Australian Government
Civil Aviation Safety Authority

ADVISORY CIRCULAR
AC 131-02 v2.0

Manned free balloons - Operations

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Advisory circulars are intended to provide advice and guidance to illustrate a means, but not necessarily the only means, of complying with the Regulations, or to explain certain regulatory requirements by providing informative, interpretative and explanatory material.

Advisory circulars should always be read in conjunction with the relevant regulations.

Audience

This advisory circular (AC) applies to persons conducting balloon transport operations, commercial balloon flying training, specialised balloon operations and Part 131 the *Civil Aviation Safety Regulations 1998* (CASR) recreational activities in Part 131 aircraft that are hot air balloons, gas balloons, mixed (gas and hot air) balloons and hot air airships. It does not apply to permanently tethered gas balloon operations as described under Subpart 131.Z of CASR.

Purpose

Primarily, this AC provides guidance for the audience on the topics listed below. A limited number of acceptable means of compliance are also included:

- flight preparation (weather assessment)
- passenger safety briefings
- inflation fans
- dangerous goods
- flying near sensitive areas
- vehicle assisted deflation and ground handling.
- electronic documents
- flights over populous areas and public gatherings.

For further information

For further information, contact CASA’s Flight Standards Branch (telephone 131 757).

Unless specified otherwise, all subregulations, regulations, Divisions, Subparts and Parts referenced in this AC are references to the *Civil Aviation Safety Regulations 1988 (CASR)*.

Status

This version of the AC is approved by the Branch Manager, Flight Standards.

Note: Changes made in the current version are not annotated. The document should be read in full.

Version	Date	Details
v2.0	December 2021	Complete replacement of Chapter 2. Major updates to regulatory references in section 3.1. Minor changes to regulatory references elsewhere. All changes are due to the commencement of Part 131 of CASR and reflect the interim legislative structure in place in the absence of the Part 131 MOS.
v1.0	October 2020	This is the first AC to be written on this subject. It provides new operational advice and includes operational guidance previously published in AC 131-01 - Part 131 Aircraft - Continuing airworthiness. The regulatory references in this document apply prior to the commencement of Part 131 on 2 December 2021. This document will be updated with new regulatory references at that time.

Contents

1 Reference material

1.1 Acronyms

The acronyms and abbreviations used in this AC are listed in the table below.

Acronym	Description
ABF	Australian Balloon Federation Inc
AC	Advisory Circular
AIP	Australian Information Publication
AMC	acceptable means of compliance
AOC	Air Operator's Certificate
ATSB	Australian Transport Safety Bureau
CAO	Civil Aviation Order
CAR	*Civil Aviation Regulations 1988*
CASA	Civil Aviation Safety Authority
CASR	*Civil Aviation Safety Regulations 1998*
EASA	European Aviation Safety Agency
EFB	electronic flight bag
GAF	graphical area forecast
GM	Guidance material
ICAO	International Civil Aviation Organization
MOS	Manual of standards
PIC	pilot in command
SA	sensitive area
TWG	Technical working group

1.2 Definitions

Terms that have specific meaning within this AC are defined in the table below. Where definitions from the civil aviation legislation have been reproduced for ease of reference, these are identified by 'grey shading'. Should there be a discrepancy between a definition given in this AC and the civil aviation legislation, the definition in the legislation prevails.

Term	Definition
old CAR	means the *Civil Aviation Regulations 1988*, as they were in force on 1 December 2021, prior to the commencement of Part 131

1.3 References

Legislation

Legislation is available on the Federal Register of Legislation website https://www.legislation.gov.au/

Document	Title
Section 20A of the Civil Aviation Act (1998)	Reckless operation of aircraft
Part 131 of CASR	Balloons and hot air airships
Part 149 of CASR	Approved self-administering organisations
Regulation 206 of CAR	Prescribed purpose - miscellaneous
Regulation 239 of old CAR	Planning of flight by pilot in command
Regulation 259 of old CAR	Manned free balloons
CAO 95.53	Civil Aviation Order 95.53 (Commercial Balloon Flying Training and Balloon Transport Operations) Instrument 2021
CAO 95.54	Civil Aviation Order 95.54 (Part 131 Recreational Activity and Specialised Balloon Operations) Instrument 2021
Instrument CASA 143/10	Determination - flight visibility and distance from cloud in VFR flights

Advisory material

CASA's advisory materials are available at https://www.casa.gov.au/publications-and-resources/guidance-materials

Document	Title
AC 1-02	Guide to the preparation of expositions and operations manuals
AC 91-17	Electronic flight bags
AC 131-01	Manned free balloons - Continuing Airworthiness
Part 131 AMC/GM	Acceptable Means of Compliance / Guidance Material

2 Overview of Part 131

2.1 Who does Part 131 apply to?

2.1.1 Part 131 applies to all operations of Part 131 aircraft. A Part 131 aircraft is any of the following:

- hot air balloons
- hot air airships
- gas balloons
- mixed balloons (gas and hot air combination).

Note: Large power-driven gas-filled airships are not a Part 131 aircraft and are not regulated by Part 131. Licensing rules for these aircraft are contained in Part 61 and the operational rules are solely contained in Part 91.

