Australian Government
Australian Transport Safety Bureau

Flight below lowest safe altitude and ground proximity alert involving Leonardo Helicopters AW139, VH-PVO

44 km north-north-west of Latrobe Regional Airport, Victoria, on 4 March 2021

ATSB Transport Safety Report
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Addendum

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Safety summary

What happened

On the morning of 4 March 2021, the crew of a Leonardo Helicopters AW139, registered VH-PVO and operated by the Victoria Police Air Wing, were re-assigned from an aerial search near Coldstream to a search and rescue task in Orbost, Victoria. Due to the cloud conditions, the pilot upgraded the flight from visual to instrument flight rules. While en route to Bairnsdale at their cruising altitude of 5,000 ft, the helicopter entered cloud and shortly after the enhanced ground proximity warning system activated with the alert 'caution terrain'. The pilot initiated a climbing left turn to avoid Mount Baw Baw, which had a maximum elevation of 5,138 ft.

What the ATSB found

The ATSB found that, while en route to Bairnsdale below the lowest safe altitude, the helicopter entered cloud in the vicinity of Mount Baw Baw, which resulted in activation of a ground proximity alert. The pilot identified the location of the terrain threat and conducted a climbing turn away.

The helicopter was below the lowest safe altitude as the pilot had incorrectly assessed the in-flight conditions as visual meteorological conditions after the helicopter reached 5,000 ft in the vicinity of Coldstream (based on their estimate of height above the cloud tops). As a result, the pilot elected to remain at 5,000 ft instead of recalculating the lowest safe altitude as the flight progressed.

The ATSB also found that the operator did not have a procedure for pilots when upgrading from visual to instrument flight rules in-flight. This would reduce the likelihood of an error when replanning in-flight, which was reported to be an infrequent task and higher-than-normal workload task, particularly in single-pilot operations.

What has been done as a result

After the incident, Victoria Police Air Wing developed an instrument flight rules upgrade procedure for inclusion in their operations manual. This procedure includes the acceptable methods for calculating lowest safe altitude and was circulated to all their pilots.

Safety message

This investigation highlighted the importance of lowest safe altitude calculations and to recalculate the lowest safe altitude appropriate for the area of operations.

Operators should also review their operations manual to ensure they have procedures in place to adequately capture their operating procedures in order to minimise the likelihood of decision-making errors.

Contents

The occurrence

On 4 March 2021, at about 1120 Eastern Daylight-saving Time,[1] the crew of a Leonardo Helicopters AW139, registered VH-PVO and operated by the Victoria Police Air Wing, were tasked with a search and rescue in Orbost, Victoria. At the time of the tasking, they were assisting with an aerial search near Coldstream. On board was the pilot and two tactical flight officers.

After receiving the new task, the crew discussed whether there was sufficient fuel onboard to continue to Orbost without returning to their base at Essendon Airport. They decided that they could proceed with the re-tasking without returning to Essendon, but would have to refuel at Bairnsdale Airport, before commencing the task at Orbost. Due to the presence of cloud to the east, in the direction of Bairnsdale, the pilot decided to upgrade the flight from visual[2] to instrument flight rules[3] and contacted air traffic control (ATC) accordingly.

Part of the upgrade to instrument flight rules required the pilot to calculate the lowest safe altitude[4] (LSALT) for the flight. At the time of the upgrade, the helicopter was about 17 NM (31 km) to the north-north-east of Moorabbin Airport. Therefore, the pilot initially calculated the LSALT of 5,000 ft above mean sea level (AMSL) based on the Moorabbin 25 NM (46 km) minimum sector altitude of 4,700 ft, with the intent to revise en route. The pilot knew they were within the 25 NM minimum sector altitude at the time as they were familiar with the area from previous training exercises. Once this was calculated and a clearance was received from ATC, the pilot set 5,000 ft as the target altitude in the autopilot altitude acquire function.

The helicopter's forward-looking infrared camera footage recorded the helicopter entering cloud at about 2,800 ft and emerge on top of the cloud at about 4,475 ft (Figure 1), before leveling off at 5,000 ft. At interview, the pilot recalled the helicopter entered cloud at about 2,700 ft and emerged at 3,500–4,000 ft. The pilot turned the volume down on the intercom radios to focus on the other tasks associated with the upgrade, including filing a flight plan with Airservices Australia. The pilot also entered the flight path from Coldstream to Bairnsdale into OzRunways[5] and noted they would be flying through the East Sale restricted airspace[6] to reach Bairnsdale (Figure 2). The pilot was cognisant of the need to obtain an airways clearance for the East Sale restricted airspace early in the flight.

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1 Australian Eastern Daylight-Saving Time: Coordinated Universal Time (UTC) + 11 hours.

