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Australian Transport Safety Bureau

Wheels up landing involving Piper PA31, VH-ETW

Birdsville Airport, Queensland, on 4 July 2016

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Addendum

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Wheels up landing involving Piper PA31, VH-ETW

What happened

On 4 July 2016, at about 0940 Eastern Standard Time (EST), a Piper PA31-325 aircraft, registered VH-ETW (ETW), departed from Birdsville Airport, Queensland for a scenic flight to Lake Eyre, South Australia and refuelling at Marree. The pilot and four passengers were on board the charter flight.

On the return flight to Birdsville, at about 1410, the pilot broadcast on the common traffic advisory frequency (CTAF) indicating that they were about 30 NM south-west of Birdsville for a landing on runway 32. Later a pilot of a SAAB 340 aircraft also broadcast on the CTAF that they were about 15 NM east of Birdsville for a straight in approach, landing on runway 32, with a similar arrival time to ETW.

The pilot of ETW overflew the airport at about 2,500 ft on the upwind end of runway 32 to reduce the possibility of a conflict with the arriving SAAB (Figure 1). ETW joined for a wide downwind leg of the circuit and the pilot lowered the landing gear. The pilot observed that the SAAB that had now landed had not vacated the runway, so the pilot retracted the landing gear and extended the downwind leg to allow further time for the SAAB to vacate the runway.

Figure 1: Birdsville airport showing the location of runway 32, the parking apron and where the birds (hawks) were generally located off the end of runway 32 (orange circle).



Source: Google earth, modified by the ATSB

The pilot conducted the downwind checklist that included checking that the landing gear was down and locked, however, as the landing gear was in the up position, this part of the checklist was not conducted. When the aircraft was towards the end of the downwind leg, the pilot selected the landing gear handle down. The pilot noticed that the landing gear selector moved out more easily than normal, but the pilot identified that three landing gear down green lights were illuminated, indicating that the landing gear was down and locked.

While the pilot was scanning out the window, they noticed a flicker of the instrument lights. When they looked back inside the cockpit, they observed that the GPS had gone back into initialising mode, which indicated that it may have lost power. During the turn onto the base leg of the circuit, the pilot gave a broadcast on the CTAF and conducted the base leg checklist items (they did not include checking the landing gear). The pilot noticed that the SAAB had not vacated the runway, but was getting close to exiting onto the apron. As the aircraft completed the turn onto the base leg, the pilot felt something against their right knee. The pilot reached down and found that it was the landing gear selector handle, which had become partially detached from the selector lever (Figure 2). The pilot took hold of the handle to ensure it was not lost and confirmed that there were three green landing gear down lights illuminated.

Figure 2: ETW landing gear selector handle partially detached, against the pilot’s knee.

ETW landing gear selector handle removed.

PA31 landing gear selector handle installed.



Source: Pilot, modified by the ATSB

The pilot inserted the handle back into the landing gear selector lever and retracted and extended the landing gear to ensure that everything was operating correctly. The pilot removed the handle and kept hold of it and then gave a final leg broadcast, turned onto the final leg and conducted the finals checklist items. This checklist included a landing gear check, but the pilot could not remember clearly if there were three green lights.

At about 200 ft on final approach, the pilot observed a significant number of birds (hawks) (see orange circle in Figure 1). Due to a 15kt crosswind, as the pilot flared the aircraft for landing, the aircraft moved to the right side of the runway and the pilot then noticed that the aircraft had a slightly higher nose attitude than normal. As the attitude kept increasing, the pilot slowly advanced the throttles, then the rear footstep touched the runway and made a scraping noise. The pilot decided not to close the throttles as the aircraft was not on the runway centreline and they continued to advance the throttles. As the speed increased, the aircraft attitude adjusted and the propellers struck the runway. The aircraft speed had increased to take off speed and the pilot assessed that the safest option was to continue with a take-off. The pilot did not notice any abnormalities with the engines.

The pilot conducted a circuit, selected and held the landing gear handle in the down position and the aircraft landed without further incident. The pilot and passengers were uninjured and the aircraft had minor damage to the propellers (Figure 3).

Figure 3: Damage to ETW propellers



Source: Pilot, modified by the ATSB

Pilot comment

The pilot reported that when the landing gear was selected down when on the final approach, the landing gear selector was easier than usual to pull out and move past the neutral stop to the gear down position.

The pilot reported hearing a continuous horn sounding while in the landing flare just as the throttle was advanced and believed that it was the stall warning horn. The pilot believed that the landing gear horn would not have sounded as the throttles were not decreased past the location of the limit switches, which is where the throttles are almost closed (see *Landing gear system* below).