2.1.2 The operation of Part 131 aircraft is divided into four categories:

- **Balloon transport operations[1]:** these are passenger transport operations in a Part 131 aircraft conducted for hire or reward and operators are required to hold an AOC due to regulation 131.040.
- **Commercial balloon licence / rating training:** these are flights for the grant of a licence or rating under Part 5 of CAR and operators are required to hold an AOC due to paragraph 206 (a) of CAR.
- **Specialised balloon operations[2]:** these are flights of Part 131 aircraft for specialised purposes, some of which may be conducted for hire or reward, but they do not have to be, and operators are required to hold an approval from CASA in line with regulation 131.325.
- **Part 131 recreational activities[3]:** these are flights of Part 131 aircraft that are not covered by any of the previous 3 categories and are administered by the Australian Balloon Federation Inc (ABF).

2.2 Summary of legislation applying to the operation of a Part 131 aircraft

2.2.1 In general, the Part 131 regulations and the Part 131 MOS are intended to contain most of the rules that apply to the operation and use of Part 131 aircraft. Part 91 and the Part 91 MOS perform an equivalent function for the rest of the aviation industry, with other operational CASR Parts (121, 132, 133, 135, 137, 138, 141, 142) prescribing specific additional rules for certain kinds of operations in aeroplanes and rotorcraft.

Note: At the time of publishing this version of this AC, the making and commencement of the Part 131 MOS has been deferred. As a result, an interim legislative structure is in place that contains the relevant operational rules relevant to the absence of the MOS.

2.2.2 Most of Part 91 is 'turned off' (or disapplied) for Part 131 aircraft because certain topics need rules to be specifically tailored to the operation of a Part 131 aircraft. The list of

[1] Balloon transport operation is defined in regulation 131.010.
[2] Specialised balloon operation is defined in regulation 131.020.
[3] Part 131 recreational activity is defined in regulation 131.025.

disapplied Part 91 rules for the operation of a Part 131 aircraft are contained in subregulation 91.030 (3).

2.2.3 Figure 1 outlines the legislative framework that will apply to different balloon operations.

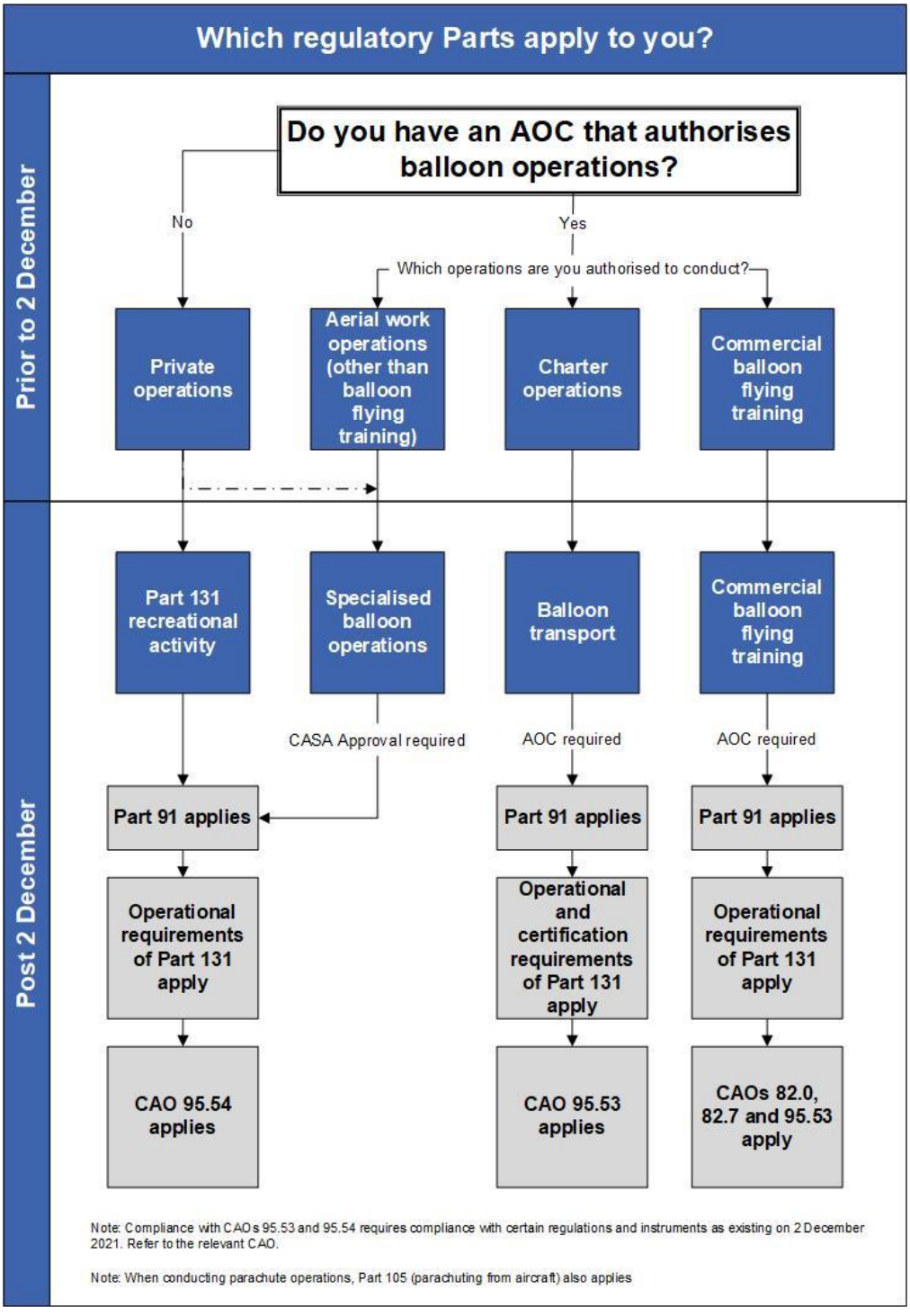

Figure 1: Legislative framework relevant to balloon operations

3 Flight preparation – weather assessment

3.1 Regulatory requirements

Notes:

