FINAL REPORT

AIC 12-1004

Sunbird Aviation Services

P2-MHC

Cesna Aircraft Company U206G

Guari Airstrip, Central Province

PAPUA NEW GUINEA

14 May 2012

The Papua New Guinea Accident Investigation Commission (AIC) was informed of the accident by Air Traffic Services in Port Moresby on 14 May 2012 and commenced an on-site investigation. This Report, made publicly available on 15 June 2014 was produced by the PNG AIC, PO Box 1709, Boroko, 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) Civil Aviation (Amendment) Act 2010, PNG Commissions of Enquiry Act 1951, and PNG Civil Aviation Rules 2004. It contains factual information, analysis of that information, findings, and recommendations.

The AIC is an independent Government statutory agency governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. In accordance with Annex 13 to the Convention on International Civil Aviation, the AIC's function is to determine the circumstances and causes of aviation accidents and incidents with a view to avoiding similar occurrences in the future. Readers should note that the information in AIC reports and recommendations is provided to promote aviation safety and is not intended to imply blame or liability.

When the AIC makes recommendations as a result of its investigations or research, safety is its primary consideration. However, the AIC fully recognizes that the implementation of recommendations arising from its investigations will in some cases incur a cost to the industry.

The AIC believes that safety information is of greatest value if it is passed on for the use of others and readers are encouraged to copy or reprint this report for further distribution, acknowledging the Papua New Guinea Accident Investigation Commission as the source.

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SYNOPSIS

In this accident, the pilot of a Cessna U206G, who was experienced in operations from remote airstrips in Papua New Guinea, attempted to return to land after experiencing loss of power just after takeoff at Guari, Central Province.

The weather in the area was fine with cool, calm conditions.

The takeoff appears to have been normal. A witness reported hearing a 'bang' sound, which he described as similar to a gunshot, shortly after the aircraft became airborne. The aircraft then turned left and descended before crashing short of the runway. The passenger sitting next to the pilot reported the pilot had signaled to him that there was a problem with the aircraft, but had remained calm throughout the occurrence.

The pilot was critically injured and two of the four passengers were seriously injured during the impact. The aircraft was destroyed by impact forces.

The way in which the propeller blades were bent showed that the propeller had been rotating when the aircraft struck the ground, but this could have been caused either by low to moderate power from the engine or by wind-milling, i.e. with no power from the engine.

The engine was examined in Cairns, Australia, but nothing was found that could have contributed to the accident.

The Accident Investigation Commission was unable to determine the reason for the reported engine malfunction.

1 FACTUAL INFORMATION

1.1 History of the flight

On the morning of 14 May 2012, a Cessna Aircraft Company U206G, registered P2-MHC, was conducting a charter flight from Guari, Central Province to Port Moresby, National Capital District (Figure 1) with a pilot and four passengers on board. Earlier in the morning, the pilot had flown the aircraft from Port Moresby to Guari; 87 km north west of Port Moresby.

