FINAL REPORT

AIC 14-1005

HeviLift Ltd

P2-KSF

de Havilland Canada

DHC-6-300

Mt Lawes, 12 km north-northeast of Port Moresby

Central Province

PAPUA NEW GUINEA

20 September 2014

The Papua New Guinea Accident Investigation Commission (AIC) was informed of the accident by the Air Services Limited on 20 September 2014 and commenced an on-site investigation.

This Report, made publicly available on 3 August 2015 was produced by the AIC, PO Box 1709, Boroko 111, NCD, Papua New Guinea.

The report is based upon the investigation carried out by the AIC, in accordance with Annex 13 to the Convention on International Civil Aviation, Papua New Guinea (PNG) Act, and Civil Aviation Rules. New Guinea (PNG) Civil Aviation Act 2000 (As Amended), Civil Aviation Rules, and the Commissions of Inquiry Act 1951. It contains factual information, analysis of that information, findings and contributing factors.

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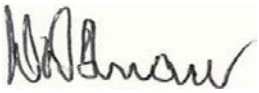

David Inau

CEO

Accident Investigation Commission

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INTRODUCTION

A DHC-6 Twin Otter aircraft was returning from Woitape, Central Province, to Jacksons Airport, Port Moresby on the morning of 20 September 2014 on a charter flight under the instrument flight rules (IFR). The weather at Woitape was reported to have been clear, but at Port Moresby the reported weather was low cloud and rain. Witnesses reported that the summit of Mt Lawes (1,700 ft above mean sea level (AMSL)) was in cloud all morning on the day of the accident.

When the aircraft was 36 nm (67 km) from Port Moresby, air traffic control gave the flight crew a clearance to descend maintaining visual separation from terrain and to track to a left base position for runway 14 right (14R) at Jacksons Airport, Port Moresby. The clearance was accepted by the crew.

When the aircraft was within 9.5 nm (17.5 km) of the airport, the pilot in command (PIC) contacted the control tower and said that they were "running into a bit of cloud" and that they "might as well pick up the ILS [instrument landing system] if it's OK". The flight crew could not have conducted an ILS approach from that position. They could have discontinued their visual approach and requested radar vectoring for an ILS approach. However, they did not do so.

The Port Moresby Aerodrome Terminal Information Service (ATIS), current while the aircraft was approaching Port Moresby had been received by the flight crew. It required aircraft arriving at Port Moresby to conduct an ILS approach. The PIC's last ILS proficiency check was almost 11 months before the accident flight. A 3-monthly currency on a particular instrument approach is required under PNG Civil Aviation Rule 61.807. It is likely the reason the PIC did not request a clearance to intercept the ILS from 30 nm (55.5 km) was that he did not meet the currency requirements and therefore was not authorised to fly an ILS approach.

During the descent, although the PIC said to the copilot 'we know where we are, keep it coming down', it was evident from the recorded information that his assessment of their position was incorrect and that the descent should not have been continued. The PIC and copilot appeared to have lost situational awareness.

The aircraft impacted terrain near the summit of Mt Lawes and was substantially damaged by impact forces. Both pilots and one passenger were fatally injured in the impact, and one passenger died on the day after the accident from injuries sustained during the accident. Of the five passengers who survived the accident, three were seriously injured and two received minor injuries. One of the fatally injured passengers was not wearing a seat belt.

1 FACTUAL INFORMATION

1.1 History of the flight

On the morning of 20 September 2014 local date (19 September UTC[1]), a de Havilland DHC-6-300 Twin Otter aircraft, registered P2-KSF (KSF) and operated by HeviLift Ltd, was being operated on a charter flight under the instrument flight rules[2] (IFR) from Jacksons Airport, Port Moresby to Woitape, Central Province. KSF departed Port Moresby at 22:11 (UTC) with two pilots on board and landed at Woitape shortly after the flight crew cancelled their SARTIME[3] at 22:39. The aircraft remained on the ground at Woitape for approximately 35 minutes while the passengers and cargo were loaded. The Woitape weather was reported to have been CAVOK[4]. At the time of the accident the weather at Port Moresby, 6 nm (11.1 km) from Mt Lawes, was fluctuating between visual meteorological conditions (VMC) and instrument meteorological conditions (IMC), with low cloud and rain.

KSF departed Woitape for Port Moresby at 2316 with seven passengers and the two pilots on board. The copilot was the handling pilot and the pilot in command (PIC) was the support monitoring pilot responding to radio calls and communicating with Air Traffic Control.