The pilot indicated that after parking the aircraft on the apron, when the avionic switch was moved to the off position, the avionics remained on and it was not until the switch had been cycled several times between the on and off position did the avionics turn off.

The pilot returned to the aircraft a few days later and noted that when the electrical master switch was turned on there were no green landing gear indicator lights despite the wheels being down, indicating the aircraft still had an avionics defect.

The pilot indicated that a maintenance release inspection (the periodic (100 hourly or 12-month) maintenance inspection) had been completed on 13 May 2016 and about 15 hours prior to the occurrence. The pilot had been the only pilot to fly the aircraft since the 100 hourly inspection and had flown a flight earlier that day and not noticed any issues with the aircraft.

Landing gear system

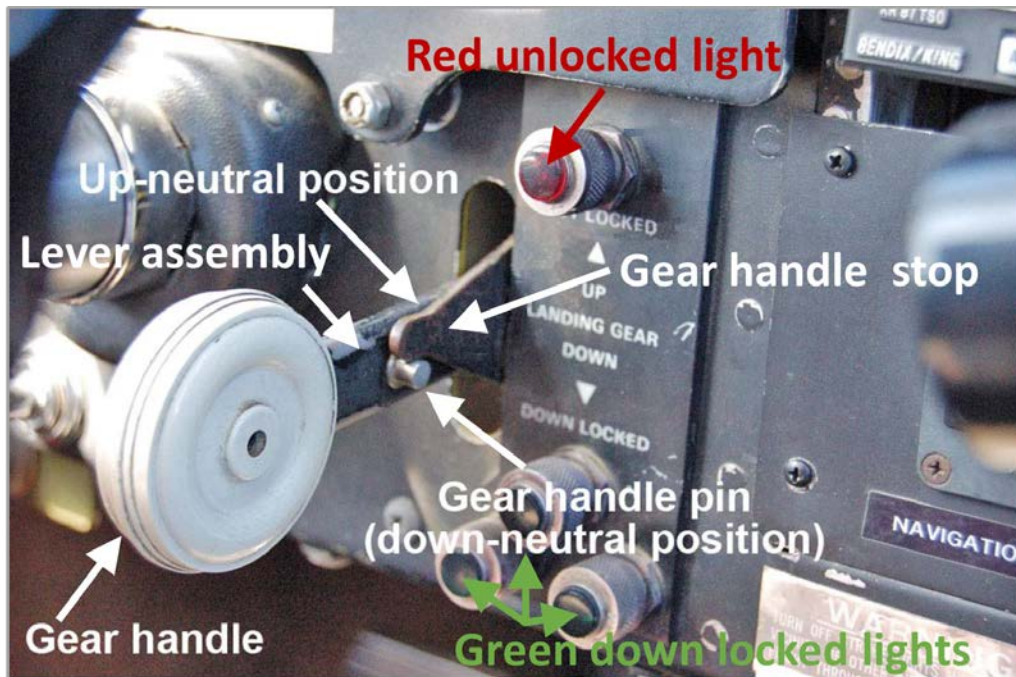
The landing gear handle is attached to the landing gear lever by a sleeve that fits over the end of the lever and is held in place by a pin, which is retained by a split pin. In this incident, the pin and split pin had fallen out of the landing gear handle and lever. In addition to connecting the handle to

the lever, the pin also interacts with a gear handle stop (Figure 4). The landing gear handle is designed so the handle is spring-loaded to a forward position (towards the instrument panel). The pin on the inboard side of the handle rests against the gear handle stop for the neutral up and neutral down position. This ensures that the landing gear handle cannot unintentionally be moved beyond the neutral stop.

To select the landing gear down, the gear handle is pulled away from the instrument panel, down and over the gear handle stop to the full down position. When the landing gear is fully extended and locked, the landing gear handle will then return automatically to the down-neutral position where it is held by the pin against the gear handle stop.

Located on the instrument panel, above and to the right of the landing gear handle are one red and three green indicator lights (Figure 4). The red light will illuminate when the gear is not locked and the gear handle is either in the up or down position. When each of the individual gear is down and locked the respective green light will illuminate. There is no indication light when the gear is up and locked. When power from either engine is reduced below 10 to 12 inches of manifold pressure, a horn in the cockpit should sound if the gear is not down and locked.

Figure 4: Landing gear selector handle showing the gear handle, lever assembly, gear handle pin and the up and down neutral positions. In addition, the red unlocked light and the green down locked lights.