GoogleEarth image modified by the AIC

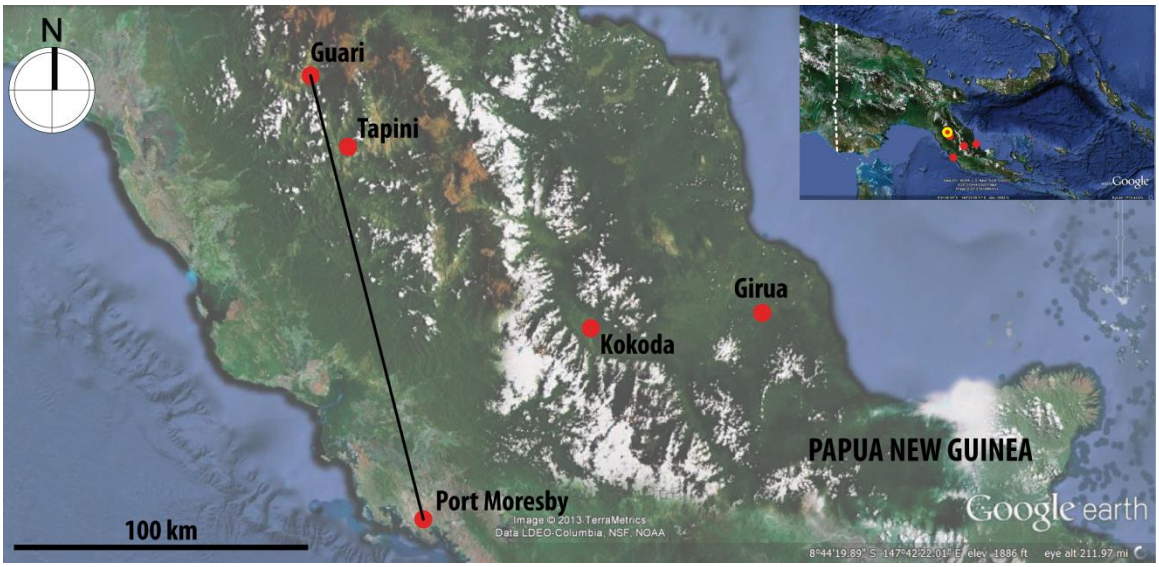

Figure 1: Intended flight path from Guari to Port Moresby

At 0805[1] the pilot reported to Air Traffic Services (ATS) Flight Service that he was taxying at Guari and shortly after, the aircraft was observed taking off. The pilot informed investigators that the takeoff was 'normal', and that during the take-off roll he had slightly veered the aircraft to the right, although he could not recall why. A witness on the ground reported that shortly after the aircraft became airborne there was a 'bang' sound from the engine. The aircraft then turned left and descended.

Just before impacting the ground, it disappeared from view beneath the ridgeline on which the runway was situated. The villagers watching the departure ran to the crash site and found the pilot and passengers still inside the aircraft. They were helped out of the wreckage and were later all evacuated to Port Moresby by helicopter.

1 The 24-hour clock, in Coordinated Universal Time (UTC), is used in this report to describe the local time as specific events occurred. Local time in the area of the accident, Papua New Guinea Time (Pacific/Port Moresby Time) is UTC + 10 hours.

1.2 Injuries to persons

Table 1: Injuries to persons

Injuries	Flight crew	Passengers	Total in Aircraft	Others
Fatal	-	-	-	-
Serious	1	2	3	-
Minor	-	1	1	Not applicable
Nil Injuries	-	1	1	Not applicable
TOTAL	1	4	5	-

The pilot was an Australian citizen. The passengers were Papua New Guinea citizens.

1.3 Damage to aircraft

The aircraft was substantially damaged by impact forces. There was no fire.

Figure 2: Cessna U206G, P2-MHC wreckage

1.4 Other damage

There was no other damage to property and/or the environment**.**

1.5 Personnel information

1.5.1 Pilot in Command

Age	: 61 years
Gender	: Male
Type of licence	: Airline Transport Pilot License (ATPL)
Valid to	: Perpetual based on medical validity
Rating:	: Single and multi-engine aircraft less than 5,700 kg Maximum Take-off Weight (MTOW)
Total flying time	: 26,040 hours
Total on this type	: 641 hours
Total last 90 days	: 192 hours
Total on type last 90 days	: 10 hours
Total last 7 days	: 0.9 hours
Total on type last 7 days	: 0.9 hours
Total last 24 hours	: 0.9 hours
Total on the type last 24 hours:	0.9 hours
Medical class	: One
Valid to	: 15 September 2012
Medical limitation	: Required to wear prescription lenses

1.6 Aircraft information

1.6.1 Aircraft Data

Aircraft manufacturer	: Cessna Aircraft Company
Model	: U206G
Serial number	: U20603847
Year of manufacture	: 1977
Nationality and registration mark	: Papua New Guinea, P2-MHC
Name of the owner	: Sunbird Aviation Ltd

Name of the operator	: Sunbird Aviation Ltd
Certificate of Airworthiness	**:** issued 22 May 2006
Valid to	: non-terminating
Certificate of Registration	**:** P2-MHC / C206G / 03847
Issue date	: 22 May 2006
Total hours since new	: 11,586.3 hours