2 Visual flight rules (VFR): a set of regulations that permit a pilot to operate an aircraft only in weather conditions generally clear enough to allow the pilot to see where the aircraft is going.

3 Instrument flight rules (IFR): a set of regulations that permit the pilot to operate an aircraft in instrument meteorological conditions (IMC), which have much lower weather minimums than visual flight rules (VFR). Procedures and training are significantly more complex as a pilot must demonstrate competency in IMC conditions while controlling the aircraft solely by reference to instruments. IFR-capable aircraft have greater equipment and maintenance requirements.

4 Minimum sector altitude (MSA) and lowest safe altitude (LSALT) are calculated to provide 1,000 ft obstacle clearance for IFR flights and are published on aeronautical charts and in the Aeronautical Information Publication (AIP) for pilot and controller reference.

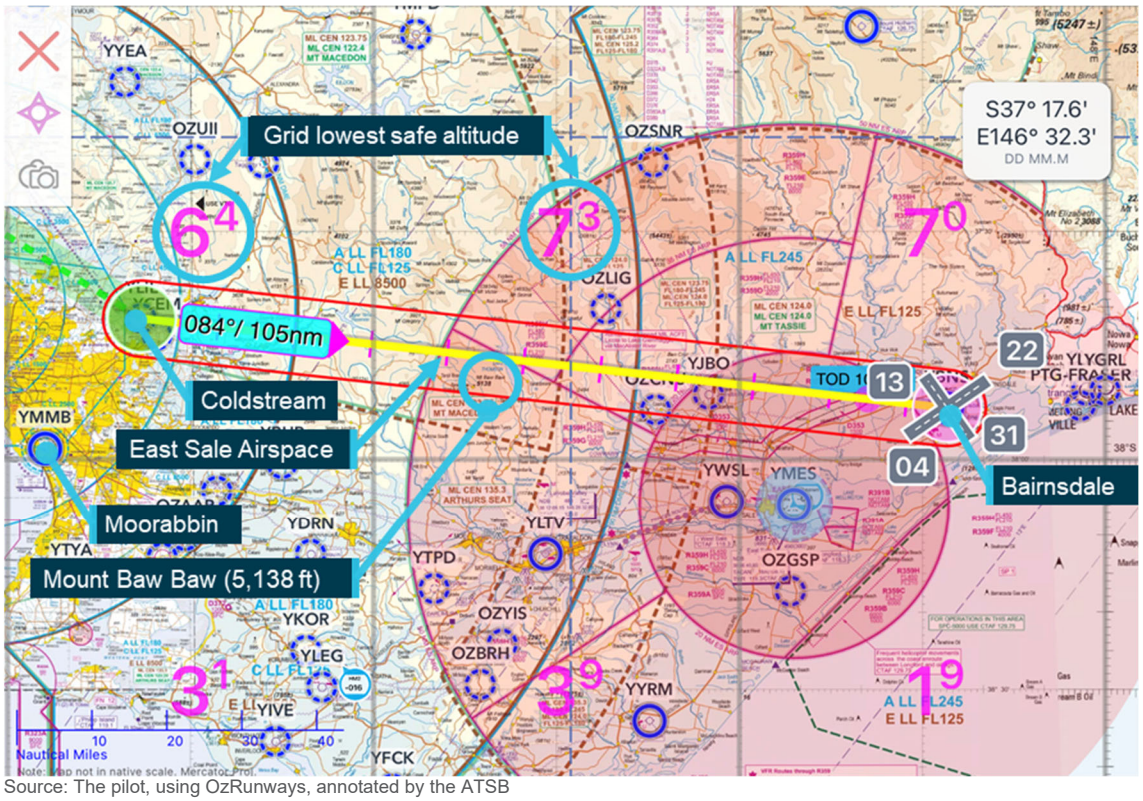
5 OzRunways: an electronic flight bag application.

6 Restricted airspace: designated in the interests of public safety, security or for the protection of the environment to restrict the flight of aircraft over the area to aircraft flown in accordance with specified conditions.

