Australian Government
Australian Transport Safety Bureau

Ground handling event involving Kavanagh B-400 balloon, VH-LNB

near Coldstream, Victoria on 16 March 2019

ATSB Transport Safety Report
Aviation Occurrence Investigation
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Addendum

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Safety summary

What happened

On 16 March 2019, two passengers were seriously injured when the basket of a Kavanagh B-400 hot-air balloon tipped over during vehicle-assisted deflation.

Prior to the accident, the balloon, operated as a scenic charter flight, landed without incident at a private property near Coldstream, Victoria.

Due to a lack of wind and the large size of the envelope, the crew elected to use the retrieval vehicle to assist by pulling the envelope over (by the crown line) during the deflation.

During this process, with 16 passengers and the pilot on board, the vehicle assisting inadvertently pulled the basket over, seriously injuring two passengers.

What the ATSB found

The ATSB found that the operator had not conducted a risk assessment around the use of a vehicle to assist in the deflation process. Although not required by regulations, the lack of a risk assessment likely left the operator and crew unaware of the risks associated with the vehicle-assisted deflation, and without appropriate procedures to control those risks. Consequently, a communication breakdown between the pilot and vehicle driver led to the basket tipping, and the passengers were unprepared and not in landing positions during the deflation process - increasing their likelihood of injury.

The ATSB also found that the Civil Aviation Safety Authority had not provided guidance to commercial balloon operators concerning the risks associated with vehicle-assisted deflation. This likely contributed to the limited awareness commercial operators had of the risks associated with vehicle-assisted deflation. Further, with substantial growth in the number of large, Australian-registered balloons requiring vehicle-assisted deflation, this is an ongoing safety risk.

What's been done as a result

The operator has updated their procedures to reduce the probability of a communication breakdown during the deflation process and is requiring the pilot to instruct passengers to assume landing positions during any vehicle-assisted deflations.

CASA has indicated they will publish an advisory circular, which will include guidance on deflation of hot air balloon envelopes using a vehicle to assist.

The ATSB has released a safety advisory notice (AO-2019-014-SAN-014) to all commercial balloon operators about the risks associated with vehicle-assisted deflation, as identified in this report.

Safety message

This investigation highlights that gradual changes to operational procedures, while possibly perceived as inconsequential, have the potential to conceal new or emerging safety risks. A thorough assessment of any introduced changes should identify these new risks and allow their mitigation or reduction to an acceptable level.

This investigation also highlights that an increase in the number of aircraft and occupants (passengers and crew) exposed to a hazard has a compounding effect that, in a relatively brief period, can increase the overall risk significantly.

Contents

The occurrence

What happened

On 16 March 2019, at about 0700 Eastern Daylight-saving Time,[1] a Kavanagh B-400 hot-air balloon, registration VH-LNB and operated as a scenic charter flight by *Picture This Ballooning*, was being prepared for departure from a private property near Dixons Creek, Victoria.

The balloon operating crew conducted passenger safety briefings:

- at the meeting point (including equipment that can be carried on board and what to expect during the flight)[2]
- on the bus during the transit from the meeting point to the launch site (including conditions at the launch site and the inflation procedure), and
- at the launch site prior to the passengers entering the basket.

Prior to take-off, with the passengers positioned in the basket, the pilot also conducted a safety briefing which included the risks associated with a layover landing in windy conditions, and having all the passengers demonstrate they could correctly assume the landing position.[3] The two ground crew assisted the pilot by checking the passengers had understood the briefing and could physically adopt the landing position.

At around 0720, after the pilot and ground crew conducted pre-flight and radio checks, the balloon lifted off with 16 passengers and the pilot on board.

During the flight, the ground crew were in communication with the pilot by radio to coordinate arrival at the planned landing site. At the landing site, prior to the arrival of the balloon, the ground crew launched a pibal[4] and observed that there was nil wind below 300 ft above ground level. This information was communicated to the pilot.

About 10 minutes prior to landing, the pilot conducted another passenger briefing concerning safety during landing. This included the requirement for the passengers to assume the landing position.

The balloon landed without incident at a private property near Coldstream, Victoria at about 0820, with the passengers all satisfactorily adopting the landing position.

Following the landing, the pilot began to shut down the burner system and waited for the two ground crew to prepare to deflate the envelope. Due to a lack of wind and the large size of the envelope, the crew elected to use the retrieval vehicle to assist by pulling the envelope over (by the crown line) during the deflation. Then, by radio, the pilot instructed the driver in the vehicle to drive forward. The vehicle started to slowly move forward, at less than walking pace, pulling the envelope. The driver's vision of the balloon's basket was obstructed by the collapsing envelope. During this process, the second ground crew member (located next to the basket) and the driver could not see each other.