Source: Canada Transport Safety Board, modified by the ATSB

Operator report

The operator conducted an investigation into the occurrence and determined that the aircraft's avionics were found to start up with the battery master switch, even though the avionics master switch was selected off. In addition, although the landing gear was down and locked, there were no green lights to indicate that this was the case. There was no indication of what the mechanical fault was in this system.

An inspection of the aircraft determined that when the gear handle was moved to the landing gear down position, it would normally return to the down neutral position. However, on the occurrence flight, the gear handle pin fell out. Without the gear handle pin to stop the landing gear lever at the gear handle stop, the lever continued to the gear up position (past the down neutral position to the

up position) The landing gear retracted without the pilot being aware. However, the gear down and locked lights should have still illuminated prior to landing if the landing gear was down and locked.

Distractions for the pilot included the landing gear handle becoming detached, an issue with the avionics on downwind, numerous birds (kite hawks) that were flying around on final and the 15 kt crosswind.

Safety analysis

When the pilot had discovered that the landing gear selector handle had become detached, they used the detached handle to move the lever to retract and extend the landing gear to determine that there were no issues with the landing gear prior to the landing. The pilot then removed the handle to ensure that it did not fall and become inaccessible in flight, just in case the landing gear needed to be retracted and extended again. They believed that there were three green landing gear down indicator lights but was unaware that with the stop pin missing, the landing gear would self-retract after the landing gear handle was released. As a result, the pilot was not aware that the landing gear had retracted prior to landing.

There were a number of interruptions and distractions during the approach and landing phase of the flight. These included waiting for another aircraft to vacate the runway and subsequent alteration of the circuit to accommodate separation, issues with the GPS, the landing gear handle becoming free, large birds under the final approach and the crosswind during the landing. The combination of these interruptions, distractions and abnormal conditions likely contributed to the pilot flaring the aircraft for landing without realising the landing gear was in the retracted position.

Findings

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

- The landing gear selector handle became detached and the landing gear retracting without the pilot's knowledge.
- Numerous distractions existed during the approach and landing that may have contributed to distract the pilot resulting in the aircraft landing with the landing gear in the retracted position.

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 are taking the following safety actions:

The pilot has undertaken comprehensive successful flight checks.

Aircraft defect rectification to ensure the aircraft is serviceable before further flight.

The aircraft operations manual will be amended to include actions to be taken when experiencing any abnormality with the aircraft's landing gear. This will refer to the emergency procedures checklist and the aircraft flight manual. The procedure will require the pilot to:

- abort the landing
- climb to 1,500 ft
- redo the pre-landing landing checklist to confirm green lights are on/or use the emergency landing gear hand pump to lower the landing gear.
- conduct a visual inspection of landing gear to ensure it is down and locked.

All pilots will be informed of the incident via email or a safety alert to inform them:

- of the importance of the gear control handle locking mechanism
- to inspect the gear control handle on a regular basis for faults or damage
- to look at additional options for confirming that the landing gear is down with the use of active control towers or having contact details of ground crew readily available to inspect the landing gear during a fly over.

Safety message

In the flying environment, interruptions and distractions can be subtle and brief and can interrupt the normal flow in the cockpit resulting in a preoccupation and distraction with one task to the detriment of another task.

The ATSB research report [Dangerous distraction: An examination of accidents and incidents involving pilot distraction in Australia between 1997 and 2004](#) (B2004/0324), is available from the ATSB website. The report found that it was likely that pilots have a general awareness of the inherent risks associated with distractions in the flying environment. Like all humans, however, pilots are susceptible to becoming preoccupied and distracted with one task to the detriment of another task.

The Flight Safety Foundation [Approach and Landing Accident Reduction \(ALAR\)](#) briefing note [2.4 - interruptions/distractions](#) discuss that interruptions/ distractions may be subtle or brief where even a minor equipment malfunction can turn a routine flight into a challenging event. The primary effects of interruptions/distractions is to break the flow pattern of ongoing cockpit activities such as normal checklists and problem-solving activities. The briefing contains guidance that may assist in managing interruptions/ distractions.

General details

Occurrence details

Date and time:	4 July 2016 – 1423 EST	
Occurrence category:	Serious incident	
Primary occurrence type:	Wheels up landing	
Location:	Birdsville Airport, Queensland	
	Latitude: 25° 53.85' S	Longitude: 139° 20.85' E

Aircraft details – VH-ETW

Manufacturer and model:	Piper PA31-325	
Registration:	VH-ETW	
Serial number:	31-8112012	
Type of operation:	Charter - Passenger	
Persons on board:	Crew – 1	Passengers – 4
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	Minor	

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.