Figure 1: Camera footage exiting cloud at 4,475 ft on climb to 5,000 ft

Source: Victoria Police Air Wing

Figure 2: Exemplar flight plan showing the route from Coldstream to Bairnsdale



Source: The pilot, using OzRunways, annotated by the ATSB

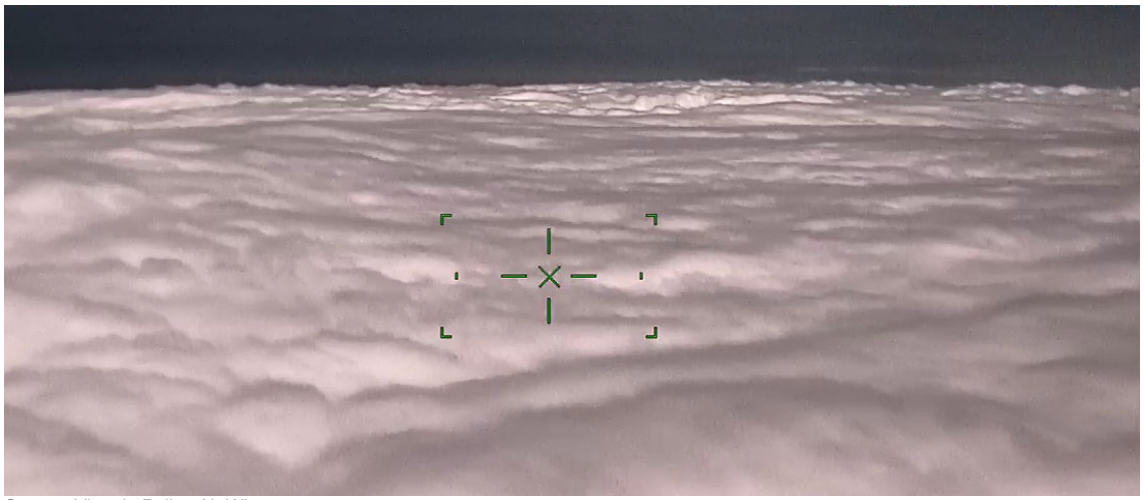
Several minutes later, the pilot conducted the cruise checks while at 109 kt indicated airspeed[7] and recalled that they were below LSALT as they were now outside the Moorabbin minimum sector altitude. Further, they were below the published grid LSALTs[8] of 6,400 ft and 7,300 ft on their track to Bairnsdale (Figure 2). However, the pilot assessed that they were about 1,000 ft

[7] Indicated airspeed is obtained from the flight data recorder.

[8] Grid lowest safe altitude: the lowest safe altitude shown for a grid on an instrument flight rules chart (en route chart or terminal area chart).

above a layer of cloud and that the conditions were day visual meteorological conditions,[9] which was an acceptable reason to operate below LSALT.[10] Based on this, the pilot decided to continue the flight at 5,000 ft and advised ATC accordingly (Figure 3).

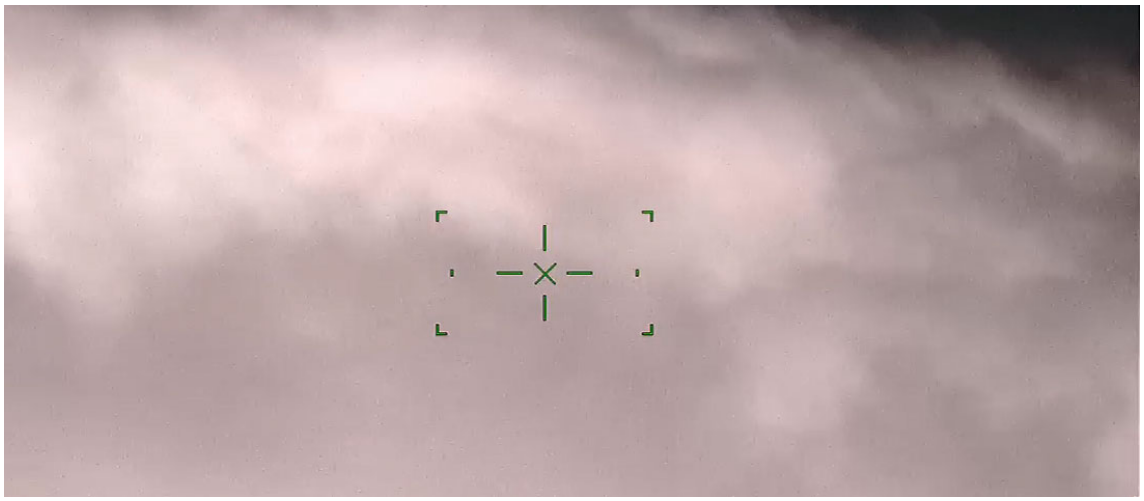
Figure 3: Camera footage at cruising altitude above cloud at 4,998 ft



Source: Victoria Police Air Wing

The pilot turned up the intercom radio volume to communicate with the tactical flight officers about the police tasking and plan for the day. To assist the pilot, the tactical flight officer in the front-left seat entered the radio frequency for East Sale. At about 1139, the pilot made several attempts to contact the East Sale air traffic controller but was unsuccessful. The tactical flight officer checked the frequency in the En Route Supplement Australia[11] and confirmed it was correct. Shortly after, the pilot observed the cloud tops beginning to rise while trying to verify the East Sale radio frequency, but initially believed they would pass just over the cloud tops. However, as shown on the camera footage, the helicopter entered the cloud just below the tops while the pilot was continuing to attempt to contact East Sale (Figure 4).

