Australian Government
Australian Transport Safety Bureau

Hard landing involving Kavanagh B-350 hot-air balloon, VH-EUA

6 km east-north-east of Yarra Glen, Victoria | 8 February 2018

Investigation

ATSB Transport Safety Report
Aviation Occurrence Investigation
AO-2018-016
Final – 30 October 2018

Cover photo: VH-EUA prior to departure, photo supplied by Go Wild Balloons Pty Ltd

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Addendum

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Safety summary

What happened

On 8 February 2018, a Kavanagh B-350 hot-air balloon, registration VH-EUA, operated by Go Wild Ballooning, departed Glenburn, Victoria for a scenic charter flight with a pilot and 15 passengers on board. About 45 minutes into the flight, over the Yarra Valley, the balloon experienced a sudden wind change with associated turbulence. The pilot decided to land immediately rather than continue over rising and heavily vegetated terrain. The resulting landing was hard and fast and 11 passengers were injured, with four of them receiving serious injuries.

What the ATSB found

The ATSB found that information about the sudden wind change was not available to the pilot prior to the flight. In particular, the most recent local balloon forecast (provided in a recorded telephone message) was inadvertently not publicly available, and other forecast information available to the pilot did not accurately state the timing of the wind change. The ATSB identified a safety issue with the procedure used by the Bureau of Meteorology to confirm the local weather forecast for balloon operators in the Melbourne area was correctly uploaded and therefore available.

Although some passengers were provided with a safety briefing prior to boarding the balloon, the operator's normal safety briefing for passengers post boarding was not conducted. In addition, the briefing prior to boarding was not effective in ensuring all passengers understood the required landing position to use in the event of an emergency landing. The ATSB identified a safety issue with the operator's risk controls for ensuring safety briefings were conducted, and that passengers understood the briefing and the availability and content of its safety information cards.

What's been done as a result

The Bureau of Meteorology has commissioned a new system and modified its procedures for providing local weather briefings to balloon operators in the Melbourne area. This new recording system automatically uploads the recording to the automated telephone service.

The operator has implemented a procedure that all passengers are required to demonstrate the landing position after boarding the aircraft. In addition, the operator has implemented procedures for all pilots to share wind and weather conditions to optimise safe and suitable launch sites in addition to conducting more regular checks of nearby aerodrome weather information.

Safety message

Pilots are reminded that good command judgement is required for all operations when actual weather conditions do not appear as forecast.

In relation to the emergency descent and landing, this accident highlights the importance of operators briefing balloon passengers about what to do in an emergency and the landing position. Proper preparation for landing is shown to reduce the likelihood and severity of injury, and operators should ensure that passengers understand the instructions provided. It is recommended that all passengers should board the basket and practice the position they should adopt for landing. This allows the operator to determine any misunderstanding prior to flight.

It is also recommended that safety information cards, with diagrams, be readily available to help communicate important safety information, particularly to people from a non-English speaking background.