1.6.2 Engine Data

Engine type	: Normally aspirated, fuel injected, piston engine.
Manufacturer	: Teledyne Continental
Type	: IO-520F
Serial number	: 554969
Total time since new	: 2,000 hours (estimated)[2]
Total time since overhaul	: 300.1 hours

1.6.3 Propeller Data

Propeller type	: Variable Pitch Propeller
Manufacturer	: Hartzell
Type	: HC-C3YF-1RF
Serial number	: not known[3]
Total time since new	: 1,309.9 hours
Total time since overhaul	: not known[4]

The maintenance record sheets for the most recent 100-hourly and 50-hourly inspections, carried out by the operator's maintenance provider, indicated no abnormalities that could have contributed to the accident.

Examination of the engine in Cairns, Australia, found no evidence of any mechanical failure that would have resulted in a loss of power.

The installation of the ignition lead for the #3 cylinder bottom spark plug differed from that of the leads on the other spark plugs. This indicated that the #3 cylinder bottom lead had been replaced, although there was no record of this in the maintenance records. The lead was subjected to an insulation check and no fault was found, so it is considered unlikely that the lead and/or its installation would have given rise to any ignition problems.

The magnetos were tested and run, with no fault found. There was no evidence of detonation[5].

2, 3, 4 The aircraft's logbooks were mislaid following the engine examination in Australia and the propeller serial number and time since overhaul are not known.

1.6.4 Weight and Balance Data

The pilot reported that the aircraft load, including the pilot's weight, was not more than 280 kg, distributed as follows. One adult passenger was next to him in the front right seat. Two adult males were in row 2, and one child was in row 3. He stated that the baggage, secured in the baggage area behind row, was no more than 25 kg.

No documents were recovered from the wreckage, so there was no record of the quantity of fuel on board when MHC departed Port Moresby. However, the pilot stated that he would have departed Port Moresby with the operator's 'standard' fuel load of 160 L for the return flight to Guari. He said that the fuel burn between Port Moresby and Guari would have been approximately 43 L, so the aircraft would have had approximately 117 L of fuel, weighing 82 kg, on board when it taxied at Guari.

The aircraft Flight Manual was not recovered from the accident site. The Accident Investigation Commission (AIC) investigation used generic Cessna U206G loading information published by the manufacturer to determine the weight and balance. Using the estimated weight of fuel on board, and the weight and disposition of the occupants and baggage, the investigation determined that MHC would have been within the permitted limits of weight and balance for a U206G aircraft when it departed Guari.

1.7 Meteorological information

The weather was reported to have been fine and cool, with no wind at Guari on the morning of 14 May 2012. The temperature at that time of the morning would probably have been no more than 16 degrees Celsius. Meteorological conditions are not considered to have contributed to the accident.

1.8 Aids to navigation

Navigation aids were not a factor in this occurrence.

1.9 Communications

All communications between ATS and the pilot were recorded by ground based automatic voice recording equipment. The quality of the aircraft's recorded transmissions was good.

1.10 Aerodrome information

Aerodrome Code	:	GAI
Airport Name	:	Guari
Airport Address	:	Central Province, Papua New Guinea

5 Violent and irregular combustion in a piston engine cylinder, resulting from an excessive compression ratio or supercharging, or using inferior fuel. Also known as 'knocking' or 'pinging'.

Airport Class	:	2
Airport Authority	:	Central Provincial Government
Type of Traffic Permitted	:	VFR
Coordinates	:	08° 07′ 82″ S, 146° 52′ 51″ E
Elevation	:	6,100 ft
Runway Length	:	Rwy 12/30, 600 metres
Windsock	:	The pole which had formerly borne the windsock remained, but nothing remained of the windsock itself.

Guari was a one-way strip, with landing towards the south east and takeoff towards the north west. There were no airport facilities or services, typical of remote aerodromes in PNG.

The pilot described the runway as being in 'quite bad condition', with small bushes growing on it and with tall cane grass just beyond the threshold of runway 12.

