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Aircraft separation issue involving an Ayres S2R, VH-WBK and an unmanned aerial vehicle

What happened

On 12 September 2013, at about 0930 Eastern Standard Time (EST),[1] the pilot of an Ayres S2R aircraft, registered VH-WBK (WBK), commenced aerial agricultural operations on a property about 37 km south-south-west of Horsham aerodrome, Victoria.

At about the same time, the operator of an unmanned aerial vehicle (UAV), Sensefly eBee 178 (Figure 1), arrived at the 'Iluka Echo' (Echo) mine site to conduct an aerial photography survey of the site. After having completed his pre-flight preparations and a risk assessment of the operation, the operator heard an aircraft operating about 1-1.5 km away on a neighbouring property to the north-east of the UAV launch site (Figure 2).

Figure 1: Sensefly eBee 178

Source: Operator

The UAV operator broadcast on the area frequency advising his intention to conduct unmanned aerial photography operations over the Echo mine site for the next 4 hours, and addressed the 'ag aircraft operating north-east of Echo mine site', but did not receive a response. He then asked the mine manager to contact the farmer, who was loading the fertilizer into the hopper of WBK, to advise him of the UAV operating in the area and request that he also notify the pilot of WBK.

The UAV operator then commenced operations on the western side of the site to increase separation with WBK. The UAV conducted a series of parallel flights from north to south, progressing from the western boundary of the area towards the east, at about 390 ft above ground level (AGL).

After completing the first load of fertilizer, the pilot of WBK reported that the farmer informed him there would be an 'aircraft' conducting aerial photography over the Echo mine site, near one of the

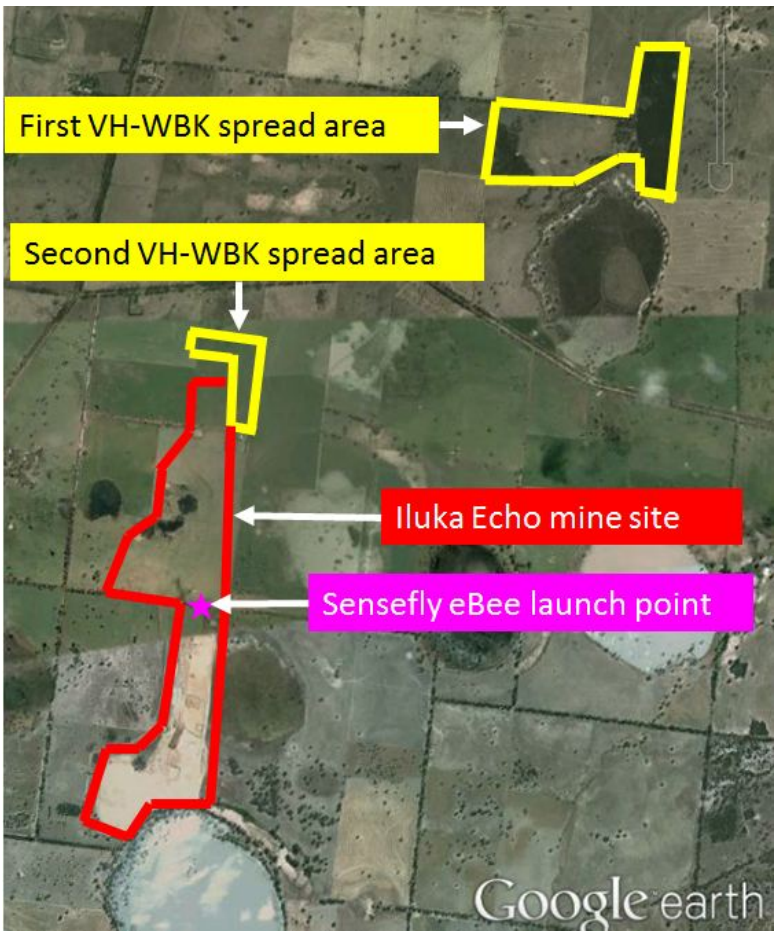
[1] Eastern Standard Time (EST) was Coordinated Universal Time (UTC) + 10 hours.

areas that he would be operating on. The pilot assumed this would be a fixed-wing aircraft operating at or above 500 ft AGL, and intended to remain at or below 350 ft AGL to ensure separation with the fixed-wing aircraft.

At about 1000, the UAV operator heard increasing noise from WBK and observed the aircraft cross the site boundary from the north, conduct a 180° turn about 150 m north of the UAV, then complete one full 360° turn before it departed again to the north. At the time, the UAV was on approach to land, at about 380 ft AGL. The operator immediately put the UAV into a holding pattern to maintain its current position. He estimated WBK was at about 100-150 ft AGL and came within about 100 m horizontally of the UAV. He attempted to contact the pilot of WBK on the radio but did not receive a response.

The pilot of WBK reported that, after completing spreading on the first paddock, he then returned to the airstrip about 3 NM to the north-east, where the aircraft was re-loaded with fertilizer. He subsequently spread the fertilizer on the second block, about 2 NM south-west of the first area, operating at about 50-100 ft AGL. He finished operating in the area by about 1200. He reported sighting a white vehicle on the road on the mine site, but did not see the UAV at any time. The next day the UAV operator contacted the pilot of WBK and advised him of the incident.

Figure 2: Operating areas for VH-WBK and the UAV



Source: Google earth

UAV operations

The UAV was required to operate at or below 400 ft AGL but could have been granted approval to operate higher, in which case a NOTAM would be issued. All UAV operators were required to broadcast on the appropriate frequency. The Civil Aviation Safety Authority Advisory Circular AC 101-1(0), *Unmanned aircraft and rockets: Unmanned aerial vehicle (UAV) operations, design*

specification, maintenance and training of human resources, is available at www.casa.gov.au/wcmswr/_assets/main/rules/1998casr/101/101c01.pdf

Pilot comments (VH-WBK)

The pilot provided the following comments:

- He did not see the UAV or hear any calls from the operator, however, it was normal procedure to turn the radio down to minimise distractions during low level operations.
- He was not aware of the procedures for UAV operations. He believed they present an additional hazard to those already encountered by pilots conducting agricultural operations, particularly as they are very difficult to see.
- He believed that a collision with the UAV may potentially have resulted in aircraft damage due to ingestion into the engine, windscreen damage or pilot distraction.

UAV operator comments

The UAV operator provided the following comments:

- If an aircraft was operating in the area, the normal procedure was to land the UAV immediately. The emergency landing for the eBee was a spiral landing at about a 60 m radius, which could take about 3-5 minutes. As WBK was below the UAV, he assessed it was safer to maintain the UAV at altitude rather than descend and potentially conflict with WBK.
- In hindsight, he should have spoken directly to the pilot to ensure the pilot understood what the UAV would be doing.
- He attempted to contact the pilot of WBK via the radio, but did not receive any response. The UAV operators were required to have a radio. Manned aircraft were not required to have a radio when operating below 5,000 ft in Class G airspace and away from certified, registered or military aerodromes.
- He visually monitors the UAV directly, or with binoculars, throughout the flight.
- If the UAV had collided with WBK, he thought it was unlikely that it would have caused any damage. Larger UAV's have a wingspan of 3-4 m and are made of carbon fibre and pose a far greater risk.
- With increasing UAV operations, it is essential that operators and pilots gain an awareness and understanding of each other's operations.

Safety action

Whether or not the ATSB identifies safety issues in the course of an investigation, relevant organisations may proactively initiate safety action in order to reduce their safety risk. The ATSB has been advised of the following proactive safety action in response to this occurrence.

UAV operator

As a result of this occurrence, the UAV operator has advised the ATSB that they have taken the following safety actions:

Industry awareness and education

The operator of the UAV has conducted a presentation on UAV's to air traffic controllers at Moorabbin Tower. They have also commenced a campaign to advise agricultural aircraft operators of their work, what UAV aircraft look like, and to establish protocols for sharing the airspace during future operations.

Safety message

This incident highlights the challenges associated with having a diverse mix of aircraft operating in the same airspace and the need for all pilots and operators to remain vigilant and employ see-and-avoid principles. The operator of the UAV reported that due to a small frontal area, a UAV may be difficult to see and therefore a potential for conflict exists, in particular with manned aircraft operating below 400 ft AGL.

Where other aircraft may be operating in the same airspace without radios, separation is limited to see-and-avoid principles. The limitations of unalerted see-and-avoid have been detailed in the ATSB's research report *Limitations of the See-and-Avoid Principle*. The report highlights that unalerted see-and-avoid relies entirely on the pilot's ability to sight other aircraft. Broadcasting on the correct frequency is known as radio-alerted see-and-avoid, and assists by supporting a pilot's visual lookout for traffic.

Prior to commencing UAV operations, direct communication with the pilots of other aircraft in the area may increase awareness and assist in preventing similar incidents from occurring. If the pilot of a manned aircraft communicates their intentions to operate in the same airspace as a UAV, the UAV operator may be able to land the UAV or take action to avoid potential conflict. The report is available at www.atsb.gov.au/publications/2009/see-and-avoid.aspx.