The pilot then put down the handheld radio to operate the vent line, which required both hands. The envelope began to deflate faster than anticipated and the fabric started to collapse directly on top of the basket and burners. The second ground crew member assisted by lifting the fabric away from the burners and passengers. The pilot picked up the radio and instructed the driver to 'drive a little bit faster'. The pilot then put the radio back down on the top of one of the fuel

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

2 RACV club in Healesville, Victoria

3 The landing position is designed to reduce the likelihood of injury from a layover or hard landing. Occupants face away from the balloon's landing direction, holding onto rope holds with their feet flat and knees together but slightly bent.

4 An abbreviation of 'pilot balloon', which is a small, helium-filled free balloon with a light that is realised and visually tracked to determine the wind at different altitudes.

tanks and proceeded to operate the vent line and talk with the passengers. The driver proceeded for another 5 to 6 m then started to slow down.

Shortly after, at around 0830 (10 minutes after landing), the basket began to tip (Figure 1). The pilot instructed the passengers to 'hang on as best they could' and did not have the opportunity to use the radio to command the driver to stop.

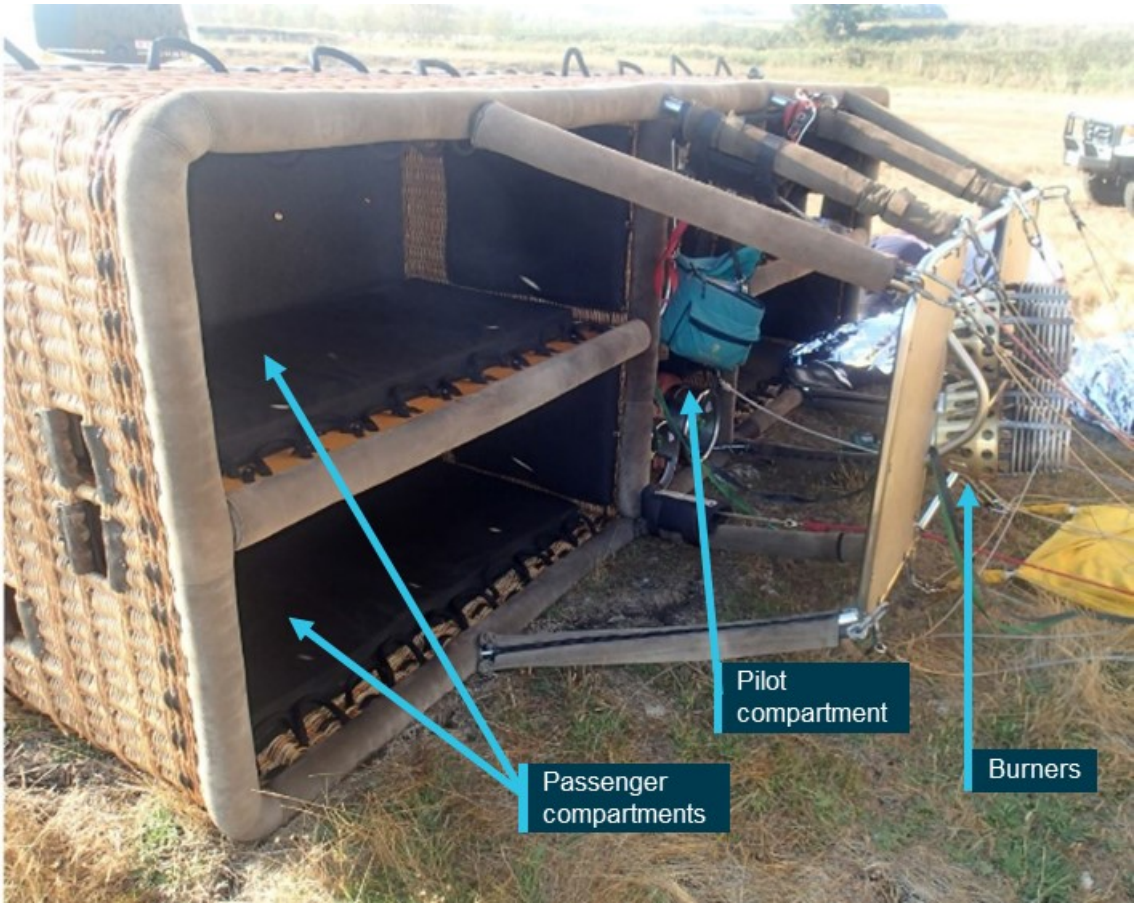
The second ground crew member jumped out of the way of the tipping basket. The pilot's radio landed at second ground crew member's feet. The second ground crew member then communicated with the driver to stop and quickly get back to assist.