1. The 2021 replacement versions of CAO 95.53 and CAO 95.54 have effect to require continued compliance with specified provisions of the *Civil Aviation Regulations 1988* and Civil Aviation Orders that are otherwise repealed from 2 December 2021. Regulation 239 of old CAR is one such provision.
2. Where this document refers to a compliance with a regulation of 'old CAR' or 'old CAO' operators and persons must comply with the provisions of the old CAR, or any instruments made under the old CAR, as if they were still in force.
3. Under Part 131, balloon transport AOC holders are required to detail their operational procedures in an exposition. Under the 2021 issue of CAO 82.7, the holders of an AOC authorising commercial balloon flying training are required to detail their operational procedures in an operations manual. As per CASA's other guidance on these documents, the 2 terms are different regulatory labels that are not intended to mean that different documents or different document formats are required. Please review AC 1-02 - *Guide to the preparation of expositions and operations manuals*.

3.1.1 Section 20A of the *Civil Aviation Act 1988* (the Act) states that a person must not operate an aircraft being reckless as to whether the manner of operation could endanger the life of another person. A person must also not operate an aircraft being reckless as to whether the manner of operation could endanger the person or property of another person.

3.1.2 Regulation 91.055 states that the pilot in command (PIC) of an aircraft must not operate in a manner that creates a hazard to another aircraft, a person or property.

3.1.3 The terrain to be flown over and seasonal meteorological conditions have considerable impact on the conduct of a balloon flight. A pilot's pre-flight weather assessment and resulting decision is a critical factor in determining the safety of a flight.

3.1.4 The permit issued to balloon AOC holders under regulation 259 of old CAR requires that before commencing a flight a PIC must, from an appropriate Airservices Australia briefing facility, obtain the following briefings for the planned duration of the flight plus two hours:

- an operational briefing, including current FIR and Head Office NOTAMs, regarding airspace activation, availability of facilities and anticipated military low flying
- a meteorological briefing, including the aerodrome forecasts and the parts of an area forecast, relevant to the flight, with particular emphasis on expected changes to surface conditions and winds at the gradient level.

3.1.5 For Part 131 recreational balloon activities, the ABF operations manual requires that, as part of the flight planning process, a pilot must conduct a thorough pre-flight weather check and review of current NOTAMS.

3.1.6 Regulation 239 of old CAR requires all PIC to plan their flights based on a study of all available information appropriate to the intended operation. In the case of flights away from the vicinity of the aerodrome, the PIC must conduct a careful study of:

- current weather reports and forecasts for the route to be followed and at aerodromes to be used
- the airways facilities available on the route to be followed and the condition of those facilities

- the condition of aerodromes to be used and their suitability for the aircraft to be used
- the air traffic control rules and procedure pertaining to the particular flight.

3.1.7 Although not legally prescribed for the purposes of regulation 239 of old CAR, it is an acceptable means of compliance if pilots and operators consider 'in the vicinity of the aerodrome' to have the meaning as prescribed by regulation 91.360 of CASR which applies only to non-controlled aerodromes. This means if the balloon is within 10nm of the aerodrome and at a height that could conflict with operations at the aerodrome.

3.1.8 The visual meteorological criteria (VMC) are authorised by CASA Instrument 143/10 and published in the AIP. The VMC for balloons are set out in Table 1 below.

Table 1: VMC for balloons

Class of airspace	Applicable height	Minimum flight visibility	Minimum clearance from cloud	Conditions (if any)
Class C, E and G	At or above 10000ft AMSL	8km	1000ft vertical 1500m horizontal	For class C – subject to special VFR
Class C	Below 10000ft AMSL	5000m	1000 ft vertical 1500m horizontal	Subject to special VFR
Class D	All of the Class D airspace	5000m	1000ft when above the cloud 500ft when below the cloud 600m horizontal	Subject to special VFR
Class E	Below 10000ft AMSL	5000m	1000ft vertical 1500m horizontal	
Class G	Below 10000ft AMSL	5000m	1000 ft vertical 1500m horizontal	The three rules below can override this rule.
Class G	Below the higher of 3000ft AMSL or 1000ft AGL	5000m	Clear of cloud	Must be in sight of ground or water and carry a radio and use it on the appropriate frequency. The two rules below 1500ft AGL can override this rule.
Class G	500 to below 1500 ft AGL	5000m	Clear of cloud	No vertical clearance from cloud only if the top of the cloud is at or below 500ft AGL and the balloon is a minimum of 10nm from an aerodrome with an instrument approach procedure (IAP)
Class G	Below 500ft AGL	100m	Not applicable	Day only. Minimum 10nm from an aerodrome with an IAP

3.1.9 Under CASA instrument 143/10 a balloon pilot may only conduct a flight under the special VFR:

- in Class C or D airspace
- if the flight is conducted clear of cloud
- the flight is conducted in accordance with the requirements of regulation 157 of CAR in relation to low flying
- the pilot has received a clearance from ATC to operate under the special VFR
- the flight visibility is not less than:
  - 100m for a height below 500ft AGL
  - 1600m for a height at or above 500ft AG.