General details

Occurrence details

Date and time:	12 September 2013 – 1000 EST	
Occurrence category:	Serious incident	
Primary occurrence type:	Near collision	
Location:	37km SSW of Horsham aerodrome, Victoria	
	Latitude: 36° 57.05' S	Longitude: 141° 56.92' E

Aircraft details: UAV

Manufacturer and model:	Sensefly eBee
Registration:	178
Type of operation:	Aerial work
Damage:	Nil

Aircraft details: VH-WBK

Manufacturer and model:	Ayres Corporation, S2R	
Registration:	VH-WBK	
Serial number:	T15-021DC	
Type of operation:	Aerial work	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Ground proximity event between Dornier DO228, VH-VJN and a vehicle

What happened

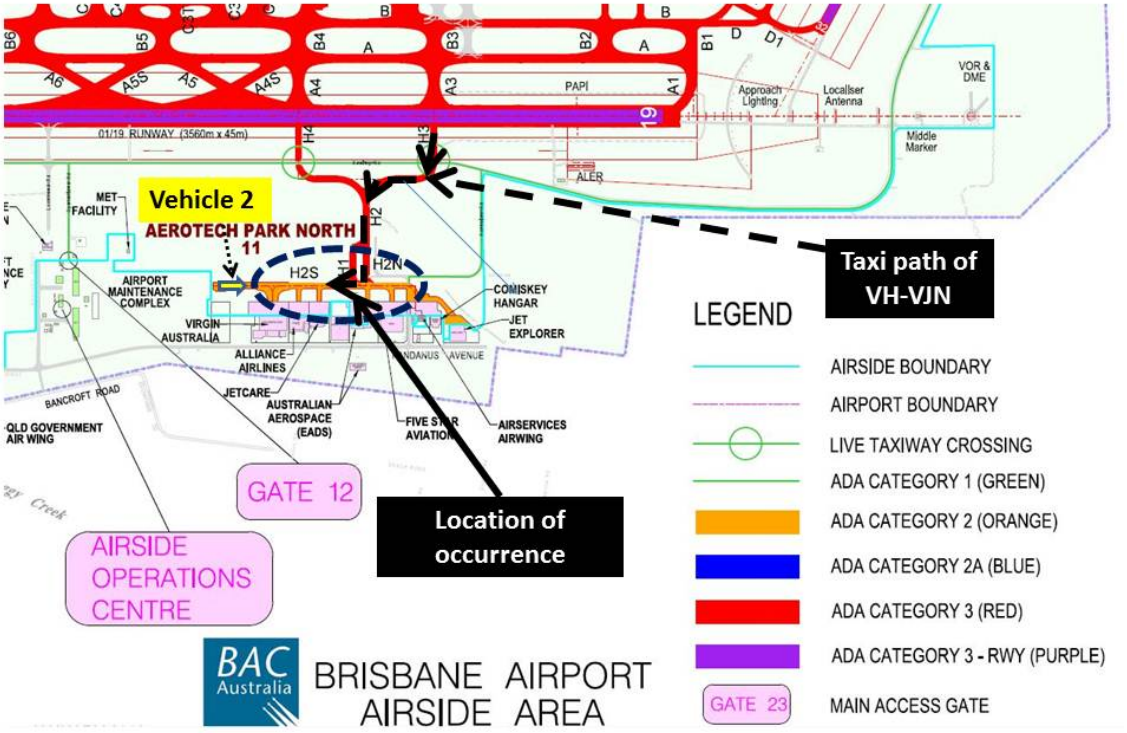
VH-VJN

Source: George Canciani

On the evening of 8 October 2013, at about 1842 Eastern Standard Time (EST),[1] a Dornier DO228 aircraft, registered VH-VJN (VJN) (inset photograph), was taxiing to the company hangar at Brisbane Airport, Queensland after the completion of a charter flight.

The crew taxied VJN via taxiway 'Hotel 3' (H3), 'Hotel 2' (H2), and then via a right turn onto 'Hotel 2 South' (H2S) (Figure 1). As per company policy, the aircraft was taxied at a maximum speed of 9 kt during turns. During the 90° turn from H2 to H2S the pilot saw a vehicle approaching from the opposite direction along H2S. The vehicle had headlights on, but no flashing light. The captain reported he manoeuvred the aircraft to the right by 2-3 m and braked firmly. During this manoeuvre the captain observed the vehicle brake, and turn right onto the grass. The vehicle passed close to the aircraft's left wingtip.

Figure 1: Brisbane Airport



Source: Brisbane Airport Corporation

[1] Eastern Standard Time (EST) was Coordinated Universal Time (UTC) + 10 hours.

Captain comments (VH-VJN)

- The captain regularly passed vehicles on H2S, but they always moved off the taxiway onto the grass until the aircraft had safely passed. However, on this occasion, he reported the vehicle continued straight ahead toward the aircraft, with no obvious deviation in direction or speed.
- The captain suggested that a possible solution was for conditional use of vehicles on the taxiway, particularly given the increase in aircraft movements along H2. This could include restricting vehicle entry onto H2 (H2, H2S and H2N) when an aircraft was taxying on H3 or H2 toward H2S until the aircraft is well clear.

Holden Rodeo driver comments

The driver of the incident vehicle (vehicle 2), a single cab Holden Rodeo, was following a company engineering van (vehicle 1)[2]. Both vehicles were exiting the company hangar using the hangar service road in accordance with the procedure detailed in the En Route Supplement Australia (ERSA)[3] and the Airside Driver's Handbook. The vehicle headlights were on, and vehicle 2 was travelling at about 25 km/hr. As vehicle 2 was approaching taxiway H2, the driver noticed VJN about 250 m away. The aircraft had both taxi lights and the anti-collision beacon visible.

The driver of vehicle 2 advised that both vehicles had been travelling in the designated area. He reported that VJN made the turn from H2 onto H2S a little wide, putting the aircraft's left wing into the designated driver area. To maintain separation both vehicle 1 and 2 left the sealed section of the taxiway onto the grass and continued driving.

Brisbane Airport Corporation (BAC) comments

BAC conducted an internal investigation into the incident and identified the following:

- To date, the driver of vehicle 1 had not been identified.
- Aircraft movements at Brisbane have increased from 123,000 in 2004 to 222,000 in 2013. At the time of the incident, there were about 1,700 vehicles approved to access to the taxiway Hotel system. The report also outlined relevant sections of the *BAC Airside Drivers Handbook* – Version November 2012[4] (extracts below). This publication details basic safety rules to ensure the safe and orderly movement of passengers, aircraft and vehicles.

  Section 1.10

  To ensure safe operation of vehicles in the vicinity of aircraft of Brisbane Airport, drivers

  – must give way to pedestrians at all times
  – must give way to moving aircraft at all times even when the aircraft are under tow
  – must stay well clear of aircraft when their red anti-collision beacons are operating.

  Section 1.11

  Drivers of vehicles and equipment must ensure safe distances are maintained at all times to operating aircraft. The aircraft to object required separation for an aircraft such as VJN operating on an apron taxi lane is 4.5 m.

  Section 2.8: Taxiway Hotel requirements

  All drivers should be aware that both taxiway H2N and H2S are designated as an 'apron' for vehicles requiring access to the maintenance facilities. The remaining sections of taxiway Hotel system is designated for aircraft movement ONLY.

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2 Vehicle 1 was ahead of vehicle 2 and did not pose a risk to VH-VJN.

3 En Route Supplement Australia produced by Airservices Australia details information about special procedures at each airport

4 www.bne.com.au/sites/all/files/content/files/November%202012%20Airside%20Drivers%20Handbook.pdf

Section 1.35: Unpaved/grassed areas

Unless expressly directed by air traffic control (ATC), the parking of vehicles/equipment or travel across or onto unpaved areas is not to be undertaken.

BAC recommendations

- BAC constructs roads that would mitigate vehicles traversing the aprons of taxiways H2S and H2N.
- To consider if the Hotel taxiway system and the nearby Mike taxiway system be restricted to Category 3 (currently Category 2)[5] and above authority to drive airside (ADA) holders, thus requiring an ATC clearance to operate in the area.

Safety message

The ATSB published a research paper on ground operation occurrences at Australian Airports over a 10 year period. Of the 282 ground occurrences reported to the ATSB between 1 January 1998 and 31 December 2008, about 37 per cent of those incidents occurring as the aircraft approached a gate, were attributed to near collisions with vehicles. This report is available at: www.atsb.gov.at/publications/2009/ar2009042.aspx.

Two recent reports of ground proximity events reported to the ATSB are:

- On 22 July 2013, the captain of an Aero Commander aircraft had to apply full brakes to avoid a collision with a fast moving ground safety vehicle at Brisbane Airport.
- On 26 August 2013, the captain of a Boeing 737 had to brake firmly to avoid a collision with a security vehicle using an authorised airside road at Sydney Airport, New South Wales. The airside road had 'give-way-to-aircraft' signage at the intersection of the taxiway and airside road; however, the driver of the security vehicle did not see the aircraft approaching from about 90° from the left. The security vehicle stopped abruptly about 10 m from the nose of the stationary aircraft. This incident also occurred at night. The ATSB investigation report (AO-2013-135) is available at:

  www.atsb.gov.au/publications/investigation_reports/2013/aair/ao-2013-135.aspx

General details

Occurrence details

Date and time:	8 October 2013 - 1842 EST	
Occurrence category:	Serious incident	
Primary occurrence type:	Ground proximity event	
Location:	Brisbane Airport, Queensland	
	Latitude: 27° 23.05' S	Longitude: 153° 07.05' E

Aircraft details: VH-VJN

Manufacturer and model:	Dornier Werke GmbH DO 228-202	
Registration:	VH-VJN	
Serial number:	8040	
Type of operation:	Charter - Passengers	
Persons on board:	Crew – 2	Passengers – Unknown
Injuries:	Crew – Nil	Passengers – Nil

[5] In Category 2 vehicle operations, drivers do not need to obtain a clearance from ATC.