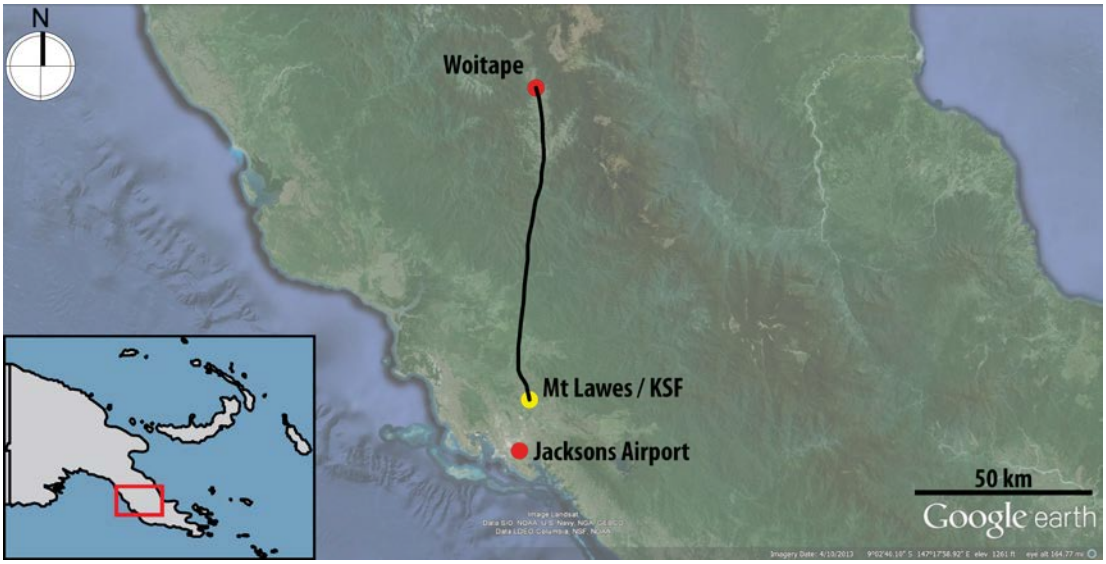

Figure 1: Track of KSF from Woitape to Mt Lawes

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

2 Instrument flight rules (IFR). Rules applied in cloud or whenever external visual clues are below visual flight rules (VFR) minima.

3 SARTIME is a time, nominated on the Flight Plan, by which the flight crew expects to have arrived at their destination. If the flight crew has not cancelled SARTIME by the time specified on the Flight Plan, an attempt will be made to contact them (ALERFA) and, in the event of no contact, the Search and Rescue phase begins.

4 CAVOK:. Ceiling and visibility OK. Visibility greater than 10 km; no clouds below 5000 ft or below the highest minimum safe sector altitude whichever is highest; no significant weather.

At 23:22:38, when KSF was approximately 36 DME[5] (67 km) from Port Moresby at 8,000 ft above mean sea level (AMSL), Port Moresby Flight Information Service (FIS) informed the flight crew that they had been issued a clearance by the Radar Controller to enter controlled airspace 'VFR' (i.e. under the visual flight rules[6]) via the 357 radial[7] at 8,000 ft and instructed the flight crew to contact Jacksons Radar at 30 DME (56 km).

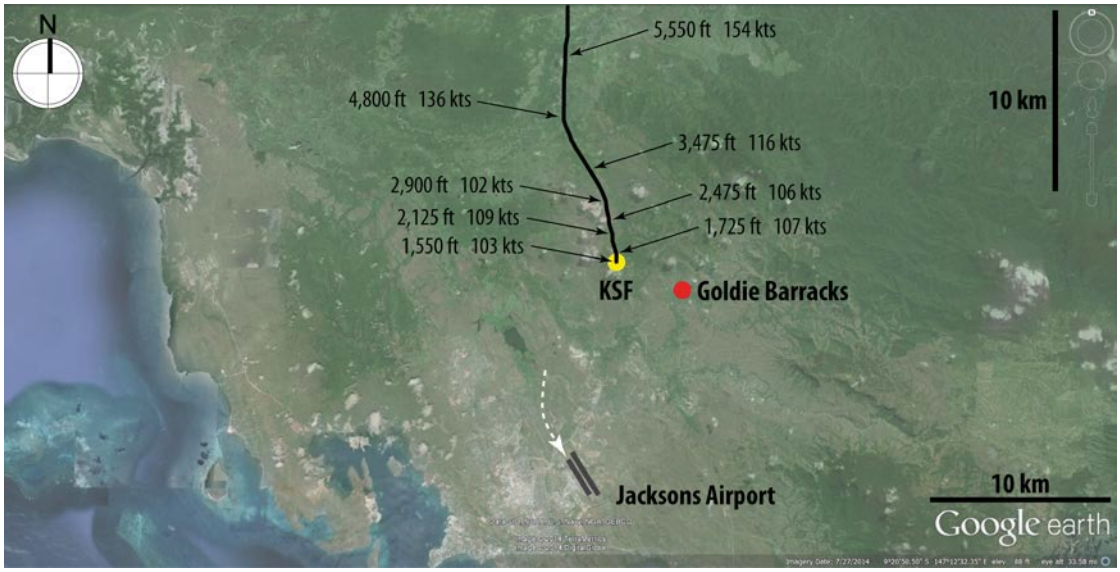

Figure 2: Final part of the track taken by KSF; the dotted white arrow shows the approximate path to be flown from a left base position onto runway 14 right

