AUSTRALIAN PARACHUTE FEDERATION

Jump Pilot Manual

VERSION 01-2023

STATUS: MANDATORY

Warning

Parachuting and flying in parachuting aircraft can be dangerous.

IMPORTANT: Version Control

It is important that members refer to the current version of this Jump Pilot Manual. Current Version number is shown on the front cover and in the below table. As the Jump Pilot Manual is administered exclusively by the APF, it will be updated and amended when and as required.

Current versions of the Jump Pilot Manual and any associated forms can be found on the APF website.

Significant changes made from the previous version are shown in Amendments.

CURRENT VERSION	RELEASE DATE
01-2023	01 April 2023

PREVIOUS VERSIONS	REPLACED BY
01-2022	01-2023
01-2021	01-2022
01-2020	01-2021
Version 8B – UPDATED:01 APRIL 2019	01-2020

AMENDMENTS

VERSION	AMENDMENT DETAILS
01-2022	• Minor wording amendments • 3.2.6 Amend wording for JPA revalidation requirements

Front cover photo by Kian Bullock

Contents

PART 1 – FUNCTION AND DEFINITIONS

1.1 Preliminary

1.1.1 Purpose

This Jump Pilot Manual (**Manual**) provide a platform for the Australian Parachute Federation (APF) to implement aviation standards for parachuting operations and issue competent Pilots with Jump Pilot Authorisations (JPA).

1.1.2 Application

This Manual is to be used by Jump Pilot Examiners (JPE) to train and assess JPA candidates. It takes effect from 01 April 2022 and repeals all previous versions.

1.2 Interpretation / Definitions

In this Manual, the terms utilised are defined in the 'Dictionary of Definitions' on the APF website (most of which are reproduced in the APF 'Regulatory Schedule 50: Glossary of Terms and Definitions' [RS 50]).

The content in this Manual must be read in conjunction with the current Operational Regulations and Regulatory Schedules, in particular OpRegs Parts 5, 6 and 8.1, and RS 51, 56 and 60.

Jump Pilot Authorisation (JPA) is defined as an authorisation issued by the APF to certify that a pilot is qualified to conduct flights for parachuting activities at member training organisations (RS 50)

1.3 Introduction

The Australian Parachute Federation is the administrative body for skydiving in Australia. It has enjoyed a long history, having celebrated its 50th anniversary in 2010, with some amazing advancements in technology and safety taking place over the years. The APF has developed into a carefully regulated, well-structured organisation with over 55 group members (also known as member organisations), 3,000 licensed members, and jumping from a fleet of nearly 100 aircraft.

The Jump Pilot Authorisation (JPA) was first introduced in June 2010, with all pilots flying for parachute training operations required to hold this authorisation from that date forward. The JPA has been implemented in order to formalise practices and procedures, afford a greater level of oversight, and generally bring more regulation to aircraft operations in support of parachuting.

This Manual is designed for assessors of Jump Pilots and prospective and/or authorised Jump Pilots and Senior Pilots. It also outlines the course syllabus for the Jump Pilot Authorisation.

This Manual is not designed to train pilots, but to detail the specific skills and potential hazards of jump flying for experienced pilots. This Manual is accepted by CASA and is a mandatory APF publication.

Please contact the Australian Parachute Federation for more information or clarification on any aspect of the APF Jump Pilot Authorisation process.

PART 2 – APF GOVERNANCE AND MEMBERSHIP

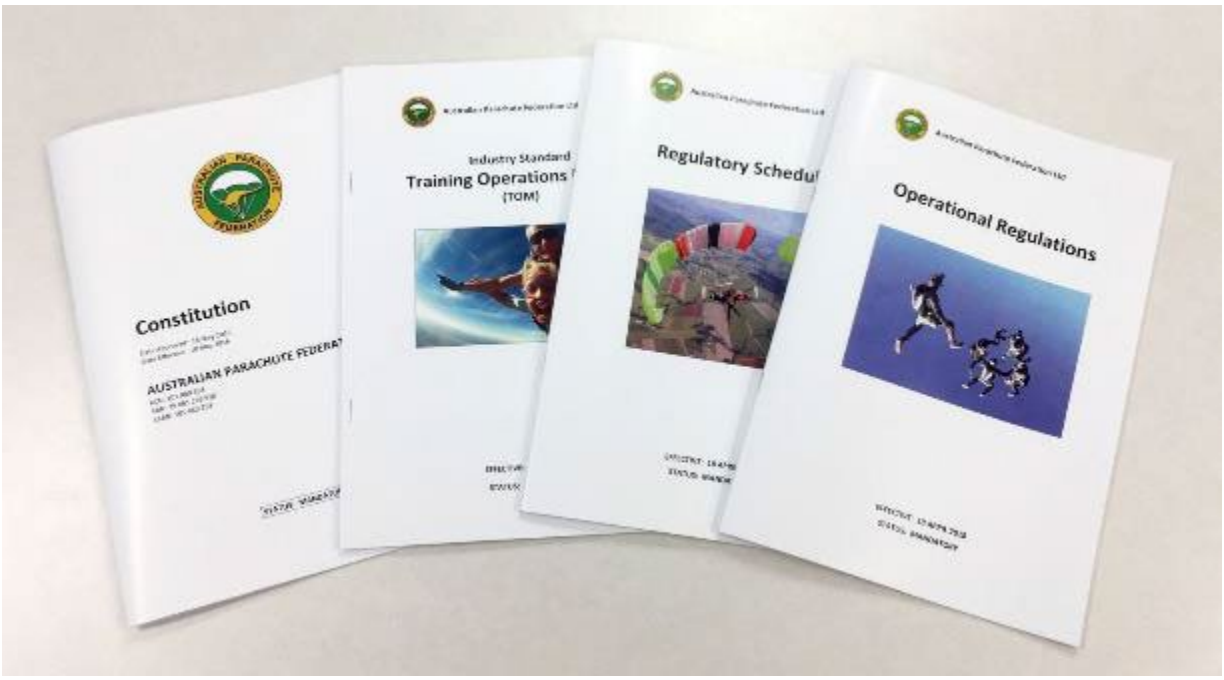
2.1 Regulatory Framework

2.1.1 Overview

Australian sport aviation operates under a self-administration model, with each Sport Aviation Organisation (SAO) having a Deed of Agreement in place with CASA. CASA has authorised the APF to carry out aviation activities under CAR Part 152. This authorisation has been given on the basis that the APF oversees the aviation activities and that this oversight is carried out subject to and in accordance with operation manuals and processes approved by CASA (CASA approved procedures).

The APF is the governing body for all except one of the civilian parachute group members in Australia. Except for that one club, each of these organisations are members of the APF and thereby bound by all rules and regulations of the APF.

As a not-for-profit association of members, the APF's Constitution provides overarching governance for the Federation. CASA authorisation and other key regulatory documents combine as a hierarchy of documents covering APF national oversight and its regulatory framework.



The APF Constitution and key regulatory documents.
Part of the document hierarchy covering APF governance.

2.1.2 CASA Regulation

There are several CASA regulations that relate to parachute operations. They include:

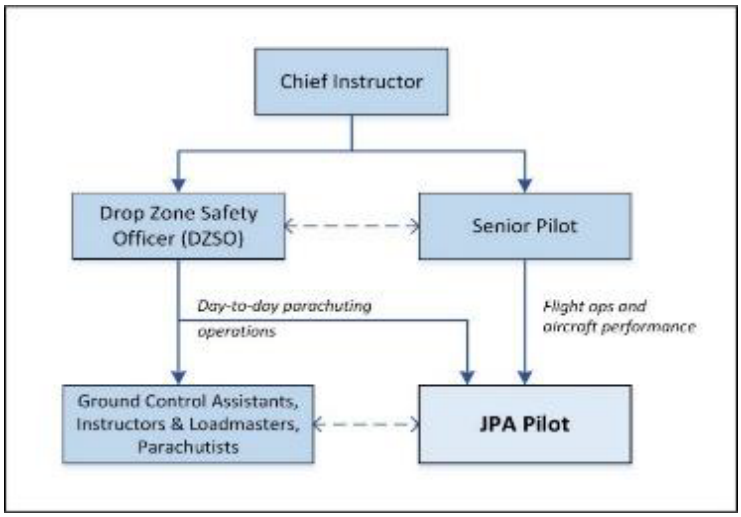
- CASA 36/19 – Making of Parachute Descents (Australian Parachute Federation Ltd) Authorisation 2019
- CASA Instrument 84/18 Conduct of Parachute Training Operations Directions 2018
- CASA Part 91 (General Operating and Flight Rules) Manual of Standards 2020 – Division 26.11 *Oxygen equipment and oxygen supplies*

2.1.3 Organisational Structure

For a comprehensive organisational chart of the APF, refer to Regulatory Schedule 57.

At a national level, the National Aviation Officer (NAO) is a member of the APF's Technical and Safety Committee and the Aviation Committee. The Aviation Committee deals with air-space access and aircraft related issues and is made up of local Aviation Officers.

Jump Pilot activities occur within group members, also referred to as member organisations. The core relationships at group member level can be simply illustrated in the following example for a training operation:



Basic Group member Organisational Structure

2.2 Oversight and Management – Aircraft Operations

2.2.1 APF Office Oversight

The APF Office manages, enhances and further develops the systems, policies and procedures that support and govern aircraft operations. Managers in various departments, supported by specialist committees and the NAO, provide high level administrative oversight and assistance to all stakeholders.

2.2.2 Senior Pilot Nomination and Approval

(a) An APF Training organisation must have a nominated Senior Pilot who must be nominated by the Chief Instructor on the appropriate form (Form JP3) which is available on the APF website.

(b) In the extended absence of the Senior Pilot (for a period of more than 3 weeks) the Chief Instructor must nominate an alternative representative and advise the APF Office via email or by completing Form J3.

(c) The minimum requirement for approval as a Senior Pilot of a Group member are that the applicant hold a current and valid Jump Pilot Authorisation (which requires current APF membership).

(d) Approval of an applicant nominated as Senior Pilot requires:

(i) acceptable to the NAO; and

(ii) approval in writing by the APF Office. The applicant will be notified by the APF Office once the Senior Pilot approval is made effective.

The NAO may consider: support and/or recommendation from the group member CI, previous experience and conduct of the applicant and the applicants adherence to the responsibilities listed in OR 5.1.5. The NRO may consult with other aviation peers. The NAO may withdraw their support of a senior pilot should they cease to meet these requirement or based on safety concerns.

2.2.3 Senior Pilot Responsibilities

Senior Pilots must:

(a) be responsible for oversight of all aircraft related aspects of the Group member;

(b) liaise between the Group member and the APF's NAO in relation to Aircraft issues;

(c) ensure the safe and legal operation of aircraft at all times including compliance with CASA Instruments (see APF Regulatory Schedule 51);

(d) ensure all pilots in command, other than when training under direct supervision**,** hold a valid APF issued JPA before conducting flights for parachute training operations;

(e) ensure JPA holders undergo periodic ongoing training and evaluation;

(f) ensure important information is promulgated to the relevant persons; and

(g) provide operational advice to the Chief Instructor and DZSO.

(h) in accordance with OR 5.1.7(e), ensure the assessment in OR 5.1.5 (h) is conducted at least:

(i) 12-monthly for pilots flying aircraft that are 10-places or less, or

(ii) 6-monthly for pilots flying aircraft that are 11-place or more or any twin-engine aircraft; and

(iii) records must be kept of the assessment. .

2.2.4 Safety Management

The APF's Safety Management System (SMS) provides oversight, which includes annual risk assessment and safety auditing of all Training Organisations (also known as Group members). Conducted by a Safety and Training Officer (STO) appointed in accordance with Regulatory Schedule 57, these annual audits are a requirement of membership of the APF. They encompass all aspects of the operation including aircraft operations, and provide senior management with the assurance that all operations are compliant with regulations. After 1 July 2016, each Group member will also have its own SMS.

2.3 APF Group members

APF Group members are member organisations and each is either a 'Training Organisation' or a 'Non-training Organisation':

2.3.1 Training Organisations

(a) Training Organisations operate under the supervision of an appointed Chief Instructor, approved to conduct training descents (e.g. student and novice training programs).

(b) As with all parachuting operations, a DZSO is required to be in attendance and is responsible for all parachuting operations on the day.

(c) The requirements for the DZSO when student operations are in progress, are defined in the Operational Regulations. See APF Operational Regulations, Part 6.

2.3.2 Non-Training Organisations

(a) Non-training Organisations do not require a Chief Instructor to be appointed but may only conduct parachuting operations with participants who hold at least an APF Certificate Class B, with NO STUDENT, NOVICE OR TANDEM PARTICIPATION ALLOWED.

(b) DZSO requirements for these operations are defined in the Operational Regulations. See APF Operational Regulations, Part 6.

***Note**: A JPA is required for training operations; and whilst not mandated for non-training operations, it is highly recommended.*

2.4 Individual Membership

2.4.1 Membership as a Jump Pilot

APF member obligations and other helpful information are described in APF Operational Regulations, Part 2 General Requirements.

Successful JPA candidates are provided with membership of the APF as a means of regulating the requirements imposed by CASA on the APF. This occurs in one of two ways:

(a) **JPA Candidates with no APF Membership**: The Jump Pilot Associate Membership is provided Free of Charge and is valid for one financial year (commencing 1 July annually), with all holders required to renew each year prior to June 30th in order for their JPA to remain valid. Jump Pilot Associate Membership does not include jumping, voting or insurance privileges.