Figure 3: Guari airstrip viewed from the south east

1.11 Flight recorders

The aircraft was not fitted with a flight data recorder or cockpit voice recorder. Neither recorder was required by current Papua New Guinea aviation regulations.

1.12 Wreckage and Impact Information

1.12.1 General Description of the Wreckage

The tail section of the fuselage and the empennage were broken and bent upwards (Figures 2 and 4). This indicates that at the time of impact, the tail section's centre of gravity was below the aircraft's centre of gravity, and that the aircraft must therefore have impacted the ground in a nose-up attitude.

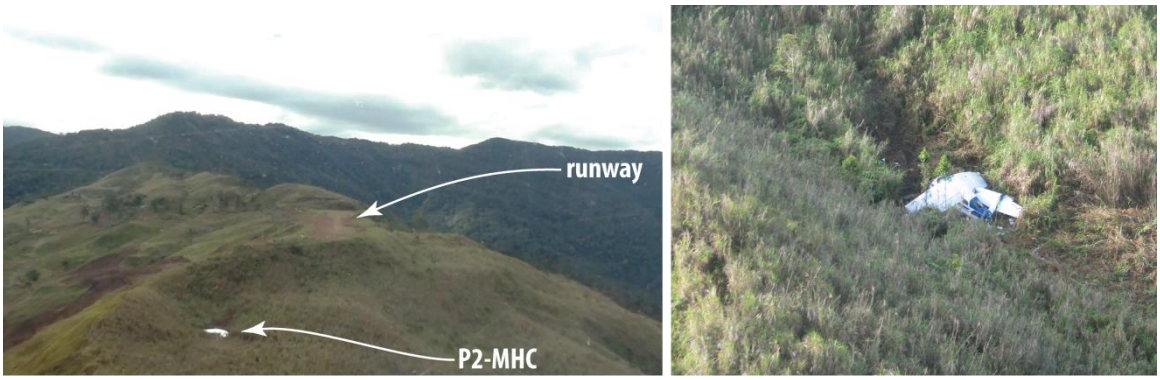

Figure 4: Accident site and wreckage of P2-MHC

The nature of the chord-wise twisting of the propeller blades (Figure 5) and the bending of one of the blades (marked by red arrows in Figure 5) indicate that the propeller was rotating when the impact occurred and that it was not being driven at high power. This may mean either that the propeller was turning because the engine was producing low to moderate power, or that the propeller was wind-milling and was not being driven by the engine at all. Neither scenario can be eliminated on the basis of the bending of the propeller blades.

Figure 5: P2-MHC propeller blades

The wing flaps appeared to be at 20 degrees, which is the setting the pilot reported he would have used for takeoff at Guari. The flap lever in the cockpit was set to full flap. It is possible that the flap lever was moved accidentally when the passengers were rescued from the wreckage. It is also possible that the pilot selected full flap during the return to land, but that the flaps did not have time to extend fully before the impact.

The engine was recovered from the accident site for testing, disassembly and examination in Cairns, Australia, and certain radio and other equipment was also removed from the wreckage. The majority of the wreckage was not removed by the AIC.

1.12.2 Impact Sequence and Distribution of the Wreckage

The aircraft impacted the ground at the base of a steep bank that was an extension of the ridge on top of which the runway was situated (Figure 4). The impact occurred short of the threshold of runway 12, and below the level of the runway. With the exception of the engine and propeller that separated from the fuselage, the wreckage was confined to the general

dimensions of the aircraft.

1.13 Medical and Pathological Information

No medical or pathological investigations were conducted as a result of this occurrence, nor were they required.

1.14 Fire

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

1.15 Survival Aspects

The accident was survivable. Villagers who had watched the aircraft take off, ran to the crash site, and found the pilot and passengers still inside the aircraft. They helped the pilot and passengers to egress from the wreckage. The occupants were all evacuated to Port Moresby by helicopter.

1.16 Tests and Research

Apart from engine testing, no other tests or research were required to be conducted as a result of this occurrence.

