

**AIRCRAFT ACCIDENT REPORT  
OCCURRENCE NUMBER 09/4376  
HELITHRUSTER (GYROCOPTER)  
ZK-RAZ  
LOSS OF ROTOR CONTROL  
NORMANBY, SOUTH TARANAKI  
12 NOVEMBER 2009**



## Foreword

As a signatory to the Convention on International Civil Aviation 1944 (“the Chicago Convention”) New Zealand has international obligations in respect of the investigation of accidents and incidents. Pursuant to Articles 26 and 37 of the Chicago Convention, the International Civil Aviation Organisation (“ICAO”) issued Annex 13 to the Convention setting out International Standards and Recommended Practices in respect of the investigation of aircraft accidents and incidents.

New Zealand’s international obligations are reflected in the Civil Aviation Act 1990 (“the Act”) and the Transport Accident Investigation Commission Act 1990 (“the TAIC Act”).

Section 72B(2)(d) and (e) of the Civil Aviation Act 1990 Act also provides:

### **72B Functions of Authority**

(2) The Authority has the following functions:

To investigate and review civil aviation accidents and incidents in its capacity as the responsible safety and security authority, subject to the limitations set out in section [14\(3\)](#) of the [Transport Accident Investigation Commission Act 1990](#):

To notify the Transport Accident Investigation Commission in accordance with section [27](#) of this Act of accidents and incidents notified to the Authority:

Following notification to the Transport Accident Investigation Commission (“the Commission”) of any accident or incident which is notified to the Authority, an investigation may be conducted by the Commission in accordance with the TAIC Act. CAA may also investigate subject to the requirements of the TAIC Act.

The purpose of an investigation by the Commission is to determine the circumstances and causes of accidents and incidents with a view to avoiding similar occurrences in the future, rather than to ascribe blame to any person.

CAA however investigates aviation accidents and incidents for a range of purposes under the Act. Investigations are primarily conducted for the purpose of preventing future accidents by determining the contributing factors or causes and then implementing appropriate preventive measures - in other words to restore safety margins to provide an acceptable level of risk. The focus of CAA safety investigations is therefore to establish the causes of the accident on the balance of probability.

Accident investigations do not always identify one dominant or ‘proximate’ cause. Often, an aviation accident is the last event in a chain of several events or factors, each of which may contribute to a greater or lesser degree, to the final outcome.

CAA investigations may also inform other regulatory-safety decision making or enforcement action by the Director.

In the case of a fatal aviation accident, the final CAA investigation report will generally be highly relevant to an inquiry, and in some circumstances, an inquest, conducted by a Coroner.

<b>Contents</b>	<b>Page Numbers</b>
Abbreviations.....	4
Data summary.....	5
Synopsis.....	6
1 Factual information.....	6
2 Analysis .....	13
3 Conclusions .....	15
4 Safety actions.....	16
 <b>Table</b>	
Table 1: Injuries incurred from the accident.....	7

## Glossary of abbreviations used in this report:

CAA	Civil Aviation Authority
C of G	centre of gravity
FAA	Federal Aviation Administration (USA)
G	acceleration due to gravity
hp	horse power
kt	knots
METAR	Aviation routine weather report
NTSB	National Transportation Safety Board (US)
NZDT	New Zealand Daylight Time
PIO	pilot induced oscillations
PPO	power push-over
PRA	Popular Rotorcraft Association
RAANZ	Recreational Aircraft Association of New Zealand
RPM	revolutions per minute
SAC	Sport Aviation Corporation Ltd.
TIA	Transient Ischemic Attack
UFO	Ultimate Flying Options <sup>1</sup>
UTC	Coordinated Universal Time
WGS 84	World Geodetic System 1984

---

<sup>1</sup> Ultimate Flying Options (UFO) is a company based in Whitford, New Zealand which manufactures gyrocopter aircraft and kits for commercial sale.

