



Final Report

AIC 17-1003

**PAPUA NEW GUINEA
ACCIDENT INVESTIGATION COMMISSION
ACCIDENT INVESTIGATION REPORT**

Bayswater Road Ltd

VH-ATO

Government Aircraft Factory (GAF) Nomad N22C

Wheels-up landing

Buka Aerodrome, Autonomous Region of Bougainville

PAPUA NEW GUINEA

8 December 2017

About the AIC

The Accident Investigation Commission (AIC) is an independent statutory agency within Papua New Guinea (PNG). The AIC is governed by a Commission and is entirely separate from the judiciary, transport regulators, policy makers and service providers. The AIC's function is to improve safety and public confidence in the aviation mode of transport through excellence in: independent investigation of aviation accidents and other safety occurrences within the aviation system; safety data recording and analysis; and fostering safety awareness, knowledge and action.

The AIC is responsible for investigating accidents and other transport safety matters involving civil aviation, in PNG, as well as participating in overseas investigations involving PNG registered aircraft. A primary concern is the safety of commercial transport, with particular regard to fare-paying passenger operations.

The AIC performs its functions in accordance with the provisions of the *PNG Civil Aviation Act 2000 (as amended)*, and the *Commissions of Inquiry Act 1951*, and in accordance with *Annex 13* to the Convention on International Civil Aviation.

The object of a safety investigation is to identify and reduce safety-related risk. AIC investigations determine and communicate the safety factors related to the transport safety matter being investigated.

It is not a function of the AIC 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 AIC endeavors to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why it happened, in a fair and unbiased manner.

About this report

Decisions regarding whether to conduct an investigation, and the scope of an investigation, were based on many factors, including the level of safety benefit likely to be obtained from the investigation. For this occurrence, fact-gathering investigation was commenced. As the aircraft sustained significant damage to both landing gear pods and the nose forward of the nose locker, the occurrence was classified as an accident. This Final Report has been produced in accordance with the ICAO *Annex 13* to the Chicago Convention on International Civil Aviation, *PNG Civil Aviation Act 2000 (as amended)* and the *PNG Accident Investigation Commission Policy and Procedures*.

Nomad N22C landing gear malfunction-aircraft landed with wheels retracted

Occurrence details

On 8 December 2017, at 00:17 UTC¹ (10:17 local time), an Australian registered GAF Nomad N22C aircraft, registered VH-ATO (ATO), owned and operated by Bayswater Road Ltd, was conducting a circuit area flight under VFR² at Buka Aerodrome, Autonomous Region of Bougainville Province,

The pilot reported that when doing the pre-landing checks the landing gear failed to extend. He attempted to deploy the landing gear using the emergency system, actuated by a manual pump. The handle of the manual pump broke after three to four pumps. The pilot decided to perform a landing in the grassy flight strip, about 32 metres to the right of the sealed runway centerline. The pilot-in-command (PIC) was the sole occupant and was not injured.



Figure 1: VH-ATO landing wheels-up in the grassy flight strip

Substantial damage

During the ground impact, the main landing gear pods sustained significant damage. The lower attachment points of both wings' struts came into contact with the landing-gear pods and tore the pods' side skins, which resulted in the pods' doors separating from the pods. No visual structural damage was evident on the wing struts or the attachments at the pods.

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.

² Visual Flight Rules



Figure 2: Damaged pods of the main landing gear



Figure 3: Right pod side skin torn

Figure 4: Left pod side skin torn

The nose landing gear and its doors were not damaged. The nose cone had a puncture hole/tear on the underside, approximately 4 inches long.



Figure 5: Puncture hole on the underside of the Nose Cone

On-site recovery

The Operator engaged Air Gold Coast from Queensland for the recovery. Engineers were deployed to the site for a temporary repair, to enable the aircraft to be ferried to Port Moresby for an engineering assessment and permanent repairs.