Note: CASA instrument 143/10 is made under regulation 172 of old CAR and CAO 95.53 and CAO 95.54 give effect to complying with this regulation in Part 12 Division 3 of old CAR as if it was still in force.

3.2 Weather and its effects on balloon operations

3.2.1 Flight in a balloon or hot air airship will be affected, and may be limited, by the local weather conditions. The most important meteorological conditions for the PIC to consider before flight are:

- wind speed and direction
- storms, rain and showers
- fog, mist and visibility
- stability of the atmosphere.

3.2.2 It is essential to safe operations that pilots and operators conduct good weather assessments and apply sound risk-based decision making to every phase of flight. However, incident and accident data has identified that the landing phase is the most dangerous in balloon operations.

3.2.3 AIP ENR 1.10 para 1.2.1 requires all aircraft to include certain forecast information within the pre-flight study required by regulation 239 of old CAR. For balloon operations conducted away from an aerodrome that has a dedicated aerodrome forecast, the minimum required forecast is a graphical area forecast (GAF).

3.2.4 However, the GAF product does not provide a localised forecast for the smaller area of operations typically used for a balloon flight. Therefore, it is recommended that pilots and operators use additional localised products relevant to their area of operation.

Wind speed and direction

3.2.5 Many applications and websites, from the Bureau of Meteorology (BoM) and other independent suppliers, provide observations and computer modelling of ‘up to the minute’ wind speed and direction. It is recommended that pilots and operators familiarise themselves with the websites and applications for their area of operations and note any version updates or new online sources of detailed weather information as they occur.

3.2.6 It is recommended that pilots and operators use a lighter-than-air gas filled small rubber balloon known as a pibal for determining wind speed and direction at the launch (take-off) site and in the first few hundred feet above the surface. The release of a pibal by

trained ground crew at the planned landing area, and the communication of the wind speed and direction to the pilot, can significantly aid the pilot's decision making for the landing phase of a flight.

Storms, rain and showers

3.2.7 The BoM weather radar coverage encompasses most areas of balloon operations and is available on any network connected device. The location, speed and direction of movement of storm cells or rain bands can easily be assessed so that flight in unsuitable conditions can be avoided.

3.2.8 In the event of a flight being conducted when there are showers in the area, pilots are encouraged to monitor the weather radar during flight in conjunction with their own observations and be prepared to land earlier than planned if the weather conditions are deteriorating. An early landing at an unplanned site under control is far simpler than a landing at the planned site in poor weather.

Fog, mist and visibility

3.2.9 In valleys low level mist or fog in the early morning is a common occurrence. The nature of balloon operations is that the take-off and initial operations occur at the times of the day when these conditions have the largest operational impact. It is therefore essential that balloon pilots and operators have a thorough practical knowledge of these phenomena and, gather as much knowledge as possible on the peculiarities of the local area in which they are conducting operations. On any given day of operations, pilots and operators should be applying this background knowledge to make solid risk-based decisions regarding the safety of every flight. If operating in a new area, sources of knowledge on local weather conditions could include operators who have been operating in the area for some time or the local BoM forecaster.

3.2.10 While the law permits a balloon operation to occur in 100 m visibility below 500 ft AGL in Class G airspace (and in Class C and D if the special VFR are complied with), it is highly recommended that pilots and operators exercise this permission with appropriate caution and only where sufficient flight preparation has taken place. As described in section 20A of the Act, pilots and operators must not operate an aircraft in a reckless manner that could endanger persons or property.

3.2.11 The Australian Balloon Federation (ABF) Training Manual v3.01 2019[4] advises the following:

> The reduced VMC clearances for balloons below 500ft AGL make it possible to launch in early morning fog that is expected to clear. Flight must not continue above 500ft AGL unless the visibility and cloud clearance from 500ft upwards are as shown in the tables above (sic – the tables show the VMC requirements as per the legal minimums). As a pilot you must always ensure that a flight is safe in your judgement, as well as being legally within VMC. Allow adequate margins with regard to the overall flight conditions and your own experience. It is advisable not to launch in 100 metres visibility unless you are confident that the visibility will improve as you fly. It is possible to fly over fog only to discover that the fogbank is continuing to form ahead of you, and you are unable to clear it. Fog or low cloud is not always calm – it can be moving at up

[4] Used with permission from the ABF.

to 8 knots. Powerlines and other obstacles are hard to see and landing in fog can therefore be very dangerous and is not recommended.

3.2.12 Pilots preparing to conduct a flight in areas and in conditions where fog limiting visibility is present, or which may form later, should conduct a risk assessment for the planned flight which should be appropriate to the operation on the day. A risk assessment is an assessment of the pilot's skills and experience against the conditions which are present and relevant to that flight. The key aspect is developing and discovering the present and relevant factors, even for experienced pilots that have often flown in foggy conditions.