(b) **JPA Candidates with APF Membership**: Current APF members with a valid sporting licence who apply for a JPA do not require 'Free of Charge APF Jump Pilot Associate Membership'. Current APF members will be issued a new membership card including the JPA.

2.4.2 Jump Pilot Associate Membership Renewal

JPA holders will be sent a membership renewal reminder electronically at least 6 weeks prior to expiry, providing they have maintained their current contact details with the APF Office.

2.4.3 The Jump Pilot Associate Membership Entitlements INCLUDE:

(a) able to exercise the privileges of the Jump Pilot Authorisation,

(b) receipt of APF promulgated broadcasts, newsletters and safety communications, and

(c) inclusion in the APF National Pilot Register.

2.4.4 The Jump Pilot Associate Membership Entitlements DO NOT INCLUDE:

(a) receipt of Australian Skydiving Magazine (ASM),

(b) undertaking parachuting activities (jumping),

(c) voting at Area Council Meetings, or

(d) insurance. Insurance is the responsibility of the aircraft operator and the member organisation.

2.4.5 Jump Pilots wishing to skydive

In the event that the holder of a JPA decides to become a parachutist, he/she will need to upgrade their existing jump pilot associate membership by completing either Form M2 (student pro-rata) or Form M1 (full membership).

PART 3 – APF JUMP PILOT AUTHORISATION

3.1 Jump Pilot Requirements

The CASA requirements for a pilot to fly parachutists include a pilot licence suitable for the aircraft to be flown and a valid pilot medical. Recency requirements to be met include a pilot proficiency check or a flight review.

The additional APF requirements to fly parachutists for a training organisation include a JPA/APF membership, along with an approved jump pilot assessment within the preceding 6 or 12 months depending on the type to be flown. (The initial JPA training is considered a valid jump pilot assessment.)

See also Operational Regulations Part 5 and Regulatory Schedule 56. These include specific requirements if flying a balloon or recreation, sports aviation and warbirds for parachuting.

3.2 Jump Pilot Authorisation (JPA) – The Process

3.2.1 Overview

All pilots flying at parachuting training organisations are required to be the holder of the Jump Pilot Authorisation (JPA). Pilots who meet the minimum requirements are able to undertake a course of instruction with an approved APF Jump Pilot Examiner (JPE), in accordance with the JPA course syllabus defined in this Manual. Once the JPA course of instruction has been successfully completed and the candidate assessed as competent by the JPE, the JPA is issued by the APF Office.

3.2.2 JPA Training Course

Providing the applicant meets the requirements of APF Operational Regulations for Jump Pilots, the applicant must complete a JPA training course with an APF approved JPE. A copy of the course syllabus is included as Appendix C. A list of approved JPE's is available from the APF website www.apf.com.au

3.2.3 JPA Assessment Process

Having completed the JPA training course, the applicant must complete an assessment process administered by the JPE. The written assessment may be open-book and has a pass mark of 80%. The oral and practical components require an assessment of SATISFACTORY. Following any retraining to address inadequate or unsatisfactory responses, a result of COMPETENT completes the assessment process. A copy of the assessment can be found as Appendix D.

Note: *Examiners and Pilots must be aware that a pilot may* ***NOT FLY LOADS WITH STUDENTS*** *until their JPA has been activated by the APF Office.*

3.2.4 JPA Activation and Issuing Process

Upon the assessment package and payment being received by the APF Office:

(a) the applicant will be made a Jump Pilot Associate Member of the APF with a membership expiry date of June 30th.

(b) the Jump Pilot Authorisation and number will be formally issued.

(c) the new JPA holder and issuing JPE will be advised.

(d) an APF membership card will be dispatched if a passport-style photograph of the applicant has been provided.

(e) the issue of a new JPA is subject to a probationary period under supervision of a Senior Pilot. Probation is considered to be successful upon satisfactory completion of first 6-monthly or 12-monthly assessment as required by OR 5.1.7 (e). In a situation where a Senior Pilot has concerns or feels a pilot should not hold a JPA at this point, the NAO should be contacted. The NAO may cancel the JPA or advise on retraining requirements.

3.2.5 JPA Membership and Lookup

(a) The JPA is valid for a period of one year or part thereof, and is considered valid only whilst either the Jump Pilot Associate Membership (or full membership) and pilot licence is current. (For annual JPA fee, see Forms J1 or J2, on APF website or towards end of this manual.)

(b) The JPA will require revalidation prior to 30th June each year by completing a 'statement of proficiency' and having this authorised by a JPE.

(c) The APF membership will require renewal prior to 30th June each year by accepting the APF terms and conditions of membership. (Associate membership is currently free.)

(d) Group members and individuals may confirm or check JPA validity by accessing the 'Member Lookup' facility on the APF website, by entering surname and date of birth.

3.2.6 JPA Revalidation Requirements

Revalidation requirements include payment of the revalidation fee ***and*** submission of an appropriately completed JPA Renewal Form J2.

Requirements for JPA revalidating and currency requirements are found in Regulatory Schedule 56.

3.2.7 JPA Responsibility for Safe and Legal Operation

The jump pilot is responsible for the safe and legal operation of the aircraft at all times including compliance with current CASA Instruments and regulations (see APF Operational Regulation 5.1.5 and Regulatory Schedule 51) and must be aware of added factors that are pertinent to themselves and aircraft involved in parachute operations including the use of single point restraints by all parachutists when below 1000 feet AGL.

3.3 Jump Pilot Examiner (JPE)

JPE's train and assess JPA candidates. The application process for becoming a JPE:

(a) prospective JPE's must be the holder of a valid JPA.

(b) individuals should lodge their written expression of interest with the APF Office, to the attention of the APF Safety and TrainingManager. This expression of interest should include:

  (i) approximate number of hours (minimum recommended 1500hrs total),

  (ii) total hours flying Parachutists (minimum recommended 250 hrs),

  (iii) aviation qualifications held,

  (iv) information on the need for a JPA in the applicant's area,

  (v) parachuting qualifications held,

  (vi) any involvement in parachuting activities, and

  (vii) any other information considered pertinent.

(c) the application will be considered and any approval made must be approved by APF NAO. The NAO will consider relative industry experience (such as higher flying hours, instructing or recommendation from a CI) should the applicant not meet the minimum recommendations.

(d) the successful JPE will be advised and their details added to the list of approved JPE's.

PART 4 – AIRCRAFT PROCEDURES

4.1 Modifications

4.1.1 Internal

Certain modifications may need to be done by a licensed engineer if the aircraft is to be re-configured for permanent parachute operations. Due to the likelihood that a parachutist will need to be positioned beside the pilot, this may include the following: removal of a control column, re-positioning of certain switches and levers on the panel, and relocating the fire extinguisher.

4.1.2 External

It is common practice for many jump aircraft to be fitted with approved external modifications such as handles and steps that facilitate parachuting exits, and also inflight doors with wind deflectors.

4.2 Aircraft Preparation

The Jump Pilot is responsible for preparing the aircraft for parachuting operations.

4.2.1 General

Generally a parachuting aircraft will be configured for Parachute Jump Exercise (PJE) operations, but on occasion the pilot may be required to do the preparation.

(a) Refer to the Flight manual or aircraft documents for placards and other equipment that must be attached to, or carried in the aircraft for parachute operations.

(b) If used for training operations, the aircraft engines must be maintained to Charter standard.

(c) If the door is removed or the aircraft is fitted with a certified in-flight opening or para-drop door, authorisation must be noted in the particular aircraft's flight manual (AFM), or be recorded as a Supplemental Type Certificate (STC) or Engineering Order in the aircraft's documents. The procedures for operation of this door will be noted in the AFM and should be studied prior to flight. A placard denoting operational limitations will usually be placed in a position easily seen by the pilot, and must be adhered to.

(d) The AFM may also contain documentation on extra components such as wind-deflectors, modified steps and grab rails, and will include operating instructions and limitations which the pilot must follow.

(e) Remove seats where required. Generally only the pilot's seat will remain onboard.

(f) Remove (or secure) any loose objects that may be drawn out of the aircraft once the door is opened in-flight. This could include the risk of the buckle of a Single Point Restraint near the door escaping out the door and then either hindering door closure or banging the side of aircraft on descent.

(g) Secure any floor matting or carpets.

(h) Ensure there are sufficient approved restraints fitted for all parachutists, that they are attached in the correct locations, and are of suitable length to not allow a parachutist to exit the aircraft while still attached.

(i) Cover any sharp edges or protrusions that cannot be removed from the cabin with an adhesive tape. This is to prevent injury, damage to parachute equipment, and avoid snagging which may result in a parachute being prematurely deployed (in accordance with AIP 5.5).

(j) Install a heavy-duty sharp knife in a protected but easily accessible location. This is to clear parachute equipment that may have become snagged on any part of the aircraft. The knife needs to be accessible by both the loadmaster and pilot; so in larger aircraft, there may need to be two knives.

(k) Operational Regulations require an emergency parachute be made available for use by all pilots conducting jump operations. The APF highly recommends their use, as they have saved pilots lives before. If an emergency parachute is worn, ensure that you have been briefed by an instructor on its proper use. **Careless handling of an emergency parachute can endanger you as well as the aircraft and all parachutists on-board.**

4.2.2 Aircraft Refuelling

(a) **Minimum Safe Fuel Quantity:** The composition of the load, i.e. Parachutists on-board and to what heights, will need to be taken into account when deciding on your fuel load. As a Jump Pilot you may be expected to operate within the minimum safe fuel quantity requirements. Generally the fuel used per sortie is consistent, and due to operating within close proximity to the airfield with brief flight times, pilots should not get caught out by deteriorating weather and other variables. This minimum fuel uplift is usually specified in the Group member's operational procedures, and it is generally accepted that pilots will carry 45 minutes fixed fuel reserve.

(b) If hot-refuelling is to be undertaken, the procedures must be conducted in accordance with the CASA Instrument EX146/21. A generic Hot Refuelling Procedure can be found at Appendix F.

(c) Pilots have been caught out in the past by losing track of how many sorties they have flown for the fuel load onboard. The repetitive nature of jump flying can easily lead to these simple errors, so get into a good habit of logging fuel usage throughout the day's operations.

4.3 Aircraft Pre-Flight Procedures

4.3.1 Daily Inspection

The procedure for the inspection will be laid out in the AFM and must be followed. Jump aircraft are subject to strenuous service and therefore require a thorough inspection at the beginning of each day, as well as regular walk-arounds throughout the day. This inspection will also reassure you, the Pilot, that the aircraft is airworthy and should include a thorough inspection of all accessible parts of the airframe and engine. In addition to the requirements laid out in ***CAAP Maintenance Schedule No: 42B-1***, particular attention should be given to the following:

(a) single point restraints for Parachutists,

(b) in-flight door is serviceable,

(c) internal snag points in the aircraft,

(d) external snag points around the door area,

(e) heavy duty knife is serviceable and accessible to the Pilot,

(f) any inadvertent damage caused by the previous parachutists exiting the aircraft,

(g) aircraft stored in the open should be checked for birds' nests under cowlings and wasps' nests in fuel vents and control surface gaps,

(h) any fluid leaks from the aircraft, and

(i) pilot oxygen system serviceability checked, including quantity and flow.

4.3.2 Permitted Pilot Maintenance

Jump pilots are often operating in regions where a maintenance facility is not available, so it is important to understand the regulations pertaining to aircraft maintenance. While ***'CAAP Maintenance Schedule 42ZC – 1'*** lists the maintenance actions a pilot is entitled to do, never attempt any maintenance action for which you haven't been trained.

4.3.3 Letter of Agreement (LOA)

A "Letter of Agreement" is an agreement between the operator and ASA for a standard operating procedure at a particular drop location which must be adhered to in controlled airspace.

If such an agreement is in place, the pilot must ensure they have a complete understanding of the procedures contained in the LOA.

4.3.4 Flight Plan Submission

Flight plans can be submitted via the normal method. The only section to be filled out unique to parachuting is the inclusion of the term "PJE" in the "Other Information–RMK" section. Once a standard plan is filed, it can be stored on the NAIPS computer and quickly and easily re-used.

While logged on to NAIPS, it is a good idea to get the area and location weather briefings downloaded. In conjunction with inflight GPS use, this will be useful to the parachutists/pilots in determining the correct exit point, and expected spot changes throughout the day.

Some operations have an LOA which details a unique flight notification and standard transponder code to be used.

4.3.5 GPS Usage

Most parachuting aircraft are fitted with a GPS. The pilot must be proficient in using the GPS for positioning the aircraft over the correct exit point for parachutists. This proficiency includes:

(a) entering a user waypoint,

(b) direct to functions,

(c) selecting an inbound/outbound course, and

(d) recognising loss of navigational integrity.

The use of GPS must be approved by the Chief Instructor and the Senior Pilot.

4.4 Further Considerations on Particular Aircraft

See **Appendix A** for a supplement on piston engine aircraft:

- Managing Thermal Shock
- Operation of the In-Flight Door – Cessna 100/200 series

See **Appendix B** for a supplement on PT6A turbine engine aircraft:

- PT6A Compressor and Compressor Turbine (CT) washing
- Statement of recurrent PT6A desalination wash training

PART 5 – PARACHUTE OPERATIONS

5.1 Operations Personnel

5.1.1 Chief Instructor

Each parachute Training Organisation must have a duly appointed Chief Instructor (CI). The CI is responsible for the supervision of all operations in their Group Member, including the conduct of all representatives, instructors and Group Member members, in accordance with all APF regulations. While the CI is not required to be in attendance 100% of operational time, they are ultimately responsible for ensuring:

(a) the safety of all aspects of parachuting activities at the drop zone where they have been appointed;

(b) appropriately trained and qualified individuals are appointed for each aspect of the operation including:

(i) Drop Zone Safety Officer,

(ii) Instructors and coaches,

(iii) Senior Pilot,

(iv) Loadmaster,

(v) Ground Control Assistant, and

(vi) Canopy Control Assistant or Target Assistant.