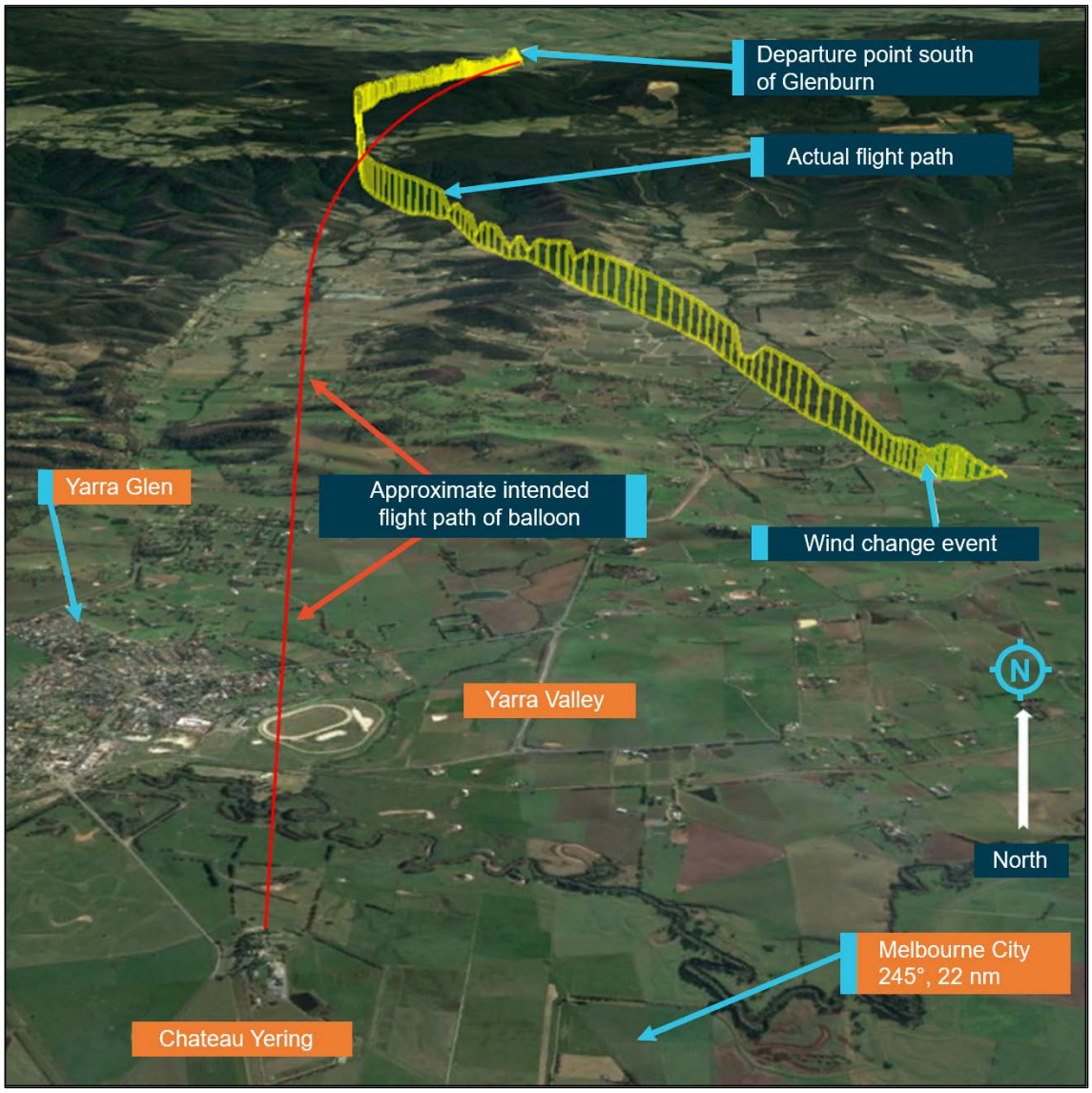
The occurrence

On the morning of 8 February 2018, a Kavanagh B-350 hot-air balloon, registration VH-EUA, operated as a scenic charter flight by Go Wild Ballooning. The flight, with one pilot and 15 passengers, was to depart from Glenburn, north of the Yarra Valley, Victoria.

During the night before the flight, the pilot checked the Bureau of Meteorology (BoM) weather forecast and on the morning of 8 February, he checked the automated phone briefing service to ascertain the suitability of the weather for the flight.

The pilot, ground crew and passengers met early at Chateau Yering Hotel, near Yarra Glen. The ground crew launched a pilot balloon (piball)[1] to measure surface and upper level winds. Based on the observations of the direction and speed of the piball, the pilot decided to take-off from a northerly launch site at Glenburn (Figure 1). Given the available forecasts and observations, the pilot's intention was to land back at Chateau Yering.

Figure 1: VH-EUA's approximate intended track (red) and actual flight path (yellow)



Source: Background image Google Earth; annotated by ATSB.

[1] Piball: an abbreviation of 'pilot balloon', which is a small, helium filled free balloon that is released and visually tracked to determine the wind at different altitudes.

The passengers, pilot, ground crew and balloon travelled by vehicles to the launch site. Prior to take-off, the ground crew inflated another piball and they observed similar conditions to those from the previous piball.

A ground crew member conducted a safety briefing with the passengers, and the pilot discussed the proposed flight with a number of other balloon pilots before preparing the balloon for launch.

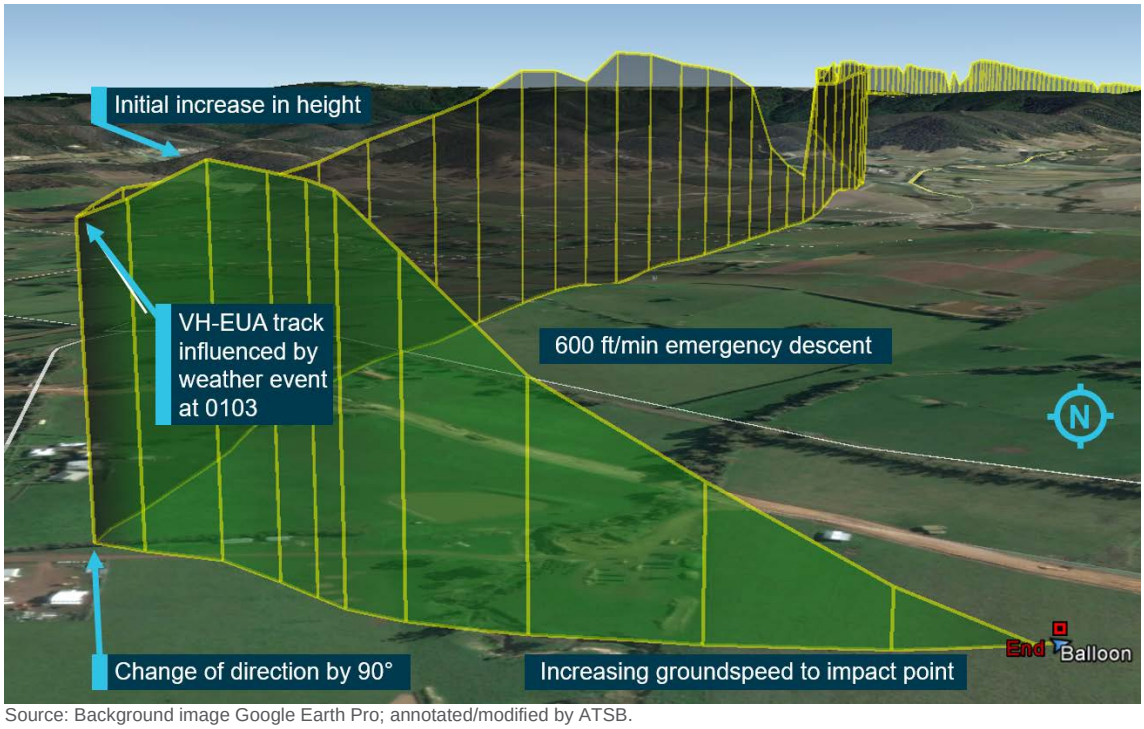
At 0617 Eastern Daylight-saving Time,[2] VH-EUA lifted off in clear conditions with a light northerly wind. Three other balloons, all operated by a different operator, lifted off from the same location shortly after.[3]

Soon after take-off, the pilot of VH-EUA received a phone call from the chief pilot of another balloon operator, who was in Melbourne city at the time. The pilot was advised that unexpected weather conditions had been experienced in the city and that a south-westerly wind may affect his operations. The pilot considered this information and decided to continue the flight, immediately towards Chateau Yering, due to a lack of suitable landing areas at that time.