## AIRCRAFT ACCIDENT REPORT

### OCCURRENCE No 09/4376

<b>Aircraft type, serial number and registration:</b>	UFO-HeliThruster, 208081, ZK-RAZ
<b>Number and type of engines:</b>	One Subaru EJ25
<b>Year of manufacture:</b>	2007
<b>Date and time of accident:</b>	12 November 2009, 1325 hours <sup>2</sup> (approximately)
<b>Location:</b>	Normanby, South Taranaki Latitude <sup>3</sup> : S 39° 33.16' Longitude: E 174° 17.00'
<b>Type of flight:</b>	Private
<b>Persons on board:</b>	Crew: 1 Passengers: 1
<b>Injuries:</b>	Crew: 1 Fatal Passengers: 1 Fatal
<b>Nature of damage:</b>	Aircraft destroyed
<b>Pilot-in-command's licence:</b>	RAANZ Microlight Pilot Certificate (Advanced National Pilot)
<b>Pilot-in-command's age:</b>	51 years
<b>Pilot-in-command's total flying experience:</b>	590 hours (approximately) 16 hours on type (approximately)
<b>Information sources:</b>	Civil Aviation Authority field investigation
<b>Investigator in Charge:</b>	Mr A M Moselen

---

<sup>2</sup> All times in this report are NZDT (UTC + 13 hours unless otherwise specified)

<sup>3</sup> WGS 84 co-ordinates

## Synopsis

The Civil Aviation Authority (CAA) was notified of the accident at approximately 1350 hours on 12 November 2009. The Transport Accident Investigation Commission was in turn notified, but declined to investigate. A CAA field investigation was commenced the same day.

The owner of a UFO –HeliThruster gyrocopter, in the company of a gyrocopter pilot, was flying his aircraft for the first time. He had completed several circuits from Runway 25 at Hawera Aerodrome when the gyrocopter was observed to climb, veer left, then descend in a steep nose-down attitude. The aircraft was not recovered from that attitude and struck the ground in a level farm paddock around 800 metres from the runway. First responders to the accident site found that neither occupant had survived the accident.

## 1. Factual information

### 1.1 History of the flight

- 1.1.1 On Thursday morning, 12 November 2009, the owner uplifted 57 litres of automotive gasoline and transported his gyrocopter to Hawera Aerodrome. There, he and a gyrocopter pilot assembled and prepared the gyrocopter for his first training flight.
- 1.1.2 Flying commenced from Runway 25 at Hawera Aerodrome and was confined to the circuit. Several take-offs and landings were completed. These were conducted by the qualified pilot seated in the left hand seat, which is normally occupied by the pilot in command of the gyrocopter. The owner sat in the right hand seat as an observer/student.
- 1.1.3 After a number of take-offs and landings the owner swapped seats with his pilot colleague. Flying then continued in a similar manner to the earlier flights, but with the owner operating the aircraft. Some of this flying was recorded on video by the owner's wife.
- 1.1.4 Review of the video footage of the owner conducting his first take-off appeared to indicate the gyrocopter was rotated to a flying attitude too early. This action was immediately followed by a power reduction and the nose of the aircraft being lowered. Power was then increased after which a normal take-off was executed.
- 1.1.5 The owner's first and second landing appeared normal. However, with the video camera zoomed in to the maximum, considerable camera shake was prevalent in the recording and this made analysis of the video footage difficult.
- 1.1.6 A local farmer also witnessed ZK-RAZ from time to time over a period of approximately 40 minutes. Immediately prior to the accident he described the gyrocopter as "dropping down quite low, then revving and climbing up again". He then described the gyrocopter as "veering to the left in a steepening turn, and climbing. The turn got steeper then the nose dropped down. It continued nose-down until it struck the ground." The witness also recalled that the engine was operating throughout the accident sequence.

- 1.1.7 The farmer alerted authorities, then he and another local resident drove to the scene where they noted that the occupants had not survived the accident.
- 1.1.8 The accident occurred in daylight, at approximately 1325 hours, in a farm paddock adjacent to Ohangai Road Normanby, South Taranaki, at an elevation of 330 feet. Grid reference NZMS 260-Q21-203828, latitude S 39° 33.16', longitude E 174° 17.00'.