(c) equipment being used is safe and serviceable and in accordance with APF Equipment Standards;

(d) parachuting activities are being conducted with safety as the primary concern to the exclusion of commercial pressures;

(e) aircraft operations are being conducted under the oversight of a Senior Pilot and in accordance with the Jump Pilot Manual and CASA Instruments (see APF Regulatory Schedule 51);

(f) all rules and regulations are being adhered to at all times under the direct supervision of a Drop Zone Safety Officer; and

(g) appropriate training and resources are made available as required to ensure safe operations at all times.

5.1.2 Drop Zone Safety Officer (DZSO)

Each parachute operation must have a Drop Zone Safety Officer (DZSO) nominated each day, who is responsible for all parachuting operations on the day, and who must be in attendance 100% of operational time. The DZSO's responsibilities include ensuring the aircraft has been prepared appropriately for parachuting operations.

5.1.3 Ground Control Assistant (GCA)

Each parachute operation must have a Ground Control Assistant nominated for each load. The GCA is responsible for communicating to the pilot and parachutists on the advisability of the exiting the aircraft.

5.1.4 Loadmaster

(a) Each parachute operation must have a nominated Loadmaster for each load.

(b) As per APF Operational Regulations (Part 6), the Loadmaster is responsible for:

(i) conducting a pre-jump briefing before any parachute descents are made, which covers all relevant aspects of the descent, and which includes all persons on-board the aircraft including pilot and parachutists;

(ii) ensuring the airspace and DZ below is clear of conflicting air traffic and any necessary **drop clearances** have been obtained; and

(iii) confirming the integrity of the exit point.

5.1.5 Other Operations personnel

In addition to the personnel mentioned above, the Jump Pilot will interact from time-to-time with other operational personnel. Depending on whether the operation involves training, non-training or a display, these may include: instructors at various levels, coaches in various disciplines, manifesters and other DZ administrative staff, display organisers and ground crew.

5.2 Parachuting Equipment

5.2.1 Altitude AMSL versus Height AGL

Jump pilots must be aware of the different terminology and meaning in general use in parachuting, in particular:

(a) parachutists will almost universally refer to heights above ground level (AGL). At the start of each day's jumping, parachutists set their altimeters to zero at ground level. These AGL heights include planned exit height (e.g. 14,000 feet), separation height in freefall (e.g. 4,000 feet), deployment height (e.g. 3,000 feet), opening height, and canopy flight path heights such as on final approach for landing (e.g. 500 feet).

Wrist-mounted altimeter. May also be chest-mounted.

Audible warning device (altimeter), mounted in helmet.

(b) pilots use aviation English language and standards for conversing with ATC and other pilots, which includes altitudes above mean sea level (AMSL) and flight levels above 10,000 feet (e.g. FL110). This is consistent with CASA regulations and documentation.

(c) APF regulations and documentation use a mix of the terminology described in (a) and (b) above. Whilst every attempt is made to ensure clarity with these two methods, you must check if unsure.

5.2.2 Transition

Many pilots have never flown above 10,000 feet prior to commencing PJE operations. De-graded performance at higher levels and the need to have or use of supplemental oxygen must be considered. Pilots must be trained by the senior pilot in the use of the supplemental oxygen system installed in the aircraft, and understand the requirements for its use in accordance with the current regulations (see 5.4.5 of this manual for further information).

One of the main details missed by inexperienced pilots is the change in QNH setting. This is very important and needs to be understood in accordance with CASA Instruments.

For example, if a pilot climbing through transition (10-11,000 feet) does not change from an area QNH of 996 to the standard QNH of 1013, then they will be operating with an increased height of 510 feet above what they are expecting.

This would not only attract the attention of ATC in controlled airspace but could be a significant contributing factor towards a collision with another aircraft.

5.2.3 Restraints

In accordance with APF regulations, parachutists must not be carried in an aircraft during parachuting operations unless the parachutist is wearing an approved restraint, at all times below one thousand (1000) feet AGL or at any time as directed by the pilot. Additionally all parachutists must be instructed in the use of the restraints fitted to the aircraft. It is the pilot's responsibility to ensure these requirements are being adhered to.

5.2.4 Helmets and Head Gear

Unrestrained equipment held in the parachutist's lap can become missiles in the event of an emergency landing/aircraft crash. For this reason, parachutists should wear and secure their helmets and camera equipment for take-off and landing.

5.2.5 Pilot Emergency Parachutes (PEP)

The Operational Regulations require a serviceable parachute *(and training in its use)* to be made available to pilots of parachuting aircraft. PEP's have saved lives in the past and their use is highly recommended.

Types vary, so have the DZSO brief you on the following:

(a) fitment of the harness,

(b) checking the pins and handles for security,

(c) checking the packing card for validity,

(d) safe handling and use of the equipment in an emergency (see section 9.7 for details).

5.3 Parachuting Pre-Flight Procedures

5.3.1 Manifest

The jump pilot must understand the manifest system in use at the operation to ensure efficient use of the aircraft and that the aircraft is not being overloaded on any sortie. Regular communication with the manifest will assist in flight scheduling. The pilot may also provide updates on changes to meteorological conditions through manifest to assist with operational planning.

5.3.2 Briefing

The pilot, DZSO and GCA(s) will discuss all aspects of the day's operations including the planned run-in direction and exit point prior to the first load, number of loads planned for the day and type of loads planned, i.e. tandems, students or experienced parachutists, etc.

5.3.3 Loading – Balance/C of G

A parachuting aircraft may carry more occupants than the maximum number that is specified in the aircraft's flight manual only if the aircraft is loaded in accordance with the following requirements and limitations set out in the flight manual or the certification data for the aircraft:

(a) the weight and balance requirements; and

(b) any other limitations related to the provision of:

  (i) adequate structural support for restraint of occupants; or

  (ii) supplemental oxygen for the flight.

W&B [YEMP-YEMP] VH-OZP C182 VFR Plan [W&B Config]

Pilot (Kg)	75
TM1 (Kg)	100
TM2 (Kg)	100
PAX1 (Kg)	87
PAX2 (Kg)	95
Left Fuel	51 Kg - 42 Kg
Right Fuel	51 Kg - 42 Kg

This example weight and balance obtained using OZrunways electronic flight bag

For paragraph 5.3.3 (b), the limitations do not include those that are solely related to the number of seats or seating positions that are, or are normally, fitted in the aircraft.

If an aircraft does not have a flight manual, then any information supplied by the manufacturer that relates to the matters mentioned above or is included in the aircrafts airworthiness certificate, is taken to be the flight manual.

Balance must be a consideration for all aircraft involved in parachuting operations and can be especially critical during climb-out and exit, when changes occur. Know the operational limitations of your aircraft!

Under the Loadmaster's supervision, the parachutists will normally load the aircraft in the reverse order of the exit.

5.4 Flight Procedures – Climb to Height

5.4.1 Start-Up and Taxiing

(a) The jump pilot faces a greater risk of having someone walk into the propeller than does a pilot working in any other environment.

(b) The DZSO should ensure safe practices are in place such as:

(i) aircraft is well away from spectators when starting up/emplaning/refuelling,

(ii) parachutists and staff always approach aircraft from the rear,

(iii) spectators are controlled, and

(iv) appropriate warning signage is clearly displayed.

5.4.2 Take-Off and Climbing Techniques

Always ensure you have properly completed all pre-takeoff procedures and checks.

Your priority will always be to operate the aircraft safely, efficiently and in accordance with the aircraft flight manual and operating procedures. It is important to note that parachutists may not be restrained above 1000ft AGL, so any turbulence or aggressive manoeuvres resulting in negative g's, steep angles of pitch or bank may result in serious injuries and/or significant load shift. The consequences of these types of manoeuvres should always be considered by the pilot. More specific local requirements may also be found in the Group member's Operations Manual. These procedures may vary considerably between group members and between different aircraft, and aircraft owners. Be sure you understand what is

expected of you with regard to handling techniques such as engine power settings, airspeeds and mixture leaning.

5.4.3 Preferred Climb Areas

The dropzone owner/operator may have preferred areas for the climb and descent to be conducted depending on noise abatement procedures or an LOA with ATC. Try to avoid climbing over urban areas whenever possible to maintain good neighbourhood relations and increases alternative landing options in an emergency where/when a forced landing is required.

5.4.4 ATC Clearance

Following discussions with Airservices and CASA, it has been agreed the APF will ensure the following actions are observed by jump pilots:

(a) unless otherwise agreed between the parachute operation and ATC, ATC may base air traffic services on the expectation the jump aircraft will remain within 3nm of the target (centre of the dropzone).

(b) unless otherwise agreed between the parachute operation and ATC, ATC may base air traffic services on the expectation the parachutist will remain within 1nm of the target.

This does not prevent parachute operations requesting a variation, either by Letter of Agreement (LoA) with Airservices or on a sortie-by-sortie basis with ATC.

If operating in CTA, a type of Assigned Altitude Indicator/Alerter is highly recommended. If fitted, correct use requires the AAI or AAS be incorporated into your instrument scan, and any assigned altitudes by ATC are entered in correctly before being read back off the instrument to avoid mistakes.

Another useful tool is a moving map GPS, which enables the pilot to easily maintain situational awareness by showing the position of the aircraft relative to the DZ and airspace steps, and help enable compliance with the ATC issued clearances.

5.4.5 Oxygen Requirements

(a) **Pilot**: APF Regulatory Schedule 51 defines the use of oxygen for flight crew in an unpressurised aircraft engaged in parachuting operations above flight level 125. An aircraft operated above flight level 125 must be fitted with supplemental oxygen equipment and must carry sufficient supplemental oxygen to meet the requirements of Table 26.43 (2) of the Part 91 Manual of Standards.

(b) **Parachutists**: The parachutists' requirements in relation to the use of supplemental oxygen are defined in the APF Operation Regulations.

5.4.6 Considerations for Parachutists

When conducting operations with first jump students, the instructors will likely request the pilot to climb the aircraft past the DZ to enable the students a good view of the exit point and parachute landing area.

Parachutists should be treated like any other passengers, so handle the aircraft smoothly and avoid manoeuvres that may make them feel unwell.

5.5 Spotting

5.5.1 Spotting Procedures

The technique used to position the aircraft for the parachutists exit is called "spotting". This is an important skill that will ensure the parachutists 'open' in a position up-wind and within their gliding range of the landing area.

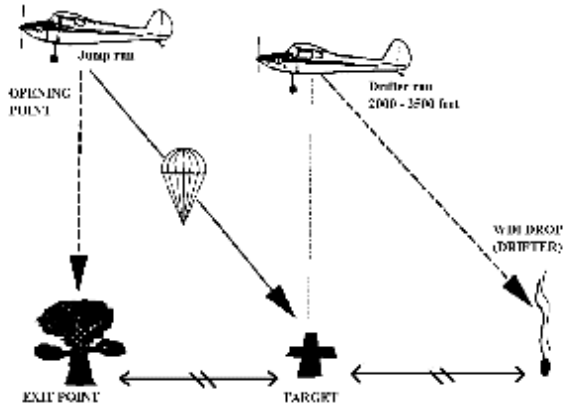
Generally the jump run will be on a track overhead the DZ and into the predominant wind. The parachutists will have pre-determined their exit point, taking into account a number of issues such as expected time between groups exiting, opening heights of different disciplines, and parachute performance. The spot is achieved using either of two main techniques: GPS or visually.

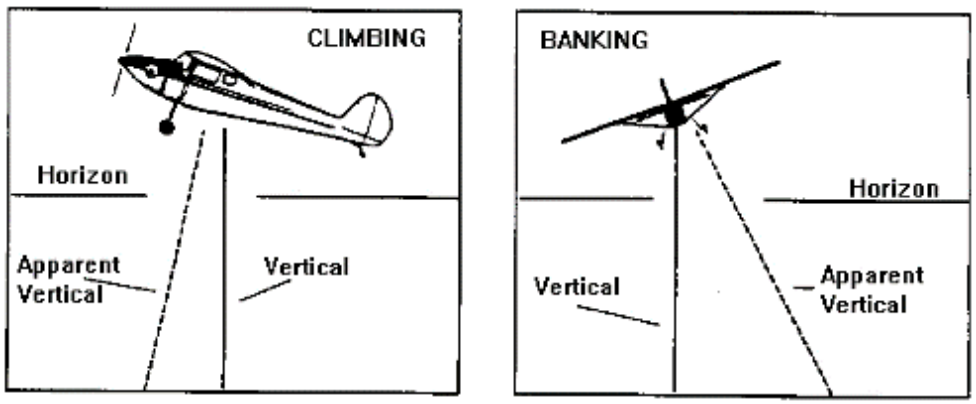
5.5.2 Global Positioning System

GPS spotting requires the pilot to be competent in the use of a GPS. The pilot will be told the required track and depth of the spot, such as “270 degrees and 0.2 short”. Often there will be no further input, especially if there is cloud in the area. Setting up the GPS for the spot will require the pilot to input a desired track to/from the nominated user waypoint. Once this is done, simply intercept the course from the downwind side and follow the track guidance given on the GPS screen. If a pre-determined track is not able to be set in the GPS, fly to a position directly on the downwind side of the waypoint and use the “GOTO” function for track guidance. Keep the jumpers informed of the miles to run to the exit point and then call “exit” as planned. Some aircraft may be fitted with a lighting system which signals such notification.