Figure 4: Camera footage of the rising cloud near Mount Baw Baw just prior to the ground proximity alert



Source: Victoria Police Air Wing

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9 Visual meteorological conditions (VMC): an aviation flight category in which visual flight rules (VFR) flight is permitted – that is, conditions in which pilots have sufficient visibility to fly the aircraft while maintaining visual separation from terrain and other aircraft.

10 Refer Civil Aviation Regulation 178: *Minimum height for flight under I.F.R.,* subregulation (4)(d).

11 The En Route Supplement Australia is a publication that contains information vital for planning a flight and for the pilot in-flight.

Upon entering the cloud, the helicopter's enhanced ground proximity warning system (EGPWS) alert for 'caution terrain' activated. In response, the pilot checked the primary flight display, which depicted 'green hash' terrain right of track (indicating the location of the terrain hazard). Therefore, the pilot initiated a climbing left turn to the north to avoid the terrain, which was Mount Baw Baw with a maximum elevation of 5,138 ft. Shortly after commencing the climbing turn, a second 'caution terrain' alert activated, and the pilot continued the climbing left turn. The helicopter exited the cloud to the north of Mount Baw Baw and the camera footage revealed the sky was clear to the east. The pilot contacted ATC to request a climb to 6,000 ft and the flight continued without further incident. Figure 5 depicts the flight path with the location of Mount Baw Baw and the EGPWS alerts.

Figure 5: Map showing VH-PVO's flight path with key locations

Source: Google Earth, annotated by the ATSB

Context

Personnel information

The pilot held an Air Transport Pilot's Licence (Helicopter), multi-engine helicopter instrument rating, a type rating for the AW139, and Class 1 Aviation Medical Certificate. At the time of the incident, the pilot had accumulated 5,094 hours of aeronautical experience, of which 144 hours were on the AW139. The pilot had completed an instrument proficiency check in October 2020 and had recorded 5.8 hours of instrument flight in the previous 90 days, including five instrument approaches.

The pilot reported being well rested on the day of the incident. A review of the sleep and roster information obtained found there was a low likelihood the pilot was experiencing a level of fatigue known to have an adverse effect on performance.

Radar altimeter setting

As part of the 'after-start' checklist, the radar altimeter (RADALT)[12] low height warning bug was required to be set to 400 ft. Around the time of the incident, there were known interference issues between the downlink from the camera and the RADALT, which could produce spurious low height RADALT indications. The pilot did not recall any spurious indications or recall referring to the RADALT during the incident flight. They also reported the low height warning bug was likely set to 400 ft as per the after-start checklist.

Recorded information

The helicopter was fitted with an enhanced ground proximity warning system (EGPWS), which would activate when terrain or obstacles were detected about 26 +/-5 seconds ahead of the helicopter. The 'caution terrain' alert indicated the helicopter had entered the 'soft' threshold for the terrain awareness mode (a 'warning terrain' alert would indicate the 'hard' threshold). The 'green' display reported by the pilot indicated terrain was at least 250 ft below the helicopter's altitude.[13] According to the helicopter's flight manual, if a caution alert occurred in-flight, the pilot should 'verify the aircraft flight path and correct as necessary'.

The ATSB analysed the information from the flight data recorder. Key events included:

- at 1140:11, the EGPWS alert 'caution terrain' activated when the aircraft was at 5,000 ft above mean sea level (AMSL) and 131 kt indicated airspeed
- at 1140:13, a pitch up and left roll were initiated after the alert
- at 1140:43 the EGPWS alert 'caution terrain' activated again when the aircraft was at 5,150 ft AMSL and 75 kt indicated airspeed.
- at 1140:45 a pitch up and left roll were initiated again immediately after the second alert.

At the time of the first alert, the helicopter was about 1.8 NM (3.3 km) horizontally and 200 ft above terrain. At the time of the second alert, the helicopter was within 0.8 NM (1.5 km) horizontally and 350 ft above terrain. Figure 6 depicts the flight path with terrain contours and the relative positions of the EGPWS alerts.