At 0657, as the balloon approached the Yarra Valley, the pilot began to descend for landing.

At 0703, when about 630 ft above ground level (AGL), the balloon encountered significant turbulence. There was also a significant change in the wind direction and speed, and the balloon started tracking about 90° to the left of its previous track (Figure 2).

Figure 2: VH-EUA actual flight path, showing change in track due to wind



Source: Background image Google Earth Pro; annotated/modified by ATSB.

Due to the turbulence associated with the wind change, the balloon initially increased altitude by 78 ft to 708 ft AGL (1,037 ft above mean sea level). Because of the turbulence, hot air inside the balloon canopy was forced out, reducing buoyancy and the balloon began to descend.

The pilot was aware of a number of obstacles in the area such as powerlines and rising, wooded terrain further along the direction of travel. He decided to conduct an emergency landing in a nearby paddock after identifying what he thought was mist on a nearby dam.

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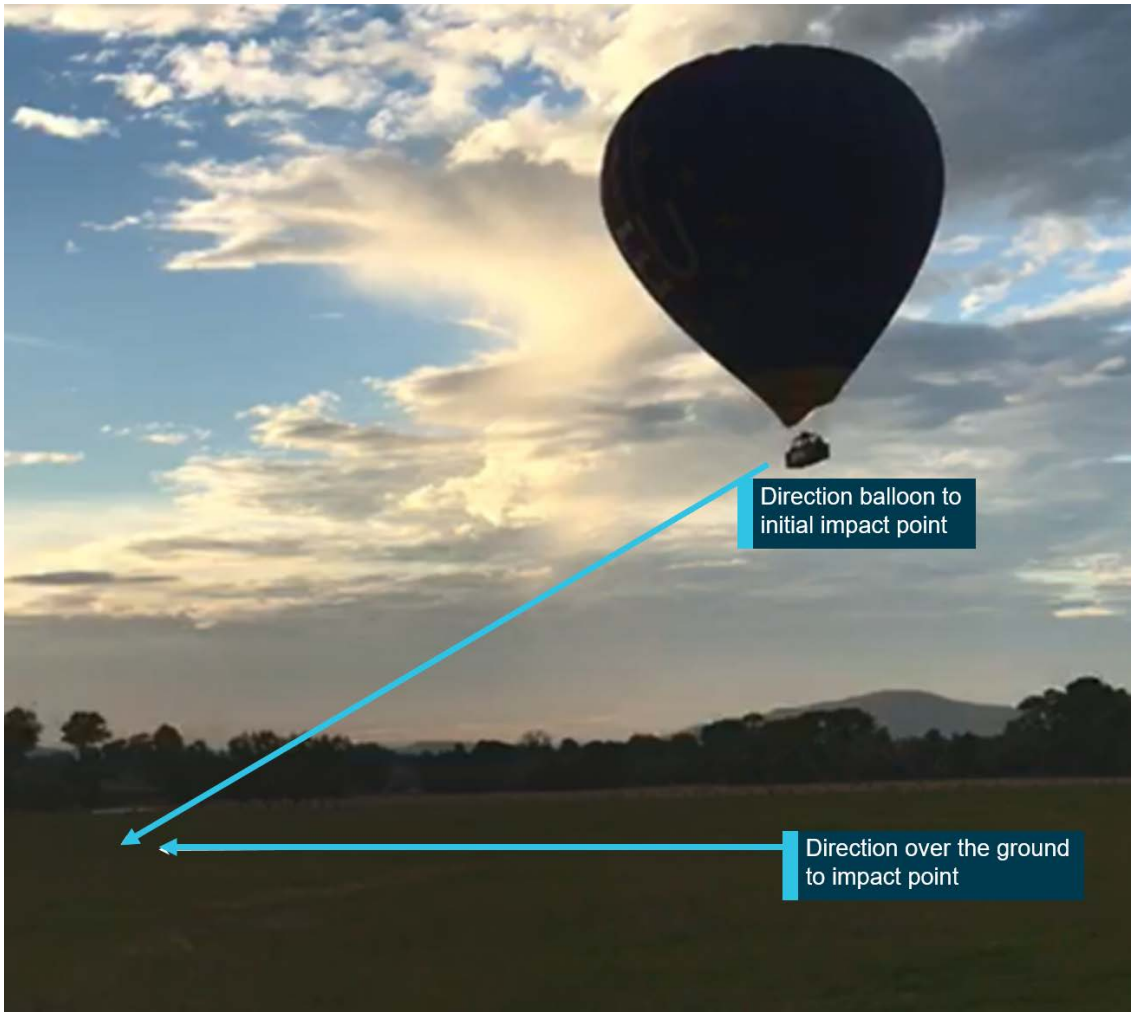
2 Eastern Daylight-saving Time (EDT): Coordinated Universal Time (UTC) + 11 hours.

3 These balloons operated at a different height and had a different flight path to VH-EUA.

In the final stages of the flight (Figure 3), the balloon descended at about 600 ft/minute and accelerated to over a 16 kt[4] groundspeed. Prior to impact, the pilot applied the burner, which reduced the descent rate to some extent. The pilot instructed the passengers to adopt the emergency landing position, but some passengers were initially confused about what to do.