At 23:25:19, the PIC contacted Jacksons Radar and reported that KSF was 29 DME (54 km) from Port Moresby on the 357 radial [tracking 177° magnetic] at 8,000 ft AMSL. He stated that they were 'visual', and requested a clearance to descend. The radar controller cleared KSF to descend to 6,000 ft AMSL 'visual' and to track to a 'left base' position for runway 14 right (Figure 2). The PIC acknowledged the clearance to descend to 6,000 ft AMSL and to track for a left base turn for runway 14 right, and stated that they were in receipt of ATIS[8] information echo.

5 Distance Measuring Equipment (DME). A navigation beacon, usually coupled with a very high frequency omni-directional radio range (VOR) beacon, to enable an aircraft to measure its distance in nautical miles from that beacon. An aircraft sends out a signal which is sent back, after a fixed delay, by the DME ground equipment. The aircraft can compute its distance to the beacon from the delay of the signal perceived by the aircraft's DME equipment.

6 The visual flight rules (VFR) are the rules prescribed for visual flight by the Civil Aviation Safety Authority of PNG (CASA PNG) which stated that, within controlled airspace, an aircraft should be 2 km horizontally and 500 ft vertically clear of cloud, with visibility of 8 km or more at or above 10,000 ft AMSL, or 5 km or more below 10,000 ft AMSL.

7 A radial is a magnetic bearing extending from a point-source navigation aid (navaid), in this case the Port Moresby very high frequency omni-directional radio range (VOR).

8 ATIS. Automatic Terminal Information Service. It is a recorded message giving pilots information about current weather conditions at an aerodrome, wind, runway(s) in use, instrument approaches in use, etc. It is updated whenever significant changes to these parameters occur. Successive iterations of the ATIS are named according to the alphabet, e.g. "Information Alpha" is followed by "Information Bravo", "Information Charlie", etc.

The radar controller responded that KSF was cleared for a 'visual approach[9]', and that the aircraft should track for a left base turn for runway 14 right, and they were to contact Jacksons Tower at 10 DME (19 km). The PIC read this back to the controller, stating that they were cleared for a visual approach to the left base position for runway 14 right, and they should contact the tower at '10 [nautical] miles'.

At 23:32:02, the radar controller contacted the tower controller and said that KSF was estimating arrival at Jacksons Airport at 2337, and that the aircraft would be on a left base turn for runway 14 right. The tower controller acknowledged this information.

At 23:32:53, the PIC contacted the tower controller and said that KSF was 9.5 DME (17.5 km) from Jacksons Airport, descending below 4,000 ft AMSL, and 'we're running into a bit of cloud, we might as well pick up the ILS [instrument landing system] if it's OK'. The tower controller replied immediately, but did not respond to the PIC's mention of the ILS; instead said 'kilo sierra foxtrot roger, continue approach runway 14 right, report on left base'. The PIC responded by reading this back without further mention of the ILS. By doing this, he acknowledged a continuation of the visual approach for a left base turn onto runway 14 right, although he was giving commands to the copilot to track to the right to pick up the ISS. Shortly afterwards, the aircraft impacted terrain at approximately 1,600 ft AMSL on the northern side of Mt Lawes, just below the summit. Mt Lawes is 6 nm from Port Moresby on a track of 177° M. The ILS is a track of 140° M. So the aircraft was 4.5 nm (8.3 km) to the left of the ILS track when the pilot commenced manoeuvring in an attempt to intercept the ILS.

Surviving passengers reported that prior to the impact the actions of the pilots appeared normal, and that they did not see or hear any evidence of engine or aircraft system malfunction before the accident.

Both pilots and one passenger were fatally injured in the impact, and one passenger passed away on the day after the accident from injuries sustained during the accident. Of the five passengers who survived the accident, three were seriously injured and two received minor injuries.

The sound of the impact was heard by a joint services patrol of the PNG Defence Force (PNGDF) and the New Zealand Army. It was also heard by PNGDF and NZ Army personnel at Goldie Barracks at the base of Mt Lawes. The PNGDF and NZ Army were the first to reach the accident site by helicopter, from which they rappelled to the ground. They administered first aid and cleared the vegetation from the aircraft. A team from the PNG Accident Investigation Commission deployed to the accident site by helicopter shortly afterwards.