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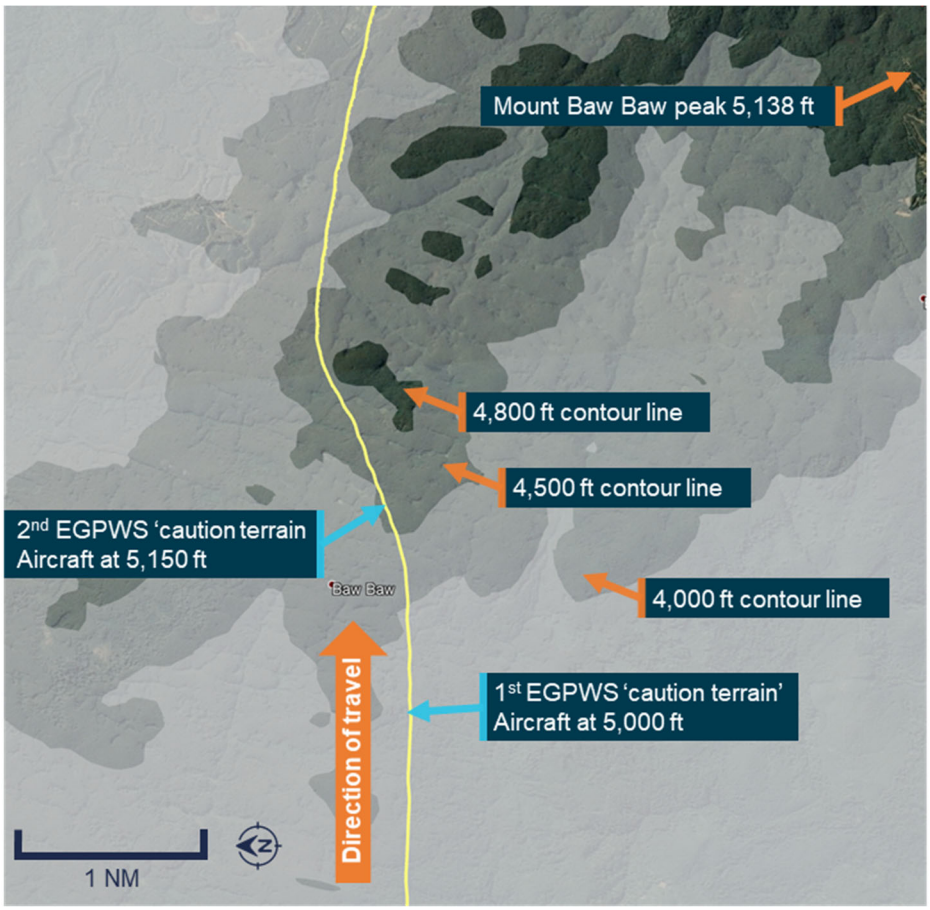
12 Radar altimeter measures altitude above the terrain presently below the aircraft.

13 Yellow indicates the terrain is between 250 ft below to 500 ft above, and red indicates the terrain is at least 500 ft above the helicopter. It should be noted that the colour contours on terrain warning systems may vary across different manufacturers.

Figure 6: Topographic map of flight path showing time of the alerts and altitudes



Source: Google Earth and flight data recorder, annotated by the ATSB

Meteorological conditions

The Bureau of Meteorology forecast conditions for the area around Mount Baw Baw for the time of the incident were for broken clouds between 1,000 ft and 3,000 ft. Footage from the forward-looking infrared camera on the helicopter showed that the cloud base was about 2,800 ft and the cloud tops were about 4,500 ft near Coldstream. On approach to Mount Baw Baw, the helicopter entered cloud at about 5,000 ft, which was just below the cloud tops based on the camera footage. The footage also indicated the sky was clear immediately to the east of Mount Baw Baw.

A briefing occurred at the Victoria Police Air Wing each morning, which included the weather. The pilot recalled discussing the weather at that morning's briefing and that it was 'average' [clouds present] inside the Melbourne basin, but clear outside the basin. In this situation, the pilot reported their standard brief would be, 'weather is a bit average in the basin this morning…but outside the basin it's pretty much green [clear] everywhere so we can go anywhere outside the basin, but we might have to fly IFR [instrument flight rules]'. The pilot recalled that the forecast freezing level was above 10,000 ft on the day of the incident and therefore did not expect icing to be a factor if an IFR flight was required.

Visual meteorological conditions

For the sector from Coldstream to Bairnsdale, the helicopter started in Class C (controlled airspace) before leaving Class C and entering Class G airspace (outside controlled airspace). The following criteria apply to visual meteorological conditions (VMC) below 10,000 ft in Class C and Class G airspace:

- 5,000 m visibility

- 1,000 ft vertical separation from cloud
- 1,500 m lateral separation from cloud.

In addition, if operating in Class G airspace at or below 3,000 ft above mean sea level or 1,000 ft above ground level, whichever is highest, the minimum flight visibility was 5,000 m, remaining clear of cloud and in sight of ground or water.