## 1.2 Injuries to persons

<i>Injuries</i>	<i>Crew</i>	<i>Passengers</i>	<i>Other</i>
Fatal	1	1	0
Serious	0	0	0
Minor/None	0	0	

**Table 1: Injuries incurred from the accident**

## 1.3 Damage to aircraft

- 1.3.1 The aircraft was destroyed.

## 1.4 Other damage

- 1.4.1 Nil.

## 1.5 Personnel information

- 1.5.1 The gyrocopter pilot held a Recreational Aircraft Association of New Zealand (RAANZ) Advanced National Certificate. According to a witness and the video recording taken on the day of the accident, the pilot was instructing the owner on how to fly his gyrocopter. However, RAANZ had no evidence that he held, or had applied for, a qualification entitling him to instruct on gyrocopters as required by CAA Rule Part 103.7 (1) (i) (ii).
- 1.5.2 Entries in the Pilot's Logbook amounted to approximately 590 hours flying gyrocopters. Sixteen of those hours were spent flying the UFO-HeliThruster type gyrocopter, including two hours flying ZK-RAZ. Half an hour of the two hours recorded in the Pilot's Logbook for ZK-RAZ was described as 'tests'<sup>4</sup>.
- 1.5.3 The owner of ZK-RAZ was 70 years of age and his Pilot's Logbook recorded that he had flown a Rotary Air Force 2000 type gyrocopter with an instructor in 1999. His total recorded flying experience amounted to approximately three hours. However, information from the owner's family revealed he had flown substantially more hours in the Rotary Air Force 2000 than was recorded. The owner's family also added that he was aware of the problems with a gyrocopters rotor being subjected to zero or negative G and that he would have taken care in avoiding that situation.

<sup>4</sup> It is considered the pilot was conducting a test flight in ZK-RAZ.

- 1.5.4 In January 2009 the owner joined the Sport Aviation Corporation Ltd (SAC), and submitted a medical declaration and fit and proper person questionnaire to obtain a Novice Microlight Pilot Certificate. He was subsequently issued with the certificate.
- 1.5.5 The medical examination for the issue of a microlight pilot certificate is performed in accordance with the Land Transport Authority –“Fitness to Drive for Private Driver’s” booklet. On completion of the medical examination, a medical declaration is then required to be signed by the applicant and a medical practitioner who is either a designated medical examiner to the CAA or the applicant’s regular general practitioner. On this occasion the medical practitioner was neither a designated CAA examiner nor the applicant’s regular general practitioner.
- 1.5.6 The fit and proper person questionnaire for the issue of a microlight pilot certificate specifically asks an applicant to declare any significant medical history. The owner answered “no” on the declaration.
- 1.5.7 The owner’s medical history indicated he had an enlarged heart and was required to take regular medication. In 1992 he suffered a heart attack. The owner’s heart condition was on-going and in February 2008 he underwent heart bypass surgery including a valve replacement. Prior to the accident the owner’s most recent medical history occurred in October 2009 when he suffered a TIA (Transient Ischemic Attack).

## **1.6 Aircraft information**

- 1.6.1 Gyrocopter UFO-HeliThruster, serial number 208081, was built from a kit set supplied by the New Zealand manufacturer in March 2000. The primary structure consisted mainly of aluminium and the secondary structure was of composite material. The gyrocopter was assembled by the owner and registered as ZK-RAZ during 2007.
- 1.6.2 The gyrocopter had a tricycle undercarriage and was capable of carrying two people in a side by side arrangement within a pod type fuselage. The fuselage was fitted with doors.
- 1.6.3 The gyrocopter was fitted with dual controls. The main rotor utilised a teetering rotor head with two blades. The rotor head was canted aft of the vertical mast by nine degrees giving a pitch control range of between zero and eighteen degrees. Roll control was provided by tilting the rotor head from side to side using the control column in a similar manner to a fixed wing aircraft.
- 1.6.4 Forward thrust was provided by a Subaru EJ-25 180 hp engine driving a composite, three bladed 76 inch diameter adjustable pitch propeller. The engine and propeller configuration supplied by the manufacturer was different than that normally fitted to the UFO (165 hp). However, the additional horse power of the engine, propeller, and their associated performance was not a factor in the development of the accident.