Figure 3: VH-EUA final descent profile



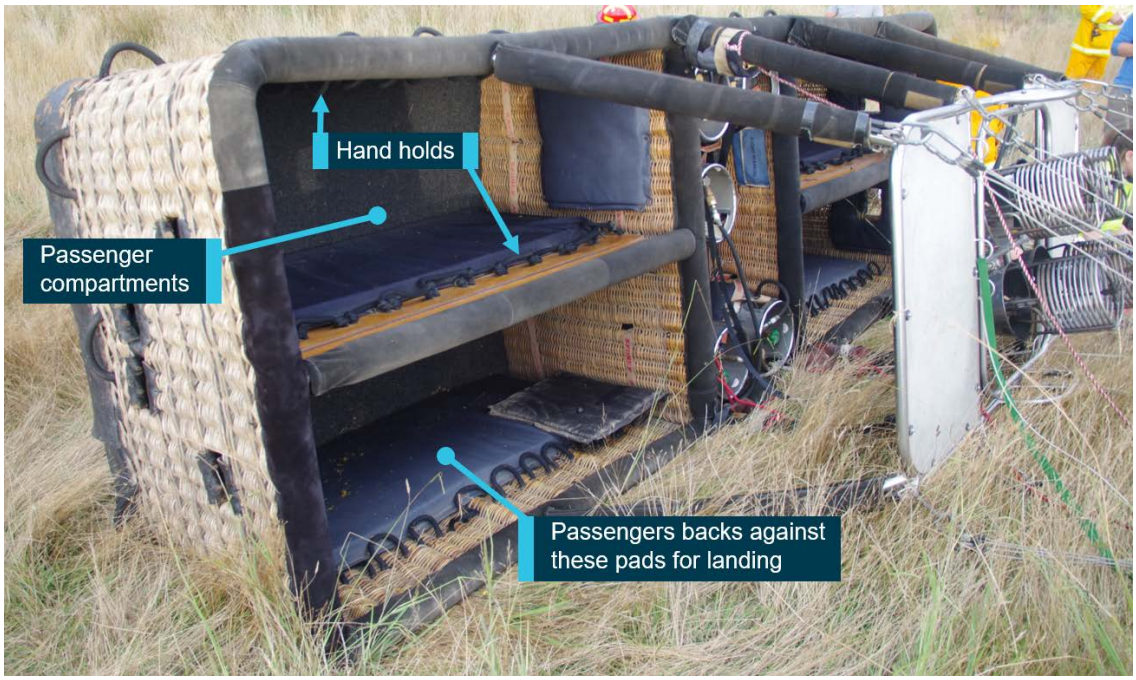
Source: Still image taken from witness video with ATSB annotations.

On approaching the ground, the pilot turned the burners off and opened the vent at the top of the balloon to deflate the balloon envelope. The basket landed hard, and the deflating balloon envelope began to act like a sail. The basket then dragged for 48 m, and then became airborne for another 56 m. After a secondary hard landing, it tipped over and dragged for another 7 m before coming to rest on its side (Figure 4). The pilot isolated the gas and began to check on the passengers.

Four passengers received serious injuries and seven received minor injuries. All of the serious injuries involved some form of spinal injury, three of which required hospitalisation. The balloon's basket sustained minor damage.

[4] One knot (kt), one nautical mile per hour, equals 1.852 kilometres per hour.

Figure 4: VH-EUA final resting position



Source: Victorian Police with annotations by ATSB to show passenger compartments, hand holds and passenger position for landing.

Context

Meteorological information

The graphical area forecast relevant to the intended flight indicated no significant cloud, visibility or other weather. The grid point wind and temperature (GPWT) forecast indicated northerly winds at lower levels (2,000 ft and below) of about 10 kt.[5] The upper winds would begin to back[6] through to a westerly direction and increase in strength to more than 20 kt. The forecast also indicated that, as the day progressed, the expected winds would ease progressively at lower altitudes and then begin to back to the west.

The Bureau of Meteorology (BoM) provided local weather briefings for balloon operators in the Melbourne area. These briefings contained site-specific weather services and gave more detailed local weather information than area forecasts. The briefings covered the Melbourne city, inner and outer suburbs and Yarra Valley areas and were provided as recorded telephone messages.

Two briefings were provided for each morning. The first briefing was recorded on the previous afternoon and normally had a short summary of the next morning's weather forecast. The second briefing was recorded in the early hours of the morning of the day of validity and provided a more comprehensive forecast based on up-to-date details.

For 8 February 2018:

- The first briefing was recorded at 1600 on 7 February and it indicated weak surface winds for the time of the flight, increasing to easterly winds at 15 kt at 1,500 ft.
- The second briefing, recorded at 0230 on 8 February, indicated wind at lower levels (2,000 ft) in the Yarra Valley would be from the north at 10 kt, but expected to change direction to the south at 10 kt by about 0900.

BoM reported that although the second briefing for 8 February was recorded in the early hours of the morning, a procedural error by a meteorologist prevented its uploading to the automated phone system. As a result, the briefing that was available to balloonists in the early hours of 8 February 2018 was the previous afternoon's recorded briefing. In addition, BoM advised that there was no procedure in place to check that the new briefing had been updated correctly.

The ground crew launched piballs at the intended landing and take-off sites to ascertain the suitability of the weather for the operation. Their observations of these indicators were mostly consistent with the area forecast.