Calculating lowest safe altitude under instrument flight rules

Introduction

The Victoria Police Air Wing operations manual stated that obstacle/terrain avoidance below the lowest safe altitude (LSALT) or minimum sector altitude (MSA) is a pilot responsibility unless using an air traffic services assigned level, in accordance with air traffic surveillance service terrain clearance procedures. Further, responsibility returns to the pilot when the aircraft is being flown in visual meteorological conditions.

The operations manual also outlined that minimum altitudes for IFR operations shall be from one of three methods, in accordance with Aeronautical Information Publication (AIP):

- pilot calculated
- IFR charts (terminal area chart/en route chart)
- departure and approach procedures for minimum sector altitudes and/or instrument approach landing procedures.

The AIP also stated that an aircraft must not be flown under the IFR, lower than the published lowest safe altitude or the pilot calculated lowest safe altitude, unless permitted by Civil Aviation Regulation 178 or otherwise approved by the Civil Aviation Safety Authority.

Civil Aviation Regulation 178*: Minimum height for flight under I.F.R.,* stated that an aircraft cannot be flown below the lowest safe altitude calculated in accordance with published procedures except in accordance with subregulation (4). Subregulation (4)(d) permitted an aircraft to be flown below the lowest safe altitude if it was being flown by day in visual meteorological conditions.

Minimum sector altitude

The AIP stated that MSA was the lowest altitude that provided a minimum clearance of 1,000 ft above all objects located in an area contained within a sector of a circle of 25 NM (46 km) or 10 NM (19 km) radius centred on a significant point, the aerodrome reference point, or the heliport reference point. Moorabbin Airport had a 10 NM MSA of 3,700 ft and a 25 NM MSA in the north-east sector of 4,700 ft. As the helicopter was about 17 NM (31 km) to the north-north-east of Moorabbin Airport, the pilot requested clearance to climb to 5,000 ft as the initial cruise altitude with the intent to revise later when established on track to Bairnsdale.

Grid lowest safe altitude

The grid lowest safe altitude is the lowest safe altitude shown for a grid on an IFR chart (terminal area chart/en route chart). The AIP stated that a pilot using a grid LSALT for obstacle clearance is responsible for determining the allowance for navigation error that should be applied, considering the limitations of the navigation aids or method of navigation being used for position fixing. This navigation error allowance must be applied to the proposed track. The highest grid lowest safe altitude falling within the area covered by the determined navigation error must be used.

When the pilot loaded the flight plan into OzRunways, they were not in the vicinity of a published IFR route for the flight to Bairnsdale, so the pilot had the option to compute a pilot calculated LSALT or to use the published grid lowest safe altitude (Figure 2). The flight plan from Coldstream to Bairnsdale was across three lowest safe grid altitudes, which were 6,400 ft, 7,300 ft and 7,000 ft, with respect to the direction of travel. Therefore, the LSALT required for the route was 7,300 ft.

Instrument flight rules traffic travelling east were required to use the odd thousands of feet for their cruising levels. If the grid LSALT of 7,300 ft was selected, the flight required a cruising level of 9,000 ft to Bairnsdale to remain above LSALT and comply with the IFR cruising levels. The infrared camera footage indicated the sky was almost certainly clear at this level and icing would not have been a risk.

Pilot calculated lowest safe altitude

When the pilot upgraded the flight to IFR, air traffic control (ATC) was advised that the selected cruising level was based on the pilot calculated method for LSALT. The AIP stated that, if a route or route segment was not shown on an AIP aeronautical chart, the lowest safe altitude can be calculated by the pilot. Based on the area to be considered for RNP 2 navigation,[14] this must be within an area of 5 NM (9 km) surrounding and including the departure point, the destination and each side of the nominal track.

Furthermore, if the highest obstacle is more than 360 ft above the height determined for terrain, the LSALT must be 1,000 ft above the highest obstacle. Otherwise, 1,360 ft must be added to the highest terrain and the LSALT rounded up to the nearest 100 ft.

This required a pilot calculated LSALT of 6,500 ft from Coldstream to Bairnsdale, to account for the peak of Mount Baw Baw at 5,138 ft, which would have permitted a cruising level of 7,000 ft in accordance with the IFR cruising levels.

Instrument flight rules upgrade in-flight

Upgrading to IFR in-flight was a relatively infrequent task. The pilot reported that it happened about once every few months. The chief pilot estimated they upgraded once or twice a year, whereas other pilots were unable to provide a frequency. The nature of Victoria Police Air Wing operations required their helicopters to conduct taskings predominantly under visual flight rules in sight of ground or water. However, the nature of the weather and terrain across Victoria required them to have the capability to transit between tasks using IFR procedures over high terrain. Prior to the incident, Victoria Police Air Wing did not have a published procedure for upgrading to IFR in-flight. The tasks involved in an upgrade to IFR would include:

- calculating the LSALT based on an applicable method
- reviewing the freezing level and risk of icing
- entering the LSALT and the destination in the navigation system
- contacting and filing a flight plan with air traffic control
- determine a method to climb to LSALT that ensures terrain clearance.