A review of the cockpit voice recording by the Accident Investigation Commission (AIC) investigators indicated that there were no aural warnings from the enhanced ground proximity warning system (EGPWS[10]) and that the flight crew did not see the terrain until approximately one second before impact.

9 A visual approach is an approach to an aerodrome conducted by visual reference to the surface when the flight crew of an aircraft are able to continue their approach visually within the following parameters: by day, (1) clear of cloud; (2) in sight of ground or water; (3) flight visibility not less than 5,000 m, and (1), (2), and (3) can be maintained at an altitude not less than the minimum prescribed for VFR flight to within the circling area.

10 Enhanced ground proximity warning system (EGPWS). An aircraft ground proximity warning system which incorporates enhancements such as the use of a GPS system, access to a global terrain database, and an extended warning interval when on a collision course with the ground.

1.2 Injuries to persons

Table 2: Injuries to persons

Injuries	Flight crew	Passengers	Total in Aircraft	Others
Fatal	2	2	4	-
Serious	-	3	3	-
Minor	-	2	2	Not applicable
Nil Injuries	-	-	-	Not applicable
TOTAL	2	7	7	-

The PIC was an Australian citizen and the copilot was a Papua New Guinea citizen. The passengers were all Papua New Guinea citizens.

1.3 Damage to aircraft

The aircraft was substantially damaged by the impact forces.

1.4 Other damage

Trees and grass on the ridge were damaged by the impact sequence, and trees were cleared from the accident site to aid the evacuation of the survivors by helicopter.

1.5 Personnel information

1.5.1 Pilot in command

Age	: 60 years
Gender	: male
Nationality	: Australian
Type and number of licence	: PNG ATPL P20172
Valid to	: perpetual
Rating	: DHC-6
Total flying time	: 19,290 hours
Total on this type	: 5,980 hours
Total last 90 days	: 104.3 hours
Total on type last 90 days	: 104.3 hours
Total last 7 days	: 20.4 hours

Total on type last 7 days	: 20.4 hours
Total last 24 hours	: 0.7 hours
Total on the type last 24 hours	: 0.7 hours
Last base check (PNG highlands)	: 29 October 2013
Last ILS proficiency check	: 19 April 2014
Medical class	: one
Valid to	: 27 October 2014
Medical limitation	: nil

The PIC was normally based in Mt Hagen, Western Highlands Province, operating predominately highland flights in visual meteorological conditions.

PNG Civil Aviation Rule 61.807 states:

(a) except as provided in paragraph (b), the holder of an instrument rating must not exercise the privileges of the rating unless the holder has, — …

4. if carrying out an instrument approach procedure under IFR, within the immediately preceding 3 months, performed in flight or in an approved synthetic flight trainer a published instrument approach procedure using a similar type of navigation system.

The PIC did not meet the currency requirements to exercise the privileges of his Instrument Rating for Instrument Landing System (ILS) approaches.

1.5.2 Copilot

Age	: 25 years
Gender	: female
Nationality	: Papua New Guinea
Type and number of licence	: CPL (Aeroplane) P22063
Valid to	: perpetual
Rating	: DHC-6
Total flying time	: 432 hours
Total on this type	: 172 hours
Total last 90 days	: 62.7 hours
Total on type last 90 days	: 62.7 hours
Total last 7 days	: 3.8 hours
Total on type last 7 days	: 3.8 hours
Total last 24 hours	: 0.7 hours
Total on the type last 24 hours	: 0.7 hours
Last base check	: 24 July 2014
Last line check	: 11 February 2014

Medical class	: Class 1
Valid to	: 13 January 2015
Medical limitation	: nil

1.5.3 Approach (radar) controller

The 50 year old radar controller held the following ratings: Flight Information Service (FIS), Aerodrome Control, Area Rating, Approach (Procedural), Approach (Radar), and had been qualified to act as an approach (radar) controller since May 2004.

1.5.4 Aerodrome (tower) controller

The 23 year old tower controller held the following ratings: Flight Data, Surface Movement Control, and Aerodrome Control and had been qualified to act as an aerodrome controller since July 2014.

1.6 Aircraft information

1.6.1 Aircraft data

Aircraft manufacturer	: de Havilland Canada
Model	: DHC-6-300
Serial number	: 528
Date of manufacture	: 1977
Nationality and registration mark	: PNG, P2-KSF
Name of the owner	: HeviLift Ltd
Name of the operator	: HeviLift Ltd
Certificate of airworthiness	: issued 30 March 2005
Valid to	: non-terminating
Certificate of registration	: issued 30 March 2005
Valid to	: non-terminating
Total hours since new	: 34,327.95 hours
Total cycles since new	: 46,302 cycles

The aircraft was not fitted with an autopilot. It was fitted with Automatic Dependant Surveillance - Broadcast (ADS-B) equipment. That equipment was linked to the on-board GPS equipment and broadcast various flight parameters twice per second, which included GPS-derived position, height, speed, direction, vertical speed, etc.