5.5.3 Visually

In this case the person spotting the aircraft will be a parachutist. They will expect the pilot to fly the jump run as briefed but will make corrections during the jump run while looking out the window/door of the aircraft. Expect hand signals or calls such as “Five Left/Right” for five degrees heading change to the left or right. Calls of “Power off” or “Door” or “Exit” are self-explanatory.





Potential spotting error when not flying level. Note distance between apparent vertical and vertical.

More information is provided below, and a detailed thesis on Spotting aircraft for Skydiving can be found on the APF Website, titled “Exit Separation”.

5.6 Communications

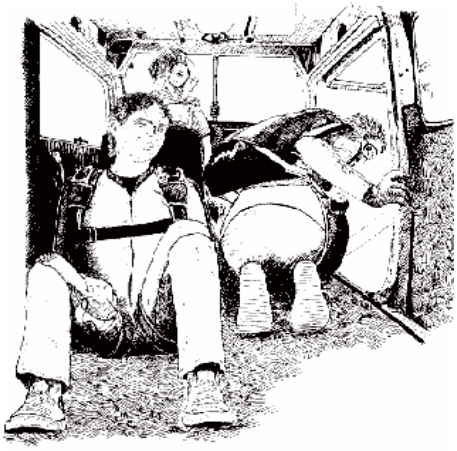
5.6.1 Clear Communication Systems

It is important for safe operations that the pilot and parachutists have a clear communications system to cater for all contingencies. The basis of good communications is a thorough briefing prior to the commencement of operations and a sound understanding of any emergency procedures that may be required.

5.6.2 Communications between Parachutist and Pilot

In-flight communications between the parachutist in-charge of each load (e.g. the Loadmaster) and the pilot can depend on the aircraft size, noise level and door location. In smaller aircraft, particularly when GPS is not being used for spotting the aircraft, either vocal commands or simple hand signals can be used to guide the pilot and aircraft to the desired exit point.

The hand signals below are typical:



5.6.3 Communications between the Pilot and the Parachutists

Due to cabin noise, light systems are often installed in the aircraft. This method is widely in use in larger aircraft and is part of the GPS spotting procedures. A typical system would involve 3 coloured lights controlled by the pilot, for example:

- red light is illuminated 3 minutes prior to the exit point,
- orange light indicates 1 minute to the exit point – time to open the in-flight door if fitted and prepare to climb-out,
- green light indicates necessary clearances have been obtained and pilot approval to begin exit.

If you are required to relay the "Clearance to drop" from ATC, be sure you can communicate with the parachutists.

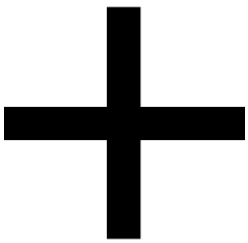
Note: *The parachutist will make the final decision to exit.*

5.6.4 Parachute Operations Radio Frequency

The use of 119.20 MHz for communication purposes is available to jump aircraft to communicate with ground stations involved in parachuting. Some parachute operations may use a company frequency.

5.6.5 Ground to Air Communication System

There are several methods of ground to air communications. The most commonly used is radio, although ground panels are still in use at some locations, especially for Parachuting Displays.

			
OK to jump	**Experienced jumpers only** ***L = no Learners***	**Orbit** ***T = Turn the aircraft***	**Do not exit** ***I = Idiots only***

All of these systems involve the pilot in some way. Obviously the use of a radio will require the pilot to understand and pass on accurately the transmission's content to the Loadmaster, instructor or spotter.

Best practise suggests the pilot should repeat back the message to the transmitter for clarification before passing on the message to the Loadmaster, instructor or spotter to avoid incorrect advice.

5.7 Prior to Parachutist Exit

5.7.1 Jump Run

The Pilot should endeavour to be established on the jump run track and at the appropriate altitude approximately one minute prior to the exit point. This gives the loadmaster time to visually check the spot, and reduces the pilot's workload in configuring for the exit and descent. Fly the aircraft as smoothly as possible and avoid steep turns during the run in.

(a) The proposed jump run should be discussed with the Loadmaster prior to take-off to allow the pilot to plan the climb.

(b) Jump run and exit point will be planned to ensure the parachutists open up-wind of the proposed landing area (Dropzone). This will generally involve a track across the top of the dropzone into the wind.

(c) The pilot must ensure all requirements of radio broadcasts and airways clearances are met in accordance with the appropriate regulations.

(d) The pilot should plan to level off at the planned drop altitude just prior to the exit point, and the parachutist in charge of spotting will then signal any variations as required.

(e) The pilot can assist the "spotter" by flying the aircraft straight and level when over the dropzone, and by passing on any pertinent meteorological information that may be available, such as wind strength and direction. Unless under the IFR, jump runs must remain clear of cloud and allow for a clear view of the dropzone unless a Cloud Jump Procedures Manual has been approved.

(f) Use the GPS to estimate upper winds by evaluating groundspeed, heading and track made good.

(g) During run-in for student jumps, a longer, straight run-in is desirable to allow the students to orientate themselves and to allow the instructor time to carry out his/her various checks and procedures.

(h) During the final part of the jump run, only small directional changes should be required. Steep banking turns should be avoided. Note that this is period when parachutists will most likely be moving around in preparation for the jump and so affecting CofG (see 5.8.1 below).

(i) If multiple jump runs are required, the aircraft bank angle should be limited to avoid parachutists disorientation.

(j) Orbits should preferably be flown in a direction to allow the loadmaster a continuous view of the despatched parachutists and the dropzone through the door.

5.7.2 Speed and Power Control

(a) An experienced pilot on type is the best person to brief you on what is required in relation to power settings required for run-in and exit, as they will vary significantly with different aircraft types.

(b) Maintain a minimum speed, with a safe margin above the stall, at which the aircraft can be positively controlled throughout the exit procedure. High exit speeds can put parachutists, especially wingsuiters, in danger of striking the horizontal stabiliser.

(c) During run-in, a verbal indication of the aircraft's ground speed to the Loadmaster may assist determining the exit separation of parachutists.

5.8 Parachutist Climb-out and Exit

5.8.1 Parachutist Movement – Balance/CofG

Whilst parachutists have been trained to minimise movement inside the aircraft, especially during take-off and climb to height, their preparation for climb-out and exit requires significant movement. This includes changing from a seated position to kneeling or standing, performing various gear checks, and ultimately movement towards the door. This invariably results in a shift in the CofG. Some aircraft are notoriously difficult to prevent from stalling with a load of jumpers at the rear door, and require precise airspeed discipline.

Note that it can take quite some time for jumpers to climb into position (inside and outside the aircraft) prior to their exits. This can be quite pronounced with large formation loads where many parachutists wish to freefall together.

Pacific Aerospace P-750 XSTOL with jumpers preparing to exit

5.8.2 Exit

(a) In smaller piston aircraft, it is still quite common for instructors to call "*Power Off*" as they or their students are preparing to exit. A "power off" is never more than a smooth power reduction to a low power setting, while the targeted airspeed is maintained. Even a slow exit will then lose only minimal altitude.

(b) Pilots should endeavour to maintain a constant run in track and be aware of the tendency to veer either left or right, depending on the side of the door, during the parachutists climb-out. This tendency to veer with the drag of the exiting jumpers can result in the subsequent exits not being in the correct location in relation to the landing area.

(c) Pilots must ensure the aircraft is in level flight for the exit. **Warning**: **Parachutists must not commence exiting unless the aircraft is at the appropriate speed and configuration.**

5.9 Post Exit, Descent and Landing

5.9.1 Post Exit Procedure

Once all the parachutists have exited, close the door if required and configure for the descent, making the necessary radio calls.

Aircraft damage

5.9.2 Descent

(a) Make the descent clear of the parachuting airspace. The parachutists will generally exit upwind of the planned landing area and not fly any further away from the target than where they were dropped. Wingsuiters will, however, have a significant increased lateral range and lower descent rate and their proposed flight paths must be considered by the pilot.

(b) Descend according to the briefing for the day and the standard operating procedures.

(c) A note of caution: In most parachute operations and competitions (other than tandem jumps or CRW), the parachutists tend to open their parachutes at between 2000 to 3500 feet A.G.L. However sometimes, for various reasons, canopies can be deployed at any height up to exit altitude; so never assume the canopies are all safely at the lower level. If a canopy opens higher than expected in CTA, you will likely be required to notify ATC.

(d) Never fly beneath the parachutists in case of a lower opening than expected or an emergency cut-away.

(e) The descent must be made so as not to subject the airframe to unnecessary loads, particularly if unexpected turbulence is encountered. Do not exceed VNE.

(f) Care must be taken to maintain balanced flight to avoid problems with fuel cross-flow during descent when your fuel load is low.

(g) At any sign of rough running, immediately level the wings and ensure that the aircraft is in balanced flight (skid ball centred), then carry out the appropriate emergency procedures applicable to the situation if required.

(h) It is the responsibility of the pilot in command to ensure parachutists are clear of CTA after each sortie, unless otherwise agreed with ATC.

5.9.3 Approach and Landing

Have a stable approach policy that you adhere to, such as an approach speed and configuration to be achieved by a certain height. Maintain alertness for jumpers under canopy who may inadvertently cross approach paths and the airstrip, or who may have landed on the runway, and always be ready to conduct a go-around incase of events such as – to fast, to high, parachutist on runway etc…

5.9.4 Parking the Aircraft

As you approach the parking area, keep your attention alert for spectators and parachutists who may have landed nearby. Park in a position so it will be natural for them to approach the aircraft from the rear and entry door side.

If you land with anyone still onboard, it is important that they are made aware of disembarkation procedures.

They must not be allowed to disembark until they can be accompanied by an instructor or ground personnel who are familiar with the procedures relating to movement around aircraft, particularly with engines running.

Before leaving the aircraft, do whatever you can to prepare it for the next load, such as resetting the trims, completing sortie paperwork, conducting a walk around and re-fuelling.

Florida, March 2014: 49-year-old parachutist about to land on DZ at Mulberry Florida airfield hit by 87-year-old pilot's plane. Both men escaped with only minor injuries. Whilst the pilot did not possess a current FAA medical certificate, and could not provide evidence of a current flight review, the National Transportation Safety Board determined the probable cause of this accident as the failure of the pilot and the parachutist to see and avoid each other. Photos by Tim Telford (released by AP/Polk County Sheriff's Office).

PART 6 – CLOUD JUMPING APPROVALS

6.1 General

CASA and the APF have developed procedures that will allow parachuting through cloud under certain prescribed procedures, at site-specific locations. See APF Regulatory Schedule 60.

These procedures are contained in a Cloud Jumping Procedures Manual (CJPM) and the Group member you are flying with may have such an approval. If so, you must ensure you are familiar with all the requirements contained within that Manual and that you have the approval of the Senior Pilot to conduct operations in accordance with the provisions in the Manual.

Cloud Jumping Manuals are specific to each Group member. These manuals provide exemptions to APF Operational Regulations regarding cloud and visibility, specifying procedures that enable the Group member to legally drop parachutists through cloud.

The pilot must have a comprehensive understanding of this manual, as by operating under these conditions, the parachutists are relying heavily on the pilot to accurately spot the aircraft and make the required radio calls to local traffic.

Important: Even though the skydivers may be able to descend through cloud, a VFR pilot must still be able to operate safely and legally, so ensure you can operate the aircraft in metrological conditions suitable to your licence and aircraft restrictions. Consider having an alternate airport available should conditions unexpectedly deteriorate.

Photo by Justin Frame

Note: It is the Group member's responsibility to be aware of the CJPM's expiry date and by submitting another cloud manual for review and uthorisation. As a Group member pilot, you may assist your Group member by reminding them in advance of the recommended minimum three months lead time for submission before expiry.

PART 7 – TYPES OF DESCENTS

7.1 General

There are a number of different disciplines/types of skydives and events, and also a number of different training methods for those wishing to be introduced to the sport of skydiving. These may take place from the jump aircraft you are flying. Each discipline, student training method and event has its own peculiarities. The jump pilot must ensure he/she is generally familiar with each one, and aware of the particular issues that may apply.

7.2 Student Training Programs

7.2.1 Tandem Parachuting

(a) General Overview:

(i) exits for tandem descents are usually from a minimum height of 8,000 feet AGL and a maximum of FL150, although exits may be undertaken from as low as 6,000 feet.

(ii) unlike certified parachutists who normally open their parachute by about 2500 feet AGL, the main parachute on a tandem descent is required to be open by 4,000 feet AGL. So for Tandem descents, an exit below 6000 feet AGL is not recommended (except in an emergency).

(iii) usually Tandems only exit on their own or with a cameraperson.

(iv) the tandem skydive involves connecting the student to the front of a Tandem Master by means of a dual harness system before the aircraft door is opened. The tandem parachute system has a small 'drogue' parachute which is deployed immediately after exit, once stability has been achieved. This drogue maintains the tandem pair at normal freefall speed of about 120mph (200kph). Once the parachute has been deployed, the tandem pair will fly around under canopy for up to 7 minutes before landing.

Photo by Steve Greens

(b) Pilot Considerations:

(i) whilst particular care must always be taken when student parachutists are on-board, and whilst tandem passengers are considered to be students, they are in the care of a Tandem Master. Tandem Masters are highly experienced parachutists with many years of experience in the sport.