3.2.13 Recommended techniques, and matters to obtain knowledge of, include the following:

- access as many local weather information sources and authorised meteorological forecasts as practicable
- reviewing the ambient temperature trend and the dewpoint
- obtain local observations of visibility and cloud cover along the planned route, and at possible landing areas, from personal observation on the drive to the launch site, or by communication from ground crew sent out to reconnoitre
- observations from high points in the terrain may provide a better overall picture of the conditions
- observations of the surface windspeed over high points may also be worth noting
- be aware that low level fog, especially (but not only) over inland bodies of water such as lakes or dams, will often thicken up after sunrise as the surface, and the air close to the surface, continues to cool
- if two or more balloons are operating in company it may be prudent to launch one balloon before the other(s) to allow the PIC to assess the conditions and communicate with the balloons still on the ground.

3.2.14 Because fog changes over time, its' movement, spread and depth is often difficult to predict with accuracy. There is a long history of pilots and operators being caught out by changes in the fog that were not predicted. Prior to becoming airborne, pilots should think about how to manage the threats to continuing safe flight and have plans in place for making a landing at an alternative time and/or place.

3.2.15 While low level surface fog or mist is usually present when the wind conditions are calm or very light, pilots and operators should be aware that these conditions can also be present in higher wind conditions. Although a balloon does move slowly compared to other aircraft, taking off and landing in 100 m visibility when the wind has picked up can result in the pilot not having enough reaction time and balloon performance to avoid obstacles. It is highly recommended that pilots consider these limitations if taking off or landing in conditions of reduced visibility.

Example:

A balloon travelling at 10kts will take 19 seconds to travel 100 metres horizontally.

A balloon travelling at 5 kts will take 38 seconds to travel 100 metres horizontally.

Most hot air balloons used for recreation and commercial operations have maximum climb rates of 1000 feet per minute or 5 metres per second. A tall eucalyptus tree may be 50 metres high.

A reasonably large balloon will contain 10 tonnes of hot air and possibly a tonne of payload. This is a significant aircraft mass. Despite the significant energy output of the

propane burners, it may take up to 30 seconds for this mass to begin moving rapidly in a different vertical direction.

3.2.16 Emergencies can occur in the take-off and initial climb phase before the balloon has reached 500 ft AGL and the required better visibility. In these circumstances, if a safe immediate landing is to be performed, the pre-flight reconnaissance of the area surrounding the launch site will be invaluable in making a safe landing. Pilots need to have a solid knowledge of power lines, trees and other obstacles in the near vicinity of the launch site.

3.2.17 If an emergency occurs during flight, pilots should carefully consider their options for landing. Depending on the emergency, conducting a descent back into very low visibility conditions to conduct a landing at a site where the pilot does not have detailed obstacle knowledge carries significant risks. Pilots should assess the relative risks for different emergencies involved with continuing flight to a landing site with better conditions versus landing immediately without adequate obstacle awareness in poor conditions.

Stability of the atmosphere

3.2.18 Thermals and atmospheric instability can seriously affect the safety of flight in lighter-than-air aircraft. In conditions of higher ambient temperatures, such as can exist in the summer months, pilots should be aware of the possibility that flying conditions may change very quickly as the temperature rises.

3.2.19 Pilots preparing to conduct a flight in higher ambient temperatures, when atmospheric instability may exist during the planned flight or on landing, should access as many local weather information sources and meteorological forecasts as practicable. Pilots should pay attention to any forecast temperature and humidity increases in the forecast period and be prepared to amend the flight plan.

3.2.20 To assist with quicker responses to control inputs in conditions of higher ambient temperatures, pilots should also be aware of the need to reduce the total load of the aircraft and should not plan to fly at maximum all up weight (MAUW).

4 Passenger safety briefing

4.1 Briefings

4.1.1 This section sets out some practices recommended by CASA for briefing passengers before and during flight. Regulation 131.195 sets out the content that must be included in the exposition required for the use and guidance of the operations personnel of a balloon transport operator. The ABF maintains an operations manual that is applicable to pilots conducting recreational balloon activities.

Note: The information contained in this section was previously published in CAAP 253-02 - Passenger safety information: Guidelines on content and standard of safety information to be provided to passengers by aircraft operators which has now been withdrawn.

4.1.2 The PIC shall ensure that before and, when appropriate during the flight, passengers are briefed on normal and emergency procedures.

4.1.3 It is during the landing phase that there is the greatest risk of injury to a passenger and well briefed passengers help to mitigate the risks during normal and abnormal situations.

4.1.4 The basic briefing is the minimum briefing that a passenger embarking on a flight in a lighter-than-air aircraft should be given by the PIC, or by a person or other briefing system designated for the purpose by the PIC. It should include information, instruction, and demonstration where appropriate, about safety matters in such a way that the information is easily understood and retained.

4.1.5 Balloon transport operators may use trained ground support personnel who can assist with the briefing of passengers. Such personnel may assist with the briefing by translating into languages other than English or by presenting written, graphic or video safety instructions.

4.1.6 Commercial balloon flying training operators should ensure that the required passenger safety briefings are included in the training syllabus for the CP(B)L and practiced by the student on every training flight.

Pre-boarding briefing

4.1.6.1 Balloon transport operators should provide passengers with safety information before they arrive at the launch site. The information should include instruction on:

- the accessible and restricted access areas of the launch site
- the dangers of the inflation fan
- any assembly point for use in an emergency
- suitable clothing - wearing high heels is not recommended because of the risk of ankle injury on touch down
- the procedures for boarding the aircraft
- the authority of the pilots and ground support personnel.