The driver, unaware of what was happening with the basket, heard unintelligible sounds from the radio and decided to stop the vehicle.

Two of the 16 passengers were seriously injured[5] when they were propelled out of the basket as it tipped over. One of the passengers sustained two broken ribs and another was knocked unconscious for around 10 minutes.

The pilot and second ground crew member, who had both received first aid training about 8 weeks prior, began administering first aid to the injured passengers and called an ambulance. The driver, also trained in first aid, took control of the injured passengers and continued to administer treatment. Around 15 minutes after the basket tipped, an ambulance arrived and the injured passengers were taken to Maroondah hospital. Both were discharged later that day.

Figure 1: VH-LNB basket final resting position



Source: Victoria Police. Annotated by ATSB

[5] A serious injury is an injury that requires, or would usually require, admission to hospital within 7 days after the day when the injury is suffered. Transport Safety Investigation Regulations 2003 Part 1.

Context

Balloon deflation

All hot air balloons have a load ring known as a crown ring at the top of the envelope. Attached to the crown ring is a crown line, which is long enough to reach to the balloon's basket. During envelope deflation, a vent at the top of the balloon is opened progressively to release hot air. To prevent the envelope collapsing on top of the basket in light wind conditions, a force is applied to the crown line to pull the envelope down and away from the basket.

For smaller balloons (generally less than 350,000 ft^3), one or two persons can provide enough force by pulling on the crown line and walking away from the basket. For large balloons, the crown line can be attached to the rear of a vehicle that then drives slowly away from the basket pulling the envelope as it deflates.

Crew experience

The pilot obtained a private balloon pilot certificate in 1997 and commercial balloon pilot licence in 2000. At the time of the accident, the pilot had just over 2,000 hours (10 hours in the previous 90 days) as pilot in command.

The ground crew member driving the vehicle during the deflation had around 20 years' experience as a ground crew member for *Picture This Ballooning* (PTB). The other ground crew member had been working in this position for the operator for around 4.5 years.

Aircraft information

VH-LNB was a Kavanagh Balloons B-400 hot-air balloon designed and manufactured in Australia with an envelope air capacity of around 400,000 ft^3. The balloon was certified to carry up to 22 passengers and the basket had capacity to accommodate 20 passengers within four passenger carrying compartments, and a pilot in the central compartment (Figure 1). Heat was produced by a four-burner liquefied petroleum gas system.

Meteorological information

The pilot reported reviewing several weather forecasts for the intended flight time, on the night before the flight and again on the morning before the flight. In addition, prior to, and during the flight, the ground crew launched pibals (pilot balloons) to check the prevailing wind speed at different altitudes. This information was communicated to the pilot.

The ATSB obtained weather data from the Bureau of Meteorology for Coldstream Airport (approximately 5 km from the accident site). It included observations recorded at 1-minute intervals between 0700 and 0900 on 16 March 2019 (at ground level). Across that period, the winds were calm (0 kt) with no gusts.

Organisational information

Picture This Ballooning

Picture This Ballooning (PTB) was a charter balloon operator that had been operating for around 22 years. It had 15 balloons in their fleet, of which 11 were used for passenger charter operations. The operator had two balloons (one Kavanagh B-350 and a B-400) with envelope sizes of 350,000 ft^3 or more. Sizes below this were less likely to require a vehicle to assist during deflation. PTB began using a vehicle to assist with in the deflation of their two large balloons about 12 months prior to the accident.

Communications procedures

The operator's Operations manual (OM) contained the following procedure for radio communications:

> Communication with retrieve crew will be via UHF radios with mobile phones as back up. Prior to launch the pilot must conduct a UHF radio check with the crew to ensure two way communication is possible. During flight both parties shall maintain a continuous watch.

The operator's crew procedures and training manual contained additional information regarding radio failure:

> Use of mobile phone as back up
>
> Recognise that the radio is not working if you are not receiving instructions
>
> Pilot has a crew number and vise [sic] versa
>
> Stay near the balloon and do not get too far in front
>
> Try a second radio
>
> It's not that big a deal so long as you think what the pilot would want you to do.

Although not documented prior to the time of the accident, the process during vehicle-assisted deflation, as reported by the pilot and the ground crew member driving, was that once the instruction to drive forward was given, the driver would continue until the pilot commanded them to stop.

Following the accident, the pilot identified that putting down the handheld radio and not maintaining communication throughout the entire process was a likely contributor to the accident.

Passenger safety briefings

The operator's procedures contained in the OM required the pilot in command to conduct passenger briefings:

> as to correct inflation procedures
>
> inside basket on landing positions prior to lift off.