(ii) tandem parachutes are opened higher, and therefore are in the air longer and with a slower descent rate.

Tandem pair poised at exit with camera person leaving

7.2.2 Accelerated Freefall (AFF)

(a) General Overview:

(i) the Accelerated Freefall program usually involves 9 'stages' or descents.

(ii) exits are usually conducted from a minimum of 10,000 feet AGL and to a maximum of FL150, however lower exits from 8,000 feet are also permitted, with the final stage of the program (stage 9) being conducted from 4,000 feet AGL.

(iii) an AFF stage one involves two instructors (commonly known as "Jumpmasters") and a student. Each wear their own parachute system and exit the aircraft together. The student is accompanied by the two instructors (during freefall until parachute activation) for at least the first three stages of the AFF program. Later stages require just one instructor (stages 4–8). A cameraperson is also likely to be on one or more of the descents.

AFF student in stable freefall with two Jumpmasters

(b) Pilot Considerations:

(i) exits with AFF students can be unpredictable to a certain extent – a student may 'rush' the climb-out and exit and leave without giving the correct cues resulting in opening downwind of the target, or

(ii) the climb-out may be very slow with the exit point becoming further away from the desired position than anticipated.

(iii) the combined weight of the three parachutists outside the aircraft causes drag. Lack of rudder control may result in the aircraft drifting off the desired heading unless corrective action to maintain track is taken by the jump pilot.

7.2.3 Solo Freefall (SFF) – Static-Line Deployment or Instructor-Assisted Deployment

(a) General Overview:

(i) the Solo Freefall (SFF) program involves either some Static-Line Deployment (SLD) or Instructor-Assisted Deployment (IAD) in the early stages, however the majority of descents are undertaken without an Instructor in freefall with the student.

(ii) the SFF program consists of 17 descents where at least the first 5 descents involve either use of an actual static-line or the instructor hand-deploying the student's pilot-chute on exit. For these initial jumps, the student is despatched between 3,000' and 3,500' AGL.

(iii) static-line deployment involves the student having their deployment bag connected to the aircraft by means of a static-line attached to an aircraft strong point with the student being despatched by a static-line instructor. During the exit, the instructor will hold the slack of the static-line and play it out as the student falls away. Once the student has cleared the aircraft and their parachute has opened, the instructor will pull in the static-line and stow it. The student's parachute is immediately deployed upon exit.

(iv) the remaining descents in the SFF program do not actually involve a static-line or IAD – they are mostly solo freefalls with exits starting from 3,200' and climbing to 9,000+ feet.

(v) the instructor does not normally exit with the student, observing the student's deployment and/or freefall as best they can from the door.

(b) Pilot Considerations:

(i) multiple run-ins are usually conducted to allow one student to be dispatched at a time.

(ii) it may be necessary to fly wider orbits between exits to allow the instructor time to prepare the next student for exit.

(iii) if the system being used is a 'direct bag' deployed static-line, the bag and static-line will need to be retrieved BEFORE power is reapplied as the bag creates drag making retrieval difficult and may also cause damage to the aircraft skin.

(iv) there is a greater risk of premature deployment in the aircraft and during climb-out and exit due to the static-line.

(v) the aircraft airspeed must be correct to avoid damage to the horizontal stabiliser.

Often SFF operations are conducted from Cessna 182 style aircraft. If using a front door aircraft without a step, the pilot may be required to operate the foot brakes to enable the parachutists to stand on the wheel without it rotating. In this case, the appropriate command calls from the instructor might be "*Power Off, Brakes On*" to the pilot, followed immediately with the call to the student "*Out you get!*"

Instructor-Assisted Deployment. Photo by Justin de Waard

7.3 Parachuting Disciplines

7.3.1 Formation Skydiving (FS)

(a) General Overview:

(i) involves parachutists flying in a 'belly to earth' position, working relative to, and making contact with one another during the freefall part of the descent.

(ii) involves a minimum of two parachutists and depending on the aircraft being utilised, the formation can be much larger.

(iii) these parachutists tend to fall in a more vertical descent path compared to other disciplines.

(iv) at usually 1,000 feet above the planned opening height, the parachutists will 'track away' from one another in order to gain horizontal separation prior to deployment of their parachutes.

Formation skydive linked exit. Photo by Chris Dykstra of Curved Air

(b) Pilot Considerations:

(i) be aware of the combined drag that is created when multiple parachutists climb-out and set-up for exit outside the aircraft and in the door.

(ii) if a large formation has been undertaken there will be multiple parachutists in the air at one time.

(iii) experienced parachutists descend quickly once their main parachute is open and may be under canopy for only a few minutes before landing.

(iv) accurate airspeed must be flown throughout the exit, due to the position of the "rear float" person who will be hanging off the very rear of the door, and very close to the tail.

7.3.2 Freeflying/Vertical Formation Skydiving (VFS)

(a) General Overview:

(i) unlike the 'belly to earth' position, freeflyers fly in a variety of positions including 'sit', 'stand-up', 'head-down', 'angles', etc.

(ii) freeflyers, particularly novices, move around the sky a lot more than 'belly to earth' parachutist.

(iii) by the nature of the manoeuvres undertaken, the freeflyer is travelling at far greater speeds than standard flat flying (e.g. falling at ~180 mph).

Freeflying head-down. Funny Farm

(b) Pilot Considerations:

Be aware of the possibility of freeflyers moving around the sky during freefall and opening off the jump run line.

7.3.3 Canopy Formation (CF)/Canopy Relative Work (CRW)

(a) General Overview:

(i) during these descents the parachutists generally open their parachutes immediately after exit and at higher than normal altitudes.

(ii) once open, the parachutists conduct 'Canopy Relative Work' with one another including 'docking' or linking with one another's open canopy. This will involve as few as two or many more during competitions or special events.

(b) Pilot Considerations:

(i) clear communications are essential to ensure no conflict between the parachutists and aircraft in the area. The pilot is required to notify any area traffic and ATC where applicable, that parachutes are open at 'altitude'.

(ii) the pilot must be very careful on descent to remain clear of the parachutists and must also be on the lookout for intruding aircraft so that they can be warned as to the number, position and altitude of the parachutists.

(iii) the jump run and exit point will likely be very different to other ops, with the intent of the parachutists arriving overhead the DZ at the completion of their descent.

Canopy Relative Work above York WA. Photo by Carl Jefferis

7.3.4 Canopy Piloting (CP)/Swooping

(a) General Overview:

(i) parachutists make these descents individually, normally exiting at about 5000' and opening immediately after exit.

(ii) once open, the parachutists make their way to their target area with a final approach that results in a fast vertical to horizontal transition in a "swoop" across the ground.

(b) Pilot Considerations: No special considerations.

A highly experienced pilot swooping in at Ayr in North Queensland.

7.3.5 Wingsuiting

(a) General Overview:

(i) wingsuits are specially designed jumpsuits which have wing areas under the arms and between the legs, which inflate into an 'aerofoil'. Once inflated, these suits greatly extend the time the parachutist is able to spend in freefall and the distance that can be flown prior to parachute deployment. Glide ratios of 2.5:1 and descent rates as low as 50 Kph can be achieved.

(ii) wingsuiters will generally be last to exit the aircraft.

Photo by BJ Adams, Hervey Bay

(b) Pilot Considerations:

(i) these parachutists tend to be 'clumsier' in the aircraft and on exit, due to the jumpsuits they are wearing.

(ii) the pilot should be aware that they may encounter wingsuiters during descent. They are not easy to see and will be faster moving than a parachute canopy, achieving more horizontal speed than vertical speed.

(iii) novice wingsuit pilots may move around the sky more than planned and pilots should give them a wide birth. They often land off the DZ.

(iv) greater planning is required prior to take-off to ensure the pilot is aware of the wingsuiters proposed flight paths.

(c) The jump-run technique, depending on the aircraft, will likely have the wingsuiters exit last. The pilot should achieve a minimum airspeed with a shallow descending flight path which enables the aircraft tail to be positioned at a higher point relative to the door to further increase the jumpers separation from the tail.

7.4 Display Descents

7.4.1 Display Descents

Displays can be conducted almost anywhere and are generally for a specific public event. The key to a safe display is good organisation and appropriately skilled display jumpers.

7.4.2 Display Organiser

Display descents are conducted under the authority of a Display Organiser, a rating issued by the APF. The Display Organiser responsibilities include ensuring that:

(a) all participants are appropriately rated and qualified for the proposed display jump,

(b) the APF has been advised of the impending display,

(c) all appropriate approvals have been sought and received,

(d) all requirements as detailed in the APF Display Manual have been adhered to, and

(e) should the display be conducted in controlled airspace, ATC is involved early in the planning process.

7.4.3 Pilot

The pilot should satisfy themselves that all necessary approvals are in place, that all requirements have been met, and that the display is being conducted appropriately. Whilst no extra qualifications are required to fly for a display jump, you should ensure you have enough experience to be comfortable with the extra complexity of the event. Pay special attention to briefings and ensure you have a comprehensive understanding of the planned flight.

7.4.4 Carriage of Pyrotechnics

(a) Pyrotechnics are often used on Display Descents and as these are considered 'Dangerous Goods', an exemption to carrying them in your aircraft will need to be gained from CASA prior to the intended parachuting display taking place.

(b) The permission of the aircraft owner should also be obtained.

(c) Whilst the pilot must ensure all is in order, it is the Display Organiser's responsibility to seek and procure permission for carriage of pyrotechnics, and ensure the display jumpers are appropriately trained in their safe use.

7.5 Other Special Operations

7.5.1 Night Jumps

The pilot intending to fly parachutists at night has the usual routine preparations as required for any night flight. In particular, airstrip, aircraft, and alternate lighting requirements, as well as lowest safe altitudes.

On night jumps the pilot must be particularly careful to remain clear of the parachuting airspace and landing area until every canopy has had time to land. Generally, the DZSO/GCA will advise once all parachutists are on the ground and the runway is clear.

7.5.2 Competition Events

These are often carried out at major area or national competitions, and require very accurate and co-ordinated flying, often in a busy, multiple aircraft environment. Only highly experienced JPA's are utilised for these complex operations.

7.5.3 Hot Air Balloon Aircraft

A balloon pilot is required to have at least a Private Balloon pilot licence to drop parachutists. Student parachutists (including Tandem parachutists) cannot be dropped from balloons without a special waiver from the APF.

7.5.4 Formation Loads

Formation loads use more than one aircraft for dropping large numbers of skydivers at once. Only experienced JPA's are utilised for these operations.

7.5.5 Helicopters

Helicopter operations have a few unique issues to be considered such as safety during boarding while engines running, and more adverse effects during the parachutists exits.

Generally though, they are operated to much the same procedures as fixed wing aircraft. Helicopter pilots should seek advice from an experienced helicopter jump pilot prior to conducting parachute drops.

PART 8 – EQUIPMENT

8.1 Harness and Container

A basic understanding of the equipment used by parachutists and how it works is essential for the jump pilot.

(a) The parachute harness and container has a main and reserve compartment with both compartments held closed by individual pin systems. The pins are protected by covering flaps (closing flaps).

Typical modern parachute container system

(b) Opening of the main container to deploy the main parachute is achieved by extracting the closing pin via:

(i) a ripcord mounted on either the front of the harness in the chest position;

(ii) a ripcord mounted on the bottom of the container;

(iii) by deploying a 'pull-out throw-away' pilot chute mounted on the bottom of the container (this is the most common system used by experienced parachutists); or

(iv) a static-line.

(c) Opening of the reserve "emergency" parachute is achieved by pulling the reserve ripcord handle which is located on the front left-side of the parachutists chest.

(d) The main and reserve parachutes are connected to the main lift web at or just below the shoulders with the main parachute able to be 'cutaway' or jettisoned in the event of a 'malfunction' of the main parachute.

(e) Modern parachute rigs have magnets in the shoulder covers. If a jumper is located close to the aircraft's compass or instrument panel, these magnets may affect the compass accuracy. If so, you should get the jumper to move position.

8.2 Parachute Deployment Methods

8.2.1 Spring-loaded Pilot Chutes

(a) Some student equipment is fitted with spring-loaded pilot chutes designed to deploy the main parachute. When the parachutist pulls the ripcord to release the pin and open the back pack, the spring-loaded pilot chute is launched into the air stream. Through drag, it acts like an anchor as the parachutist falls away, effectively pulling the main parachute out.

(b) Reserve parachutes are also activated by spring-loaded pilot chutes.

8.2.2 Throw-Away Pilot Chutes

Most experienced parachutists have 'throw-away pilot chutes' to activate their main canopy and these are designed to inflate quickly once they have been launched into the air. The main pilot chute remains attached to the bridal and main canopy. These pilot chutes are located in a pouch, usually on the bottom of the container. With some older equipment, this pouch may be located on the leg strap.

Normal deployment: Throw-away pilot chute connected to main deployment-bag, just prior to bag opening.

8.2.3 Free-bags and Jettisoned Main Canopies

Most reserve pilot chutes are connected via a long bridle to a deployment bag called a "free-bag", allowing the reserve pilot chute/bridle/bag assembly to detach from the reserve parachute after its deployment.

Pilots need to be aware that following a main parachute cut-way, not only will there be a separated main canopy floating to earth, but also a reserve pilot chute/bridle/bag assembly, which both need to be avoided.

Due to the cost of replacing these components, the landing locations of these separated components is well sought-after information.

Cutaway main canopy and its deployment bag on the left hooked-up to the reserve's pilot chute, bridle and free-bag on the right.