- 1.6.5 For take-off in ZK-RAZ, the rotor blades are initially turned by a hydraulically actuated pre-rotator coupled to the engine via belts and pulleys. Once adequate rotor RPM is obtained, the pre-rotator is disengaged by activating an electrical solenoid via a button on the control column. The gyrocopter can then be accelerated along a runway using thrust from the propeller while lift is provided by the rotating rotor blades. As long as forward speed during takeoff is maintained, rotation of the rotor blades is sustained by air passing up through the rotating disc.
- 1.6.6 According to the manufacturer, control of this type of gyrocopter requires care because of the flight control sensitivity. Small movements of the control column translated to a larger response in roll and pitch. The wife of the owner had heard that ZK-RAZ would “flick” or pitch up during cruise flight. However, no information is available concerning the magnitude of such an event or the frequency of occurrence.
- 1.6.7 The gyrocopter was first inspected for a Flight Permit by the CAA in 2007, but issue was deferred until the aircraft met a number of requirements. These requirements were specific to engineering aspects of equipment and fittings and had no influence in the development of the accident.
- 1.6.8 The required items were completed and a Flight Permit was issued in January 2009. However, the CAA stipulated that ten hours of endurance testing had to be completed and certified in the Aircraft Logbook in accordance with Civil Aviation Rule, Part 103.211 (a) (3) and Part 103.213 *Statement of airworthiness*, prior to the carriage of a passenger:

A pilot-in-command of a microlight aircraft who completes the endurance testing in accordance with Civil Aviation Rule 103.211, must enter in the applicable maintenance record required by Civil Aviation Rule 91.617—

(1) details of every manoeuvre completed during the testing together with details of the demonstrated flight speeds; and

(2) the following statement (which must include the flight time hours completed) followed by the pilot’s name, licence or certificate number, signature and the date of the final test:

*I certify that this aircraft has satisfactorily completed ..... hours flight time in compliance with Part 103 and the aircraft has adequate performance, is controllable through its normal range of speeds and throughout all manoeuvres completed, and is airworthy.*

There were no hours recorded in the Aircraft Logbook, nor were there any particulars of the required endurance testing recorded.

- 1.6.9 The last recorded maintenance on the gyrocopter was an annual inspection by a person authorised by RAANZ. The inspection documents indicated that there were no defects with the gyrocopter.

- 1.6.10 With respect to weight and balance, the Aircraft Logbook included an entry stating that a 'hang test' had been performed. A hang test is an acceptable means of establishing the centre of gravity of a gyrocopter.
- 1.6.11 A four litre oil container filled with wet sand weighing approximately nine kilograms was found in the wreckage. It was determined that the container had been installed in the nose section, forward of the rudder pedals by the owner. The extra weight was to compensate for the difference in weight between the owner and the pilot. The concept avoided the need to do a separate hang test when the pilot flew the gyrocopter solo. The container of sand did not have any significance when the owner and pilot were flying in the aircraft and therefore its presence did not contribute to the accident.
- 1.6.12 The Flight Manual for the gyrocopter contained warnings common to all UFO HeliThrusters, regardless of engine and propeller set-up. One of these pertained to flying with less than the minimum rotor RPM, and another concerned subjecting the rotor system to negative G. The negative G warning reads as follows:

***Warning:** Maintain positive G loading on the rotor system in all flight conditions. Flight control is lost at zero G conditions. Rotor RPM decays rapidly and recovery of flight control may not be possible.*

## **1.7 Meteorological information**

- 1.7.1 A westerly air flow was affecting the area at the time of the accident. The forecast was for cloudy conditions, occasional showers, and westerly winds of 15 knots, gusting to 25 knots. The actual weather (METAR), experienced at Wanganui and New Plymouth Aerodromes for the time of the accident was westerly winds of 11 knots and a temperature of 16 degrees Celsius.
- 1.7.2 The video recording taken of some of the flying included footage of the windsock and general weather conditions at Hawera Aerodrome. There was no precipitation and the windsock activity supported the METAR information, but with gusts up to approximately 20-25 knots. The windsock indicated a wind direction of approximately 260 degrees magnetic.

