



Australian Government

Australian Transport Safety Bureau

Flight below minimum permitted altitude involving Cessna 441, VH-EQU

Near Wollongong Airport, New South Wales, 3 August 2015

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Addendum

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Flight below minimum permitted altitude involving Cessna 441, VH-EQU

What happened

On 3 August 2015 at about 0410 Eastern Standard Time (EST), a Cessna 441 aircraft, registered VH-EQU, departed Scone Airport for a positioning flight to Illawarra Regional Airport (Wollongong Airport), New South Wales. The flight was to be conducted as a multi-crew operation with the pilot flying (PF) occupying the left seat, and the pilot monitoring (PM) occupying the right seat.

Prior to departure, the pilots conducted a pre-flight briefing noting that the weather forecast for the Wollongong area included a warning for severe turbulence below 8,000 ft. The departure and cruise were uneventful. After commencing descent into Wollongong, the PF briefed the PM for an area navigation (RNAV) instrument approach and landing to runway 16 (Figure 1). The approach was planned to be hand flown in darkness under clear skies with a westerly wind of 25–30 kt, reducing to a light breeze on the ground.

The aircraft arrived overhead position WOLND (Figure 1) at about 5,000 ft on descent to 3,700 ft. Due to the strong westerly wind, flying conditions were turbulent and the PF reported that it was quite difficult keeping the aircraft's wings level. Approaching WOLNI, the PF levelled the aircraft and maintained 3,700 ft as planned. The aircraft was then slowed down to permit the extension of flap and landing gear.

Figure 1: Cessna 441, VH-EQU



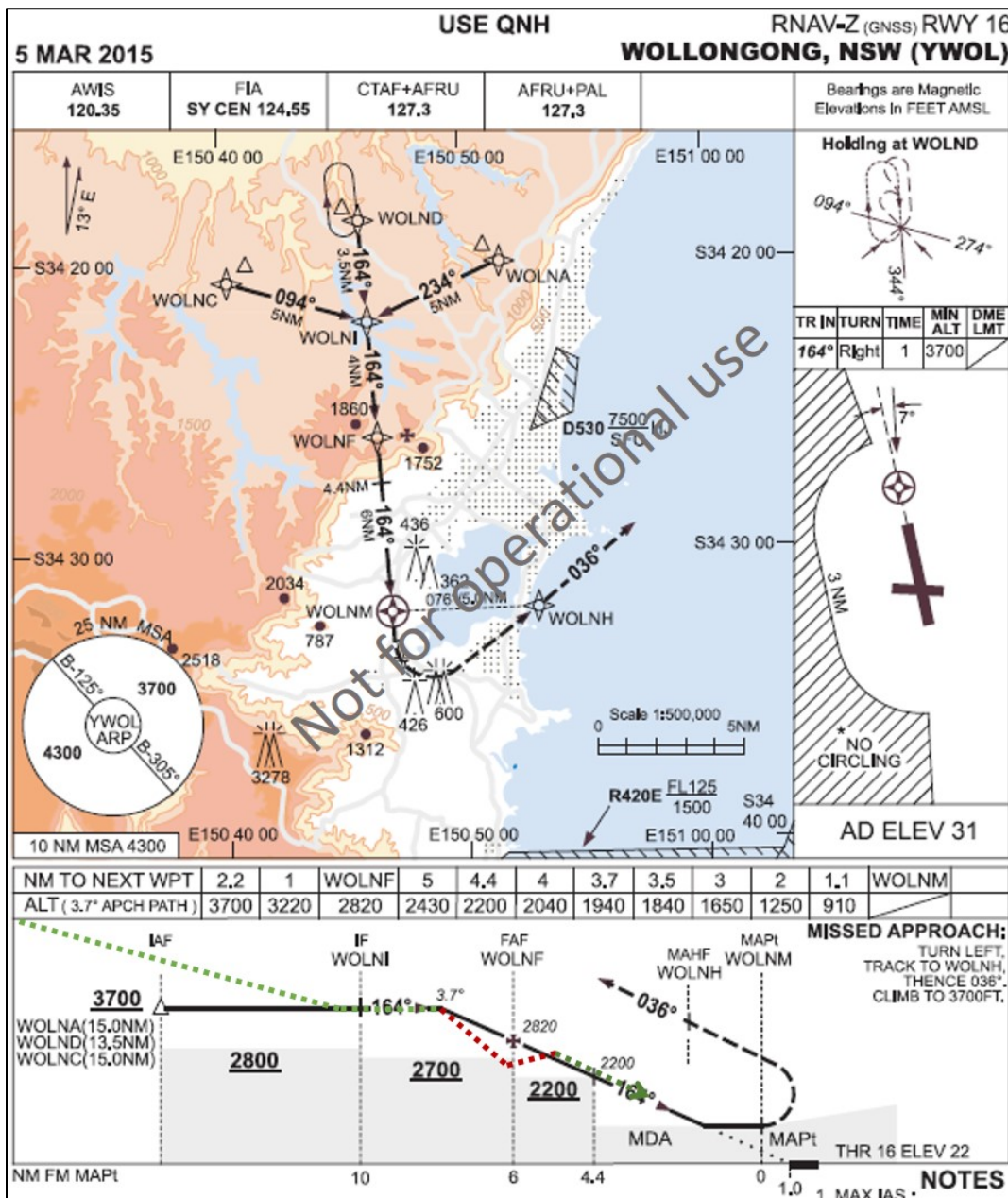
Source: Aircraft owner, modified by the ATSB

In accordance with the approach, the PF recommenced descent at 2.2 NM prior to position WOLNF. Due to the steeper than normal approach path angle (3.7 degrees as opposed to the usual 3.0 degrees), the PF reported establishing a descent rate of about 1,000 feet per minute (fpm). The PM reported that they were expecting a descent rate of about 900 fpm. Air traffic

control surveillance data showed the descent rate established was somewhere between 1,000 and 1,500 fpm.