8.3 Parachute Handling

8.3.1 Controlling a "Square" or "Ram-Air" Parachute

(a) Modern parachutes are essentially soft wings, inflated by forward speed "ramming" air into them to create their shape and generate the lift required for flight.

(b) All parachutes are controlled by pulling on steering lines attached to their trailing edge, and this is usually facilitated by attached handles called brake/steering toggles. On square canopies, pulling down on a steering toggle creates drag on that side of the parachute which allows the other side to overtake, thus creating a turn.

(c) Modern square parachutes can achieve air speeds of up to 50 knots and glide rations of 3:1.

(d) For landing a square parachute, both brake toggles are pulled down simultaneously in order to 'flare' the parachute.

(e) Parachutes are susceptible to turbulence which can cause them to collapse or partially collapse. This is another factor to consider if you are operating near the parachutists during their landing approach.

Steering a square canopy

Photo supplied by Dave Boulter

8.3.2 Flying a Square Parachute

(a) Once under the open parachute, the parachutist's flight path should generally remain upwind of the planned landing area. However in a lower wind environment, modern square parachutes can fly a significant distance downwind of the landing area and still return to the target area.

(b) Whilst APF regulations define minimum opening heights for all parachutists, the pilot must be aware that an opening is possible at any altitude. Those minimum prescribed heights are:

(i) tandem parachutists must be open by 4,000 AGL

(ii) non-tandem, licensed (or certificated) parachutists must be open by 2,000 feet AGL

(c) Depending upon the size and type of parachute, the experience of the parachutist, the altitude at which the parachute has been deployed, a parachutist may spend between 2 and 7 minutes under the open canopy before landing (with the exception of Canopy Relative Work).

8.4 Reserve Parachutes

The reserve parachute is similar in design to the main parachute (also square), although key differences include:

(a) faster openings – the deployment system is designed to operate faster, an obvious advantage in the event of needing a fast deployment close to the ground.

(b) stronger construction.

(c) rigorous inspection and repacking requirements – all reserve parachutes must be repacked by a qualified APF Packer A or Rigger every 6 or 12 months.

Round parachutes remain in service, particularly in the military, however they are generally no longer used by sport parachutists. Round reserve parachutes are common in pilot rigs – see section 8.8 for more information.

8.5 Automatic Activation Devices (AAD)

8.5.1 Types in Use

(a) Modern AAD's are an electromechanical back-up device, designed to initiate the deployment of a parachute at a specific altitude and airspeed. Most parachutists these days have an AAD fitted to their equipment. There are a number of different types of AAD's in use for students and experienced jumpers. Since the specification for these units are apt to change and new systems are becoming available, there will be no attempt here to explain the specifics of any one unit. It is however important for the pilot to know the basic function of automatic activators.

(b) AADs can be fitted to a main or a reserve parachute.

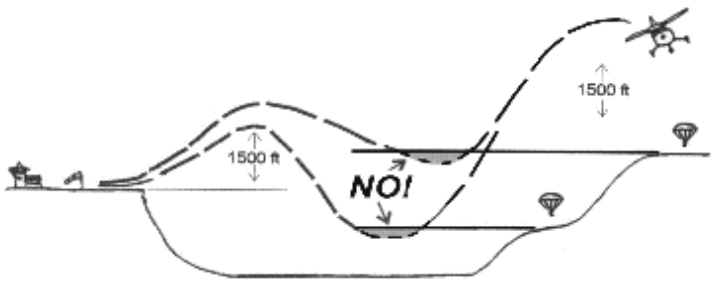
(c) AADs for reserve parachutes usually have a rate of altitude change sensor connected to a battery and a small sealed pyrotechnic charge. Once the charge is fired, a small blade cuts the loop retaining the reserve pin and the opening is initiated.

8.5.2 Pilot Considerations:

(a) AAD's are used on almost every load. In the event of descending with parachutists on-board, the pilot must avoid high rates of descent to prevent accidental activation of parachutes.

(b) Due to their lower thresholds, some student AADs are required to be turned-off if the student is descending in the aircraft.

(c) Never fly below the airfield's take-off elevation, as this will affect the ground level settings of the AAD's onboard, re-setting programmed activation heights.



8.5.3 Further Information

Pilots should make themselves familiar with the different types of AAD's. Further information on AAD's can be found at the websites of the two main manufacturers:

(a) CYPRES: http://www.cypres.aero

(b) VIGIL: http://www.vigil.aero

PART 9 – EMERGENCY PROCEDURES

The following information is intended as a guide only. Aircraft emergency procedures are relatively standard around the world, with obvious variations in relation to different aircraft types, parachute equipment, local terrain and emergency instruction. The Senior Pilot will outline emergency procedures specific to the Dropzone where you are flying.

9.1 Students/Novices

When there is a loadmaster on-board, the division of responsibility in an emergency situation is very clear: the pilot takes care of the aircraft and communicates with the loadmaster, while the loadmaster controls and directs the actions of the student/novice parachutists. The students and novices are briefed accordingly and are instructed to follow the instructions of their instructor or the loadmaster.

9.2 Engine Failures

An engine failure may be a sudden and complete loss of power, or it may be a partial power loss. Either way, you must immediately maintain control of the aircraft with airspeed, then go into your emergency drills. Only troubleshoot if you have enough altitude.

Obviously the lower the altitude the more critical the situation. In anycase, the key is to be prepared for an engine failure at any time. This means knowing your emergency procedures comprehensively so that you can carry them out instinctively when required. The best way to ensure you are not caught out is to conduct a thorough pre-takeoff safety brief. This should include a target airspeed, possible forced landing areas up ahead, and emergency drills.

While flying parachutists, one extra consideration during an emergency is that, altitude permitting, you can quickly reduce the load by telling the jumpers to exit. They will most likely prefer to land under a parachute then to be involved in an aircraft crash landing. This reduction in load will reduce potential loss of life, and improve the pilots chances of survival in a forced landing by reducing the aircrafts airspeed and momentum on impact.

If you have a pilot rig on you also have another option to exit the aircraft yourself and land under a parachute instead.

Obviously an emergency has many variables. In a fire for example, everyone would likely try to exit the aircraft, even at a low altitude, but in general the sport jumpers would exit at anything above 1500', while the tandems would likely want a higher altitude. As the pilot in command, try to manage the situation to minimise the loss of life.

While conducting your engine failure drills you may well find that the parachutist and their equipment has caused the power loss, with the mixture control, fuel selector, carburettor heat or even the throttle bumped or snagged.

If an emergency landing is to be carried out with passengers still onboard, try to remind them to ensure their restraints are secured and to brace for impact.

In the unlikely event that you experience an engine failure after takeoff at low altitude, remember what your flying instructor taught you: ***MAINTAIN CONTROL WITH AIRSPEED, AND DO NOT TURN BACK.***

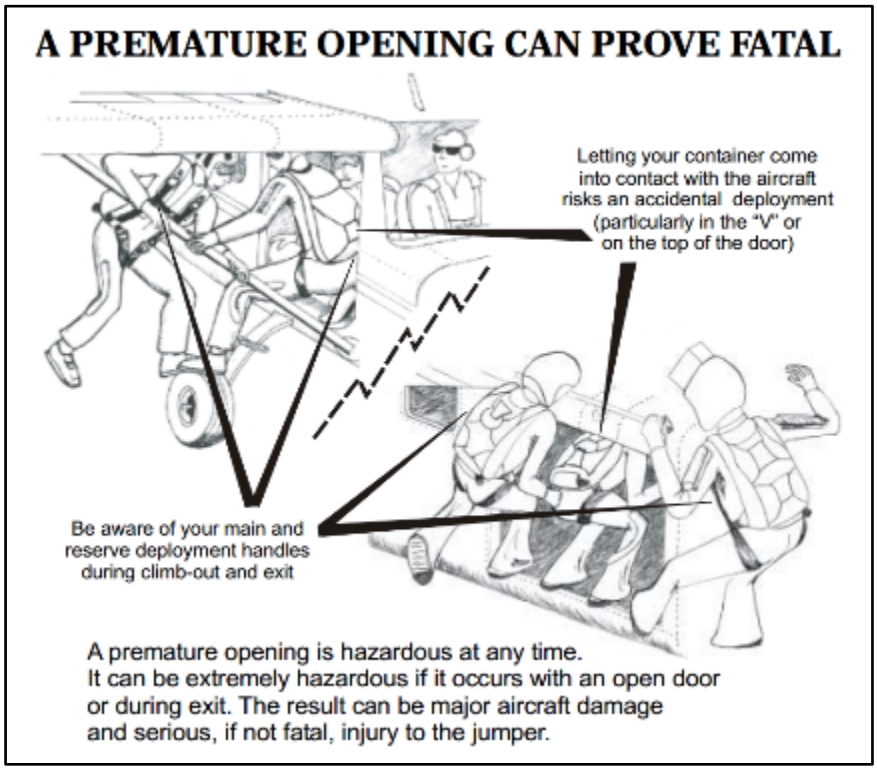
9.3 In-Aircraft Parachute Deployment

There are a number of situations where a ripcord may be accidentally pulled or a pin dislodged resulting in a container opening in the aircraft, on climb-out, or on the step. An extremely hazardous situation exists when the door has been opened and a pilot chute is suddenly deployed finding its way outside.

This is one of the most dangerous situations a pilot and parachutists can face and the importance of preventing this situation cannot be over-emphasised. The safety procedures designed to protect against this occurrence must never be relaxed.

Parachutists are taught to protect their handles and equipment while inside the aircraft and during climb-out and it is usually the students and novices that require the most attention. They are often still "clumsy"

in the aircraft and therefore, great care must be taken. Most experienced jumpers have a great respect for this hazard and will seldom have to be reminded of it; however if you find yourself with a load of inexperienced parachutists on-board, who are not observing the rules of minimising movement and protecting handles, don't hesitate to speak up should you feel it is necessary.



If parachutists are behaving in such a way as to be a danger to themselves, you and the aircraft, you should not only speak up but also report this to the DZSO. This will provide him/her the opportunity to address the potential risks of this behaviour.

If a parachute container opens in the aircraft, ensure that the pilot-chute is captured and smothered immediately and do not open the door. If the parachute is dislodged inside and the door is open, close the door immediately. If there is an open parachute container on-board, do not open the door in-flight under any circumstances.

An accidental opening in the aircraft with the door open is potentially disastrous. If a pilot chute escapes while the door is open, it can be out and into the slip stream before reaction is possible. The jumpers will do their best to ensure the person attached is able to be expedited out the door as quickly as possible. In the past, this has resulted in the parachutist attached to the parachute being pulled through the side of the aircraft!

Keep a close watch for any premature openings and if one occurs, immediately apply maximum rudder to swing the tail clear of the deploying parachute and the person attached.

9.4 Baulked Exits (Student Refusal) Procedures

A student may refuse to jump just prior to exit. An experienced instructor will be able to judge whether or not, by talking to the student and observing their body language, whether or not he/she can restore their confidence enough to allow them to continue safely with the jump. Often in this situation where the student has not yet climbed out, the instructor will call for the door to be closed and will request an orbit while they talk to the student, and decide if a second attempt is likely to be successful. If the student still refuses, the instructor will accompany and supervise them on-board for the aircraft's descent and landing. Operational regulations state that students must be accompanied in the aircraft at all times by an instructor following a refusal to jump.

If however the student has commenced the climb-out or exit and 'baulks' once positioned on the step outside the aircraft, it can be dangerous and near impossible in some situations to assist them back into the aircraft. In this case the instructor will likely need to initiate the exit by whatever means they can.

In these situations, the instructor has a difficult task and will need to rely on you to remain as near as possible to the correct exit point, apply power when necessary to maintain the correct altitude and airspeed, continue to fly as smoothly as possible, and comply with any commands/requests from the instructors.

9.5 Static-Line Hang-ups and Other Hang-ups

(a) Static-Line Hang-ups

A static-line hang-up is a static-line that has failed to operate correctly and the result is a person hanging underneath the aircraft from a very strong 5,000 lb line. This is a very rare occurance with the modern systems used in Australia.

The most immediate concern is that the hung-up person will attempt to deploy a parachute while still attached to the aircraft, with disastrous consequences. It is a requirement to have a knife onboard the aircraft for this type of situation. The instructor will likely try to communicate their intentions with the student underneath the aircraft, and then cut the static-line to release them. It's important the pilot continues to fly the aircraft at the appropriate airspeed and maintain a safe altitude, while remaining in close proximity to the DZ or another safe landing area.

(b) Other Hang-ups

On a rare occasion, a jumper may get hung-up outside the door of the aircraft. This has happened in the past with equipment snagging on the aircraft, or with the parachutist forgetting to undo a single point restraint prior to exit. In most cases the jumper has been able to release themselves or another person onboard has been able to help them, but on one occasion the pilot was required to use the knife to release the hung-up jumper.

The main way to mitigate this risk is to ensure there are no snag points around the door of the aircraft. Also, the restraints (SPRs) near the door are of short enough length to stop the parachutists movement through the door whilst still attached.

Once again, its important the pilot continues to fly the aircraft at the appropriate airspeed and maintain a safe altitude, while remaining in close proximity to the DZ or another safe landing area.

9.6 Emergency Exit

In an airborne emergency such as a structural failure or fire, the pilot may decide that the chances of surviving a landing in the aircraft are non existent, and decide to order the evacuation of the aircraft. Each load must have a loadmaster who will start the aircraft evacuation once the pilot gives the command.

