain up to approximately 5,000 ft above mean sea level. Visual navigation across such an area in adverse weather conditions was likely to have exposed the pilot to rapidly changing conditions of in-flight visibility and turbulence.

An alternative route for the flight was via the coast. That route involved relatively simple navigation, above mostly low-level terrain and included many suitable diversion aerodromes. However, the pilot selected the route because of his intention to visit his friends in Scone. The investigation did not establish what other aspects the pilot may have considered during his planning for the flight.

Overall, the pilot probably did not adequately consider the risks inherent in the final route selected, given the environmental conditions on the day.

Overdue aircraft maintenance

The current maintenance release that was found in the aircraft indicated that there were four scheduled maintenance items that were overdue by approximately 2 weeks. As the pilot was required to fly by visual means, those items were unlikely to have contributed to the development of the accident.

The aircraft's emergency locator transmitter (ELT) was destroyed by accident impact forces. However, one of the overdue maintenance items was the ELT batteries, which were due for replacement 2 weeks prior to the accident. The investigation was unable to establish the effect the out-of-date batteries would have had on ELT function if it had remained intact during the impact sequence. The fact that the batteries had not been maintained increased the risk that the ELT may not function correctly if required.

FINDINGS

Context

The aircraft struck terrain, probably while the pilot was attempting to return to Scone after encountering weather unsuitable for flight under the visual flight rules (VFR).

From the evidence available, the following findings are made with respect to the accident and should not be read as apportioning blame or liability to any particular organisation or individual.

Contributing safety factors

- Both the forecast and actual weather conditions were not suitable for VFR flight on the planned route.
- The pilot most likely did not check the forecast weather before the flight.
- The route chosen for the flight was not suitable for a single engine aircraft in the prevailing weather conditions.

Other safety factors

• Endorsements on the maintenance release indicated that the aircraft had outstanding maintenance requirements that expired 2 weeks prior to the accident.

APPENDIX A : SOURCES AND SUBMISSIONS

Sources of Information

Bureau of Meteorology

Accident site property owner

Pilot's friends

Previous aircraft owner

Pilot at Scone Airport

Aircraft broker

Airservices Australia

NSW Police Force

Submissions

Under Part 4, Division 2 (Investigation Reports), Section 26 of the Transport Safety Investigation Act 2003, the ATSB may provide a draft report, on a confidential basis, to any person whom the ATSB considers appropriate. Section 26 (1) (a) of the Act allows a person receiving a draft report to make submissions to the ATSB about the draft report.

A draft of this report was provided to the Civil Aviation Safety Authority, Bureau of Meteorology, the NSW Police Force, and the NSW Coroner.

Submissions were received from the Civil Aviation Safety Authority and the Bureau of Meteorology. The submissions were reviewed and, where considered appropriate, the text of the report was amended accordingly.