The ADS-B data was received using PNG Airservices' ground-based equipment. The track in Figure 1 was derived from this information plotted on Google Earth™ by PNG Airservices Ltd and provided to the PNG AIC by PNG Airservices Ltd.

1.6.2 Engine data

Engine Type	: turbo-propeller
Manufacturer	: Pratt & Whitney Canada
Type	: PT6A-27
Engine number one (left)	
Serial number	: PCE52361
Total time since new	: 11,509 hours
Total time since overhaul	: 7,999 hours
Engine number two (right)	
Serial number	: PCE42563
Total time since new	: 15,949 hours
Total time since overhaul	: 4,454 hours

1.6.3 Propeller data

Propeller type	: variable pitch, 3-bladed
Manufacturer	: Hartzell Propeller Inc.
Type	: HC-B3TN-3D
Propeller number one (left)	
Serial number	: BUA19278
Total time since new	: 8,027 hours
Total time since overhaul	: 985 hours
Propeller number two (right)	
Serial number	: BUA25722
Total time since new	: 17,243.6 hours
Total time since overhaul	: 343 hours

1.6.4 Fuel Information

The aircraft was refuelled at Port Moresby with sufficient fuel for the flight to Woitape and return to Port Moresby. The fuel was JET-A1, otherwise known as AVTUR.

The aircraft's fuel tanks were destroyed during the impact. AIC's investigators noted the smell of fuel at the accident site.

1.6.5 Collision avoidance systems

1.6.5.1 Enhanced ground proximity warning system

KSF was equipped with a Honeywell (Bendix King) enhanced ground proximity warning system (EGPWS) part number EMKGA-06974 incorporating a Bendix King KGP560 Terrain Awareness and Warning System (TAWS) part number 965-1198-005.

The EGPWS was sent to the Australian Transport Safety Bureau (ATSB) in Canberra, Australia for download and analysis. The manufacturer, Honeywell provided assistance in determining why the EGPWS did not provide alerts and warnings prior to the aircraft impacting terrain.

The Honeywell engineers determined that the EGPWS was inhibited (i.e. the cockpit Terrain Inhibit switch was pushed) on approach to Woitape and it remained inhibited on the next flight (the accident flight).

The EGPWS does not record UTC, but only elapsed time (power up time for the EGPWS unit). From correlation with the CVR, the Terrain Inhibit was activated about 25 seconds before touchdown at Woitape and after two Terrain Caution alerts had already been generated.

The EGPWS is designed to give "Caution" and "Warning" alerts at about 20 seconds and about 10 seconds respectively before a collision with terrain. Pushing the Terrain Inhibit switch doesn't turn off the EGPWS unit; it remains on, but alerts/warnings are not enunciated to the crew.

The Terrain Inhibit switch is intended to be used to prevent nuisance warnings when the landing airport is not in the EGPWS terrain database.

1.6.5.2 Traffic alert and collision avoidance system

KSF was fitted with a Garmin GTS-850 Traffic Alert and Collision Avoidance System (TCAS).

1.7 Meteorological information

The weather at Port Moresby on the morning of the accident was fluctuating between VMC and IMC, with low cloud and rain in the vicinity of the airport. The Woitape weather was reported to have been CAVOK. A witness who heard the impact from Goldie Barracks said the cloud base had been below the summit of Mt Lawes all morning on the day of the accident.

The helicopter pilot who flew the PNGDF and NZ Army personnel to the accident site shortly after the accident reported that it had rained during the night and that the cloud base had been 8 oktas[11] at 1,000 ft above sea level at 2300 on the morning of the accident. He reported that the cloud cover had not changed by the time he heard the sound of the impact at 2333.

11 In meteorology, an okta is a unit of measurement used to describe the amount of cloud cover. Sky conditions are estimated in terms of how many eighths of the sky are covered in cloud, ranging from 0 oktas (completely clear sky) through to 8 oktas (completely overcast).

1.7.1 Automatic Terminal Information Service

The Automatic Terminal Information Service (ATIS) information at Jacksons Airport spanning the period before and after KSF departed for Woitape at 2211 was as follows.