Loss of ground control involving Air Tractor AT-502B, VH-FLH

What happened

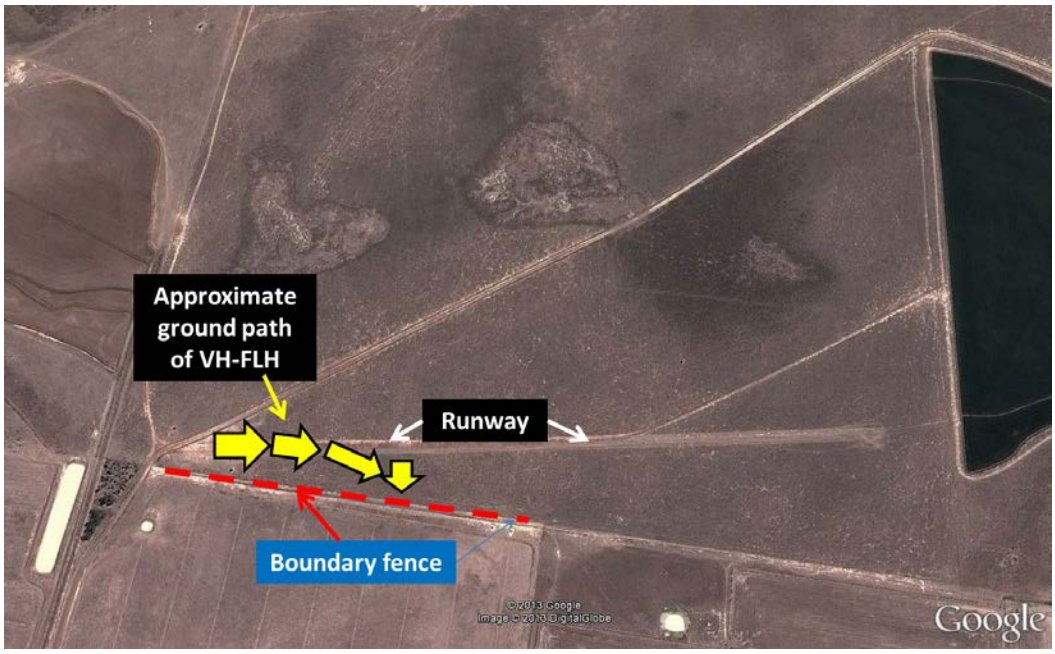
On 21 October 2013, an Air Tractor AT-502B aircraft, registered VH-FLH, was conducting rice sowing operations north-east of Deniliquin, New South Wales. The operation was supported by ground personnel who loaded the aircraft's hopper from a truck.

At about 1145 Eastern Daylight-savings Time (EDT),[6] the pilot was conducting his fourth landing for the day onto the property airstrip located about 11 NM north-east of Deniliquin Airport. Each of the sowing runs took about 6-8 minutes to complete. After each landing, the truck refilled the aircraft with about 850 kg of rice seed. For this landing, the truck was located near the threshold at the eastern end of the runway.

The pilot reported that the approach was normal, at an airspeed of about 58-60 kt, with a predominantly south-west wind of about 5-8 kt. The wind fluctuated between the west and south, but remained light.

During the landing, the main wheels touched down first, followed by the tail, which was locked into place. Shortly after, the aircraft suddenly veered right about 45°. The pilot considered a go-around, but was concerned that the aircraft would not clear the boundary fence (Figure 1). Consequently, he elected to continue the landing and selected reverse thrust, applied left brake, left rudder and left aileron in an attempt to re-align the aircraft with the runway. The aircraft did not slow down as the pilot expected. The wheels began to 'grab' and the left undercarriage leg became detached which caused the aircraft to rotate facing about 90° away from the runway. The left wingtip and propeller subsequently contacted the ground. The pilot shut down the aircraft and exited. The pilot was not injured, but the aircraft was substantially damaged (Figure 2).

Figure 1: Accident site



Source: Google earth

[6] Eastern Daylight-savings Time (EDT) was Coordinated Universal Time (UTC) + 11 hours.

Figure 2: Damage to VH-FLH

Source: Operator

Source: Operator

Airstrip information

The airstrip was east-west in orientation and about 964 m long. As it was located in a paddock, it had a relatively flat and firm surface with a boundary fence running along the southern side of the strip (Figure 1).

Pilot experience and comments

The pilot had over 7,750 flight hours with more than 3,850 on Air Tractor type aircraft. All his commercial flying experience has been in the agricultural industry.

The pilot provided the following comments regarding the accident:

- He was surprised that the aircraft veered to the right as the previous three landings at the airstrip, in the last 30 minutes, had been without issue.
- He had considered conducting a go-around as soon as the aircraft commenced veering right, but had concerns regarding the aircraft's ability to safely clear the fence. He felt he had the situation under control until it veered further.
- He believed that the aircraft had experienced a wind gust during landing, which may have contributed to the accident.

Operator comments

A post-accident engineering inspection conducted by the operator did not identify any mechanical issues with the aircraft. The operator suggested that a sudden wind gust may have contributed to the accident, or that a brake may have locked during the landing.

ATSB comment

Based on the information provided, the Australian Transport Safety Bureau (ATSB) was unable to determine what led to the loss of ground control.

General details

Occurrence details

Date and time:	21 October 2013 – 1145 EDT	
Occurrence category:	Accident	
Primary occurrence type:	Loss of ground control	
Location:	20 km NE of Deniliquin, New South Wales	
	Latitude: 35° 24.55’ S	Longitude: 145° 04.51’ E

Aircraft details

Manufacturer and model:	Air Tractor Inc. AT-502B	
Registration:	VH-FLH	
Serial number:	502B-2835	
Type of operation:	Aerial work	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

Ground proximity event involving a Cessna 208, VH-LNI and a vehicle

What happened

On 31 December 2013, at about 0945 Western Standard Time (WST),[1] the driver of an ambulance received a telephone call from the Western Australian State Operations Centre to meet a rescue helicopter at the Jurien Bay aeroplane landing area (ALA), Western Australia, and collect patients to be transferred to the local medical centre.

At about 0950, the pilot of a Cessna 208 aircraft, registered VH-LNI (LNI), landed at Jurien Bay to embark parachutists, and, while taxiing, received a radio broadcast on the common traffic advisory frequency (CTAF) from the pilot of the rescue helicopter. The helicopter pilot advised that they had landed at the beach about 0.5 NM from the aerodrome to transfer the patients to the ambulance. He advised that he would broadcast on the CTAF when subsequently proceeding to the aerodrome to refuel.

LNI then parked at the northern apron (Figure 1), with the engine running, in preparation for the arrival of the parachutists. The northern apron was in front of the Royal Flying Doctor Service (RFDS) terminal and the southern area of that apron was restricted to patient transfer operations. According to an agreement with the Dandaragan Shire Council, the skydiving aircraft were permitted to use the northern apron for parachute loading, but not to be parked to the east or north of the RFDS building on that apron at any time, or to impede access of emergency services vehicles.

About two minutes later, a second aircraft landed, vacated the runway, and taxied to the southern apron. The skydiving hangar and aerodrome access gate were located at the southern apron.

At about 0955, the ambulance arrived at the aerodrome at the RFDS gate, which was secured and accessible only by emergency services personnel. The driver stopped the ambulance and unlocked the gate and was required to cut rope barriers that had been erected and were blocking ambulance access to the RFDS terminal.

The driver attempted to communicate with the pilot of LNI, using hand signals. The ambulance driver reported that he used one hand indicating ‘stop’ and the other a ‘scissors’ action to indicate to the pilot to remain stationary. The pilot reported that he interpreted the hand gestures from the driver to imply that he was to leave the area.[2]

The ambulance then entered the airport and proceeded via the RFDS apron towards the runway. The driver reported that the ambulance deviated past the standing aircraft leaving about 14 m distance from the aircraft propeller. The pilot of LNI estimated the distance to be about 3 m.

The ambulance driver then proceeded to the runway and stopped prior to entering the runway. The driver reported that he and his ambulance partner conducted a thorough visual inspection for aircraft approaching and on the runway. The ambulance then entered the runway and drove towards the helipad, about 300 m south of the RFDS apron (Figure 2).

The pilot of LNI then broadcast on the CTAF, his intention to taxi to the southern apron, and commenced taxiing. While driving along the runway, the ambulance driver received a call from the Operations Centre advising that the helicopter was at the Jurien Bay marina awaiting the ambulance for patient transfer. He made a U turn and returned via the same route, and reported

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1 Western Standard Time (WST) was Coordinated Universal Time (UTC) + 8 hours.

2 The ambulance operations manager advised that there was no standard specified regarding the use of hand signals for communication with pilots.

again deviating around the stationary aircraft maintaining a safe distance. The pilot of LNI reported that when he sighted the ambulance returning he immediately stopped taxiing and that the ambulance passed within about 2 m of the aircraft wingtip.

Figure 1: Jurien Bay (ALA)

Source: Google earth

Ambulance driver / sub-centre manager

The ambulance driver provided the following comments:

- There were no written procedures regarding access to or use of the aerodrome from St John Ambulance.
- Ambulance crews have been tasked by the RFDS Operations Centre to conduct runway wildlife inspections prior to RFDS aircraft landing.
- A 'Sub Centre Circular' had been promulgated on 4 April 2011 providing guidelines regarding ambulance movement around RFDS aircraft.
- The ambulance personnel did not communicate directly with flight crew. All communications were by phone via the operations centre in Perth.
- He followed the local procedure to stop, look and listen for aircraft prior to entering the runway.
- He had made a submission to the shire council requesting that aircraft other than emergency services aircraft be prevented from accessing the RFDS terminal. The shire agreed to remove the sign permitting general aircraft parking from the RFDS apron.