## **1.8 Aids to navigation**

- 1.8.1 Not applicable.

## **1.9 Communications**

- 1.9.1 Not Applicable.

## **1.10 Aerodrome information**

- 1.10.1 Hawera Aerodrome has dual grass runways and all circuits are left hand. ZK-RAZ was utilising Runway 25.

## **1.11 Flight recorders**

- 1.11.1 Not Applicable.

## **1.12 Wreckage and impact information**

- 1.12.1 The accident site was in a farm paddock approximately 800 metres short of the threshold and 90 metres left of the extended centreline of Runway 25 at Hawera Aerodrome.
- 1.12.2 The gyrocopter impacted the ground on a heading of 270 degrees magnetic while in a steep nose-down attitude. The impact forces were absorbed through the forward right hand nose section of the aircraft. The wreckage was contained in a small area indicating there had been a large vertical component in the flight profile before the accident.
- 1.12.3 The combined weight of the engine and rotor mast assembly following on in the accident sequence caused several sections of the keel assembly to fail in overload. The gyrocopter then folded completely in half just forward of the seat backs and came to rest inverted.
- 1.12.4 All components of the gyrocopter were accounted for at the accident site. The tail section had completely detached and was located near the nose section. The rotor mast and blade assembly had remained attached and it was apparent from ground scars and blade damage that rotor RPM had been low at the time of impact.
- 1.12.5 One of the two rotor blades was found moderately bowed and it was established that this blade had struck the ground first, followed shortly thereafter by the gyrocopter. Subsequently, the blade had struck the rim of the left main wheel assembly. The second blade had received only slight deformation and exhibited ground contact marks along its entire leading edge, indicating the blade had virtually stopped rotating before it struck the ground.
- 1.12.6 There was considerable impact disruption to the engine controls and at the control column attachments; however, flight control integrity was established. The engine controls were found in the idle position and the rotor system and Teleflex controls were found operable and had been working in the correct sense.
- 1.12.7 The control column was found bent at the base and had crease damage around an attachment bolt opposite that of the impact load path. The damage and bending was consistent with the control column being held fully aft, that is, in the commanded direction of nose up.
- 1.12.8 Inspection of the rudder system found the left hand set of rudder pedals was bent in a manner that indicated full right rudder had been commanded during the accident sequence.
- 1.12.9 Both seat backs were inspected and it was noted the plastic tubing to the fuel balance tank had been disrupted from impact forces. As a consequence the fuel remaining on board had drained away.

## **1.13 Medical and pathological information**

- 1.13.1 Post-mortem examination determined cause of death to both occupants was from multiple injuries.

- 1.13.2 With respect to the owner, the post mortem revealed potentially significant heart disease including an artificial valve and evidence of previous heart surgery.
- 1.13.3 Toxicological tests for the owner showed no evidence of higher than normal levels of carbon monoxide. In addition, the toxicology report recorded that there was no evidence of alcohol, or medicinal, and recreational drugs. In terms of the owner's medical history, the toxicology tests undertaken would not routinely detect the routine medications that he was likely to have been taking at the time.
- 1.13.4 There was nothing remarkable in the pathologist's report concerning the pilot except for his toxicology, where five milligrams of alcohol per 100 millilitres of blood and less than five milligrams of alcohol per 100 millilitres of urine were detected. The toxicological report stated that the trace levels of alcohol may have been due to means other than deliberate ingestion usually caused as a result of the accident.
- 1.13.5 The pilot's toxicology report, revealed no evidence of higher than normal levels of carbon monoxide or any evidence, of medicinal, and recreational drugs.

