



Transport Accident
Investigation
Commission

Preliminary Report

Tuhinga mō tēnei wā

Aviation inquiry AO-2022-001
Ultramagic, S.A. N-250, ZK-MET
Pilot ejection from basket on landing
Lyndhurst, near Methven
1 January 2022

And referencing;
Aviation inquiry AO-2021-001
Kavenagh E-260, ZK-FBK
Impact with terrain
near Arrowtown
9 July 2021

March 2022



The Transport Accident Investigation Commission

Te Kōmihana Tirotiro Aituā Waka

No repeat accidents – ever!

“The principal purpose of the Commission shall be 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.”

Transport Accident Investigation Commission Act 1990, s4 Purpose

The Transport Accident Investigation Commission is an independent Crown entity and standing commission of inquiry. We investigate selected maritime, aviation and rail accidents and incidents that occur in New Zealand or involve New Zealand-registered aircraft or vessels.

Our investigations are for the purpose of avoiding similar accidents in the future. We determine and analyse contributing factors, explain circumstances and causes, identify safety issues, and make recommendations to improve safety. Our findings cannot be used to pursue criminal, civil or regulatory action.

This preliminary report is not admissible in any criminal, civil or regulatory proceedings against any person or agency. The *Transport Accident Investigation Commission Act 1990* protects this preliminary report from disclosure.

At the end of every inquiry, we share all relevant knowledge in a final report. We use our information and insights to influence others in the transport sector to improve safety, nationally and internationally.

Commissioners

Chief Commissioner	Jane Meares
Deputy Chief Commissioner	Stephen Davies Howard
Commissioner	Richard Marchant
Commissioner	Paula Rose, QSO

Key Commission personnel

Chief Executive	Martin Sawyers
Chief Investigator of Accidents	Harald Hendel
Investigator-in-Charge for this inquiry	Hamish Johnstone
Commission General Counsel (Acting)	Louise Cook

Notes about Commission reports

Kōrero tāpiri ki ngā pūrongo o te Kōmihana

Nature of this report

This preliminary report is made under section 9 of the *Transport Accident Investigation Commission Act 1990*. It is not a draft report prepared for comment but a completed report, that the Commission believes is necessary or appropriate in the interests of transport safety.

This preliminary report is being issued in the initial stages of the investigation. It follows the identification of particular facts and circumstances that the Commission believes have made it necessary in the interests of transport safety.

Final report

Upon the completion of the full investigation the Commission will issue a final report on the accident. That report will contain an analysis of the facts of the accident, findings and further recommendations (if any).

Photographs, diagrams, pictures

The Commission owns the photographs, diagrams and pictures in this report unless otherwise specified.

Verbal probability expressions

For clarity, the Commission uses standardised terminology where possible.

One example of this standardisation is the terminology used to describe the degree of probability (or likelihood) that an event happened or a condition existed in support of a hypothesis. The Commission has adopted this terminology from the Intergovernmental Panel on Climate Change and Australian Transport Safety Bureau models. The Commission chose these models because of their simplicity, usability and international use. The Commission considers these models reflect its functions. These functions include making findings and issuing recommendations based on a wide range of evidence, whether or not that evidence would be admissible in a court of law.

Terminology	Likelihood	Equivalent terms
Virtually certain	> 99% probability of occurrence	Almost certain
Very likely	> 90% probability	Highly likely, very probable
Likely	> 66% probability	Probable
About as likely as not	33% to 66% probability	More or less likely
Unlikely	< 33% probability	Improbable
Very unlikely	< 10% probability	Highly unlikely
Exceptionally unlikely	< 1% probability	



Figure 1: Ultramagic N-250, ZK-MET
(Credit: Adventure Balloons NZ)