Training manager

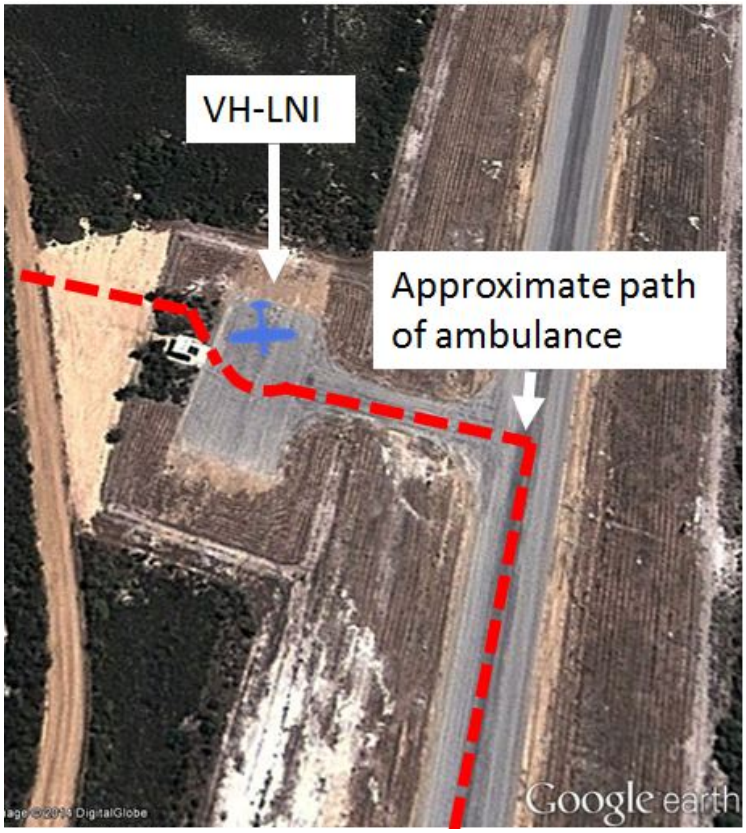
The ambulance training manager advised that there were no training procedures regarding operations around aerodromes. There was an emphasis on the first priority for all ambulance personnel being to assess for danger. They will henceforth incorporate a specific focus in the training regarding dangers that apply to aerodrome operations.

Ambulance operations manager

The ambulance operations manager provided the following comments:

- The Emergency Management Manual provided procedures for Perth International Airport and applied to other airports where an Aviation Security Identity Card (ASIC) was required for entry. The manual instructed ambulance personnel to wait at the security gate until a security escort arrives.
- There were no procedures for non-secured aerodromes. The aerodrome operators were responsible for any local operating procedures or agreements with emergency services personnel.
- The rural ambulance centres operate according to local procedures. In this incident, they expected that standard operating procedures at the aerodrome existed and that they would be provided and promulgated by the aerodrome operator.

Figure 2: Jurien Bay (ALA)



Source: Google earth and pilot recollection

Safety action

Whether or not the ATSB identifies safety issues in the course of an investigation, relevant organisations may proactively initiate safety action in order to reduce their safety risk. The ATSB has been advised of the following proactive safety action in response to this occurrence.

Shire council

As a result of this occurrence, the Dandaragan Shire Council has advised the ATSB that they have spoken to representatives of both parties involved in an attempt to prevent further incidents occurring and that a further meeting is scheduled. The Council intends to undertake works at the airport including construction of additional hangars and a taxiway in front of the hangars.

Safety message

The ATSB SafetyWatch highlights the broad safety concerns that come out of our investigation findings and from the occurrence data reported to us by industry. One of the safety concerns is safety around non-controlled aerodromes www.atsb.gov.au/safetywatch/safety-around-aeros.aspx.

This incident highlights the importance of understanding local procedures around non-controlled aerodromes, in particular having agreements between users of a facility. At aerodromes where operators are not required to have radio communication capability, the need for pilots to keep a good lookout is amplified.

General details

Occurrence details

Date and time:	31 December 2013 – 0955 WST	
Occurrence category:	Serious incident	
Primary occurrence type:	Ground proximity event	
Location:	Jurien Bay (ALA), Western Australia	
	Latitude: 30° 18.20' S	Longitude: 115° 03.32' E

Aircraft details

Manufacturer and model:	Cessna Aircraft Company 208	
Registration:	VH-LNI	
Serial number:	20800298	
Type of operation:	Private – parachute operations	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Nil	

Piston aircraft

Total power loss involving a Piper PA-28 161, VH-CCQ

What happened

Damage to VH-CCQ

Source: Insurer

On 1 October 2013, at about 0900 Eastern Standard Time (EST),[1] a Jabiru J160 aircraft departed Lilydale Airport, Victoria, for a planned flight to Charleville, Queensland with a fuel stop in Bourke, New South Wales. When about 9 NM north of Lilydale, the engine began to run rough and surge, and the pilot elected to return to Lilydale. Maintenance engineers were unable to resolve the engine issues with the Jabiru in a timely manner.

At about 1330, the pilot hired a Piper PA-28-161 aircraft, registered VH-CCQ, and planned the flight to Charleville, Queensland via Bourke. The pilot reported that he was advised that the historical fuel burn for the aircraft was about 25-27 L/hr.[2]

At about 1420, the aircraft departed Lilydale for Bourke with full fuel tanks, which the pilot reported to be about 185-190 litres.[3] On board the aircraft were the pilot and one passenger. During the cruise, maintaining 8,500 ft above mean sea level (AMSL), the pilot selected an engine power setting of 65% and leaned the fuel mixture. He reported that the aircraft's groundspeed and fuel flow correlated with the true airspeed (TAS)[4] and fuel flow specified in the aircraft operating manual.[5]

The pilot conducted fuel calculations every 30 minutes during the cruise, and changed between the left and right fuel tanks to maintain the aircraft's balance within the normal operating limits. When approaching Bourke, the pilot calculated the fuel remaining on board based on the fuel gauge indications and the nominal fuel flow, and elected not to land at Bourke for refuelling, but to divert and continue directly to Charleville.

When approaching the New South Wales/Queensland border, the pilot sighted stratus cloud ahead and descended the aircraft to an amended cruise level of 6,500 ft AMSL.

At about 1900, when about 20 NM east of Cunnamulla, Queensland, the engine began to run rough and surge. The pilot assessed that the most likely cause was fuel contamination in the selected right tank and changed to the left fuel tank. The engine continued to run rough and the pilot elected to divert to Cunnamulla.[6] The pilot selected carburettor heat on, however, the engine continued to run rough and surge.

The pilot declared a 'MAYDAY'[7] on both the area frequency and the common traffic advisory frequency (CTAF), with no response received. The engine power then reduced to idle and the pilot configured the aircraft for a forced landing. During the descent, the engine continued to surge. The pilot reported that all engine temperature and pressure indications were normal.

As it was dark by this time, when at about 1,500-2,000 ft above ground level (AGL), the pilot selected the landing light on to illuminate a suitable forced-landing site. The light flashed on and

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1 Eastern Standard Time (EST) was Coordinated Universal Time (UTC) + 10 hours.
2 The operator reported that the aircraft burns 30 L/hr and that the flight log in the aircraft advises the same fuel burn.
3 The operator reported that the total usable fuel on board was 180 L.
4 True airspeed (TAS) is the indicated airspeed corrected for air density.
5 The aircraft was not fitted with a fuel flow gauge.
6 Cunnamulla was 103 NM south-south-west of Charleville.
7 Mayday is an internationally recognised radio call for urgent assistance.

then failed. The initial illumination of the landing light caused a loss of night vision for the pilot who then relied on the aircraft instruments to estimate the aircraft's height above the ground.

The aircraft landed in a paddock at about 1920, bounced once and, during the subsequent landing roll, the pilot shut down the engine. The aircraft subsequently collided with a tree, detaching the left wing. The pilot reported that he had detected a fuel smell and heard the sound of liquid running. The pilot and passenger exited the aircraft and moved away from the aircraft in case of fire. After about 20 minutes, with no fire eventuating, the pilot returned to the aircraft and located a telephone with which he called emergency services.

The aircraft was substantially damaged (Figure 1), the pilot sustained serious injuries and the passenger sustained minor injuries.

An engineering report provided to the ATSB stated that during an inspection of the engine conducted after the accident, the carburettor float bowl was found to be empty.

Figure 1: Damage to VH-CCQ

Source: Insurer

Pilot comments

The pilot reported that, when the engine began to run rough, he noted that the fuel gauge indicated that 60 L of fuel was remaining. Also, he had performed a fuel check about 6 minutes prior, which indicated that 1 hr of fuel was remaining in each tank. Table 1 shows the fuel calculations performed by the pilot throughout the flight.

Table 1: Pilot enroute fuel calculations

Time	Fuel remaining in Litres	Title
1410	185	At startup
1420	180	After taxi
1500	166	
1530	150	
1600	138	
1634	126	
1659	113	
1730	101	
1804	88	
1854	66	

Safety message

This incident highlights the importance of thorough pre-flight planning and understanding the implications of both aircraft and pilot limitations.

The ATSB publication *Avoidable Accidents No. 5 – Starved and exhausted: Fuel management aviation accidents,* www.atsb.gov.au/publications/2012/avoidable-5-ar-2011-112.aspx, states that

> *Accurate fuel management also relies on a method of knowing how much fuel is being consumed. Many variables can influence the fuel flow, such as changed power settings, the use of non-standard fuel leaning techniques, or flying at different cruise levels to those planned. If they are not considered and appropriately managed then the pilot's awareness of the remaining usable fuel may be diminished.*

CAAP 234-4(1)[8] *Guidelines for Aircraft Fuel Requirements*, states that fuel gauges, particularly on smaller aircraft, may be unreliable. In an aircraft that is not fitted with a fuel flow indicator, the fuel gauges should not be relied on as the sole means of calculating fuel burn in flight.

Night flight in single-engine aircraft carries an increased level of risk in the event of an engine power loss, and the combination of engine and landing light failure may have had more serious consequences if the pilot had not also held a current instrument rating. The pilot's inability to see any horizon or ground features necessitated his reliance on the aircraft instruments to control the descent and landing.