Pre-flight briefing

4.1.6.2 When all passengers on a balloon conducting any kind of operation, but not including a hot air airship, are boarded each person must have access to at least one handhold

and have enough room to adopt a safe landing position. The safety briefing will usually be conducted by the PIC and should include the following:

- an instruction and demonstration of the landing position, appropriate to the balloon design, that a passenger must adopt for landing
- an instruction on where to hold on to internal handholds
- an instruction to flex the knees on touch down to minimise the effect of any impact during landing
- in baskets fitted with seats an instruction to sit down on the seats before landing
- an instruction to stow cameras and personal items before landing
- an instruction to remain in the basket at all times until instructed to disembark
- an instruction to precisely follow the instructions of the PIC or ground support personnel in the event of an emergency
- an instruction that smoking is prohibited
- a reminder that dangerous goods are prohibited
- an instruction on the use of any other safety or emergency equipment carried (e.g. life jackets).

4.1.6.3 A passenger on a hot air airship must be seated in a seat with a seat belt or harness and the safety briefing must be conducted by the PIC in accordance with the aircraft flight manual.

Pre-landing briefing

4.1.6.4 On approach to a landing the PIC of a balloon shall make a pre-landing announcement reminding passengers that:

- cameras and loose personal items must be stowed
- on command all passengers must assume the previously practiced
- landing position
- all persons must remain on board until instructed to disembark
- if a fast or hard landing is expected a reminder of the need to hold on firmly and adopt a lower position in the basket on touch down.

4.1.6.5 On final approach to landing the PIC should ensure all passengers are comfortable in the landing position and be prepared to correct any anomalies before touch-down.

4.2 Proficiency of crew members in safety and emergency procedures

4.2.1 It is a requirement of section 12 of old CAO 20.11 that the crew members of a balloon charter, now called balloon transport, operation are not assigned to emergency duties unless the person has successfully completed the operator's proficiency test initially, and thereafter annually. All flight crew and any ground support personnel involved in boarding and briefing passengers, or who may be involved in assisting during an emergency, are required to successfully complete the proficiency test on initial deployment and thereafter annually.

Note: CAO 20.11 was made under regulations 207, 252 and 253 of old CAR. CAO 95.53 and CAO 95.54 give effect to complying with these regulations and the CAO as if they were still in force.

5 Inflation fan

5.1 General

5.1.1 The following advice applies to all aircraft that may use a portable powered fan to assist with initial cold inflation. Hot air balloons and hot air airships regularly use a portable fan for cold inflation. Gas balloons do not need inflation fans.

Note: This advice was previously published in AC 131-01 v1.2.

5.2 Australian Transport Safety Bureau advice

5.2.1 In July 2013 the Australian Transport Safety Bureau (ATSB) issued the following safety advisory notice (SAN) AO-2013-116-SAN-003:

> The Australian Transport Safety Bureau advises balloon operators to review their risk controls in relation to the safety of cold-air inflation fans, especially in relation to passenger proximity to operating fans, and the security of loose items, such as passenger clothing.

5.2.2 The ATSB advise that suitable procedures should be in place when using portable powered fans:

> Portable powered fans are regularly used to cold inflate hot air balloons. These inflation fans with rapidly spinning propellers are potentially dangerous and all balloon operators should have procedures for ensuring their safe use.

5.2.3 CASA endorses the ATSB advice and recommends that pilots and operators follow the fan operating procedures guidance below in section 5.3.

5.3 Recommended inflation fan operating procedures

5.3.1 CASA's recommended safe operating procedures to be followed when using portable powered inflation fans include:

- fan blades or propellers should be protected by a protective guard, grill or cage constructed so that clothing, loose hair or other items cannot be easily drawn in or become entangled with the moving parts[5]
- fans should be clearly marked with signs or placards indicating danger and the need to keep clear
- all fans should be fitted with a kill switch facilitating an instant shut down
- any ground support crew or other personnel working around the balloon should be briefed on the operation of the fan and know how to operate the kill switch
- the immediate area surrounding an operating fan should be marked with a safety cone or cones and/or barrier to define an exclusion zone for all but trained personnel
- during operation, the fan should be placed so that the pilot-in-command (PIC) or a trained person attending the fan can easily reach the kill switch
- during windy inflations, extra care should be taken to avoid a moving basket knocking over a running fan. Care should also be taken to avoid any part of the

[5] For guard, grill or cage standards, refer to International Standard ISO 12499:1999.

envelope or control lines coming into contact with the fan. The PIC or person delegated by the PIC should ensure the fan is switched off as soon as it is no longer required and moved away from the basket

5.3.2 Balloon transport operators should ensure passengers are briefed verbally or by other means to stay clear of the fan while it is running and warned not to approach the fan wearing loose items of clothing or scarves. Refer to paragraph 4.1.7 Pre-boarding briefing above.

5.3.3 It is recommended that balloon transport operators do not pre-load passengers into the basket during the cold inflation phase. Passengers should only be boarded when the basket is in the upright position.

5.3.4 Regulation 131.195 (for balloon transport operators) and CAO 82.7 paragraph 5.5B (for commercial balloon licence/rating training AOC holders) requires that the operator's exposition or operations manual (as applicable) must contain, with respect to the flight operations of all types of aircraft operated by the operator, such information, procedures and instructions as necessary to ensure the safe conduct of the flight operations[6]. Noting these requirements, operators must detail their fan operating procedures in their exposition.