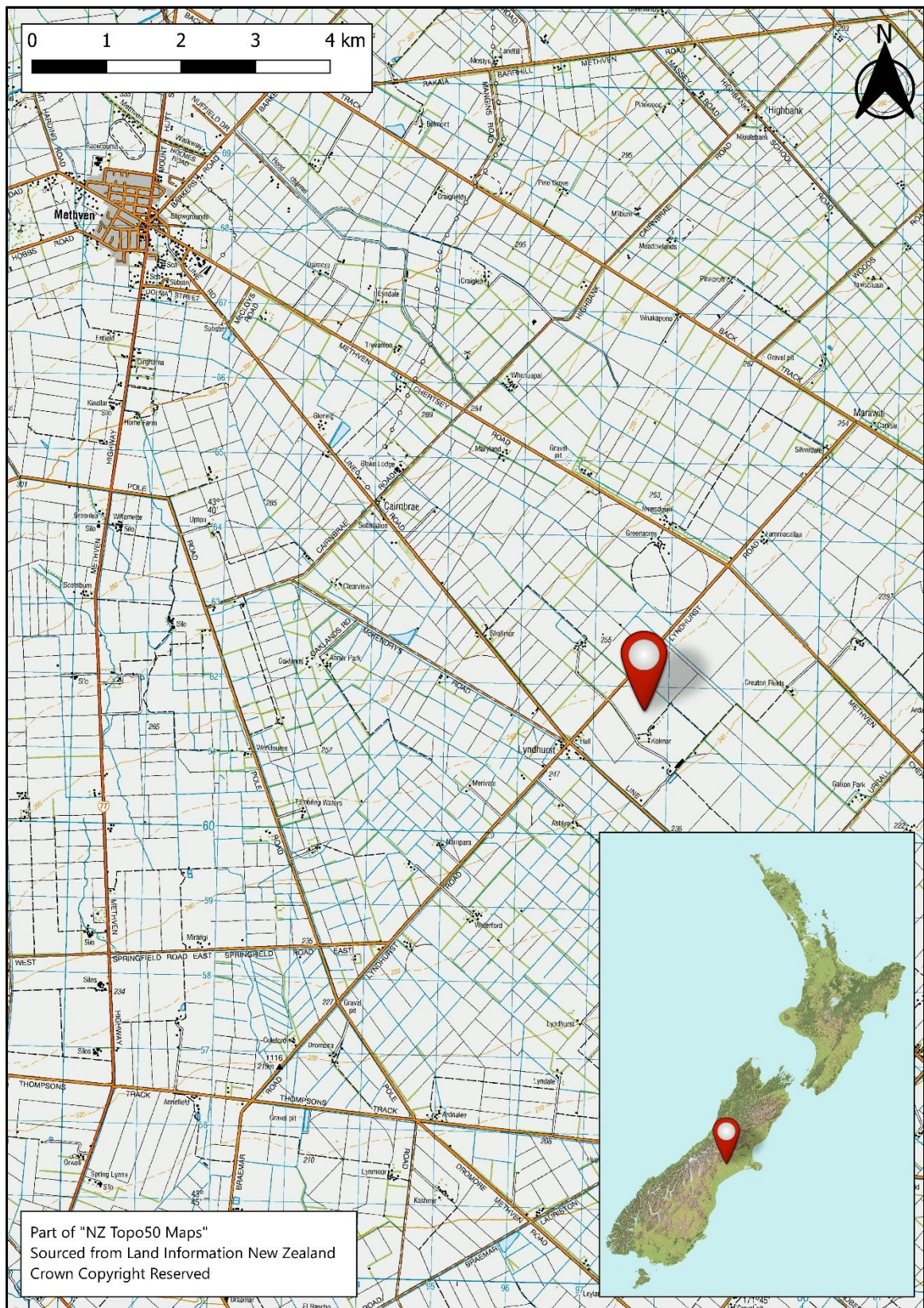


Figure 2: Location of accident

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1 Factual information

Pārongo pono

Narrative

- 1.1. On Saturday 1 January 2022, ZK-MET, an Ultramagic N-250 Balloon¹, was on a commercial scenic flight near Methven. On board were the pilot and seven passengers.
- 1.2. The landing area was the second paddock in a series of paddocks immediately after crossing a road. The paddocks were wide, but short in the direction of travel. A powerline ran along the side of the road, approximately perpendicular to the direction of travel.
- 1.3. Approaching the landing area, the pilot activated the balloon's fast deflation system by pulling down on the 'rip line' connected to a vent at the top of the envelope.^{2,3} The basket tipped over on contact with the ground and the pilot was ejected from the basket.
- 1.4. The basket and deflating envelope came to rest after approximately 35 metres, with all passengers in their braced landing positions until after the balloon deflated.
- 1.5. The pilot's final position was behind the basket with the rip line caught around their neck, resulting in serious injury. The passengers were not injured, and the balloon was not damaged.
- 1.6. The balloon was fitted with a pilot restraint harness. The pilot and witnesses recalled that the pilot was not wearing the harness during the flight.

¹ Incorporates the complete balloon assembly, including the basket, burners and envelope.

² Pulling down the rip line collapses the vent, allowing hot air to escape and causing a rapid deflation of the envelope.

³ The envelope is the part of the balloon that holds the hot air and provides lift.