The Civil Aviation Advisory Publication (CAAP) 5.13-2(0),[9] stated that, for single-engine aircraft operations, the most serious night time emergency is total engine failure. Further, it advised that due to limited outside visual reference at night, the aircraft has to be flown by reference to instruments, otherwise the pilot runs a considerable risk of becoming disoriented.

Landing and navigation are also more difficult at night because of the limited visual cues available to assist the pilot. The CAAP also advised that exposure to bright light causes the eyes to lose the dark adaptation of night vision.

General details

Occurrence details

Date and time:	1 October 2013 – 2015 EST	
Occurrence category:	Accident	
Primary occurrence type:	Engine failure	
Location:	9 km N of Cunnamulla aerodrome, Queensland	
	Latitude: 27° 56.98' S	Longitude: 145° 38.20' E

Aircraft details

Manufacturer and model:	Piper Aircraft Corporation PA-28-161	
Registration:	VH-CCQ	
Serial number:	28-7816358	
Type of operation:	Private	
Persons on board:	Crew – 1	Passengers – 1
Injuries:	Crew – Minor	Passengers – Minor
Damage:	Substantial	

[8] www.casa.gov.au/wcmswr/_assets/main/download/caaps/ops/234_1.pdf
[9] www.casa.gov.au/wcmswr/_assets/main/download/caaps/ops/5_13_2.pdf

Incorrect configuration involving Beech A36, VH-YEN

What happened

On 12 November 2013, a flight instructor and student pilot were conducting flying training in a Beech A36 (Bonanza) aircraft, registered VH-YEN, at Camden Airport, New South Wales. The purpose of the flight was to enable the student to obtain an aircraft design feature, retractable undercarriage (landing gear) endorsement.

After completing a pre-flight briefing, the instructor conducted a pre-flight inspection with the student, who was new to the aircraft type.

VH-YEN damage

Source: NSW Police

Soon after, the flight departed for the training area to complete the upper air training section of the endorsement. For about 40-45 minutes, the instructor worked with the student to complete a range of flight activities. This included conducting stalls[1] in various configurations; operating at different engine power settings with varying combinations of landing gear and flap selections, steep turns, the manual landing gear extension procedure and practice forced landings. Throughout the exercise, the student operated both the flap and landing gear levers (Figure 1), including a go-around from a practice forced landing.

On returning to Camden, the crew received an air traffic clearance to conduct a straight in approach and a touch-and-go on runway 06.

During the approach, the student completed the pre-landing checks, which included extending the landing gear and flaps. The instructor reported the student flew a well-controlled approach, although he inadvertently selected full (‘down’) flap instead of ‘approach’ flap as instructed.

At about 1445 Eastern Daylight-saving Time (EDT),[2] the aircraft touched down about 50-100 m past the runway 06 threshold and about 2 m left of the centreline. The instructor advised the student to re-align the aircraft with the runway centreline. The instructor then looked outside the cockpit at the aircraft’s position while the student corrected the alignment.

Shortly after, when the aircraft was about 200-300 m along the runway, the student became concerned about the length of runway remaining, and quickly moved to retract the flaps and prepare the aircraft for the take-off. However, the student inadvertently reached for the landing gear lever and retracted the landing gear.

The instructor heard the landing gear warning horn activate, quickly assessed the situation, and selected the lever to extend the gear again. As he felt the aircraft sink toward the runway, he applied full engine power in an attempt to keep it flying long enough for the landing gear to fully extend.

With the left main gear almost extended, the aircraft began to veer to the right. The instructor noted that there were buildings in the path of the aircraft and elected to reject the take-off. When the aircraft had slowed to about 30-40 kt, the nose dug into the grass alongside the runway.

The instructor and student were not injured, but the aircraft sustained substantial damage.

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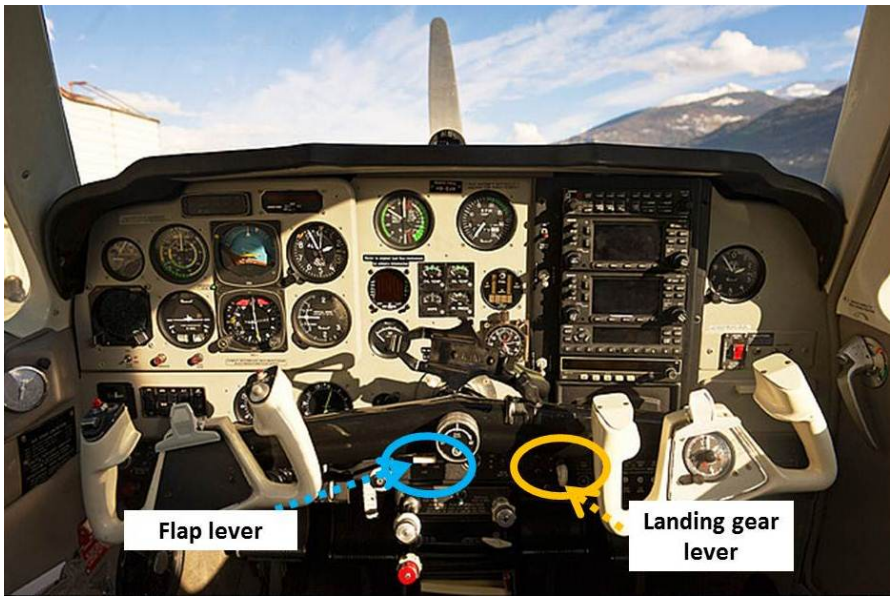
1 Term used when a wing is no longer producing enough lift to support an aircraft’s weight.

2 Eastern Daylight-saving Time (EDT) was Coordinated Universal Time (UTC) + 11 hours.

The student had completed his recent training in a Cessna 182 aircraft, which had the flap lever located in a position similar to that of the landing gear lever in the Bonanza (Figure 1 and Figure 2).

Figure 1: Cockpit of a Beech Bonanza similar to VH-YEN



Source: Daniel Adler

Figure 2: A Cessna 182 cockpit

Source: Boran Pivcic

Student pilot comments

The student was soon to undertake his Commercial Pilot's (Aeroplane) Licence flight test. He commented that, in hindsight, it may have been prudent to complete the test prior to starting the retractable landing gear endorsement.

Safety action

Whether or not the ATSB identifies safety issues in the course of an investigation, relevant organisations may proactively initiate safety action in order to reduce their safety risk. The ATSB has been advised of the following proactive safety action in response to this occurrence.

Aircraft operator

As a result of this occurrence, the aircraft operator has advised the ATSB that they have changed their procedure for retractable landing gear design type endorsements

Instructors at the flying school undertaking retractable landing gear design type endorsement training with students are now required to conduct a full stop landing on the first approach.

ATSB comment

In most retractable aircraft, the landing gear selector is intentionally wheel-shaped, to assist the pilot to identify this control from others in the cockpit. The flap lever is likewise shaped like an aerofoil, to represent a wing/flap system.

These designs add a level of redundancy against inadvertent retraction of the landing gear.

The AOPA Air Safety Foundation's publication *Beechcraft Bonanza/Debonair Safety Highlights* recommends "using extreme caution" when operating the flap switch while on the ground, for the pre 1984 Beech models: The report is available at:

www.aopa.org/-/media/Files/AOPA/Home/Pilot%20Resources/ASI/safety%20highlights/beech_bonanza.pdfSafety%20message

Research on human skill development has provided insight on why pilots make errors related to habit. As pilots progress in flying skills, many of the physical activities within flying can become routine and automatic. This can cause some pilots to make control inputs "by habit' in certain situations.[3]

The inadvertent retraction of the landing gear by pilots flying a range of aircraft types or unfamiliar with the earlier models of this type of aircraft has appeared in aircraft accident reports over many years.

In a 1980 report[4] published by the United States (US) National Transportation Safety Board (NTSB), the Beech Bonanza and the twin-engine Beech Baron were involved in the majority of inadvertent landing gear retraction accidents between 1975 and 1978. At that time, the Bonanza model accounted for about 30 per cent of the active light single-engine retractable landing gear aircraft fleet, however, they were involved in 67 per cent of landing gear retraction accidents. The report included a directive to manufacture all new aircraft of this type with the landing gear and flap controls in the same, relative location, that is, the landing gear lever to the left and the flap lever to the right of the engine controls. For aircraft that were unable to conform to this, a guard or latch mechanism to prevent inadvertent activation of the landing gear controls was required.

This was also highlighted in a 2001 report[5] produced by the US Aircraft Owners and Pilots Association (AOPA), which stated that the early model Bonanzas had a significantly higher involvement in inadvertent landing gear retraction than other aircraft.

From 1984, the Bonanza and other Beech model aircraft were manufactured with the landing gear lever to the left of the engine power controls and the flap lever to the right.

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3 Fitts, P.M.; Posner, M.I. Human Performance. New York, United States: Academic Press 1967

4 www.ntsb.gov/doclib/recletters/1980/A80_56_58.pdf

5 www.aopa.org/-/media/Files/AOPA/Home/Pilot%20Resources/ASI/safety%20highlights/beech_bonanza.pdf

General details

Occurrence details

Date and time:	12 November 2013 –1500 EDT	
Occurrence category:	Accident	
Primary occurrence type:	Incorrect configuration	
Location:	Camden Airport, New South Wales	
	Latitude: 34° 02.42’ S	Longitude: 150° 41.23’ E

Aircraft details

Manufacturer and model:	Beechcraft Aircraft Corporation A36	
Registration:	VH-YEN	
Serial number:	E-1731	
Type of operation:	Flying training - dual	
Persons on board:	Crew – 2	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

Hard landing involving a Rolladen-Schneider Flugzeugbau LS7-WL, VH-XJJ

What happened

On 15 December 2013, at about 0900 Eastern Daylight-savings Time,[1] the pilot of a Rolladen Schneider Flugzeugbau LS7-WL glider, registered VH-XJJ, attended the daily pilots' briefing at Benalla aerodrome, Victoria.