#### **1.14 Fire**

- 1.14.1 Fire did not occur.

#### **1.15 Survival aspects**

- 1.15.1 The impact forces were not survivable.

#### **1.16 Tests and research**

- 1.16.1 Not applicable.

#### **1.17 Organisational and management information**

- 1.17.1 Not applicable.

#### **1.18 Additional information**

- 1.18.1 A handbook on rotorcraft containing information on gyrocopters is available on the FAA Website<sup>5</sup>. The handbook provides technical and operational information as well as recommended practices for dealing with emergencies.
- 1.18.2 The handbook deals with aspects of gyrocopter flight operations that place emphasis on pilot proficiency and appropriate flight training. In particular, there is a section that refers to pitch instability induced by pilot induced oscillations (PIO) and bunt-over/power push-over (PPO).
- 1.18.3 A gyrocopter's best rate of climb is directly associated with its airspeed and excess power available. An increase in forward airspeed will increase the rate of climb. If the rotor disc is then tilted forward to maintain level flight, the more it is tilted towards the horizontal, the more sensitive control column forces become. If

---

<sup>5</sup> Rotorcraft Flying Handbook 2000 –Federal Aviation Administration –FAA H 8083-21.  
[www.faa.gov/library/manuals/aircraft/media/faa-h-8083-21.pdf](http://www.faa.gov/library/manuals/aircraft/media/faa-h-8083-21.pdf)

too much forward pressure is exerted (i.e. a bunt-over), an unloaded rotor situation (zero or negative G) can result.

1.18.4 In a report issued by the Popular Rotorcraft Association<sup>6</sup>, two major contributing causes or issues were identified in accidents involving gyrocopters. These are:

1. Pitch stability-related issues, and
2. Proficiency or training-related issues.

## **1.19 Useful or effective investigation techniques**

1.19.1 Not applicable.

## **2. Analysis**

- 2.1 From the available evidence gathered by the safety investigation it was concluded that the accident probably occurred as a result of the gyrocopter's rotor disc being subjected to and then sustained in a zero or negative G condition sufficient for the situation to become uncontrollable. The investigation discounted mechanical failure as a cause of the accident, and found no other discrepancies involving the construction and rigging of the gyrocopter.
- 2.2 The investigation considered three aspects for determining how an unloaded rotor situation might have occurred:
  1. mishandling of the controls by the inexperienced owner in response to the weather conditions at the time,
  2. the "flick" during cruise flight conditions or,
  3. a medical event affecting the owner.
- 2.3 While the gusty winds were not ideal for the owner to be flying the gyrocopter for the first time, the gusty conditions had prevailed for the previous series of circuits that had been flown. The owner also was aware of the dangers associated with a zero or negative G condition. Therefore gusty wind conditions were considered unlikely to have contributed to the accident.
- 2.4 The "flick" or pitch up during cruise flight conditions was also dismissed on the basis that the gyrocopter was not in cruise flight. In addition, there had been no evidence of a "flick" or pitch up occurring at any time during the series of circuits preceding the accident.
- 2.5 Whilst the owner would have had no knowledge of some of the underlying pathology involving his heart, the fact that he had and suffered a TIA a month earlier, raises the possibility of his experiencing a medical event. Therefore it is not inconceivable that an unintended bunt-over/PPO occurred during a medical event. That it became sustained to the point of the gyrocopter being uncontrollable indicates that the accompanying qualified pilot was unable to arrest

---

<sup>6</sup> Popular Rotorcraft Association Safety Report: Gyroplane Accident Causes per NTSB Report 9/10/2002. [www.pra.org/index.php?option=com\\_content&view=article&id=87:gyroplane-accident-causes&catid=75:Safety%issues&intermid=29](http://www.pra.org/index.php?option=com_content&view=article&id=87:gyroplane-accident-causes&catid=75:Safety%issues&intermid=29)

the situation. In that regard, a medical event may have created sufficient confusion and/or the pilot may have experienced difficulty getting control off the owner during the short time frame available to him. Of further note, the pilot was not a trained and experienced flight instructor.