Figure 3: View inside basket – pilot harness

Previous occurrence

- 1.7. On 9 July 2021, ZK-FBK, a Kavanagh E-260 hot air balloon, was on a commercial scenic flight in the Wakatipu Basin near Queenstown. On board were the pilot and 10 passengers. As the balloon descended in a wind of about 16 knots (30 kilometres per hour), the basket struck the sloping ground leading up to a paddock from an adjacent gully. The pilot, who was not wearing a pilot restraint harness, was ejected from the basket as a result. The deflating envelope and basket came to rest after approximately 150 metres. The pilot sustained moderate injuries. This occurrence is being investigated by the Commission, investigation number AO-2021-001.

2 Safety issues and remedial action

Ngā take haumanu me ngā mahi whakatika

General

- 2.1. Safety issues are an output from the Commission's analysis. They typically describe a system problem that has the potential to adversely affect future operations on a wide scale.
- 2.2. Safety issues may be addressed by safety actions taken by a participant, otherwise the Commission may issue a recommendation to address the issue.

Use of a pilot restraint harness during the landing phase of balloon operations

- 2.3. Under Civil Aviation Rules, balloon pilots in New Zealand are exempt from wearing restraint harnesses during landing⁴.
- 2.4. This and another recent occurrence⁵ of a pilot also being ejected from their basket during a landing sequence, both resulted in pilot injury and a loss of control of the balloon. These occurrences have together highlighted the need to urgently address this safety issue.
- 2.5. The baskets of commercial balloons typically have multiple compartments, with the pilots' occupying compartments separate from the passengers. The baskets of the balloons involved in the two occurrences were of a 'double T' design, with separate pilots' compartment across the centre of the baskets. The design enabled a pilot to move freely about their compartments and not tangle with a passenger, or allow a passenger to tangle with the various control lines. Private balloons are typically smaller than commercial balloons, with no internal partitions and fewer control lines. The risk of entanglement is therefore less.
- 2.6. The Commission has made a recommendation in section 3 to address this issue.

⁴ Civil Aviation Rule 91.205: Crew members at stations states:

(a) Each crew member on duty during take-off and landing in an aircraft, other than in a balloon, shall—
(1) be at their crew member station unless their absence is necessary to perform duties in connection with the operation of the aircraft; and
(2) have their safety belt fastened while at the crew member station.

⁵ Inquiry number AO-2021-001.

3 Recommendations Ngā tūtohutanga

General

- 3.1. The Commission issues recommendations to address safety issues found in its investigations. Section 9 of the *Transport Accident Investigation Commission Act 1990* states that the Commission may produce preliminary reports and make recommendations to the Civil Aviation Authority, Waka Kotahi (NZ Transport Agency) or Maritime New Zealand, as the case may be, as may be necessary in the interests of transport safety.
- 3.2. In the interests of transport safety, it is important that recommendations are implemented without delay to help prevent similar accidents or incidents occurring in the future.

New recommendation

- 3.3. **On 22 February 2022 the Commission recommended that the Director of Civil Aviation take prompt steps to mandate the wearing of pilot restraint harnesses during critical phases of commercial balloon flights. (001/22)**

4 Key lessons

Ngā akoranga matua

- 4.1. When pilot restraint harnesses are fitted, balloon pilots should wear them for critical phases of flight.
- 4.2. Balloon owners and operators should consider installing pilot restraint harnesses⁶ if they are not fitted to their baskets.

⁶ In accordance with Civil Aviation Rules for modifying aircraft.

5 Data summary

Whakarāpopoto raraunga

Aircraft particulars

Aircraft registration:	ZK-MET
Type and serial number:	Ultramagic, S.A. N-250 s/n 250/95
Number and type of engines:	three blast burners
Year of manufacture:	2020
Operator:	Adventure Balloons (NZ) Limited
Type of flight:	commercial adventure
Persons on board:	eight (one crew, seven passengers)

Crew particulars

Pilot's licence:	NZ CPL (Balloon)
Pilot's age:	67 years
Pilot's total flying experience:	about 2,300 hours' balloon flight time

Date and time 1 January 2022, 0900

Location Lyndhurst Road, Lauriston

latitude: 43° 41.348'

longitude: 171° 43.613'

Injuries one serious

Damage nil

6 Conduct of the inquiry

He tikanga rapunga

- 6.1. On 1 January 2022, the Civil Aviation Authority notified the Commission of the occurrence. The Commission subsequently opened an inquiry under section 13(1) of the *Transport Accident Investigation Commission Act 1990* and appointed an investigator in charge.
- 6.2. Commission investigators travelled to the accident site on 1 January 2022 to conduct a site inspection. They inspected and secured the balloon and basket. Five of the seven passengers and the ground support person were interviewed on 1-2 January 2022.
- 6.3. Investigators interviewed the balloon pilot on 11 January 2022. The remaining two passengers were interviewed on 13 January 2022.
- 6.4. On 22 February 2022 the Commission approved the publication of this preliminary factual report.
- 6.5. The inquiries into AO-2021-001 and AO-2022-001 occurrences are continuing.