At lower levels, the parachutists will open their reserve parachutes as soon as they are clear of the aircraft. These parachutes are designed and packed to deploy quickly and only require a couple of hundred feet.

Note: Emergency procedures for structural failure are not discussed in manuals or safety publications because there are to many variables and little that can be effectively done. It is mentioned here because, with parachutes on-board, there is a chance that lives can be saved by exiting the aircraft. This applies equally to you as a pilot if you are wearing a parachute.

9.7 Emergency Pilot Rig Use

In the event that you decide to use the pilot emergency parachute, you must be prepared to follow the procedures you've been briefed on by the DZSO for the particular rig in use. Pilot rigs normally contain a round canopy, which achieve minimal air speed (~5 to 8 knots) and glide ratios of up to 1:1. The general procedure for use is as follows:

(a) prior to leaving the aircraft, grasp the ripcord handle. It is easier to locate it prior to exit as it may move once in freefall, and the associated disorientation may make it more difficult to find.

(b) once clear of the aircraft, pull the ripcord to full arms length,

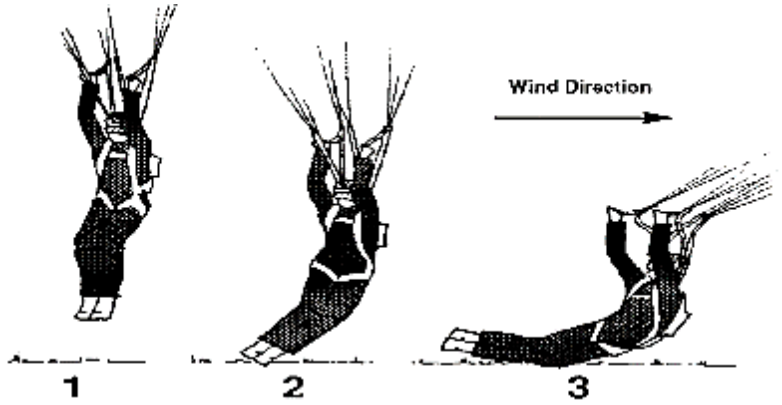
(c) once the parachute is open, reach up and grasp the two small steering toggles (handles), or the coloured lines, on the risers above your shoulders.

(d) to steer, pull down one side to turn in that direction.

Photo supplied by Dave Boulter

(e) fly towards a cleared area and try to land into the wind to minimise landing speed.

(f) for landing, it is highly recommended that you perform a Parachute Landing Roll (PLR).



The PLR is the safest method. You must not attempt to 'flare' a round canopy in the way a square is flared.

To land using a PLR, bend your knees to absorb the impact. This is achieved by relaxing the knees and bending them up a little, and allowing your body to roll as you land (see diagram).

9.8 Accidents, Incidents and Reporting

For any aircraft related serious incident or accident, it is a requirement for the ATSB to be notified. Information about the process is available on the ATSB website at www.atsb.gov.au. Additionally, the JPA or Senior Pilot must immediately notify the APF National Aviation Officer (NAO), then in writing within 24 hours to the NAO and the APF Office.

In relation to parachuting only accidents/incidents, the DZSO is responsible for taking whatever actions is necessary, including contacting the emergency services required and making the appropriate notifications to the APF.

APPENDIX A: PISTON ENGINE AIRCRAFT SUPPLEMENT

Managing Thermal Shock

The main consideration of a piston engine while on descent, is one of temperature, and the rate-of-temperature-change.

An efficient operation requires that the aircraft be flown in a manner that keeps load times as low as possible but also doesn't cause structural or mechanical distress to the aircraft. To achieve this without damaging the engine, the pilot needs to achieve a slow, gradual reduction in temperature from the high temps achieved at the top of climb, to the lower temps achieved on descending to circuit height.

If this rate of temperature change is to rapid, then there is the potential for so-called "*Thermal Shock*". This shock cooling can cause excessively worn piston ring grooves, broken rings, cracked cylinder heads and warped exhaust valves. It is expensive to repair and can be avoided.

Techniques to avoid shock cooling vary dependant on type, with the more susceptible engines being turbo charged pistons.

Operation of the In-Flight Door – Cessna 100/200 series

The in-flight opening door will have operating limitations specified in the operating supplement, and is usually placarded in the aircraft.

(a) These operating instructions will usually say "Pilot only to operate".

(b) Observe these limitations as the in-flight door is quite fragile and easily damaged if operated at airspeeds in excess of the design speeds. Maximum airspeed for cycling most in-flight doors is 80 knots. Check the limitations on the door you are using.

(c) For this reason, it is unwise to allow the parachutists to operate the door even under your supervision as they won't necessarily understand the airspeed limitation and may open it when you don't want it opened.

(d) The parachutist spotting the load will usually call for 'door open' when they are ready, however, advise the parachutists when you are about to open the door to avoid causing alarm.

(e) When the locking handle is released, the door will likely open and move up under the wing due to the airflow. If the door can be locked in the open position, reach over and lock it open.

(f) To close the door, simply release the over-centre handle or latch, and side slip gently to the right (left rudder). The change in airflow direction should close the door enough for the pilot to reach the handle and lock the door closed. Avoid using excess force on the door.

(g) Hold the side slip once the door is latched and check its closed properly and flush.

(h) Experience has shown that the door can be improperly closed leading to door damage during a high speed descent. Its imperative that the door security is assured before increasing airspeed on descent.

(i) Ensure that the door is correctly lathed closed for all take-offs and landings.

A properly designed and installed door will not vibrate or flutter within its designed speed range, even with a parachutist standing on the step. Should you experience a vibration or flutter of the door, reduce power and airspeed immediately. Full power operation with the door open should be avoided.

APPENDIX B: TURBINE ENGINE AIRCRAFT SUPPLEMENT

APF PT6A Compressor and Compressor Turbine (CT) wash

1. Applicability

Operators of Pratt & Whitney Canada (P&WC) PT6A series engines required to perform a desalination wash in accordance with the instructions for continuing airworthiness issued by the manufacture.

NOTE: This supplement is not approved for the Pacific Aerospace P-750 XSTOL or variants of this Type. The access to perform these tasks is considered too complex and thus inappropriate for Pilot maintenance.

2. Purpose

CASA has developed a policy statement which provides the guiding principles for the making of an instrument under paragraph 42ZC(6) of the Civil Aviation Regulations 1988 (CAR 1988) for the purpose of authorising a pilot, or an aircraft maintenance engineer that is not endorsed on the type (an engineer) to perform the maintenance tasks referred to in Paragraph 3.

3. Maintenance Tasks

Compressor Desalination Wash:

This wash is used to remove salt deposits. Light dirt deposits may also be removed by this wash. The wash fluid is to be injected into the engine intake using either an installed compressor wash ring or a hand held wash wand. Refer Pratt & Whitney Canada engine specific Maintenance Manual (Ref. 71-00-00 POWER PLANT – CLEANING).

Compressor Turbine (CT) Desalination Wash:

This wash is used to remove salt deposits from the compressor turbine blades and stator. The wash fluid is injected through a wash tube installed into the gas generator igniter boss. Refer Pratt & Whitney Canada engine specific Maintenance Manual (Ref. 71-00-00 POWER PLANT – CLEANING).

4. Background

Registered operators of turbine engines are required to follow manufacturer's instructions if they have elected CAR42A or CAR42B (Schedule 5) maintenance schedule. In the case of the election of CAR42B, "all instructions issued by the manufacturer of the (turbine) engine for the continued airworthiness of the engine are to be taken to form part of the CASA maintenance schedule and the election has effect accordingly."

If a registered operator wishes to vary the manufactures instructions for continuing airworthiness, then election of CAR42C – approved system of maintenance, may allow for a maintenance schedule or procedure that uses the manufacturer's instructions as a baseline and varies that baseline based on experience and/or engineering justification.

The actions of AD/PT6A/28 were instigated to ensure that an appropriate water wash regime was established for PT6A engines operating in a salt laden environment. The purpose of water washing is to remove salt deposit that can accumulate over a period of time and cause corrosion or sulphidation attack most often affecting the compressor turbine blades.

The identified water wash tasks are outside the scope of work that may be carried out by a pilot under Schedule 8 of CAR 1988, to that end the performance of this maintenance may only be carried out by a person authorised to do so under subregulation 42ZC(4) of CAR 1988.

It has been acknowledged that a number of applicable aircraft are operated from airstrips where persons authorised to carry out the subject maintenance are not readily available. This situation is compounded by the fact that for aircraft that are continuously in a salt laden environment a Desalination Compressor and CT Wash is recommended on a daily basis, after the last flight of the day.

To address this situation, and where appropriate, CASA has developed a policy statement and supporting documentation has been developed in order to facilitate the authorisation of a pilot or LAME that is not rated on Type to perform the maintenance tasks referred to in Paragraph 3.

5. Conditions

An authorisation under the provisions of this document is subject to compliance with the following conditions:

(a) The holder must not exercise the privileges of the instrument unless the engine has been modified with a P3 Air Filter Drain Adapter.

Note: *The instrument does not permit the removal of the P3 line for engines that do not have a P3 Air Filter Drain Adapter.*

(b) Maintenance may only be carried out whilst the holder has a valid flight review for the aircraft type mentioned in the instrument or a valid Aircraft Maintenance Engineer licence, as applicable.

(c) Current approved maintenance data and appropriate tooling and equipment must be available and utilised when conducting the maintenance authorised by the instrument.

(d) The holder must not certify for maintenance unless the holder has personally performed the maintenance, and the holder must not certify for maintenance if the maintenance was performed by another person under the holder's supervision.

(e) The holder must ensure that:

(i) the maintenance authorised by the instrument is recorded on the aircraft's maintenance release or other approved documents; and

(ii) completion of the maintenance is certified in accordance with subregulation 42ZE (1) of CAR 1988, Schedule 6 of CAR 1988 or an approved alternative system of certification.

(f) The holder must ensure that the number of the instrument is quoted on all certifications made for completion of the maintenance performed.

(g) Subject to Paragraph 5(i), the maintenance must not be carried out by the pilot if, under the approved maintenance data for the aircraft, the maintenance requires the use of tools.

(h) If any defect or damage is detected in the aircraft, any decision about continued serviceability must be made by an appropriately Licenced Aircraft Maintenance Engineer.

(i) If any material amendment is made to the content, scope or intent of the approved maintenance data that applies to the maintenance tasks, the holder must not carry out the maintenance until the holder is trained in all the differences between the current version of the approved maintenance data and the version of the approved maintenance data about which the holder has received training.

(j) The holder must not exercise the privileges of the instrument unless the holder has, within the previous 2 years:

(i) successfully completed initial training or recurrent training in the maintenance; and

(ii) obtained a statement of competency in respect of that training from a Part 145 organisation, a maintenance training organisation or the holder of a certificate of approval for the maintenance.

(k) The holder may, at any reasonable time, be required to undergo an examination in respect of the maintenance tasks endorsed on this instrument.

Sub-Appendix B1: Training Criteria

Training must be completed to assure an applicant for a Maintenance Authority under CAR 42ZC(6) has attained the appropriate skills, knowledge and experience to perform the task unsupervised. The following criteria must be addressed in the training and the completion of three (3) desalination washes under supervision must be accomplished in accordance with the approved data for the type of aircraft prior to an application to CASA for a CAR 42ZC(6) Maintenance Authority.

1) Familiarity with associated documents – All pertinent sections of documents required for the wash procedure and specific to the aircraft type. The associated documents must include, but may not be limited to:
    a. Pratt & Whitney Canada Maintenance Manual specific to the engine type being operated
        i. PWC Consumable Materials List & table
        ii. Chapter 71-00-00 POWERPLANT CLEANING
    b. Pratt & Whitney Canada SERVICE INFORMATION LETTER (S.I.L.) NO. PT6A – 206 R1 - Compressor and Turbine washes as an effective means of preventative Maintenance.
    c. Related sections of the airframe maintenance manual required for access to perform the desalination wash.
2) Use of tooling specific to the desalination wash task as per Pratt & Whitney requirements. The training must cover the use of tools for the following purposes:
    a. Removal and installation of the exhaust duct drain;
    b. Removal and installation of an igniter; and
    c. Any related activities covered under Schedule 8 of CAR 1988.
3) A demonstrated understanding of the need for tooling calibration and the ability to verify the validity and serviceability of the tooling used for the specific task.
4) Understanding the requirements for the certification of maintenance, including but not limited to:
    a. CASA system of certification of completion of maintenance (CAR Schedule 6)
    b. Certification of completion of maintenance (CAR 42ZE)
    c. Reporting of defects (CAR 51)

Sub-Appendix B2: Initial application to CASA for maintenance authority

For initial issue of CAR42ZC(6) Maintenance Authority, download the Airworthiness Bulletin “AWB 02-058” from the CASA website at casa.gov.au.

Complete attachment ‘A’ as per the included instructions, then submit to the Certificate Management Team (CMT) at your regional CASA office.