The OM also contained the following information regarding briefing of passengers:

> Passengers are to be briefed on the ballooning experience in general and safety aspects of ballooning (eg: the fan, landing positions, exiting the basket, etc). Pilots should make use of the PTB checklists and briefing cards found on board all PTB balloon basket.

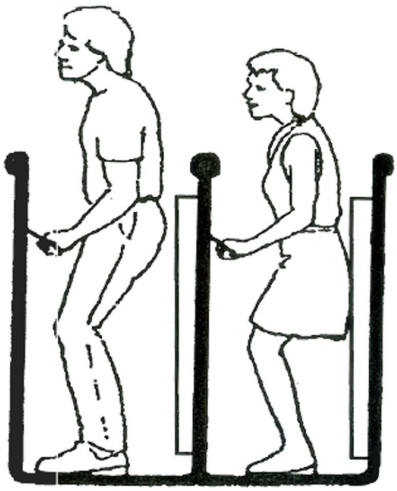
Further, the OM contained the following information regarding the positioning of passengers in basket:

> A physical demonstration of landing positions by the passengers must be conducted before take off on each flight.

The pilot and a passenger reported that a safety briefing was conducted, upon arrival at the launch site, primarily regarding the hazards associated with the inflation fans (pre-boarding). Another briefing was conducted in the basket prior to launch (pre-flight) which included passengers demonstrating they could correctly assume landing positions. A final briefing, primarily concerning landing positions, was also conducted by the pilot around 10 minutes prior to landing (pre-landing).

In addition to the safety briefings, the balloon had safety cards on board that also contained safety information including a pictorial representation of the body position when in the landing position (Figure 2).

Figure 2: Picture This Ballooning's on-board safety briefing cards



Source: Picture This Ballooning

Landing position

The Kavanagh Balloons Flight Manual contained procedures for fast landings, including:

> When a high horizontal landing speed is expected, passengers should be made aware that the basket will tip forward and they should take a lower than normal landing positions to avoid being thrown out of the basket.

The pilot reported that during the vehicle-assisted deflation the passengers were not in the landing position.

Crew's awareness of the risk of tipping during vehicle-assisted deflation

The pilot reported that at the time of the accident not noticing that there was a problem until the basket began to tip. In addition, while having previously observed baskets tipping due to wind, the pilot had not considered that the deflation vehicle could produce the same outcome. Further, the ground crew member driving the vehicle also reported not expecting anything to go wrong during the deflation process.

Civil Aviation Safety Authority

The Civil Aviation Safety Authority (CASA) is an independent statutory authority with the primary functions of conducting safety regulation of civil air operations in Australia and the operation of Australian aircraft overseas.

Passenger safety briefings

CASA's Civil Aviation Advisory Publication: *Passenger safety information: Guidelines on content and standard of safety information to be provided to passengers by aircraft operators* (CAAP 253-02 V2.0), included specific guidance for balloon operators regarding passenger safety briefings during pre-boarding, pre-flight, pre-landing final approach and landing.

The guidance did not contain information regarding passenger safety briefings during the deflation process.

Safety management system

CASA regulations did not require operators of balloon aerial work and charter operations to have a safety management system (SMS).

CASA have proposed Civil Aviation Safety Regulation (CASR) Part 131, which was available as an exposure draft until 30 September 2019, and scheduled to commence on 2 December 2021. Part 131 would have required balloon transport operators (currently charter operations) to have

an SMS that is '…appropriate for the size, nature and complexity of the operator's balloon transport operations'. The SMS must include:

> …a safety risk management process, including:
>
> (i) Hazard identification processes; and
>
> (ii) Safety risk assessment and mitigation processes

In addition, the proposed Part 131 also contained the requirement for balloon transport operators to have a safety manager with

> …sufficient relevant safety management experience to capably lead, manage and set standard to enable the operator to safely implement the operator's safety management system…

and the responsibility for

> …managing the operation of the safety management system including managing corrective, remedial and preventative action in relation to the system…