[6] Other than information, procedures or instructions that are set out in other documents required to be carried in the aircraft in pursuance of these Regulations.

6 Dangerous goods

6.1 Regulatory requirements related to dangerous goods

6.1.1 Part 92 of CASR *Consignment and carriage of dangerous goods by air* is applicable to all Australian aircraft and all foreign aircraft (other than state aircraft) operating in Australian territory (Regulation 92.005).

6.1.2 Under subsection 23 (2AA) of the Act the PIC of an aircraft must take all reasonable precautions to ensure dangerous goods are not carried on the aircraft inadvertently.

6.1.3 Dangerous goods may not be carried as cargo on an aircraft without permission from CASA under subsection 23 (2) of the Act.

6.2 Manual and training

6.2.1 Under regulation 92.040 balloon transport operators not intending to carry dangerous goods are not required to have a dangerous goods manual. Under subregulation 92.040 (3) operators carrying dangerous goods that are required to be on board an aircraft by a law in force in Australia (such as life jackets, fire extinguishers and supplemental oxygen) are exempted from having a dangerous goods manual.

6.2.2 Under regulation 92.095 employees of operators engaged in balloon operations are not required to undertake dangerous goods training.

7 Sensitive areas

7.1 Sensitive areas - maps and registers

7.1.1 Under the regulation 259/260 of old CAR permit issued to balloon AOC holders, and the ABF operations manual for Part 131 recreational aircraft activities, the PIC of a balloon or hot air airship must carry maps showing any sensitive areas (SA) in the planned flying location. A sensitive area is an area of land or water where there is a restriction on the operation of balloons or hot air airships that has been agreed between the landholder and an organisation or operator of the aircraft. The organisation or operator may be an AOC holder, or the Australian Balloon Federation acting on advice from recreational balloon operators.

7.1.2 A SA is sometimes also called a sensitive zone (SZ), or previously a prohibited zone (PZ). The restriction may be a lower limit for over-flight, a no-landing injunction or both. Some SAs may be designated for emergency landing only.

7.1.3 A SA is defined by an area drawn on a map, and/or published map or GPS coordinates. Information on the reason for the restriction if known should be included. Common reasons include livestock, biosecurity, hazardous activities, access issues, locked gates, and privacy concerns.

7.1.4 In the interests of good landholder relations pilots and operators should share local SA information. An organisation such as the Australian Balloon Federation may maintain an up to date central register of sensitive areas which is available to any member.

7.1.5 AOC holders should maintain an up to date register of sensitive areas in their local flying areas and make this available to their flight and ground crew. AOC holders are encouraged to inform the ABF on the status of sensitive areas in their local area so that a national register can be kept up to date.

7.1.6 Electronic registers of sensitive areas are acceptable as well as hard copies. A register should indicate the location, property boundaries, the restriction, the reasons and other relevant information.

7.1.7 CASA does not legislate private arrangements made between landholders and aircraft operators but other federal or state laws may apply.

8 Vehicle assisted deflation and ground handling

8.1 Vehicle assisted deflation

8.1.1 All operators have a duty of care for their passengers that applies to both the launch site and landing area. This section may apply to all operators and pilots in command of balloons and hot air airships but is principally directed at balloon transport operators who may use a vehicle attached to the crown line of a large passenger carrying hot air balloon to pull down the envelope for deflation after landing.

8.1.2 Balloon transport AOC holders should ensure that if vehicle assisted deflation is a standard operating procedure then the operator should conduct an assessment of the potential hazards of the activity and the operator's operations manual should detail the required risk mitigation procedures and precautions.

8.1.3 After a hot air balloon makes a final landing in light winds considerable force may need to be applied to the crown line of the balloon in order to cause the envelope to collapse in front of the basket so that the remaining air can be squeezed out. For the larger passenger carrying balloons several people may be required to apply this force. Where practical an alternative may be to use a vehicle to assist with the deflation. Vehicle assisted deflation involves attaching the free end of the crown line to the rear of a vehicle or trailer which is then driven slowly forward while the PIC activates the deflation vent from inside the basket.

8.1.4 It is essential that there is good communication between the driver of the vehicle and the PIC. The PIC must be able to stop the vehicle moving once the balloon is sufficiently pulled down. If not, the basket may be tipped over and dragged forward resulting in injury to the pilot or any passengers in the basket. In addition, the envelope may be damaged by excessive strain on the rigging and control lines.

8.1.5 Balloon transport operators should develop and document procedures for mitigating the risks inherent in vehicle assisted deflation that should include but not be limited to:

- managing communications between the vehicle driver and the PIC whether using UHF radio, phone and/or signalling through a third person.
- decisions on disembarking some or all passengers before commencing deflation
- ensuring that if there are any passengers still in the basket that they remain in the landing position until instructed otherwise.

8.2 Ground handling

8.2.1 This section applies to all operators Part 131 aircraft.

8.2.2 Operators and pilots in command should take care to avoid creating a hazard or risk to persons or property during any of the following activities:

- laying out, inflation and preparation for launch
- landing, normal deflation and pack up
- relocation of inflated balloon on the ground
- use of the handling line for hot air balloons
- use of the trail rope for gas balloons.

9 Electronic documents

9.1 Introduction and applicability

9.1.1 The *Acts Interpretation Act 1901*; and *Electronic Transactions Act 1999* are the enabling legislation allowing the use of digital media to display the documentation required by the *Civil Aviation Act 1988* and any of its subordinate regulations.