Following an analysis of the weather forecast and discussion of the day's gliding operations, the pilot planned to head to the north of Benalla. While waiting to be towed aloft, the pilot discussed his plans with the chief flying instructor, who advised the pilot that there would be better lift[2] to the southeast of the airfield as indicated by the presence of cumulus (Cu) clouds.

Cumulus cloud

Source: Metlink

The pilot then amended his planned flight to follow the Cu clouds and lift to the south-east of Benalla. At about 1320, the glider was launched and climbed to about 4,500 ft above mean sea level, overhead the airfield. The pilot tracked towards a quarry and a series of small hills and then followed the Cu clouds to the south-east. While flying, the pilot maintained a lookout below for suitable paddocks for an outlanding.

Once over the hills, the pilot reported that at about 1430, the wind changed from a south-easterly to a south-westerly direction. The pilot reported that at about the same time, the Cu clouds dissipated and the lift disappeared. The pilot observed that the glider was not within range of a return to Benalla or the last suitable field he had identified, and commenced looking for a suitable field for an outlanding. The pilot identified a field about 1 to 2 NM ahead in a valley. The selected paddock appeared to be suitable, however, when at about 500 ft above ground level (AGL), the pilot observed that the surface had rocks and holes and quickly chose an alternative field.

The alternative field was perpendicular to the planned landing area and the glider would be landing towards the north-east (Figure 1). There was a row of trees on the approach end of the field and a ditch at the far end. The pilot conducted an approach to the field and the glider passed over the trees at about 50 ft AGL. The pilot then attempted to reduce altitude and airspeed by conducting shallow turns and flying diagonally across the field. The glider landed heavily in the north-eastern corner of the field. The pilot sustained a serious injury due to the hard landing and the glider was substantially damaged.

Pilot comments

The pilot provided the following comments:

- he had recently completed a successful outlanding about 2 NM north of Benalla and a 110 NM cross-country flight
- he had a total of 28.5 hours' gliding experience

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1 Eastern Daylight-savings Time (EDT) was Coordinated Universal Time (UTC) + 11 hours.

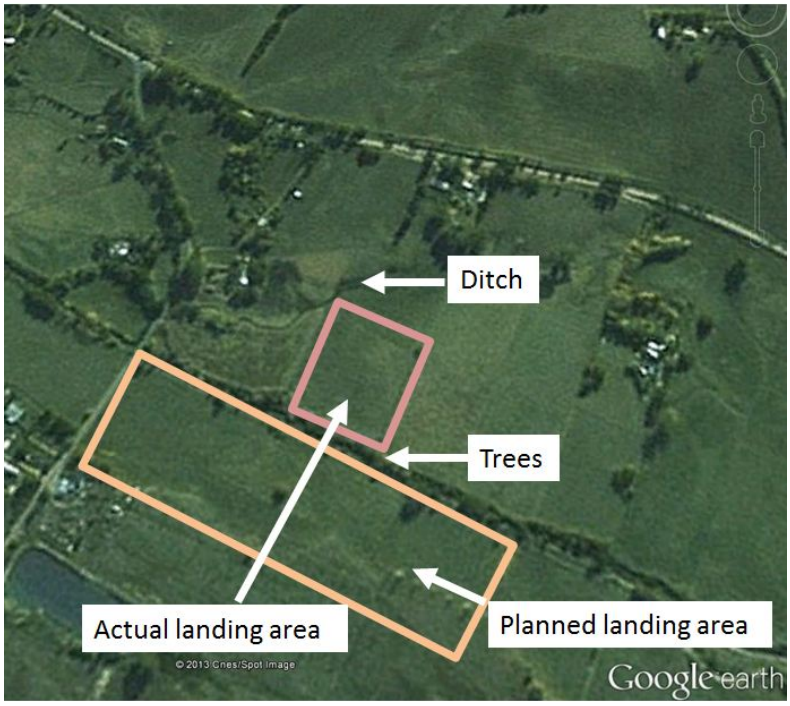
2 Lift is a meteorological phenomenon used as an energy source by soaring aircraft and can be gained by using rising air from thermals, ridge lift, wave lift and convergence.

- the decision to head to the south was a combination of confidence from successful previous flights and advice from the chief flying instructor; however, flying towards the hills increased the risk of having to conduct an outlanding and of having fewer suitable landing areas
- he did not recognise early enough that the lift indicated by the cumulus clouds was not as good as on his previous flight
- outlandings are an inherent part of gliding operations and pilots are taught to remain within range of a safe landing paddock at all times.

Chief flying instructor comment

The chief flying instructor reported that he had conducted a briefing with the pilot prior to the flight, including a discussion of the weather conditions, and a reminder regarding selection of a suitable landing area.

Figure 1: Landing area



Source: Google earth

Safety message

This incident highlights the importance of pilots of recognising their abilities and limitations, and to ensure they feel confident with the planned flight. It is a reminder for glider pilots to keep a constant lookout for suitable fields in which to conduct an outlanding.

General details

Occurrence details

Date and time:	15 December 2013 – 1530 EDT	
Occurrence category:	Accident	
Primary occurrence type:	Hard landing	
Location:	20 km SE of Benalla aerodrome, Victoria	
	Latitude: 36° 42.27' S	Longitude: 146° 07.95' E

Glider details

Manufacturer and model:	Rolladen-Schneider Flugzeugbau GMBH, LS7-WL	
Registration:	VH-XJJ	
Serial number:	7071	
Type of operation:	Gliding	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – 1 (Serious)	Passengers – Nil
Damage:	Substantial	

Hard landing involving a Cessna U206G, VH-UFT

What happened

On 21 December 2013, at about 1230 Eastern Standard Time (EST),[1] a Cessna U206G aircraft, registered VH-UFT, departed Weipa for a charter flight to Hicks Island aeroplane landing area (ALA), Queensland. On board were the pilot and five passengers.

At the time, there was scattered cloud at different levels, showers of rain and a strong south-easterly wind. The pilot elected to cruise at about 1,500 ft above mean sea level (AMSL) until within 20 to 25 NM of Hicks Island, when the pilot descended the aircraft to about 1,000 ft AMSL to remain clear of cloud.

Hicks Island (ALA)

Source: Google earth

From there, the cloud base was lower and after descending to about 500 ft above ground level (AGL), when about 20 NM from Hicks Island, the pilot was unable to conduct an approach to the aerodrome and opted to approach from the north. The pilot was again unable to continue the approach and remain in visual meteorological conditions (VMC) and attempted one more approach from the south. After another unsuccessful attempt at reaching Hicks Island, the pilot elected to hold for about 40 minutes. After that time, the weather had not improved and the aircraft diverted to Lockhart River aerodrome, flying over water to remain clear of cloud and terrain.

After refuelling and about 45 minutes on the ground at Lockhart River, the pilot was advised by personnel at Haggerstone Island (south of Hicks Island), that the weather had improved and that there were still showers in the area. The weather radar also displayed some white returns, indicating light showers in the area. At about 1520, the aircraft departed Lockhart River for Hicks Island, and about 30 minutes later, the pilot conducted an approach to runway 09. On the final stage of the approach, at about 200 ft AGL, the aircraft encountered windshear, resulting in some loss of height.

The pilot continued the approach and after the initial touchdown, the aircraft remained on the ground for about 3-4 m then became airborne and subsequently bounced. The nose landing gear then contacted the ground and detached from the aircraft (Figure 1). The aircraft came to a stop on the runway.

[1] Eastern Standard Time (EST) was Coordinated Universal Time (UTC) + 10 hours.

Figure 1: Damage to VH-UFT

Source: Operator

Pilot comments

The pilot provided the following comments:

- The pilot had 6.7 hours of flying experience in the Cessna 206 with the most recent flight 3 months earlier.
- Runway 09 at Hicks Island slopes up and then levels off and then slopes up again. The pilot had previously experienced that aircraft becoming momentarily airborne after the initial touchdown on the runway and another company pilot reported having the same experience.
- The pilot elected not to conduct a go-around after the aircraft became airborne because the bounce on landing was perceived to be normal for that runway.
- The landing did not seem hard enough to cause the nose landing gear to shear off.
- During the flight, when the aircraft encountered showers of rain, the water on the windscreen made it difficult to distinguish the cloud from the sea.
- The upslope of the runway gave the illusion that the aircraft was high on the approach.

Safety message

A go-around is the procedure for discontinuing an approach to land. It is a standard manoeuvre that is performed when the pilot is not completely satisfied that the requirements for a safe landing have been met.

The need to conduct a go-around may occur at any stage during the approach and landing phase, but according to the United States Federal Aviation Administration (FAA), the most critical go-around is one initiated when very close to the ground. Consequently, the sooner a condition that warrants a go-around is recognised, the safer the manoeuvre will be.

This incident is a reminder to pilots to be go-around ready.

The following links provide some useful information on go-arounds:

- Aviation safety explained – Go-arounds: www.casa.gov.au/scripts/nc.dll?WCMS:STANDARD:1001:pc=PC_91481

- FAA Airplane Flying Handbook, Chapter 9, Approaches and Landings: www.faa.gov/library/manuals/aircraft/airplane_handbook/media/faa-h-8083-3a-4of7.pdf

General details

Occurrence details

Date and time:	21 December 2013 – 1545 EST	
Occurrence category:	Accident	
Primary occurrence type:	Hard landing	
Location:	Hicks Island (ALA), Queensland	
	Latitude: 11° 59.00' S	Longitude: 143° 16.00' E

Aircraft details

Manufacturer and model:	Cessna Aircraft Company U206G	
Registration:	VH-UFT	
Serial number:	U20604593	
Type of operation:	Charter – passenger	
Persons on board:	Crew – 1	Passengers – 5
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

Collision with terrain involving a Grumman G 164A, VH-CCF

G-164A aircraft, registered VH-CCF, took off to the west, from an airstrip about 18 km north of Deniliquin, New South Wales, to conduct aerial spreading operations.