The aircraft was raised, and the landing gear extended at the site. The aircraft was ferried to Port Moresby under a *Special Flight Permit, Certificate Number ACS 640*, granted by the regulator from the State of Registry, the Australian Civil Aviation Safety Authority.

 Australian Government Civil Aviation Safety Authority		Certificate/Job Number ACS 640
SPECIAL FLIGHT PERMIT		
1. Nationality & Registration Mark VH- ATO	2. Manufacturer & Manufacturer's Designation of Aircraft GAF N22C Nomad	3. Aircraft Serial No. 108
4. Purpose CASR 21.197(1) (a) Flying the aircraft to a base where repairs, alterations, or maintenance are to be performed, or to a point of storage;		
5. This Special Flight Permit is issued pursuant to the Civil Aviation Safety Regulations of Australia in respect of the above aircraft to conduct <input checked="" type="checkbox"/> a flight / <input type="checkbox"/> flights for the above mentioned purpose, from <u>Buka Island PNG</u> to <u>Port Moresby PNG</u> during the period specified below subject to any prescribed conditions set out as an Annex to this certificate. However, this permit for the above mentioned aircraft does not meet requirements in Annex 8 to the Convention on International Civil Aviation and therefore the aircraft must not be operated in international airspace or over the territory of a foreign country without the special permission of that country.		
Permit issue date <u>12 / 12 / 2017</u> (day/month/year)		Permit expiry date <u>19 / 12 / 2017</u> (day/month/year)
<input type="checkbox"/> Delegate of the Authority <input checked="" type="checkbox"/> Authorised person*  <u>L B Ogier</u> (Signature) (Printed Name)		
* Instrument of Appointment Number: <u>1-LVUCH</u>		
Note: This permit is subject to the conditions listed on the annex dated <u>12 / 12 / 2017</u> . Attachments to this permit form part of this permit.		
6. Subject to suspension or cancellation, pursuant to the Civil Aviation Safety Regulations of Australia, this permit shall remain in force until the expiry date above.		
NO ENTRIES MAY BE MADE ON THIS PERMIT EXCEPT BY A DELEGATE OF THE AUTHORITY OR AN APPROPRIATE AUTHORISED PERSON.		
Any person finding this certificate should forward it to the Civil Aviation Safety Authority		
Form 721 05/2016 Special Flight Permit Page 1 of 2		

 Australian Government Civil Aviation Safety Authority		Certificate/Job Number ACS 640
ANNEX TO SPECIAL FLIGHT PERMIT		
THIS ANNEX IS ISSUED AS PART OF THE SPECIAL FLIGHT PERMIT IDENTIFIED ABOVE AND MUST BE ATTACHED TO THAT PERMIT AT ALL TIMES.		
Aircraft Registration <u>VH - ATO</u> is subject to the following conditions: Conditions are based on information provided by the applicant.		
1. Flights must be conducted in accordance with the regulatory requirements of the national civil aviation authority having air traffic control responsibility and the CASA requirements for Day VFR flight.		
2. POB: Pilot and 2 crew.		
3. To prevent the landing gear retracting, it must be selected down, locked down and safetied in accordance with the AMM. The landing gear control circuit must be isolated with the selector in the Down selection and placarded INOP.		
4. The aircraft shall be operated within the limitations specified in the applicable Aircraft Flight Manual and relevant fixed placards. Unless otherwise limited the maximum landing gear extended speed of 120 knots CAS shall not be exceeded during the permitted flight.		
5. A copy of this permit is to be carried on board the aircraft for the permitted flight.		
6. Elapsed flight time shall be recorded on the MR to ensure the aircraft's TTIS is kept accurate.		
END.		
<input type="checkbox"/> Continued next page		Page <u>1</u> of <u>1</u>
Annex issue date <u>12 / 12 / 2017</u> (day/month/year)		<input type="checkbox"/> Delegate of the Authority <input checked="" type="checkbox"/> Authorised person*  <u>L B Ogier</u> (Signature) (Printed Name)
* Instrument of Appointment Number: <u>1-LVUCH</u>		
NO ENTRIES MAY BE MADE ON THIS ANNEX EXCEPT BY A DELEGATE OF THE AUTHORITY OR AN APPROPRIATE AUTHORISED PERSON.		
PURSUANT TO REGULATION 11.077 OF THE CIVIL AVIATION SAFETY REGULATIONS OF AUSTRALIA, A PERSON MUST NOT CONTRAVENE A CONDITION SPECIFIED ON A PERMIT.		
Any person finding this certificate should forward it to the Civil Aviation Safety Authority		
Form 721 05/2016 Special Flight Permit Page 2 of 2		