Regarding the last item, when an aircraft departs IFR from an airport, or conducts a missed approach from an instrument approach procedure, it is the compliance with the respective procedure that provides terrain clearance assurance until the aircraft reaches LSALT. Therefore, in the case of an IFR upgrade in-flight, the pilot must determine a suitable method to provide terrain clearance assurance until reaching LSALT.

Related occurrences

A review of the ATSB database found a recent similar occurrence of a helicopter entering instrument meteorological conditions while flying below LSALT.

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[14] RNP 2 (required navigation performance) was the criteria for the Victoria Police Air Wing AW139 helicopters. It is used for en route navigation in Australia under the Performance-Based Navigation (PBN) system, which uses the global navigation satellite system (GNSS) and computerised onboard systems to define the aircraft navigation in terms of accuracy, integrity, continuity and functionality. RNP results in narrower protection areas than traditional navigation methods.

ATSB occurrence 202002989

On 12 June 2020, a Bell 412 conducting aerial work departed Jandakot Airport, Western Australia under visual flight rules. During climb, the crew requested an upgrade to IFR and a clearance to the south-east. The crew entered cloud at 1,000 ft, which was below the minimum sector altitude of 2,500 ft. The controller issued a safety alert and cleared the helicopter to climb to 4,000 ft.

Safety analysis

Introduction

On the morning of 4 March 2021, the crew of a Leonardo Helicopters AW139, registered VH-PVO and operated by the Victoria Police Air Wing, received a ground proximity alert for 'caution terrain' while en route from Coldstream to Bairnsdale. As a result, the pilot initiated a climbing left turn to avoid terrain and the helicopter exited the cloud.

The analysis will discuss the calculation of the lowest safe altitude (LSALT), upgrading from visual to instrument flight rules in flight, and related procedures.

Flight into cloud below lowest safe altitude

While en route from Coldstream to Bairnsdale, the helicopter was operating at an altitude of 5,000 ft and was initially above the cloud tops. The peak of Mount Baw Baw, with an elevation of 5,138 ft, was located close to the planned track but was obscured by the formation of orographic uplift cloud for the flight path from west to east. As the required pilot calculated LSALT was 6,500 ft and the grid LSALT was 7,300 ft, the flight at 5,000 ft was below both the LSALTs available for this route. While they recognised the cloud tops were rising, the pilot initially believed the helicopter would clear the tops. This likely resulted in the pilot continuing along track, rather than requesting either a climb or diversion left/right of track, which resulted in the helicopter entering the cloud below LSALT. Almost immediately after entering cloud, the EGPWS alert 'caution terrain' activated. In response, the pilot identified the terrain and initiated a climbing left turn.

Assessment of in-flight conditions

As part of the instrument flight rules upgrade, the pilot was required to calculate a LSALT. The pilot used their current location and the 25 NM (46 km) Moorabbin Airport minimum sector altitude of 4,700 ft as the reason for selecting 5,000 ft. The pilot indicated this LSALT was sufficient at the time, with the intent to revise it later in-flight.

After establishing the helicopter in the cruise at 5,000 ft, the pilot completed the cruise checks, which included an altitude check. At the time, the pilot assessed the cloud tops were between 3,500 ft to 4,000 ft. Therefore, at 5,000 ft, the pilot perceived that they were about 1,000 ft above the cloud tops. Visual meteorological conditions require 1,000 ft vertical separation from cloud, which was consistent with the pilot's assessment of the conditions at the time. Therefore, the pilot assessed that the conditions complied with the regulations permitting instrument flight below the LSALT. Based on this, the pilot decided to continue at 5,000 ft. However, recorded data from the forward-looking infrared camera indicated that the cloud tops were about 4,500 ft in the vicinity of Coldstream, and therefore the helicopter was not operating in visual meteorological conditions, which would have required the pilot to recalculate a LSALT. Therefore, the flight continued below LSALT as a result of the pilot incorrectly assessing the conditions.

IFR upgrade procedure

Although all pilots in the Victoria Police Air Wing maintain instrument ratings, the majority of the flights were operated under visual flight rules for tasking purposes. The incident pilot reported that they did not frequently upgrade from visual to instrument flight rules but needed to be prepared to do so if required by the conditions and tasking. The procedural requirements for an in-flight upgrade would therefore need to be recalled from memory while maintaining sufficient attentional resources on the task of flying and navigating the helicopter in a single-pilot environment. This results in an environment of concurrent task demands, with separate tasks competing for the pilot's limited resources, which can increase the likelihood of a loss of awareness of the environment.