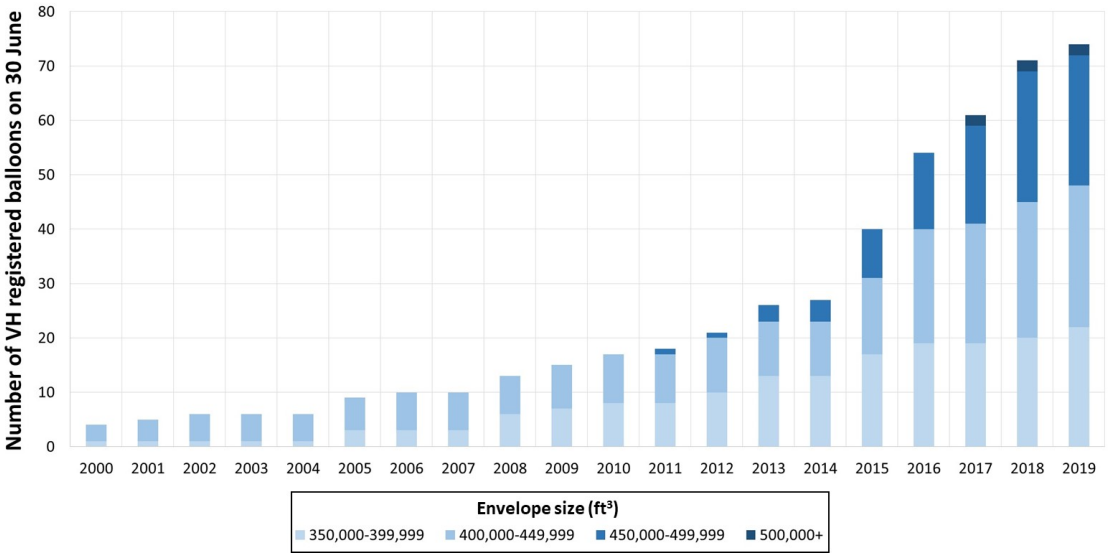
In a 22 November 2019 update, CASA provided a summary following the consultation period for Part 131:

> To provide additional time to consult with industry on the requirements related to safety management systems and training and checking systems, CASA has removed the proposed regulations related to safety management systems (SMS) and training and checking systems for balloon transport operators (including the requirement for the two associated key personnel – the head of training and checking and the safety managers).

Large balloons in Australia

Multiple ground crew and pilots reported to the ATSB that the use of the vehicle-assisted method is only used for balloons with envelope sizes of 350,000 ft^3 or greater (some reported 400,000 ft^3 as the minimum size). Balloons with smaller envelope sizes are more likely to be collapsed by hand in low wind conditions.

Figure 3: Number of large VH-registered balloons on 30 June between 2000 and 2019



Source: Civil Aviation Safety Authority

The ATSB conducted an analysis of the trend in the risk associated with vehicle-assisted deflation. This was based on vehicle-assisted deflation only being used for balloons with a capacity of 350,000 ft^3 or greater.

Over the period mid-2015 to mid-2019, the number of large balloons registered in Australia increased by around 8-9 more balloons each year (Figure 3).

Given this trend, it is likely that the use of vehicles to assist during deflation will continue to increase over the period 2020-2022. In addition, the average size of these balloons (350,000 ft^3 or greater) has also increased and accordingly, the average number of passengers per larger balloon flight has also increased.[6] It follows then, that, the number of passengers potentially exposed to injury associated with vehicle-assisted deflation per flight will also probably increase.

Related occurrences

A review of the ATSB occurrence database found the following ground handling occurrences involving the use of a vehicle to assist in the deflation process:

Occurrence 201600589

At 0700 on 22 April 2016, the pilot of a Kavanagh Balloons B-425 was seriously injured when the basket tipped during a vehicle-assisted deflation. During the deflation, the pilot dropped the radio resulting in a communication breakdown with the driver of the vehicle. The pilot was then unable to command the driver to stop, resulting in the vehicle driving too far, causing the basket to tip. At the time of the accident, there was probably only one passenger still on board the balloon.

Following that occurrence, the operator involved implemented new procedures intended to reduce the likelihood and consequences of a communication breakdown during vehicle-assisted deflation. This included the following information:

> Communication needs to be very clear not only on the radio but visually as well. This is where the second crew member is vitally important, if for whatever reason radio comms are lost between the PIC [pilot in command] and vehicle this crew member needs to be able to convey information between basket and vehicle. Whilst anyone is pulling over an envelope please limit radio transmissions in other balloons and retrieve vehicles, multiple people using the same channel will cause cancelling of transmissions, PIC and driver only to use radio during the pull down procedure with the vehicle driver "reading back" instructions, this ensures the information is correct and understood. If multiple balloons are about to begin collapsing their envelopes using mobile phones is preferred to ensure continuous communication. Discuss hand signals between crew members before commencing procedure and if at any-time communication either visual or verbal is lost STOP and wait until comms are restored.

The new procedure also contained information intended to reduce the consequence of a similar accident:

> While collapsing envelope the pilot is to remain inside basket and passengers are to adopt landing positions.

Occurrence 201809492

At 0630 on 31 December 2018, a passenger on board a Kavanagh Balloons B-400 sustained a minor injury when the basket tipped during a vehicle-assisted deflation. During the deflation, radio interference resulted in a communication breakdown between the pilot and the driver of the vehicle. The driver was unable to hear the pilot's command to stop, resulting in the vehicle driving too far, causing the basket to tip. At the time of the occurrence there were 18 passengers on board the balloon.