Following the 8 February 2018 accident, BoM provided analysis of Doppler[7] wind imagery and the Coldstream, Victoria weather sensors. The analysis showed development of moderate westerly winds coinciding with the arrival of a low-pressure trough at the balloon accident site at about the time of the accident.

The pilot had significant operational experience in balloon operations in the local area. He stated that it was not uncommon to utilise lower level katabatic[8] wind conditions to operate the balloon down the Yarra Valley. He reported that he had only ever encountered this type of unexpected weather change during flight once before in 15 years of operating in the area.

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5 Information about GPWT charts is provided by BoM on its website (see www.bom.gov.au/aviation/knowledge-centre).

6 Wind that shifts in a counter-clockwise direction with an increase in height, for example: from west to south-west.

7 Doppler radar measures the phase of a pulse of energy as it returns to the radar. Changes in phase can be related to motion of the reflecting particles, such as wind.

8 Cold dense air that flows down the valley to produce a localised wind.

Passenger safety briefing

The operator's procedures required passengers to have a safety briefing before take-off, with the passengers in the basket. The pilot was responsible for conducting the briefing, but could delegate the task to a ground crew member. The briefing was required to explain and demonstrate the position to adopt during landings and emergencies. The landing position required passengers to bend their knees slightly, hold on to the rope handholds (Figure 4), rest their back against the padding and face away from the landing direction.

According to the procedure, the person conducting the briefing was also required to ask passengers whether they understood the briefing, with particular attention given to non-English speaking passengers. There was no specific requirement for passengers to physically demonstrate the landing position to show that they had understood the briefing.

A ground crew member stated that they typically provided passengers with two briefings: one before the passengers entered the basket and one after they had entered the basket. He advised that two passenger briefings took place on the morning of 8 February. However, several passengers recalled only one briefing, which was provided by the ground crew member before passengers entered the basket and included information about the landing position and the inside of the basket. Some of these passengers also recalled being told there would be another briefing after they entered the basket, but this second briefing did not occur.

The operator reported that all passengers were present at the briefing. However, two passengers, who assisted with setting up the balloon, did not recall receiving any safety briefing.

On board the balloon were two passengers who could not speak English. Those passengers recalled having the initial briefing provided by the ground crew member, which was translated by a family member who had accompanied them to the launch site. Although the flight manifest identified these two passengers as non-English speaking, the pilot later reported that his understanding was that all passengers on board understood English.

The operator's procedures required the pilot to provide an additional briefing towards the end of a flight, with the content depending on the prevailing conditions. For a fast or hard landing, this involved:

- repeating the instructions for the landing position, and asking passengers to indicate that they understood
- advising passengers to take up the landing position, and checking they were in the correct position
- instructing passengers to hold on tightly until advised that it was safe to relax their grip.

On this occasion, the pilot reported that he did not provide a detailed in-flight briefing to the passengers after he had made the decision to land as soon as possible, however, he did instruct passengers to adopt the landing position.

Some passengers reported that when instructed by the pilot to adopt the landing position, there was confusion about what position to adopt and the direction to face, with some passengers kneeling, sitting and/or facing the direction of travel. The non-English speaking passengers advised that they did not understand the pilot's instruction and copied the actions of other passengers. The pilot attempted to correct the passengers' landing positions, however, not all passengers were in the correct position on impact.

Civil Aviation Order 20.11 (*Emergency and life saving equipment and passenger control in emergencies*) required that passenger safety information cards be available to passengers on any charter flight with a seating capacity greater than six. It stated that the cards must be carried in a convenient location and detail the passenger brace position for an emergency landing.

The operator had developed safety information cards. Ground crew reported that these were kept in the balloon support vehicle and were only retrieved and used to assist passenger

understanding by exception rather than as a normal routine. The operator reported that the safety information cards were also kept in the pilot's compartment of the balloon basket. The cards were not provided to any of the passengers on the day of the accident.

Civil Aviation Advisory Publication (CAAP) 253-2(0) (*Passenger safety information: Guidelines on content and standard of safety information to be provided to passengers by aircraft operators*) provided generic guidance on passenger safety briefings and safety information cards for all types of aircraft. It recommended that safety information cards contain non-complex pictorial representations to assist operators in explaining instructions about what to do in an emergency.

The operator's cards were available in nine languages, but only the English cards provided pictures showing the required landing position.

Other occurrences

A search of the ATSB occurrence database found that in the 10 years to April 2018 there were 47 balloon hard landings or collisions with terrain in Australia. Only some of these occurrences were investigated by the ATSB. One of these occurrences, a hard landing in 2014, involved some non-English speaking passengers not understanding or following the pilot's instructions to adopt the landing position.[9]

[9] ATSB AO-2014-157, Hard landing involving a Kavanagh Balloon, VH-CNX, 60 km NW of Gold Coast Airport, Queensland on 26 September 2014. Available from www.atsb.gov.au.

Safety analysis

During the flight on the morning of 8 February 2018, the balloon encountered a wind change that substantially altered the direction and speed of the balloon and subjected the occupants to moderate turbulence. The pilot assessed the direction of the balloon after the wind change and concluded that future forced landing options may be further limited if he did not land immediately. Continuation of the flight may have posed increased risk to occupants, and he decided to accept a hard landing in order to lower future risk to passengers. The pilot's decision to land immediately after the sudden wind change was in accordance with the operator's operations manual.