The pilot reported applying a higher power setting than normal for take-off to allow for the warm temperature (about 25 ºC) and short airstrip. When at about 150 ft above ground level (AGL), the pilot levelled the aircraft off and commenced a right turn towards the north. During the turn, the pilot felt the aircraft sink. The pilot rolled the wings level and elected not to jettison the fertilizer load at that time as the aircraft normally stopped sinking once the wings were level. However, the aircraft continued to sink and the pilot then jettisoned the load.

When at about 20-30 ft AGL, with a nose high attitude, the pilot felt the aircraft's wings shaking, indicating an imminent stall.[1] The pilot increased engine power in an attempt to avert the stall, but the aircraft continued to descend. Shortly after, the wheels touched down in a rice paddy in about 20 cm of water and the aircraft flipped over (Figure 1). The aircraft was substantially damaged. The pilot was uninjured.

Figure 1: Damage to VH-CCF

Source: Pilot

[1] Stall (aerodynamic) is the term used when a wing is no longer producing enough lift to support an aircraft's weight.

Pilot comments

The pilot provided the following comments:

- Normally when the load was jettisoned, the aircraft ballooned and the pilot then lowered the nose to regain airspeed. On this day the aircraft continued to sink.
- The aircraft was loaded with about 450 kg of fertilizer; well below the maximum operating weight for the conditions.
- The wind was a light and gusty southerly. The pilot would normally turn the aircraft into wind after the initial climb, but as there were trees to the south of the airstrip, the pilot elected to turn downwind towards a clear area. It was possible that the aircraft may have encountered a downdraft.

General details

Occurrence details

Date and time:	31 December 2013 – 1230 EDT	
Occurrence category:	Accident	
Primary occurrence type:	Collision with terrain	
Location:	18 km N of Deniliquin aerodrome, New South Wales	
	Latitude: 35° 23.83' S	Longitude: 144° 56.97' E

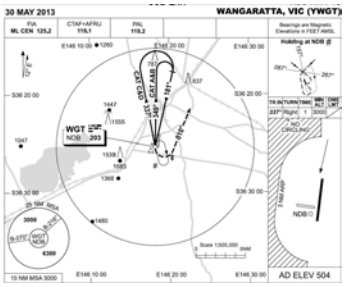
Aircraft details

Manufacturer and model:	Grumman American Aviation Corporation G-164A	
Registration:	VH-CCF	
Serial number:	1105	
Type of operation:	Aerial work	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

Aircraft proximity event between a Piper PA-34, VH-FOE and a Piper PA-39, VH-MAB

What happened

Wangaratta NDB approach



Source: Airservices Australia

On 2 January 2014, at about 1200 Eastern Daylight-savings Time (EDT),[1] a Piper PA-39 aircraft, registered VH-MAB (MAB), departed Shepparton, Victoria, on an instrument flight rules (IFR) training flight, with a flight instructor and student pilot on board. The planned route was to track from Shepparton to Wagga Wagga, New South Wales, then to Albury and to Wangaratta, Victoria and return to Shepparton, and to conduct IFR approaches at each location.

At about 1400, a Piper PA-34 aircraft, registered VH-FOE (FOE), departed Phillip Island, Victoria, for a private flight under visual flight rules (VFR) to Wangaratta, with a pilot and one passenger on board.

At about 1525, when approaching Wangaratta on a direct track from Albury, New South Wales, and about 15 NM from the aerodrome, the student pilot of MAB broadcast on the common traffic advisory frequency (CTAF) advising the aircraft's location and his intention to conduct a practice non-directional beacon (NDB) approach at Wangaratta. He advised the air traffic controller at Melbourne Centre of his intentions to conduct airwork at Wangaratta and was not advised of any traffic in the area.[2]

He then conducted a sector entry and two holding patterns in accordance with the published procedures. During that time, the instructor reported communicating on the CTAF with the pilot of a glider tow aircraft and sighted one glider operating in the area.

At about 1540, the pilot of FOE broadcast on the CTAF, advising that FOE was 10 NM south-east of Wangaratta at 4,500 ft above mean sea level (AMSL), on descent and inbound to the aerodrome. The instructor of MAB heard this broadcast while outbound on the NDB approach to the north of the aerodrome, and did not respond.

When turning inbound on the approach and about 7 NM from the aerodrome, the instructor of MAB reported broadcasting turning inbound.[3] He reported that the student also broadcast when about 3 NM from the aerodrome advising his intention to conduct a missed approach from overhead the aerodrome. The instructor reported hearing a beep-back from the aerodrome frequency response unit (AFRU)[4] for each broadcast he made on the CTAF.

The student of MAB continued the approach until about 1,000 ft above ground level,[5] overhead the NDB, he discontinued the approach and commenced a climb, maintaining runway heading.

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1 Eastern Daylight-savings Time (EDT) was Coordinated Universal Time (UTC) + 11 hours.

2 In Class G airspace, air traffic control provided traffic information to IFR flights regarding other IFR flights and regarding identified VFR flights where practicable.

3 The ATSB was unable to verify radio calls as the CTAF was not recorded at Wangaratta. The pilot of MAB heard all of the broadcasts made by the pilot of FOE.

4 Aerodrome Frequency Response Units (AFRUs) provide an automatic response, or 'beep back', to pilots' radio transmissions on the CTAF. They confirm the operation of the aircraft's radio transmitter and receiver, the volume setting, and that the pilot has selected the correct frequency for use at that aerodrome.

5 Wangaratta aerodrome was at an elevation of 504 ft AMSL.

On arriving overhead the aerodrome and descending through about 2,400 ft AMSL, the pilot of FOE broadcast a call on the CTAF advising that FOE was overhead, and commenced a right turn to join downwind for runway 18. About 2 seconds later, his passenger sighted MAB and alerted the pilot. The pilot sighted MAB below and on a reciprocal heading and estimated the aircraft was about 100-200 m away and about 40-70 ft below FOE (Figure 1).

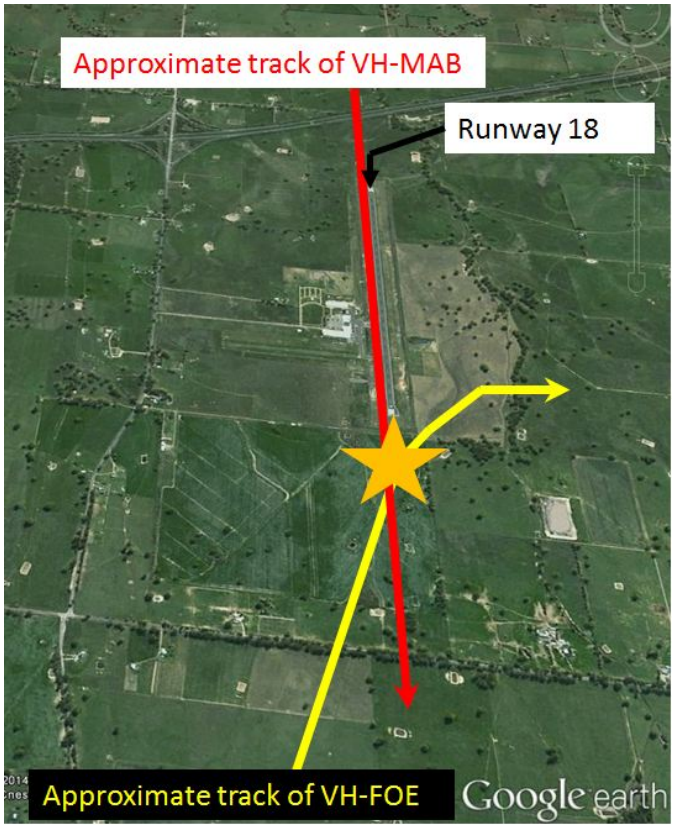
The instructor of MAB reported that he was overhead the runway 36 threshold and on climb when he sighted FOE about 250-300 ft above and almost directly overhead. He immediately pushed forward on the control column to level the aircraft off.

The ATSB was unable to reconcile the differences between estimates in proximity provided by the pilots of the aircraft.

The pilot of FOE reported that he then broadcast a call to the pilot of MAB but did not receive a response. The pilot of MAB did not hear the call but reported broadcasting a departure call on the CTAF at about the same time.

The pilot of FOE broadcast on the CTAF joining downwind, which was heard by the instructor of MAB. As MAB departed the area, the instructor also heard the pilot of FOE broadcast a base call on the CTAF and cancel SARTIME[6] with Melbourne Centre.

Figure 1: Approximate aircraft tracks



Source: Google earth and pilot recollections

[6] Time nominated by a pilot for the initiation of Search and Rescue action if a report from the pilot has not been received by the nominated unit.

Pilot comments (VH-FOE)

The pilot of FOE provided the following comments:

- He omitted an estimated arrival time from his inbound broadcast. Providing an arrival time may have assisted in alerting the pilot of MAB.
- The pilot of FOE did not hear any broadcasts from other aircraft on the CTAF.
- The track of FOE was verified using Avplan software.

Safety message

The ATSB SafetyWatch highlights the broad safety concerns that come out of our investigation findings and from the occurrence data reported to us by industry. One of the safety concerns is safety around non-controlled aerodromes www.atsb.gov.au/safetywatch/safety-around-aeros.aspx.