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[6] Generally, the larger a balloon's envelope size the more passengers the balloon can carry. Balloon with envelope sizes of 450,000 ft^3 or greater are more likely to carry 20 or more passengers.

Safety analysis

This analysis will discuss how and why the basket tipped over during the vehicle-assisted deflation and the effect of the passengers not being in the landing position. The risk management of vehicle-assisted deflation will also be analysed from both the balloon operator's perspective and the commercial balloon industry and regulator more broadly.

Communication breakdown and procedures

During the vehicle-assisted deflation, the driver did not have vision of the basket and the pilot (in the basket) put the hand-held radio down. Subsequently, the pilot was unable to pick up the radio in time to order the driver to stop the vehicle when it became apparent that the basket would tip. In addition, the second ground crew member was not in a position to effectively communicate with the driver during the deflation. The scenario collectively meant that no one could quickly communicate with the driver to prevent the basket tipping.

Picture This Ballooning (PTB) did not have specific procedures for vehicle-assisted deflation or communicating during the process. The general loss of communication (radio failure) procedure was not suitable during vehicle-assisted deflation because there was no time in which to access an alternative means of communication in the event of a communication breakdown.

The normal communication practice for vehicle-assisted deflation was for the driver to continue until the pilot instructed them to stop. However, the pilot could have a very short time to instruct the driver to stop if they approached the point where the basket tips. This would require continuous radio communication between the pilot and the driver, which was lost when the pilot put down the radio to open the vent. While the communications procedure in the company's operations manual required pilot and ground crew to 'maintain a continuous watch' during flight, it did not stipulate the same during deflation. However, if the pilot needed two hands to open the vent, an alternative means of communicating with the driver was required.

The vehicle-assisted deflation process did not effectively utilise the second ground crew member and that person was not required to be in a position to be able to communicate with the driver by an alternative means such as shouting or signalling.

The pilot and ground crew did not use standard communication phraseology during the vehicle-assisted deflation. The lack of standard phraseology can increase the likelihood of miscommunication or delayed actions.

Use of passenger landing position

The landing position was designed to reduce the likelihood and severity of injury during layover landings. ATSB analysis concluded that the injury profile of passengers within a basket that tips during a vehicle-assisted deflation would be similar to when a basket tips during a fast landing.

PTB did not have specific passenger positioning procedures for vehicle-assisted deflation, nor was there a specific passenger briefing for this process. In addition, the pilot was unaware there was a risk of the basket tipping, and accordingly, did not instruct the passengers to assume the landing position during the vehicle-assisted deflation. As such, most of the passengers were not in the landing position during the deflation and were thus exposed to a greater risk of injury when the basket tipped.

Awareness of tipping risk

The pilot and ground crew was unaware that there was a risk of the basket tipping during the vehicle-assisted deflation. A greater awareness of the risks associated with vehicle-assisted deflation would likely have prompted greater vigilance during the process and thus a reduced probability of the basket tipping. Further, the pilot would have been more likely to brief passengers on the risk and instruct on use of the landing position.

Operator's safety risk management processes

Before the accident, the operator had not conducted a safety risk assessment of deflation techniques, nor were they required to by current regulations or their own management processes and practices. As a result, the operator had not properly considered the risks of vehicle-assisted deflation and so had not considered writing specific safety procedures to ensure it was done safely and the crew was aware of the risks.

Following a similar accident, another operator working under similar conditions developed a new procedure for deflation. This included measures to reduce the likelihood of a communication breakdown[7] during vehicle-assisted deflation and having passengers in the landing position during the process. This further indicates that if a risk assessment had been conducted by PTB, it is probable they would have identified communication breakdown and the risk of injury to passengers (if the basket tipped) as key operational risks requiring mitigation.

CASA guidance material

Guidance material produced by CASA did not contain information regarding passenger safety briefings during the deflation process.

Prior to the subject event, there had been two related accidents with similar contributing factors. More generally, the ATSB found limited awareness of any risks associated with vehicle-assisted deflation in the commercial ballooning industry. It is likely that if guidance material had been issued by CASA on the risks associated with vehicle-assisted deflation, it would have increased awareness of the associated risks with operators introducing large balloons to their charter operations.

As balloon charter operators are not presently required by regulation to have a safety management system (SMS), there was, and remains, a lower likelihood of these operators conducting risk assessments for changes in operations. Given another operator involved in a similar accident reported that they had not conducted a formal risk assessment of vehicle-assisted deflation prior to the accident, guidance material from CASA could have drawn attention to the risks for these operators.