***Information Charlie* issued 0735**

Runway in use:	: 14
Runway condition:	: Wet
Instrument approaches:	: ILS
Wind:	: 150 degrees, 5 to 10 knots
QNH:	: 1012
Temp / dew point:	: 24/24
Cloud:	: Broken at 500 ft, broken at 1,500 ft
Visibility:	: Reduced to 2,000 m in low cloud and rain

***Information Delta* issued 0830**

Runway in use:	: 14
Runway condition:	: [Dry]
Instrument approaches:	: ILS
Wind:	: 140 degrees, 10 to 15 knots
QNH:	: 1012
Temp / dew point:	: 25/24
Cloud:	: Broken at 800 ft, broken at 2,000 ft
Visibility:	: OK, reduced to 6 km to the east in low cloud

The ATIS at Jacksons Airport current while KSF was approaching Port Moresby was as follows.

***Information Echo* issued 0900**

Runway in use:	: 14
Runway condition:	: [Dry]
Instrument approaches:	: ILS
Wind:	: 130 degrees, 10 to 15 knots
QNH:	: 1013
Temp / dew point:	: 26/24
Cloud:	: Scattered at 1,500 ft with lower patches, and scattered at 2,500 ft.
Visibility:	: OK, reduced to 6 km to the east, build-ups in the area.

1.8 Aids to navigation

KSF was equipped with the following aids to navigation.

- Two Garmin GTN650 units, part numbers 011-02256-00 and 011-02256-01, incorporating GPS and VOR units.
- Two Aspen EFD1000 electronic flight displays, including a moving map.
- One Bendix King multi-function display (MFD) part number 066-04035-0301.
- One King, model KN62A automatic direction finder (ADF).
- One King, model KT76A distance measuring equipment (DME) receiver.

Ground-based navigation aids at Jacksons Airport operating at the time of the accident were as follows.

- Instrument landing system (ILS) runway 14L/32R.
- Port Moresby VOR/DME; co-located VOR and DME.
- Port Moresby non-directional beacon (NDB).

1.9 Communications

All communications between ATS and the crew were recorded by ground based automatic voice recording equipment for the duration of the flight. The quality of the aircraft's recorded transmissions was good. A transcript was prepared by PNG Airservices Ltd.

The aircraft was equipped with two VHF radios incorporated in the two Garmin GTN 650 NAV/COM units. There was also a Codan 2000 high frequency (HF) radio installed in the aircraft. All three radios were serviceable on the accident flight.

1.10 Aerodrome information

Not relevant to this accident.

1.11 Flight recorders

The aircraft was equipped with the following flight recording equipment:

- a cockpit voice recorder (CVR); and
- a video camera/data logger.

A flight data recorder (FDR) was not installed in the aircraft, nor was a FDR required under PNG Civil Aviation Rules current at the time of the accident.

1.11.1 Cockpit Voice Recorder

The aircraft was fitted with a CVR manufactured by L-3 Communications, part number 2100-1020-00. The CVR was installed in the tail section of the aircraft and was recovered undamaged from the accident site. It was subsequently sealed in a container and transported to the Australian Transport Safety Bureau's (ATSB) flight recorder replay and analysis laboratory in Canberra, Australia.

The ATSB downloaded the recorded information and provided it to the AIC in a replayable format. The information showed that the flight crew were unaware of their proximity to terrain until about 1 second before the impact.

1.11.2 Video camera/data logger

The aircraft was fitted with a Vision 1000 video camera/data logger manufactured by Appareo. This unit was recovered from the wreckage by the AIC on the day of the accident.

The Vision 1000 unit recorded visual and aural data.

Passing 10 DME the PIC told the copilot to bring the power back and said:

> 'stuff the nose down and away we go'.

He said he would set the radio to call the tower on 118.1. At 9.5 DME (17.6 km) passing 4000 ft he contacted the tower and said:

> 'We're running into a bit of cloud, we might as well pick up the ILS [instrument landing system] if it's OK.'

The flight crew could not have conducted an ILS approach from that position. They could have discontinued their visual approach and requested radar vectoring for an ILS approach. However, they did not do so.

The tower controller replied immediately, but did not respond to the PIC's mention of the ILS; instead, said:

> 'Kilo sierra foxtrot roger, continue approach runway 14 right, report on left base'.

The PIC acknowledged, then said to the copilot:

> 'We're going to go down here. Got to get down to 5,500 [ft]. Where are we now? Are we on the ILS yet? We're not yet.

The copilot confirmed that her ILS course bar also had not moved to indicate they were approaching the ILS track.

> PIC: 'Hasn't come in yet. Go a bit to the right, pick it up. Eight miles, we're within the ILS. Mine's not showing the ILS on it though, why not? 110.1 [ILS frequency] is correct isn't it?'

That was then followed by the PIC saying

> PIC: ‘course bar moving on this side. Keep it going down now we know where we are, looks good underneath.’

The video showed that they were in cloud, although the PIC may have seen down through his side window to breaks in the cloud.