Kōwhaiwhai - Māori scroll designs

TAIC commissioned its four kōwhaiwhai, Māori scroll designs, from artist Sandy Rodgers (Ngāti Raukawa, Tūwharetoa, MacDougal). Sandy began from thinking of the Commission as a vehicle or vessel for seeking knowledge to understand transport accident tragedies and how to avoid them. A 'waka whai mārama' (i te ara haumarū) is 'a vessel/vehicle in pursuit of understanding'. Waka is a metaphor for the Commission. Mārama (from 'te ao mārama' – the world of light) is for the separation of Rangitāne (Sky Father) and Papatūānuku (Earth Mother) by their son Tāne Māhuta (god of man, forests and everything dwelling within), which brought light and thus awareness to the world. 'Te ara' is 'the path' and 'haumarū' is 'safe' or 'risk free'.

Corporate: Te Ara Haumarū - the safe and risk free path



The eye motif looks to the future, watching the path for obstructions. The encased double koru is the mother and child, symbolising protection, safety and guidance. The triple koru represents the three kete of knowledge that Tāne Māhuta collected from the highest of the heavens to pass their wisdom to humanity. The continual wave is the perpetual line of influence. The succession of humps represents the individual inquiries.

Sandy acknowledges Tāne Māhuta in the creation of this Kōwhaiwhai.

Aviation: Ngā hau e whā - the four winds



To Sandy, 'Ngā hau e whā' (the four winds), commonly used in Te Reo Māori to refer to people coming together from across Aotearoa, was also redolent of the aviation environment. The design represents the sky, cloud, and wind. There is a manu (bird) form representing the aircraft that move through Aotearoa's 'long white cloud'. The letter 'A' is present, standing for a 'Aviation'.

Sandy acknowledges Ranginui (Sky father) and Tāwhirimātea (God of wind) in the creation of this Kōwhaiwhai.

Maritime: Ara wai - waterways



The sections of waves flowing across the design represent the many different 'ara wai' (waterways) that ships sail across. The 'V' shape is a ship's prow and its wake. The letter 'M' is present, standing for 'Maritime'.

Sandy acknowledges Tangaroa (God of the sea) in the creation of this Kōwhaiwhai.

Rail: rerewhenua - flowing across the land



The design represents the fluid movement of trains across Aotearoa. 'Rere' is to flow or fly. 'Whenua' is the land. The koru forms represent the earth, land and flora that trains pass over and through. The letter 'R' is present, standing for 'Rail'.

Sandy acknowledges Papatūānuku (Earth Mother) and Tāne Mahuta (God of man and forests and everything that dwells within) in the creation of this Kōwhaiwhai.



Transport Accident Investigation Commission

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AO-2019-003	Diamond DA42 aeroplane, impact with terrain, 22 nautical miles south-southeast of Taupo, Kaimanawa Ranges, 23 March 2019
AO-2018-005	MD Helicopters 600N, ZK-ILD, Engine control malfunction and forced landing, Ngamatea Station, 14 June 2018
AO-2018-001	Tandem parachute UPT Micro Sigma, registration 31Z, Double malfunction, Queenstown, 10 January 2018
AO-2018-006	Robinson R44, ZK-HTB Loss of control Stevensons Arm, Lake Wanaka 21 July 2018
AO-2017-009 and AO-2017-010	Commission resolution to close aviation inquiries Boeing 787, near Auckland, New Zealand, 5 and 6 December 2017
AO-2019-001	Airbus Helicopters AS350, ZK-HEX, Forced landing, Wakefield, Nelson, 17 February 2019
AO-2017-004	MBB BK117 A-3 helicopter, ZK-IED, Loss of control, Porirua Harbour, 2 May 2017
AO-2017-002	Robinson Helicopter Company R22, ZK-IHA, Impact with terrain, Near Reefton, 27 March 2017
AO-2017-003	ATR72, ZK-MCY, Landing gear failure, Nelson, 9 April 2017
AO-2015-003	Robinson R44, Main rotor blade failure, Waikaia, Southland, 23 January 2015
AO-2015-007	Airbus Helicopters AS350BA, ZK-HKU, Collision with terrain, Fox Glacier, 21 November 2015
AO-2017-007	Airbus A320 VH-VGY, Descent below clearance limit, Christchurch, 6 August 2017

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