With the increase in the numbers of larger balloons registered in Australia, it is expected that the use of the vehicle-assisted deflation practice will similarly increase, and will likely be used by a greater number of operators over time. Further, with larger envelope and basket capacities comes an increase in the numbers of passengers exposed to injury risk in the event of a basket tipping during a vehicle-assisted deflation. As such, this guidance will be important for helping educate other operators as they move to larger balloon operations in the future.

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[7] Driver 'reading back' pilot's instructions; use of mobile phones if radio interference is anticipated; second ground crew member to stand in a position visible to both pilot and the driver; and, if visual of verbal communications is lost, the driver is to stop and wait until communication are restored.

Findings

From the evidence available, the following findings are made with respect to the ground handling event involving a Kavanagh B-400 balloon, registered VH-LNB, near Coldstream, Victoria on 16 March 2019. Two passengers were seriously injured when, during deflation, the balloon's basket was inadvertently tipped by the vehicle assisting with deflation of the envelope. 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

- The pilot put down the handheld radio to operate the vent line, and the second ground crew member was not in an observable position for the driver, which led to a communications breakdown and limited their opportunity to promptly command the driver to stop to avoid the basket tipping.
- The majority of the passengers were not in the landing position when the basket tipped, increasing their probability for injury.
- ***Picture This Ballooning*** **did not have any procedures for conducting vehicle-assisted deflation.** [Safety issue]
- The pilot and ground crew were unaware of the risk of the basket tipping from the vehicle pulling the envelope during vehicle-assisted deflation.
- ***Picture This Ballooning's*** **safety risk management processes and practices were not sufficient to facilitate the identification of key operational risks associated with vehicle-assisted deflation.** [Safety issue]

Other factors that increased risk

- **The Civil Aviation Safety Authority provided no guidance for operators concerning the risks associated with vehicle-assisted deflation.** [Safety issue]

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.

Depending on the level of risk of the safety issue, the extent of corrective action taken by the relevant organisation, or the desirability of directing a broad safety message to the aviation industry, the ATSB may issue safety recommendations or safety advisory notices as part of the final report.

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 provided 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.

Vehicle-assisted deflation procedures

Safety issue number: AO-2019-014-SI-02

Safety issue owner: Picture This Ballooning

Operation affected: Aviation: Charter

Who it affects: Commercial Balloon operators that use a vehicle to assist during deflation

Safety issue description

Picture This Ballooning did not have any procedures for conducting vehicle-assisted deflation.

Proactive safety action

Action taken by: Picture This Ballooning

Action number: AO-2019-014-NSA-011

Action status: Closed

Safety action taken: *Picture This Ballooning* developed a new procedure for deflation. This included the steps:

> Clear radio communication is to be established between the PIC and the crew (Crew 1) driving the tow over vehicle.
>
> Crew 2 shall be radio equipped and locate themself adjacent to the basket where a) they can maintain verbal contact with the PIC and b) maintain visual contact with the tow over vehicle. Crew 2 are to act as communication backup between PIC and Crew 1 if required.
>
> PIC to instruct passengers to resume their landing positions in case the basket inadvertently gets pulled over onto its side.

Status of the safety issue

Issue status: Closed - Adequately addressed

Justification: The ATSB is satisfied that these procedures should significantly reduce the likelihood of basket tipping and personnel injury when conducting a vehicle-assisted deflation.

Risk management processes

Safety issue number: AO-2019-014-SI-01

Safety issue owner: Picture This Ballooning

Operation affected: Aviation: Charter

Who it affects: Commercial Balloon operators that use a vehicle to assist during deflation

Safety issue description

Picture This Ballooning's safety risk management processes and practices were not sufficient to facilitate the identification of key operational risks associated with vehicle-assisted deflation.

Proactive safety action

Action taken by: Picture This Ballooning

Action number: AO-2019-014-NSA-012

Action status: Closed

Safety action taken: *Picture This Ballooning* provided the following response to the safety issue:

> Picture This Ballooning is to adopt safety management systems as required by CASA as and when CASA Part 131 is brought into force. In the meantime, Picture This Ballooning will specifically review its own safety management processes and practices, together with introducing a regular annual industry wide review of best practice in light of any and all safety incidents reported by ATSB and/or CASA.

Status of the safety issue

Issue status: Closed - Adequately addressed

Justification: The ATSB agrees that compliance with the requirements of Part 131 will likely facilitate the identification of key operational risks including those associated with vehicle-assisted deflation. Prior to the introduction of Part 131, the operator's review of their own safety management processes and practices and an annual, industry-wide review will also likely facilitate the identification of key operational risks.

Guidance on vehicle-assisted deflation risks

Safety issue number: AO-2019-014-SI-03

Safety issue owner: Civil Aviation Safety Authority

Operation affected: Aviation: Charter

Who it affects: Commercial Balloon operators that use a vehicle to assist during deflation

Safety issue description

The Civil Aviation Safety Authority provided no guidance for operators concerning the risks associated with vehicle-assisted deflation.