Information about the wind change was not available to the pilot prior to the flight. The Grid Point Wind and Temperature (GPWT) chart, which provides wind information, did not capture localised information on the wind change below 2000 ft due to the nature of the product. Although the Bureau of Meteorology (BoM) had identified the potential for a wind change in the Melbourne area during the morning, this information was unavailable to balloon pilots in the relevant local weather briefing area, due to an individual error in the upload of the information to the publically available phone briefing system.[10]

The error in uploading the local weather briefing meant that the pilot (and other balloon pilots) were not able to use this localised (and in this case more accurate) weather information to re-assess his pre-flight planning or to plan around the expected south-westerly wind change. BoM indicated there was no procedure in place to ensure the recorded briefing was correctly uploaded, which would minimise the risk of such errors.

Soon after take-off, the pilot was advised of a possible wind direction and strength change in-flight. However, at the time he could not identify a suitable landing area in the immediate vicinity of the balloon. He decided to continue the flight and proceeded to the intended landing area as quickly as possible. There appeared to be subsequent landing opportunities in the open fields in the valley prior to the wind change arriving (Figure 2). It may have been prudent to have considered landing earlier, but such a decision would have been complicated by the uncertainty regarding the nature and timing of any wind change.

Prior passenger preparation for a balloon landing, including an emergency, is shown to reduce the likelihood and severity of injury. As such, passengers need to be briefed on the position to adopt when landing during the pre-flight safety briefing and be reminded of it just prior to landing. On this occasion, there were inconsistent accounts about what safety briefing information was provided to the passengers prior to the flight. The operator reported that all passengers attended the briefing, and the ground crew member recalled that he had provided the operator's normal safety briefings to the passengers, including briefings before and after the passengers boarded the balloon. However, the consistent and independent recollection of the passengers was that the only briefing occurred prior to the passengers boarding, and not all passengers were present at the time.

The period prior to take-off in any aviation operation involves high workload and distractions, and there is a potential for key tasks to be inadvertently omitted. The operator's procedures did not have a formal check process between the pilot and ground crew member to minimise the risk of such errors and ensure the full safety briefing was provided.

Overall, it appears likely that the passengers were not provided with a safety briefing after they had boarded the balloon. In addition, the briefing that was conducted prior to the passengers boarding was not effective in ensuring that all passengers understood the required procedures for a landing position. Not being in the correct position during the initial hard landing probably contributed to the occurrence or severity of at least some of the passenger injuries.

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[10] BoM advised that, although the information on the wind change was not available through the recorded phone briefing, pilots were still able to ring the forecaster directly for a briefing or obtain clarification on any aspect of the forecast.

To ensure that safety briefings are effective, a balloon operator should ensure that passengers understand the information provided. The operator's procedures required that passengers be asked to indicate whether they understood the safety briefing. To ensure passengers know what to do, it is recommended that all passengers should board the basket and simultaneously practice the position they should adopt on landing.[11] This better enables the operator to determine any misunderstanding prior to flight.

In addition to passenger briefings, safety information cards are a readily accessible method of providing normal and emergency procedures to passengers to enhance safety. Storage of these cards in an area not readily accessible to passengers increases the risk of passengers not fully understanding important information, especially in preparation for an emergency landing. Such cards can be even more effective if they include pictorial representations of the required actions, particularly for non-English speaking passengers. In this case, the safety briefing cards were not made available to passengers, removing another opportunity to overcome any limitations with the provision of the safety briefing.

The Civil Aviation Safety Authority (CASA) issued the Civil Aviation Advisory Publication (CAAP) 253-2(0) in 2004 to provide guidance on the provision of safety information to passengers (oral and written). Although the information is still relevant, it contains only generic guidance material applicable to all aircraft types. Given the unique nature of balloon operations, and the increase in balloon charter operations in recent years, production of specific guidance material about recommended practices for briefing of balloon passengers would be beneficial. Towards this end, the Civil Aviation Safety Authority has recently published a bulletin that provides additional guidance for passenger briefings for balloon operations (see Additional safety action). It also recently commenced a process of public consultation for a revision of CAAP 253-2(0).

[11] UK Civil Aviation Authority 2006, *Evaluation of and possible improvements to current methods for protecting hot-air balloon passengers during landings*, CAA Paper No. 2006/06.

Findings

From the evidence available, the following findings are made with respect to the hard landing involving the balloon, registered VH-EUA, that occurred 6 km east-north-east of Yarra Glen, 8 February 2018. These findings should not be read as apportioning blame or liability to any particular organisation or individual.

Safety issues, or system problems, are highlighted in bold to emphasise their importance. A safety issue is an event or condition that increases safety risk and (a) can reasonably be regarded as having the potential to adversely affect the safety of future operations, and (b) is a characteristic of an organisation or a system, rather than a characteristic of a specific individual, or characteristic of an operating environment at a specific point in time.

Contributing factors

- During the flight, the balloon encountered a wind change that substantially altered the direction and speed of the balloon and subjected the occupants to moderate turbulence.
- The most recent local balloon forecast was inadvertently not made publicly available, and other forecast information available to the pilot did not accurately state the timing of the wind change.
- **The Bureau of Meteorology did not have a procedure to ensure that a recording of the local weather forecast for balloon operations in the Melbourne area was correctly uploaded and accessible to balloon pilots. [Safety issue]**
- The pre-flight safety briefing provided to the passengers was ineffective in ensuring that all passengers understood the required landing position to use in the event of an emergency landing.
- **Although the operator had procedures for conducting a verbal safety briefing prior to flight and had safety briefing cards available, its risk controls did not provide assurance that all passengers would understand the required procedures for emergency landings. More specifically:**
  - **safety briefing cards were not routinely made available to passengers prior to or during flight**
  - **safety briefing cards for non-English speaking passengers did not include diagrams to help communicate important information**
  - **the procedure for safety briefings did not require passengers to physically demonstrate that they understood the required landing position**
  - **the procedure for safety briefings did not require the pilot and ground crew to crosscheck that a safety briefing had been conducted prior to departure. [Safety issue]**

Other findings

Following the sudden wind change, the pilot decided to land immediately rather than continue flight over rising and heavily vegetated terrain. Given the existing situation, this decision meant that a hard and fast landing was likely to occur.