> PIC: ‘7.5 [DME (13.9 km)] 2000 [ft] still pretty high, keep it coming down. Keep it pushing down. I’ll put the props up for you.’

The video shows the copilot holding the power levers and the PIC pushing the propeller levers forward and the sound of the propellers increasing to fine pitch.

> PIC: I’m not very happy with.

Recording stops at impact.

1.12 Wreckage and Impact Information

1.12.1 General Description of the Wreckage

The aircraft impacted Mt Lawes, just below the summit on the northern side, tracking 176° magnetic.

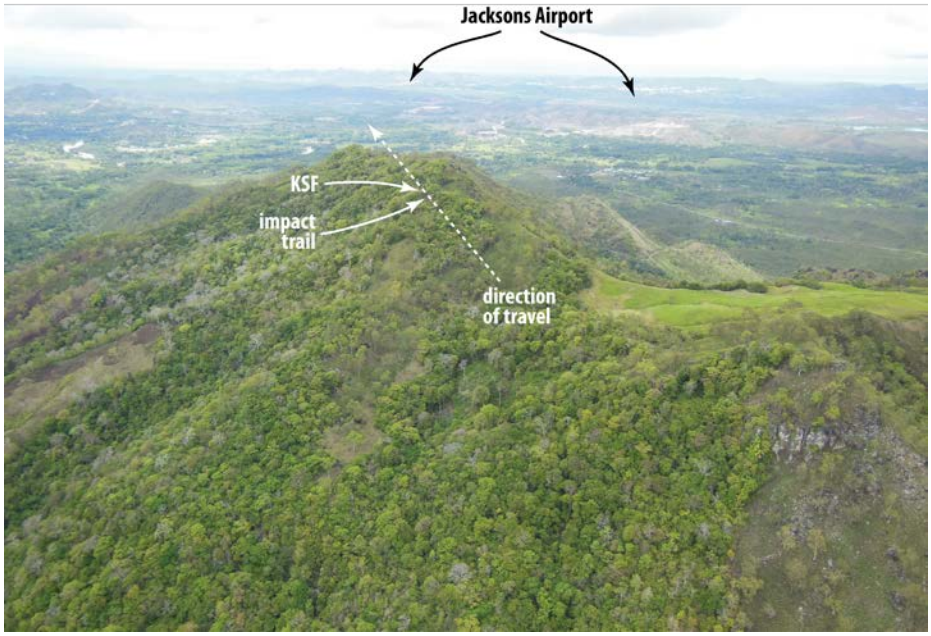

Figure 3: KSF accident site on Mt Lawes, with Jacksons Airport in the distance

Figure 4: KSF accident site on Mt Lawes

1.12.2 Impact Sequence and distribution of the wreckage

The impact sequence left a trail approximately 100 m long in the vegetation.

Figure 5: Wreckage of KSF and impact trail

Before coming to rest on the steep slope, the aircraft turned approximately 45 degrees to the right, causing the tail section to twist through 90 degrees and the front of the aircraft to strike the side of the mountain. The cockpit was crushed during the impact. The left horizontal stabiliser, visible in Figure 5 to the left of the impact trail, detached from the tail.

Figure 6: Wreckage of KSF and impact trail

Figure 7: Wreckage of KSF

The right wing separated from the fuselage and was found inverted on the right side of the aircraft. The right engine was situated on the ground beneath the main wreckage (the rear part of the main wreckage remained elevated, see Figure 8).

Figure 8: Wreckage of KSF showing empennage hanging

1.13 Fire

There was no evidence of any pre- or post-impact fire.

1.14 Survival Aspects

The front of the aircraft, including the cockpit and front passenger seat row, was crushed against the side of the mountain during the impact. For the two pilots and the passenger in the front seat row it was a non-survivable impact. Survivors stated that the passenger who was fatally injured in the impact (seated on the right in row two) was not wearing a seat belt, but that all the other passengers were wearing their seatbelt.

1.15 Tests and research

No tests or research were required to be conducted as a result of this accident.

1.16 Organisational and management information

1.16.1 The operator

HeviLift Ltd

PO Box 49

Mt Hagen 281

Western Highlands Province

Papua New Guinea

Hevilift Ltd held an Air Operator's Certificate for DHC-6 that was current at the time of the accident.

1.17 Additional information

There was no other factual information that was relevant to the circumstances leading up to the occurrence.

1.18 Useful or effective investigation techniques

The investigation was conducted in accordance with Papua New Guinea Civil Aviation Act, Commissions of Inquiry Act, the Civil Aviation Rules, and the PNG Accident Investigation Commission's approved policies and procedures, and in accordance with the Standards and Recommended practices of Annex 13 to the Chicago Convention.