1.17 Organisational and Management Information

Operator: Sunbird Aviation Services
PO Box 205
Vanimo
Sundown Province

At the time of the accident, the aircraft operator held a valid Air Operator's Certificate (AOC) issued by the Papua New Guinea Civil Aviation Safety Authority (CASA).

1.18 Additional Information

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

1.19 Useful or Effective Investigation Techniques

The investigation was conducted in accordance with Papua New Guinea Legislation and Civil Aviation Regulations, 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

A pilot with many years flying experience in remote areas of Papua New Guinea was conducting a routine flight in good weather, in a Cessna Aircraft Company U206G aircraft, from Guari, Central Province. The early morning weather was good with calm conditions.

Shortly after takeoff, the engine lost power. The pilot turned the aircraft left in an attempt to land back on the airstrip, but was unable to do so because of insufficient engine power and height to effect a safe turn back. The aircraft impacted the ground short of the airstrip threshold.

The way in which the propeller blades were twisted indicates that the propeller was rotating when the impact occurred. It was not possible to determine whether this was at a low engine power setting or because it was wind-milling.

The tail section of the aircraft had broken upwards off the fuselage. The investigation determined that the centre of gravity of this section must therefore have been below the aircraft's centre of gravity when the aircraft struck the ground. This indicates that the aircraft was nose-high when the tail section broke off and is consistent with the pilot raising the nose in an attempt to minimise the impact.

The engine and associated components were examined at an engine overhaul facility in Cairns, Australia. The installation of the ignition lead for the Nbr-3 cylinder bottom spark plug differed from that of the leads on the other spark plugs. This indicated that the Nbr-3 cylinder bottom lead had been replaced, although there was no record of this in the maintenance records. The lead was subjected to an insulation check and no fault was found, so it is considered unlikely that the lead and/or its installation would have given rise to any ignition problems.

The Accident Investigation Commission was unable to determine the reason for the reported engine malfunction.

3 CONCLUSIONS

From the evidence available, the following findings are made with respect to the landing accident involving the Cessna Aircraft Company U206G aircraft, registered P2-MHC, which occurred at Guari, Central Province, on 14 May 2012. The findings should not be read as apportioning blame or liability to any particular organization or individual. The order in which they are presented does not indicate a level of significance.

3.1 Findings[3]

3.1.1 Aircraft

1. The aircraft was certified, equipped and maintained in accordance with existing regulations and approved procedures.
2. The aircraft was certified as being airworthy when dispatched for the flight.
3. The mass and the centre of gravity of the aircraft were within the prescribed limits.
4. There was no evidence of any defect or malfunction in the aircraft that could have contributed to the accident.
5. There was no evidence of airframe failure or system malfunction prior to the accident.
6. The aircraft was structurally intact prior to impact.
7. All control surfaces were accounted for, and all damage to the aircraft was attributable to the severe impact forces.
8. The aircraft was destroyed by impact forces.
9. There was no evidence of pre- or post-impact fire.
10. Propeller blade damage and twist was consistent with the propeller turning because the engine was producing low to moderate power, or that the propeller was wind-milling and was not being driven by the engine.

3.1.2 Pilot

1. The pilot was licensed and qualified for the flight in accordance with existing regulations.
2. The pilot's actions and statements indicated that his knowledge and understanding of the aircraft systems was adequate.

3 Findings: The order in which the findings are presented does not imply a hierarchy of significance.

3.1.3 Flight Operations

1. The flight was conducted in accordance with the procedures in the company Operation's Manual.
2. The pilot carried out normal radio communications with the relevant Air Traffic Services unit.
3. There was insufficient engine power, and insufficient height available, to effect a return to the departure airstrip.

3.1.4 Flight recorders

1. The aircraft was not equipped with a flight data recorder (FDR) or a cockpit voice recorder (CVR); neither was required by regulation.

3.1.5 Medical

1. There was no evidence that incapacitation or physiological factors affected the pilot's performance.

3.2 Contributing factors

After the onset of the engine problem, the engine did not produce sufficient power to enable the pilot to land the aircraft back on the airstrip. The investigation was not able to determine the reason for the reported engine malfunction.