Safety issues and actions

The safety issues identified during this investigation are listed in the Findings and Safety issues and actions sections of this report. The Australian Transport Safety Bureau (ATSB) expects that all safety issues identified by the investigation should be addressed by the relevant organisation(s). In addressing those issues, the ATSB prefers to encourage relevant organisation(s) to proactively initiate safety action, rather than to issue formal safety recommendations or safety advisory notices.

All of the directly involved parties were provided with a draft report and invited to provide submissions. As part of that process, each organisation was asked to communicate what safety actions, if any, they had carried out or were planning to carry out in relation to each safety issue relevant to their organisation.

The initial public version of these safety issues and actions are repeated separately on the ATSB website to facilitate monitoring by interested parties. Where relevant the safety issues and actions will be updated on the ATSB website as information comes to hand.

Procedures for uploading balloon forecasts

Number:	AO-2018-016-SI-01
Issue owner:	Bureau of Meteorology
Operation affected:	Aviation: General Aviation
Who it affects:	All balloon operators and pilots in the Melbourne region

Safety issue description:

The Bureau of Meteorology did not have a procedure to ensure that a recording of the local weather forecast for balloon operations in the Melbourne area was correctly uploaded and accessible to balloon pilots.

Proactive safety action taken by the Bureau of Meteorology

Action number: AO-2018-016-NSA-002

As a result of this occurrence, the Bureau of Meteorology advised the ATSB that it had updated the recording system to be more user-friendly and robust, as well as other safety actions. More specifically, the Bureau stated:

> The new recording system automatically uploads and replays the briefing to the forecaster, which confirms the recording has successfully uploaded. This removes the final step of manual activation of the recording hence reducing the risk of a human error.
>
> While it was common practice to include a date and time at the start of each recording, the procedures have been updated to formalise this requirement. In addition, further information has been provided in the procedures on detailing wind changes in the briefing.
>
> The Bureau advised that they provide briefing services to balloon operators at various locations across Australia, but the service varies state to state. The Bureau in consultation with aviation industry is in the process of reviewing balloon forecasting services nationally with the view to providing a nationally consistent and standard service to balloon operators in the future.

Current status of the safety issue

Issue status: Adequately addressed.

Justification: The ATSB is satisfied that the safety action will reduce the risk associated with this safety issue.

Passenger briefing procedures

Number:	AO-2018-016-SI-02
Issue owner:	Go Wild Ballooning Pty Ltd
Operation affected:	Aviation: General Aviation
Who it affects:	Crew and passengers on the operator's flights

Safety issue description:

Although the operator had procedures for conducting a verbal safety briefing prior to flight and had safety briefing cards available, its risk controls did not provide assurance that all passengers would understand the required procedures for emergency landings. More specifically:

- safety briefing cards were not routinely made available to passengers prior to or during flight
- safety briefing cards for non-English speaking passengers did not include diagrams to help communicate important information
- the procedure for safety briefings did not require passengers to physically demonstrate that they understood the required landing position
- the procedure for safety briefings did not require the pilot and ground crew to crosscheck that a safety briefing had been conducted prior to departure.

Proactive safety action taken by Go Wild Ballooning Pty Ltd

Action number: AO-2018-016-NSA-004

The operator advised the ATSB that passengers were now required to adopt their landing position once all the passengers had boarded the aircraft, and that this procedure was checked by the pilot and/or ground crew prior to launch.

In addition, the operator reported that it was working on updating its passenger safety briefing cards for non-English speaking passengers. It had also considered including passenger safety information cards with its flight itinerary sent to passengers, but noted that this would be difficult when dealing with multiple languages.

ATSB comment

The ATSB acknowledges the steps taken by the operator to introduce a procedure to ensure passengers, on boarding the aircraft, are required to demonstrate the landing position. Given that this has to occur after the pilot has boarded, the ATSB acknowledges there is less likelihood of the ground crew and pilot having a misunderstanding regarding whether a briefing has occurred. However, it would still be advisable to introduce a formal crosscheck to ensure that the briefing and demonstration takes place. In addition, the ATSB considers that further work to ensure that safety information cards are provided, or made readily available, for all passengers is important to further reduce risk.

Current status of the safety issue

Issue status: Partially addressed

Justification: The ATSB is satisfied that, although not every aspect of the safety issue has been or is being addressed, the safety action taken and proposed will reduce the risk associated with this safety issue.

Additional safety action

Whether or not the ATSB identifies safety issues in the course of an investigation, relevant organisations may proactively initiate safety action in order to reduce their safety risk. The ATSB has been advised of the following proactive safety action in response to this occurrence.

Go Wild Ballooning Pty Ltd has advised the ATSB that, in relation to operational procedures, it had taken the following safety actions:

- all pilots share information on winds, weather tendencies and optimising safe and suitable launch sites before each flight
- checks of nearby aerodrome weather information are conducted on a more regular basis.