Research conducted by the ATSB found that, between 2003 and 2008, 181 occurrences of reduced separation were reported, of which 55 were near mid-air collisions (aircraft proximity events). Insufficient communication between pilots and breakdowns in situational awareness were the most common contributors to safety incidents in the vicinity of non-towered aerodromes.

A review by the ATSB of mid-air collisions between 1961 and 2003 also found that almost 80 per cent of mid-air collisions (29 accidents) occurred in or near the circuit area. *A pilot's guide to staying safety in the vicinity of non-towered aerodromes* is available at www.atsb.gov.au/publications/2008/ar-2008-044(1).aspx.

This incident highlights the importance of using both unalerted and alerted see-and-avoid principles and maintaining a vigilant lookout at all times.

Civil Aviation Advisory Publication (CAAP) 166-1(2): *Operations in the vicinity of non-controlled aerodromes,* casa.gov.au/wcmswr/_assets/main/download/caaps/ops/166-1.pdf, cautions pilots not to descend into the active side of the circuit from above because of the difficulty of seeing and being seen by aircraft directly below the aircraft's flight path. The CAAP advises pilots to descend on the non-active side of the circuit.

General details

Occurrence details

Date and time:	2 January 2014 – 1548 EDT	
Occurrence category:	Serious incident	
Primary occurrence type:	Aircraft proximity event	
Location:	Wangaratta aerodrome, Victoria	
	Latitude: 36° 24.95' S	Longitude: 146° 18.42' E

Aircraft details: VH-MAB

Manufacturer and model:	Piper Aircraft Corporation PA-39	
Registration:	VH-MAB	
Serial number:	39-96	
Type of operation:	Flying training – dual	
Persons on board:	Crew – 2	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	None	

Aircraft details: VH-FOE

Manufacturer and model:	Piper Aircraft Corporation PA-34	
Registration:	VH-FOE	
Serial number:	34-7350298	
Type of operation:	Private	
Persons on board:	Crew – 1	Passengers – 1
Injuries:	Crew – Nil	Passengers – Nil
Damage:	None	

Helicopters

Wirestrike involving a Robinson R44, VH-HJT

What happened

On 16 December 2013, the pilot of a Robinson R44 helicopter, registered VH-HJT, had completed a full day of aerial agricultural work, after which he reported feeling dehydrated and tired from the time pressures involved with the operation. He then attended a briefing for the next day's operations with the land owner, which involved aerial spraying of weeds on three properties. The briefing specified the areas to be sprayed; however, no maps or detailed information regarding the operation were provided to the pilot.

The next day, due to a series of delays, operations commenced at about 0800 Eastern Daylight-savings Time (EDT).[1] The pilot reported that he felt well and rested, but that at that time, he was feeling time pressure to complete the job and frustrated at the inadequacy of the preparations.

After completing five loads of spraying, the pilot elected to land the helicopter to discuss the remaining areas to be sprayed with the land owner. He was reminded of a rocky gully with blackberries that needed to be sprayed, which was away from the area he had been working on earlier. He did not recall that gully being mentioned at the briefing the night before and he was not alerted to the existence of any power lines. The pilot then overflew the gully and did not observe any power lines or power poles.

The pilot then commenced spraying the gully, which required looking out of the helicopter window and door towards the ground. He then sighted power lines (Figure 1) just as the helicopter main rotor disc struck the wires. The pilot immediately conducted a precautionary landing. The helicopter sustained substantial damage to the main rotor blades (Figure 2). The pilot was uninjured. The strike also resulted in insulators being detached from the 22,000 volt power lines.

Figure 1: Unknown powerline

Source: Pilot

Figure 2: Damage to VH-HJT

Source: Pilot

[1] Eastern Daylight-savings Time (EDT) was Coordinated Universal Time (UTC) + 11 hours.

Pilot comments

The pilot believed that a series of factors contributed to the accident and that delaying operations until these had been resolved may have averted it. These factors included:

- He had not been feeling well at the briefing, but was unable to defer it until the following day.
- There was insufficient information and documentation regarding the operation provided at the briefing.
- There was a discrepancy between the planned and actual chemical load required for the operation, resulting in insufficient chemical remaining to complete the required areas. The pilot therefore elected to land and discuss the rest of the spraying operation with the land owner.
- He was conducting 'spot' spraying, which required him to focus more on the ground below, rather than to the front as for large area spraying.
- The pressure he felt to complete the job was largely self-imposed.

Safety action

Whether or not the ATSB identifies safety issues in the course of an investigation, relevant organisations may proactively initiate safety action in order to reduce their safety risk. The ATSB has been advised of the following proactive safety action in response to this occurrence.

Helicopter operator

As a result of this occurrence, the operator has advised the ATSB that they are taking the following safety actions:

- purchasing a computer and printer to be used for planning operations to ensure all maps and overlays are available for the briefing and can be printed for the pilots
- obtaining maps and global positioning system (GPS) data from the power company regarding the location of power lines
- GPS units are being upgraded to enable power wires and obstacles to be depicted on the GPS screen used by company pilots. Training will also be provided in the use of the technology.
- ensuring sufficient and accurate information is provided to pilots prior to commencing spraying operations
- the operator will emphasise to pilots the importance of conducting a thorough inspection prior to application of chemical and at any time during the application as required.

Safety message

Research conducted by the ATSB identified 180 wirestrike accidents between 2001 and 2010. Of these, 100 occurred during agricultural operations.

The research report advises pilots to have an up-to-date and detailed map with powerlines and other hazards clearly marked. Pilots of some wirestrike accidents reported to the ATSB that the maps they received from clients did not have powerlines clearly marked on the map. The report further cautioned pilots not to rely on the maps solely and to conduct an aerial reconnaissance to confirm wire locations and other hazards. Having a plan and a procedure to minimise the risk of wirestrike is a valuable mitigation strategy. The ATSB report *Wirestrikes involving known wires: A manageable aerial agriculture hazard* is available at www.atsb.gov.au/publications/2011/avoidable-2-ar-2011-028.aspx.

For further risk management strategies for agricultural operations, the Aerial Application Pilots Manual is available from www.aerialag.com.au/Home.aspx.

This incident highlights the importance of thorough planning. The use of all available resources and technologies in planning can reduce the pilot's workload and risk of an event. A combination

of factors such as poor planning, time pressure and local conditions may lead a pilot to believe there is increased risk in an operation. Delaying the operation until these have been resolved may reduce the associated risk to an acceptable level.

General details

Occurrence details

Date and time:	17 December 2013 – 1005 EDT	
Occurrence category:	Accident	
Primary occurrence type:	Wirestrike	
Location:	28 km S of Cootamundra aerodrome, New South Wales	
	Latitude: 34° 51.23' S	Longitude: 148° 00.13' E

Helicopter details

Manufacturer and model:	Robinson Helicopter Company, R44 II	
Registration:	VH-HJT	
Serial number:	10422	
Type of operation:	Aerial work	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Substantial	

Australian Transport Safety Bureau

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The Bureau is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, marine and rail modes of transport through excellence in: 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 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 identify and reduce safety-related risk. ATSB investigations determine and communicate the safety factors related to the transport safety matter being investigated. The terms the ATSB uses to refer to key safety and risk concepts are set out in the next section: Terminology Used in this Report.

It is not a function of the ATSB to apportion blame or determine 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.

About this Bulletin

The ATSB receives around 15,000 notifications of Aviation occurrences each year, 8,000 of which are accidents, serious incidents and incidents. It also receives a lesser number of similar occurrences in the Rail and Marine transport sectors. It is from the information provided in these notifications that the ATSB makes a decision on whether or not to investigate. While some further information is sought in some cases to assist in making those decisions, resource constraints dictate that a significant amount of professional judgement is needed to be exercised.

There are times when more detailed information about the circumstances of the occurrence allows the ATSB to make a more informed decision both about whether to investigate at all and, if so, what necessary resources are required (investigation level). In addition, further publically available information on accidents and serious incidents increases safety awareness in the industry and enables improved research activities and analysis of safety trends, leading to more targeted safety education.

The Short Investigation Team gathers additional factual information on aviation accidents and serious incidents (with the exception of 'high risk operations), and similar Rail and Marine occurrences, where the initial decision has been not to commence a 'full' (level 1 to 4) investigation.

The primary objective of the team is to undertake limited-scope, fact gathering investigations, which result in a short summary report. The summary report is a compilation of the information the ATSB has gathered, sourced from individuals or organisations involved in the occurrences, on the circumstances surrounding the occurrence and what safety action may have been taken or identified as a result of the occurrence.

These reports are released publically. In the aviation transport context, the reports are released periodically in a Bulletin format.

Conducting these Short investigations has a number of benefits:

- Publication of the circumstances surrounding a larger number of occurrences enables greater industry awareness of potential safety issues and possible safety action.
- The additional information gathered results in a richer source of information for research and statistical analysis purposes that can be used both by ATSB research staff as well as other stakeholders, including the portfolio agencies and research institutions.
- Reviewing the additional information serves as a screening process to allow decisions to be made about whether a full investigation is warranted. This addresses the issue of 'not knowing what we don't know' and ensures that the ATSB does not miss opportunities to identify safety issues and facilitate safety action.
- In cases where the initial decision was to conduct a full investigation, but which, after the preliminary evidence collection and review phase, later suggested that further resources are not warranted, the investigation may be finalised with a short factual report.
- It assists Australia to more fully comply with its obligations under ICAO Annex 13 to investigate all aviation accidents and serious incidents.
- Publicises ***Safety Messages*** aimed at improving awareness of issues and good safety practices to both the transport industries and the travelling public.

Australian Transport Safety Bureau

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Investigation

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