The purpose of a procedure is to provide the best way to operate the aircraft safely and efficiently by outlining the steps required to be completed at a point in time. This is a rules-based process to accomplish a task, which reduces the need to problem-solve. While the operator did not have an upgrade procedure at the time of the incident, such a procedure would incorporate both regulatory operating requirements and aircraft systems operating requirements. Therefore, a single dedicated procedure could improve the efficiency of recall, thereby reducing the cognitive task demands and likelihood of an error.

Findings

ATSB investigation report findings focus on safety factors (that is, events and conditions that increase risk). Safety factors include 'contributing factors' and 'other factors that increased risk' (that is, factors that did not meet the definition of a contributing factor for this occurrence but were still considered important to include in the report for the purpose of increasing awareness and enhancing safety). In addition 'other findings' may be included to provide important information about topics other than safety factors.

These findings should not be read as apportioning blame or liability to any particular organisation or individual.

From the evidence available, the following findings are made with respect to the Flight below lowest safe altitude involving Leonardo Helicopters AW139, VH-PVO, 44 km north-north-west of Latrobe Regional Airport, Victoria, on 4 March 2021.

Contributing factors

- While en route to Bairnsdale below lowest safe altitude, the helicopter entered cloud in the vicinity of Mount Baw Baw, which resulted in activation of a ground proximity alert. The pilot identified the location of the terrain threat and conducted a climbing turn away.
- The pilot incorrectly assessed the in-flight conditions as visual meteorological conditions after the helicopter reached 5,000 ft in the vicinity of Coldstream and elected to remain at this altitude instead of recalculating the lowest safe altitude.

Other factors that increased risk

- The operator did not have a procedure for pilots when upgrading from visual to instrument flight rules in-flight. This would reduce the likelihood of an error when replanning in-flight, which is a higher-than-normal workload task.

Safety actions

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. All of the directly involved parties are invited to provide submissions to this draft report. As part of that process, each organisation is asked to communicate what safety actions, if any, they have carried out to reduce the risk associated with this type of occurrences in the future. The ATSB has so far been advised of the following proactive safety action in response to this occurrence.

Additional safety action by Victoria Police Air Wing

As a result of the incident, Victoria Police Air Wing have developed an instrument flight rules upgrade procedure to be incorporated into their operations manual. This procedure was circulated to all their pilots and included the acceptable methods for calculating lowest safe altitude and the requirement to ensure terrain clearance while on climb to that altitude.

General details

Occurrence details

Date and time:	4 March 2021, 1140 EDT	
Occurrence class:	Serious incident	
Occurrence categories:	Flight below minimum altitude, aircraft preparation, ground proximity alerts/warnings	
Location:	44 km north-north-west of Latrobe Valley aerodrome, Victoria	
	Latitude: 37° 50.298' S	Longitude: 146° 16.38' E

Aircraft details

Manufacturer and model:	Leonardo S.P.A. Helicopters AW 139	
Registration:	VH-PVO	
Operator:	Starflight Victoria PTY LTD contracted to Victoria Police Air Wing	
Serial number:	31878	
Type of operation:	Aerial work-Search and Rescue - (aerial work)	
Activity:	General aviation/recreational-aerial work-search and rescue	
Departure:	Essendon Airport, Victoria	
Destination:	Bairnsdale Airport, Victoria	
Persons on board:	Crew – 3	Passengers – 0
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	None	

Glossary

AGL	Above ground level
AMSL	Above mean sea level
AIP	Aeronautical Information Publication
ATC	Air traffic control
CASA	Civil Aviation Safety Authority
EGPWS	Enhanced ground proximity warning system
IFR	Instrument flight rules
MSA/LSALT	Minimum sector altitude (MSA) and lowest safe altitude (LSALT)
RADALT	Radar altimeter
VFR	Visual flight rules
VMC	Visual meteorological conditions

Sources and submissions

Sources of information

The sources of information during the investigation included the:

- pilot
- front and rear tactical flight officers onboard the flight
- Victoria Police Air Wing
- Bureau of Meteorology
- Airservices Australia
- Department of Defence
- Civil Aviation Safety Authority.

Submissions

Under 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. That section 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 following directly involved parties:

- The pilot, front and rear tactical flight officers, Victoria Police Air Wing, Airservices Australia, and the Civil Aviation Safety Authority.

Submissions were received from:

- The pilot, front and rear tactical flight officers, and Victoria Police Air Wing.

The submissions were reviewed and, where considered appropriate, the text of the report was amended accordingly.

Australian Transport Safety Bureau

About the ATSB

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

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

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

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

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

Purpose of safety investigations

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

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

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

Terminology

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