9.1.2 Regulation 131.265 permits documents that are required to be carried on a flight to be in electronic form. This is intended to include the pilot's licence and medical certificate, the aircraft flight manual, and maps and charts.

Note: Electronic copies of documents carried on flights which begin or end outside Australian territory may not comply with the law of a foreign country.

9.1.3 This guidance applies to all operators of Part 131 aircraft.

9.1.4 Carriage of documents as electronic copies does not prohibit carriage of documents in hard copy. Hard copies of documents may be carried as back-up for electronic documents. Other acceptable back-up procedures are described in section 9.5 of this AC.

9.2 Electronic flight bags

9.2.1 Electronic flight bags (EFB) is a portable information system for flight crew which allows storing, updating, delivering and or computing digital data to support flight operations or duties. The International Civil Aviation Organization (ICAO) publishes a classification system for categorising different kinds of EFBs. [7]

9.2.2 The EFB system includes the hardware, the operating system, the software used, and any antennae and power sources used for the operation of the EFB.

9.2.3 The hardware most likely to be used for the carriage of electronic documents and used for navigation on a Part 131 aircraft would be considered a portable electronic device (PED) under the ICAO classification.

9.3 Portable electronic device

9.3.1 A portable electronic device is a device that can display any required document information including a pilot licence, medical certificate, flight note, loading information, passenger list, maps and charts.

9.3.2 A PED may also be used to display real time navigation information and be used to record flight information including track and altitude.

9.3.3 Examples of a PED include a laptop computer, tablet smart phone or gps tracker that is not connected to the aircraft flight system but may be temporarily mounted to facilitate easy visual access to navigation information.

9.3.4 The PIC of a Part 131 aircraft may choose to carry more than one PED and use one as a back-up to the principal device.

[7] Refer to AC 91-17 for more information.

9.4 Mounting of the PED

9.4.1 A PED may be mounted in a Part 131 aircraft either attached to a permanent or temporary structure.

9.4.2 A PED that is not attached to any mounting device permanently attached to the aircraft structure is not considered part of the certified aircraft configuration and does not require airworthiness approval.

9.4.3 A mounting device that is permanently attached to the aircraft structure may require airworthiness approval for the physical mounting.

9.4.4 A mounting device that is temporarily attached to the aircraft but has no effect on the operation or structure of the aircraft does not require airworthiness approval. Any operator using a temporary mounting device should ensure that the mounting device, either when holding the PED or when empty, will not cause a hazard to persons or property during the course of normal or abnormal operations.

9.4.5 An operator that uses a PED that is temporarily attached to a permanently or temporarily mounted device should be satisfied that the PED can be secured for landing or removed and securely stowed.

9.4.6 A PED used for navigation should be mounted so that the display is readable by the PIC and any other pilot acting in command under supervision in normal operations.

9.5 Back-up and currency

9.5.1 Operators using a PED for carriage of documents or navigation should ensure that the operating system and software is kept up to date with the latest version. Balloon transport and commercial balloon flight training operators should nominate who is responsible for ensuring the software is up to date. This may be a person in the organisation that is responsible for all the PEDs or individual pilots may be responsible for their own PED.

9.5.2 Pilots conducting a specialised balloon operation or a Part 131 recreational activity are responsible for ensuring that the operating system and software is kept up to date with the latest version.

9.5.3 Back-up may be another battery powered PED with the same software as the primary device or paper copies that are also kept updated as required.

9.6 Availability of documents

9.6.1 Any documents carried as electronic copies should be readily available for inspection if required.

9.6.2 Balloon transport operators and commercial balloon flying training operators should ensure that all required copies of documents are backed up on the operator's base computer system.

9.6.3 Balloon transport operators and commercial balloon flying training operators should ensure that all pilots use PEDs and systems approved by the operator and the standard operating procedures should be described in the operator's exposition or operations manual.

10 Flights over populous areas and public gatherings

10.1 Populous area and public gathering

10.1.1 In the CASR Dictionary Part 1:

- a *populous area* includes a city or town
- a *public gathering* means an assembly of people at a place on the basis of a general public invitation to attend at that place, whether or not a charge is made for attendance.

10.2 Minimum height for flight over populous areas and public gatherings

10.2.1 Under regulation 91.055, an aircraft must not be operated in a manner that creates a hazard to another aircraft, a person or property.

10.2.2 When overflying a *populous area* or *public gathering*, a Part 131 aircraft should be flown at a minimum height of 1000 ft above the highest feature or obstacle within a horizontal radius of 100 m of the point on the ground or water immediately below the aircraft.

10.2.3 When operating in a *populous area* a Part 131 aircraft need not maintain a minimum height over the area if the aircraft is:

- taking-off, or is conducting manoeuvres necessary to achieve a safe landing
- engaged in a missed approach
- participating in an air display that is the subject of an approval for the purposes of regulation 91.180 (air displays in Australian territory)
- engaged in a procedure to determine the suitability of a landing area for a landing
- navigating to a suitable landing area.

10.3 Suitable landing area

10.3.1 A suitable landing area for a Part 131 aircraft means a place where, in the reasonable opinion of the pilot in command given the prevailing conditions, the aircraft can be safely landed without causing a hazard to persons or property on the ground or on the aircraft.