Shortly before WOLNF and as the aircraft approached 2,700 ft, the PM called ‘two thousand seven hundred’ with the expectation that the PF would maintain that altitude until passing WOLNF. However, the descent continued and a few seconds later, the terrain alerting and warning system (TAWS)¹ generated visual and aural ‘CAUTION-TERRAIN’ alerts. These alerts were generated as the system detected that the flight path was projected to come within 300 ft of an obstacle or terrain.

Figure 2: Wollongong RNAV(GNSS) approach to RWY 16 showing approximate flight path profile (green/red dotted line) based on air traffic control surveillance data



Source: Aircservices Australia, modified by the ATSB

¹ The TAWS included a forward-looking terrain avoidance function along and below the aircraft’s lateral and vertical flight path. In the event of a potential conflict with terrain, the system provided the pilots with visual and aural alerts.

Pilot flying comment

The PF's company duties included aircraft charter pilot and flight instructor. The PF's flying experience included 230 hours operating Cessna 441 aircraft (16 hours in the last 90 days) and 6,930 total flying hours.

The PF recalled working hard trying to keep the aircraft's wings level, which may have distracted them from monitoring the descent profile adequately. The PF recalled thinking that they may have been slightly low on profile approaching WOLNF, but was startled when the terrain warning sounded. The PF had not participated in any TAWS training, even though they had flown the aircraft (fitted with TAWS equipment) for the previous 12 months.

Pilot monitoring comment

The PM company duties included aircraft charter pilot and flight instructor. The PM's flying experience included 350 hours operating Cessna 441 aircraft and 3,400 total flying hours.

The PM believed that when the TAWS alert activated, the aircraft was at an altitude somewhere between 2,600 ft and 2,500 ft and about 0.5 NM before WOLNF. The time between being below 2,700 ft, having the TAWS alert and an appropriate response was less than 10 seconds.

The PM reported having completed TAWS training with a previous employer. The PM believed that following the TAWS warning, they should have applied full power, climbed at maximum rate and conduct a missed approach in accordance with the operator's procedures.

Fatigue management

Prior to the flight, both pilots had completed 2 days free of duty. They reported being well rested and obtaining about 8 hours sleep each night.

On the morning of the flight, the pilots reported waking up around 0300. They advised that they generally found it counterproductive to try and get to sleep early and therefore only received about 5 hours of sleep.

Despite the limited amount of sleep, both pilots reported being alert during all stages of the flight.

ATSB comment

The aircraft was fitted with a terrain awareness and warning system (TAWS) designed to reduce the risk of flight into terrain. While a TAWS was not required for the particular type of operation, the lack of TAWS training probably explains the nature of the PFs response to the terrain alert.

Pilots and operators of aircraft are encouraged to be appropriately trained in the use of all equipment fitted to their aircraft.

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 all pilots now receive TAWS training.

Safety message

Due to the early start combined with inadequate sleep the night before, despite reporting otherwise, the pilots were likely fatigued. Pilots need to be aware that obtaining less than 7-8

hours sleep a night increases the risk of operating with a level of fatigue known to have a demonstrated effect on performance.

Pilots also need to consider the effect flying in the early hours of the morning has on their performance. Their body is in a circadian low period which could lead to periods of impaired alertness and delayed reaction times.

The ATSB continues to be concerned about flight below minimum descent altitudes. When conducting an approach in instrument meteorological conditions, which includes darkness, pilots must ensure the approach is conducted in accordance with the prescribed procedure. In this case, the pilots were required to manage the vertical profile to ensure the aircraft remained at or above the minimum descent altitude, thereby ensuring clearance from terrain and obstacles.



Descent below the minimum descent altitude compromises the minimum terrain clearance requirements and increases the risk of controlled flight into terrain (CFIT).

General details

Occurrence details

Date and time:	3 August 2015 – 0441 EST
Occurrence category:	Incident
Primary occurrence type:	Flight below minimum descent altitude
Location:	Near Wollongong Airport, NSW

Aircraft details

Manufacturer and model:	Cessna Conquest	
Registration:	VH-EQU	
Serial Number:	441-0035	
Type of operation:	Private – Test and Ferry	
Persons on board:	Crew – 2	Passengers – 0
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	Nil	

About the ATSB

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The ATSB 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; and 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 operations involving the travelling public.

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.

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.

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 report

Decisions regarding whether to conduct an investigation, and the scope of an investigation, are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, a limited-scope, fact-gathering investigation was conducted in order to produce a short summary report, and allow for greater industry awareness of potential safety issues and possible safety actions.