On 10 October 2018, the Civil Aviation Safety Authority (CASA) issued 'Cabin safety bulletin 12 - General aviation passenger briefings'.[12] The purpose of the bulletin was to '…provide guidance on how to conduct a briefing to increase passenger situational awareness and enhance any response to an emergency or abnormal event within the passenger-carrying environment'.

The bulletin provided guidance for small aeroplanes, helicopters and hot air balloons. For balloons, the bulletin included the following information:

Pre-flight briefing

- Passengers must follow pilot-in-command instructions.
- When and how to enter and exit the basket.
- No smoking in or around the balloon.
- Precautions relating to the inflation fan.
- Precautions relating to the hot phase of inflating the balloon.
- Restricted access areas in the launch area.
- Details of the landing position appropriate to the balloon design type and that this position must be adopted for all landings on hearing the cue 'landing positions'.
- A practice adoption of the landing position by all passengers to demonstrate their understanding.
- An explanation that on landing the basket may remain upright or may tip onto the side and although this may not happen it is quite normal.
- A reminder to remain in the basket in any event until instructed to disembark.
- An instruction to:
- flex the knees on touch down
- where to hold on
- stow cameras and personal items before landing
- ensure that nothing can be outside the basket including hair, clothing or limbs can be outside the basket.

Pre-landing briefing

On approach to landing, the pilot-in-command should make a pre-landing announcement reminding passengers that:

- cameras and loose personal items must be stowed
- on the command 'landing positions' all passenger must assume the position previously practiced
- all persons must remain on board until instructed to disembark
- if the landing is anticipated to be fast or hard, a reminder of the knee flex position and to hold on firmly.

The oral briefing may be supplemented with:

- assistance from ground support personnel to ensure all passengers have [demonstrated] the landing position

[12] The full bulletin, and other CASA cabin safety bulletins, is available on the CASA website at www.casa.gov.au/aircraft/standard-page/cabin-safety-bulletin.

- repetition of the oral briefing by a translator
- use of placards and signage using text and/or pictograms and international symbols that illustrate the landing position and other requirements…

In addition to the bulletin, on 19 October 2018 CASA released a revised draft of CAAP 253-02 for public consultation, with particular reference to the carriage of passengers on balloon flights.

General details

Occurrence details

Date and time:	8 February 2018 – 0705 EDT	
Occurrence category:	Accident	
Primary occurrence type:	Hard landing	
Location:	Lilydale (ALA), 035° M 9 km	
	Latitude: 37° 37'.46 S	Longitude: 145° 25'.77 E

Aircraft details

Manufacturer and model:	Kavanagh Balloons B-350	
Registration:	VH-EUA	
Operator:	Go Wild Ballooning Pty Ltd	
Serial number:	B350- 368	
Type of operation:	Charter – Passenger	
Persons on board:	Crew – 1	Passengers – 15
Injuries:	Crew – 0	Passengers – 11
Damage:	Minor	

Sources and submissions

Sources of information

The sources of information during the investigation included the:

- pilot and ground crew member
- operator (Go Wild Ballooning Pty Ltd)
- passengers
- witnesses to the landing (including a video recording)
- Bureau of Meteorology (BoM)
- Victorian Police.

Submissions

Under Part 4, Division 2 (Investigation Reports), Section 26 of the *Transport Safety Investigation Act 2003* (the Act), the Australian Transport Safety Bureau (ATSB) may provide a draft report, on a confidential basis, to any person whom the ATSB considers appropriate. Section 26 (1) (a) of the Act allows a person receiving a draft report to make submissions to the ATSB about the draft report.

A draft of this report was provided to the pilot, ground crew member, the operator, BoM and the Civil Aviation Safety Authority (CASA).

Submissions were received from the operator, BoM and CASA. The submissions were reviewed and, where considered appropriate, the text of the report was amended accordingly.

Australian Transport Safety Bureau

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The ATSB is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, marine and rail modes of transport through excellence in: independent investigation of transport accidents and other safety occurrences; safety data recording, analysis and research; fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia that fall within Commonwealth jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to operations involving the travelling public.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, relevant international agreements.

Purpose of safety investigations

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

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

Developing safety action

Central to the ATSB's investigation of transport safety matters is the early identification of safety issues in the transport environment. The ATSB prefers to encourage the relevant organisation(s) to initiate proactive safety action that addresses safety issues. Nevertheless, the ATSB may use its power to make a formal safety recommendation either during or at the end of an investigation, depending on the level of risk associated with a safety issue and the extent of corrective action undertaken by the relevant organisation.

When safety recommendations are issued, they focus on clearly describing the safety issue of concern, rather than providing instructions or opinions on a preferred method of corrective action. As with equivalent overseas organisations, the ATSB has no power to enforce the implementation of its recommendations. It is a matter for the body to which an ATSB recommendation is directed to assess the costs and benefits of any particular means of addressing a safety issue.

When the ATSB issues a safety recommendation to a person, organisation or agency, they must provide a written response within 90 days. That response must indicate whether they accept the recommendation, any reasons for not accepting part or all of the recommendation, and details of any proposed safety action to give effect to the recommendation.

The ATSB can also issue safety advisory notices suggesting that an organisation or an industry sector consider a safety issue and take action where it believes it appropriate. There is no requirement for a formal response to an advisory notice, although the ATSB will publish any response it receives.

Australian Transport Safety Bureau

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Linkedin Australian Transport Safety Bureau

Investigation

ATSB Transport Safety Report
Aviation Occurrence Investigation

Hard landing involving Kavanagh B-350 hot-air balloon, VH-EUA
6 km east-north-east of Yarra Glen, Victoria, on 8 February 2018

AO-2018-016
Final – 30 October 2018