Proactive safety action

Action taken by: Civil Aviation Safety Authority

Action number: AO-2019-014-NSA-013

Action status: Monitor

Safety action taken: The Civil Aviation Safety Authority advised the ATSB of their intention to produce an advisory circular addressing the safety issue in the following response:

> ... This AC [Advisory Circular] will include guidance on deflation of hot air balloon envelopes using vehicle assistance.
>
> The information will include that:

1) The operator and PIC should have a system to ensure communications are maintained at all times between the pilot, other ground crew persons, and the driver of the vehicle.
2) Passengers should either have disembarked or have adopted the landing position before the deflation procedure begins.
3) Pilots should be aware of the need to control the rate of deflation in relation to the force applied to the crown rope
4) Operator's operations manuals should document the standard operating procedure for deflating the balloon with or without vehicle assistance.

ATSB response: The ATSB agrees that the proposed advisory circular would, when published and disseminated, allow commercial balloon operators to take effective action to reduce the risks associated with vehicle-assisted deflation practices. The ATSB will continue to monitor this safety action.

Status of the safety issue

Issue status: Open - Safety action pending

Additional safety actions

ATSB safety advisory notice to all commercial balloon operators

Action number: AO-2019-014-SAN-014

To accompany this report and encourage proactive safety action, the ATSB has released a safety advisory notice to all commercial balloon operators informing them of the risks associated with vehicle-assisted deflation.

The ATSB advises all commercial balloon operators utilising vehicle-assisted deflation methods to review their current operational practices in light of the findings in the ATSB investigation report AO-2019-014 with the aim of mitigating the risks associated with the procedure. This review should be conducted with emphasis on:

- reducing the risks associated with a communications breakdown between the pilot and vehicle driver, and
- include a review of the positioning of occupants within the basket to minimise the likelihood of injury if the basket tips during the vehicle-assisted deflation.

Future study proposed by Picture This Ballooning

Action number: AO-2019-014-NSA-015

Picture This Ballooning has informed the ATSB that, at the earliest practical date, they intend to study the forces present during the vehicle-assisted deflation process and to pass these results to other commercial ballooning operators.

General details

Occurrence details

Date and time:	16 March 2019 – 0830 EDT	
Occurrence category:	Accident	
Primary occurrence type:	Ground handling	
Location:	5 km 6° T of Coldstream (ALA), Victoria	
	Latitude: 37° 40.9560’ S	Longitude: 145° 24.9720’ E

Aircraft details

Manufacturer and model:	Kavanagh Balloons B400	
Registration:	VH-LNB	
Operator:	Picture This Ballooning	
Serial number:	B400-440	
Type of operation:	Charter – Passenger	
Departure:	Private property near Dixons Creek, Victoria	
Destination:	Private property near Coldstream, Victoria	
Persons on board:	Crew – 1	Passengers – 16
Injuries:	Crew – 0	Passengers – 2 Serious
Aircraft damage:	Nil	

Sources and submissions

Sources of information

The sources of information during the investigation included:

- *Picture This Ballooning*
- The Civil Aviation Safety Authority
- The Bureau of Meteorology
- Witnesses
- Victoria 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 *Picture This Ballooning* and the Civil Aviation Safety Authority.

Submissions were received from *Picture This Ballooning* and the Civil Aviation Safety Authority. There submissions were reviewed and where considered appropriate, the text of the report was amended accordingly.

Australian Transport Safety Bureau

The 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 the ATSB's 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.

Terminology used in this report

Occurrence: accident or incident.

Safety factor: an event or condition that increases safety risk. In other words, it is something that, if it occurred in the future, would increase the likelihood of an occurrence, and/or the severity of the adverse consequences associated with an occurrence. Safety factors include the occurrence events (e.g. engine failure, signal passed at danger, grounding), individual actions (e.g. errors and violations), local conditions, current risk controls and organisational influences.

Contributing factor: a factor that, had it not occurred or existed at the time of an occurrence, then either:

(a) the occurrence would probably not have occurred; or

(b) the adverse consequences associated with the occurrence would probably not have occurred or have been as serious, or

(c) another contributing factor would probably not have occurred or existed.

Other factors that increased risk: a safety factor identified during an occurrence investigation, which did not meet the definition of contributing factor but was still considered to be important to communicate in an investigation report in the interest of improved transport safety.

Other findings: any finding, other than that associated with safety factors, considered important to include in an investigation report. Such findings may resolve ambiguity or controversy, describe possible scenarios or safety factors when firm safety factor findings were not able to be made, or note events or conditions which ‘saved the day’ or played an important role in reducing the risk associated with an occurrence.