2 ANALYSIS

The investigation found that the flight progressed normally after takeoff from Woitape, and the on-board video recorded data showed that the descent to 6,000 ft was commenced at 29 nm (53.7 km) from Port Moresby when the aircraft was clear of cloud. About 10 nm (18.5km) from Port Moresby, when the aircraft was in broken cloud the descent rate was increased. The pilot in command (PIC) told the tower controller that they were 'running into a bit of cloud' and said 'we might as well pick up the ILS' [instrument landing system approach]. However, the PIC did not request an ILS approach.

The Port Moresby Aerodrome Terminal Information Service (ATIS), current while P2-KSF was approaching Port Moresby had been received by the flight crew. It required aircraft arriving at Port Moresby to conduct an ILS approach. The PIC's last ILS proficiency check was about 11 months before the accident flight.

The PIC did not meet the currency requirements specified in the PNG Civil Aviation Rule 6.807 in order to exercise the privileges of his Instrument Rating for Instrument Landing System (ILS) approaches. It is likely the reason the PIC did not request a clearance to intercept the ILS from 30 nm (55.6 km) to fly an ILS approach to runway 14 at Port Moresby.

During the descent, although the PIC said 'we know where we are, keep it coming down', it was evident from the recorded information that his assessment of their position was incorrect, and therefore the descent should not have been continued. The PIC and copilot had lost situational awareness.

The Enhanced Ground Proximity Warning System (EGPWS) did not provide Terrain alerts or warnings prior to the collision with the terrain. From correlation with the CVR, the investigation determined that the Terrain Inhibit was activated about 25 sec before touchdown at Woitape and after two Terrain Caution alerts had already been generated.

By not deactivating the EGPWS Terrain Inhibit prior to departure from Woitape, the crew deprived themselves of the "Caution" and "Warning" alerts that would have sounded about 20 seconds and about 10 sec respectively before the collision.

3 CONCLUSIONS

3.1 Findings

3.1.1 Aircraft

a) The aircraft was certified, equipped and maintained in accordance with existing PNG Civil Aviation Rules and approved procedures.

b) The aircraft was certified as being airworthy when dispatched for the flight.

c) The mass and the centre of gravity of the aircraft were within the prescribed limits.

d) There was no evidence of any defect or malfunction in the aircraft that could have contributed to the accident.

e) All control surfaces were accounted for.

f) The aircraft was destroyed by impact forces.

3.1.2 Crew / pilots

a) The flight crew was licensed and qualified for the flight in visual meteorological conditions in accordance with existing Civil Aviation Rules.

b) The PIC's last ILS proficiency check was about 11 months before the accident flight.

c) The PIC did not meet the currency requirements specified in the PNG Civil Aviation Rule 6.807 in order to exercise the privileges of his Instrument Rating for Instrument Landing System (ILS) approaches.

3.1.3 Flight operations

a) The flight crew carried out normal radio communications with the relevant ATC units.

b) The flight crew continued the descent in instrument meteorological conditions without confirming their position.

c) The flight crew's assessment of their position was incorrect

3.1.4 Operator

a) The operator held a current Air Operator's Certificate

3.1.5 Air Traffic Services and airport facilities

a) ATC provided prompt and effective assistance by the timely activation of the 'crash' alarm.

3.1.6 Flight recorders

a) The aircraft was equipped with a cockpit voice recorder (CVR) in accordance with the PNG Civil Aviation Rules.

b) The CVR recorded valid data.

c) The aircraft was fitted with a video camera/data logger that recorded useful information.

3.1.7 Collision avoidance systems

a) The EGPWS Terrain Inhibit was activated by the flight crew about 25 sec before touchdown at Woitape and after two Terrain Caution alerts had already been generated.

b) By not deactivating the Terrain Inhibit prior to departure from Woitape, the crew deprived themselves of the "Caution" and "Warning" alerts about 20 seconds and about 10 sec respectively before the collision.

3.1.8 Medical

a) There was no evidence that incapacitation or physiological factors affected the flight crew performance.

3.1.9 Survivability

a) Flight crew: The accident was not survivable due to the cockpit being crushed on impact.

b) Passenger seated in row 1: The accident was not survivable due to the forward cabin area being crushed on impact.

c) Passengers seated in row 2: The accident may have been survivable if this passenger had been wearing the seat belt.

d) Five passengers seated behind row 2: The accident was survivable.

3.2 Causes [Contributing factors]

a) The flight crew continued the descent in instrument meteorological conditions without confirming their position.

b) The flight crew's assessment of their position was incorrect and they had lost situational awareness

c) The flight crew deprived themselves of the "Caution" and "Warning" alerts that would have sounded about 20 sec and about 10 sec respectively before the collision, by not deactivating the EGPWS Terrain Inhibit prior to departure from Woitape.