- 2.6 Regarding the observations made during the safety investigation, had some of the circumstances been different, then the accident may not have occurred. These are:
1. The pilot did not hold an Instructor Rating and there was no evidence to indicate he had received any course of instruction on aspects regarding flying training. As a consequence the flight should not have proceeded with the owner flying the aircraft.
  2. There were no test flight records in the Aircraft Logbook. The lack of evidence of sufficient test flying records meant that flights should not have proceeded with the carriage of a passenger/student as stipulated by Civil Aviation Rule Part 103.159 (3).
- 2.7 The carriage of sand in the nose (ballast weight) did not contribute to the accident, but it did affect the gyrocopter's on-going airworthiness as the carriage of sand would be considered a modification. Without its approval in accordance with Civil Aviation Rule, Part 103.209 *Modification*, the Flight Permit was not valid.
- 2.8 It remains that human factors were instrumental in the cause of the accident. With respect to the owner, he may not have felt his recent medical history was of concern as he had a qualified pilot seated beside him.
- 2.9 With respect to the pilot, he may have had the best of intentions in availing the owner of his experience, but without being a qualified flight instructor he should not have proceeded with the flight instruction.
- 2.10 Flight instruction requires a prerequisite level of training, knowledge and experience to effectively manage a student during a flight. Because the pilot did not hold an Instructor Rating and had received no recognised training on the subject, he was not qualified, and should not have been involved with the flight.
- 2.11 In terms of human factors and the observance of rules, the accident highlights the importance of the individual ensuring a comprehensive self assessment is made on fitness and suitability to conduct a flight, and that Civil Aviation Rules are regarded as the minimum required for safety.

### **3. Conclusions**

- 3.1 The possibility of any pre-existing airframe or engine defect that could have contributed to the accident was eliminated as far as practicable by the safety investigation.
- 3.2 The carriage of a container of sand in the nose of the aircraft invalidated the Flight Permit.
- 3.3 There were no records that would indicate a test flight program had been properly performed or completed. As a consequence the gyrocopter could not be considered airworthy and a passenger should not have been carried until 10 hours of test flying had been completed and recorded.
- 3.4 The pilot in command was type rated on the type of aircraft but not as an instructor. The flight therefore, should not have been conducted for the purpose of flight instruction.
- 3.5 The owner suffered a recent TIA and had a heart-related medical history. This history increased the likelihood of the owner suffering an incapacitating medical event such as another heart attack or TIA.
- 3.6 A handling error by the owner probably resulted in a bunt-over/PPO from which the gyrocopter could not be recovered. The handling error could have been caused by the owner suffering a medical event.
- 3.7 The bunt-over/PPO would have resulted in the gyrocopter's rotor disc being subjected to zero or negative G, directly contributing to departure from controlled flight.
- 3.8 The aircraft's impact with the ground was not survivable.
- 3.9 It is considered that if Civil Aviation Rules had been complied with, the accident would not have occurred.

## 4. Safety actions

- 4.1 The Executives of RAANZ and SAC were sent a copy of this report so that they could provide further education to their members. In particular, to show how in this accident non-compliance with Civil Aviation Rules compromised flight safety.
- 4.2 The CAA has initiated a project which will review gyrocopter operations and their associated Civil Aviation Rules (CAA Safety Action Number 11A1014) to ensure that adequate regulatory control and safety is being assured with gyrocopter operations in New Zealand.

Report written by:

Authorised by:

Alan Moselen  
Principal Safety Advisor  
Air Transport Group

John Kay  
General Manager  
Policy and Interventions

27 September 2012

Civil Aviation Authority of New Zealand  
Aviation House 10 Hutt Road Petone  
P O Box 31 441 Lower Hutt New Zealand  
Tel: +64-4-560 9400 Fax: +64-4-569 2024  
[www.caa.govt.nz](http://www.caa.govt.nz)