Figure 6: CASA Australia Special Flight Permit Number ACS 640

Engineering assessment

In the presence of the AIC investigators at Port Moresby, the landing gear and its systems were examined by the engineers from Air Gold Coast. The defect causing the failure of the landing gear to extend was found to be a broken wire on the up-lock switch on the right-main landing gear. That caused the motor to lock up.



Figure 7: Broken Wire on the up-lock switch of the right landing gear



Figure 8: Broken Handle of the Emergency gear extension

After three or four pumps of the manual landing gear extension handle it fractured. The pilot reported that he had to apply a large force on the pump handle during those initial pump actions. The investigation determined that because the log motor had locked up, large resistance on the small 3/8 drive was experienced, and the handle drive failed.



Figure 9: Failed drive

The manual extension handle drive was inspected, and it showed no evidence of corrosion or fatigue cracking. The servicing history of the component was also analysed, and that confirmed that the component was serviceable prior to the flight.

AIC comment

The landing gear system was examined including the electrical wiring. The wire to the up-lock switch on the right land gear had fractured and separated, rendering the normal landing gear extension system inoperative.

Excessive force due to the resistance of the locked-up landing gear extension motor during the pumping to extend the gear manually, likely contributed to the overload failure of the handle.

Other factors

Other factors is used by the AIC in reports for safety deficiencies or concerns that are identified during the course of an investigation, that while not causal to the accident or serious incident, nevertheless should be addressed with the aim of accident and serious incident prevention, and the safety of the travelling public.

Other factor related to *Foreign Operator Certification and Permit*

The *Foreign Operator Certification and Permit* documentation between the PNG Department of Transport (DOT) and the Operator was analysed during the investigation. There were irregularities in the issuance of the *PNG DOT Foreign Operator Permit* which were brought to the attention of the Secretary for DOT. However, they did not contribute to the accident and were regarded as Other Contributing Factors.

On 16 December 2017, the Secretary DOT informed the AIC that the process for issuing Foreign Operator Certification and Permit documentation will be reviewed in consultation with CASA PNG and AIC.

General Details

Date and time	8 December 2017 – 00:17 UTC approximately	
Occurrence category	Accident	
Primary occurrence type	Wheels-up landing	
Location	Buka Aerodrome, Autonomous Region of Bougainville, PNG	
Coordinates	Latitude: 05° 25'20"S	Longitude: 154°40'21"E

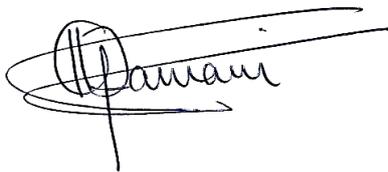
Crew details

Pilot in Command	
Nationality	Australian
Licence type	CPL (A)
Licence number	792648
Total hours	2,545
Total hours on type	143
Total hours last 30 days	34

Aircraft Details

Aircraft manufacturer and model	Government Aircraft Factory Nomad N22C	
Registration	VH-ATO	
Serial number	108	
TTIS (hours)	11,053	
Engines		
Engine manufacturer and model	Rolls Royce-Allison 250 B17C	
Not damaged Not a factor in the occurrence		
Type of operation	Non-commercial circuits	
Persons on board	Crew: 1	Passengers: NIL
Injuries	Crew: NIL	Passengers: NIL
Damage	Substantial	

Approved



Hubert Namani, LLB

Chief Commissioner

3 May 2018