Complete this statement as evidence of the required ongoing training (every 2 years)
to validate your CASA maintenance authority

Sub-Appendix B3: Statement of recurrent PT6A desalination wash training

Trainee Name: _____ ARN: _____

Date: _____ / _____ / _____

Trainer Name: _____ Lic No: _____

Maint. Org/Training Org/COA _____

Aircraft Type: _____Engine Type:_____ VH - _____

Aircraft Type: _____Engine Type:_____ VH - _____

Aircraft Type: _____Engine Type:_____ VH - _____

Aircraft Type: _____Engine Type:_____ VH - _____

Aircraft Type: _____Engine Type:_____ VH - _____

The trainee named above has demonstrated an acceptable level of understanding of the following training criteria as specified in Appendix B of the Australian Parachute Federation Jump Pilot Manual, revision _____ dated _____/_____/_____:

☐ Familiarity with *ALL* associated documents, including but not limited to:

- ❑ Civil Aviation Safety Authority Airworthiness Directive AD/PT6A/28 latest revision.
- ❑ Pratt & Whitney Canada Maintenance Manual, including
  - PWC Consumable Materials List & table
  - Chapter 71-00-00 POWERPLANT CLEANING
- ❑ Pratt & Whitney Canada SERVICE INFORMATION LETTER (S.I.L.) NO. PT6A – 206 latest revision.
- ❑ Related sections of the airframe maintenance manual required for access to perform the desalination wash.

☐ Use of tooling specific to the desalination wash task as per Pratt & Whitney requirements.

- ❑ Removal and installation of the exhaust duct drain;
- ❑ Removal and installation of an igniter; and
- ❑ Any related activities covered under Schedule 8 of CAR 1988.

☐ A demonstrated understanding of the need for tooling calibration and the ability to verify the validity and serviceability of the tooling used for the specific task.

☐ Understanding the requirements for the certification of maintenance, including but not limited to:

- ❑ CASA system of certification of completion of maintenance (CAR Schedule 6)
- ❑ Certification of completion of maintenance (CAR 42ZE)
- ❑ Reporting of defects (CAR 51)

☐ *Trainee has demonstrated competence to the trainer of the applicable Compressor and/or Compressor Turbine Desalination Wash procedure by practical demonstration.*

I am satisfied (trainee name) _____ has fulfilled the training competencies, as detailed above, and is an appropriate person to continue to carry out Compressor Wash procedures on the above stated aircraft under their CASA Maintenance Authority. I have verified they have a valid flight review on type, or valid AME licence as of this date.

Trainer Name:_____ Trainer Signature: _____

Date: ____ / ____ / _____

APPENDIX C: APF JUMP PILOT AUTHORISATION – COURSE SYLLABUS

Classroom:

Introduction

- Licence and logbook checks to ensure prerequisites are held by prospective jump pilots
- APF Organisation & Structure
- About the Jump Pilot Authorisation
- Senior Pilot role and responsibilities
- Jump Pilot responsibilities

The Paperwork:

- Jump Pilot Authorisation (JPA) application form completed
- Overview of APF Operational Regulations, Regulatory Schedules and AIP's
- Overview of CASA Instrument issued under CAR 209
- Where to check for new documents:
  - https://www.apf.com.au/apf-members/publications/publications
  - https://www.airservicesaustralia.com/aip/aip.asp
- The Aircraft Flight Manual
  - Checking the AFM to see if your aircraft is suitable for parachuting
  - The Maintenance Release
  - AFM Supplements
- Group members Aircraft Operations and Cloud Jumping Procedures Manuals
- Daily Load Sheets system
- Weight and Balance checks for Parachuting Configuration
- Letters of Agreement with Air Services Australia
- Overview of Training Operations Manual (TOM)

Radio Procedures

- General radio use
- Radio procedures at different aerodromes
- Radio procedures in different airspace
- Radio procedures with relevant Letter of Agreement
- ATC Clearances

Emergency Procedures

- Takeoff Safety Briefs
- Fire on the ground or in the air
- Engine failures and communication with Instructors/parachutists (exit or remain on-board)
- Emergency exit altitudes
- Canopies open in the aircraft with door open/closed
- Parachutists hung-up on exit
- Aircraft descent with parachutists on-board
- Catastrophic failures
- AAD information for climb, descent and firing parameters

The Practical

- Parachuting equipment display and explanation
- How to check pilot's rig serviceability
- Handling and emergency use of the pilots rig

The Aircraft

- Daily and pre-flight checks
- Parachute specific pre-flight
  - Two VHF radios
  - Pilot's rig
  - Knife
  - Restraints
  - Oxygen and its use

Operations

- Using the inflight-door
  - Serviceability checks
  - Limitations
  - Opening/Closing
- Aircraft Operator's procedures
- Fuelling
- Loading
- Taxiing
- Climbing
  - Power Settings
  - Engine Temperature control techniques
  - Noise sensitive areas
  - Transition altitude
- Run-in
  - Using the GPS
  - Radio calls on various frequencies at standard times
  - Expected ATC clearances and variations
  - Communication with parachutists
  - Preparation and configuration for descent
- Descending and Landing
  - Power settings and engine temperature management
  - Flight paths to avoid
  - Parachutists' expected landing areas
  - Stabilised approach parameters
  - Missed approaches

APPENDIX D - JPA ASSESSMENT GUIDELINES AND ASSESSMENT

NOTES FOR EXAMINER

1. The following written assessment may be conducted as an open-book assessment at the discretion of the Examiner. It is to be completed by the candidate under the assessment conditions described in the text box below titled “Instructions to Candidate”.
2. The pass mark for this written assessment is 80%. The knowledge gap identified by incorrect responses requires retraining in those areas prior to awarding of “satisfactory” and any final determination of competency.
3. The oral and practical assessment require an assessment of “satisfactory”.
4. Upon successful completion of all assessment requirements, the completed assessment booklet must be returned to the APF Office within 10 business days of completion.
5. Upon receipt of the completed assessment package by the APF Office, a JPA and number will be issued. The jump pilot may exercise the privileges of his/her new rating once this is issued.
6. Issuing particulars and entitlements for the Jump Pilot Authorisation are defined in the Jump Pilot and Aircraft Operations Manual.
7. The JPE is responsible for ensuring the JPA candidate meets all the licence and flying requirements to hold a JPA rating.

INSTRUCTIONS TO CANDIDATE

Read these conditions before you begin.

- This written assessment consists of 50 questions.
- Read each question carefully. There are no trick questions. Answer the multi-choice questions by circling the most correct letter. DO NOT RUSH. Think about each question and choose the MOST appropriate answer.
- All answers are to be in INK. Please write legibly. If you need to change an answer, ensure that the result is clear and unambiguous, and have the Examiner initial all changes before leaving the assessment room.
- Each correct answer is worth one mark. If you leave a question blank, no mark will be recorded for that question.
- You may ask the Examiner for clarification if necessary.
- During the assessment, the only person you are permitted to speak to is the Examiner.
- If you have comments regarding this assessment, please note them and pass them on with the completed assessment papers. Your feedback is appreciated.
- Good luck!

Part One - Written assessment

1. The governing body of parachuting in Australia is:

a) Civil Aviation Safety Authority (CASA)
b) Australian Parachute Federation (APF)
c) Air Services Australia (ASA)
d) Air Transport Safety Bureau (ATSB)

2. The CASA Instrument which outlines pilot qualifications and maintenance standards for aircraft involved in parachuting operations involving student training is:

a) CAAP 42ZC-1
b) Instrument Number CASA 84/18 (under regulation 11.245 of the CASR 1988)
c) CASA 278/97
d) CASA 563/04

3. Unless the pilot holds an APF Certificate Class D, the minimum aeronautical experience a private pilot must possess before flying parachute operations is:

a) 100 hours
b) 120 hours
c) 165 hours
d) 200 hours

4. APF Operational Regulations require that all jumps be made under the following conditions:

a) If the ground is not visible, the parachutist uses an authorised means of determining aircraft position
b) Unless approved otherwise, conditions are such that the target is clearly visible and the parachutist does not enter cloud throughout the descent
c) The mode of determining aircraft position for exit is approved by the Chief Instructor or Senior Pilot
d) All of the above

5. APF Operational Regulations require approved restraints to be used by parachutists in the aircraft:

a) Below 1000 feet and in turbulence
b) In accordance with a briefing
c) At all times below 1000 feet AGL or at any time as directed by the pilot in command
d) In certain aircraft types only, as listed in CASA Specification for Parachute Descents

6. Supplementary oxygen must be provided to the aircrew if:

a) The aircraft that operates above FL 125
b) The aircraft operates above FL125 but less tha FL 140 for more than 30 minutes
c) The aircraft operates above 10,000 AMSL feet at night
d) Both a) and b)
e) All of the above

7. Student parachutists shall not make orientation flights unless they have received the pre-flight instruction specified in:

a) Civil Aviation Orders
b) APF Operational Regulations
c) APF DZSO Guide
d) Training Operations Manual

8. The role of the Senior Pilot at a Training Organisation is:

a) To be responsible for all aircraft related aspects of the operation
b) To ensure the safe and legal operation of aircraft at all times including compliance with the Instrument under CAR 209
c) To ensure adequate and ongoing training of all pilots conducting parachute operations at their organisation
d) To ensure all pilots hold a Jump Pilot Authorisation before flying for parachute training operations
e) All of the above

9. As a jump pilot, you have specific duties and responsibilities. From the list below, select two that apply to the Jump Pilot Authorisation:

a) The safe and legal operation of the aircraft at all times including compliance with the Instrument under CAR 209
b) Carry out jump pilot training for issuance of the Jump Pilot Authorisation
c) Liaise with CASA on matters relating to aircraft operations
d) Maintain the appropriate pilot qualifications to hold a JPA

10. The minimum maintenance category to be listed on the MR for aircraft involved in parachute operations is:

a) Category A
b) Parachuting Category C
c) Charter standard
d) Private Category

11. If the parachute Training Organisation you are flying for has approval to conduct parachute jumps through cloud, where would you find that approval?

a) Training Operations Manual (TOM)
b) The Organisations Cloud Jumping Procedures Manual (CJPM)
c) Pilots Operating Handbook (POH)
d) Training Operations Standard Operating Procedures (SOP's)

12. The role in the aircraft of the Loadmaster is:

a) To coordinate the organisation of aircraft loading and exit order
b) To communicate with the Pilot to ensure the airspace and DZ below is clear of conflicting air traffic and any necessary drop clearances have been obtained
c) To determine the exit point
d) All of the above

13. APF Group Members are deemed to be either a Training Organisation or a Non-Training Organisation.
A training organisation:

a) Requires the supervision of a Chief Instructor
b) Conducts training jumps for students and novices who have yet to attain a Certificate Class B
c) Requires the pilot to hold a Jump Pilot Authorisation
d) Requires the appointment of a Senior Pilot
e) All of the above

14. Which of the following people must be in attendance in order for parachuting operations to commence at an APF Training Organisation?

a) Chief Instructor
b) Nominated Senior Pilot
c) Drop Zone Safety Officer
d) Level 2 Coach

15. Select two correct statements from the following list in relation to the DZSO of a Training Organisation:

a) Is only responsible when the Chief Instructor is not in attendance
b) Must be appointed before any parachuting operations commence
c) Is responsible for all parachuting operations on the day
d) Is only responsible for the safety of Student Parachutists

16. Before carrying out any student parachuting operations, who is responsible for ensuring that a DZSO has been appointed?

a) Chief Instructor
b) Most senior instructor present
c) Most senior parachutist present
d) The pilot
e) All parachutists

17. If the winds at jump-run altitude are very strong, then horizontal separation of opening points for different groups of parachutists depends on:

a) Counting slowly between exits
b) The amount of ground covered between exits
c) Powering-off early
d) A deep spot

18. You are taking-off from an airfield that is 600 feet lower than the Drop Zone you are dropping in to. How would a parachutist altimeter be set before take-off?

a) 600 feet above zero
b) Leave it on zero
c) 600 feet below zero
d) 1200 feet below zero

19. A parachutist with a pyrotechnic flare wants to exit the aircraft at night. What is the first issue that should be considered by the pilot?

a) The flare damaging the cabin
b) The flare burning a hole in the parachute
c) Obtaining approval from CASA to carry dangerous goods
d) A Display Organiser is appointed prior to the jump

20. An AFF jump is:

a) Undertaken by a student with either one or two instructors
b) Is always conducted as a Tandem Jump as stage one
c) Is always conducted from a minimum altitude of 10,000 feet AGL
d) All of the above

21. A Tandem jump:

a) Is always conducted from a minimum exit height of 6,000 feet AGL
b) Involves an Instructor attaching the Student (passenger) to their harness by means of a dual harness system
c) Is conducted under a parachute that utilises a small 'drogue' parachute that is deployed immediately after exit
d) Involves the tandem pair usually opening their parachute higher than the solo jumpers
e) All of the above

22. What considerations should be made when descending in the Aircraft with parachutists on-board?

a) Update appropriate radio broadcasts to amend canopy numbers over DZ
b) Notify the GCA of number of jumpers remaining on-board (to avoid the stress of a GCA not seeing all the expected canopies in the air)
c) Below 1500 feet AGL, do not exceed 1500 feet per minute descent rate due AADs
d) All of the above

23. A SFF static-line jump involves:

a) Students exiting from an altitude of between 3,000 – 5,000 feet AGL
b) Students have their deployment bag connected to the aircraft by means of a static-line attached to the aircraft strong point
c) Students are dispatched by an Instructor
d) Usually involves multiple run-ins to allow one student to be dispatched at a time
e) All of the above

24. At what height does a parachutist require oxygen to be used?

a) For descents made from above FL150
b) All flight above FL120
c) Flight above 10,000 feet for more than 15 minutes
d) All of the above

25. Which of the following aircraft handling considerations should be taken into account during an exit with an AFF student and their two instructors?

a) May require an earlier power off to allow for a slower setup in the doorway, climb-out and exit
b) May require a lower airspeed for exit due to light weight/weaker students having difficulty in climbing out
c) The combined mass outside the aircraft can cause 'drag' causing the aircraft to 'drift' off track during the run-in
d) All of the above

26. Which of the following aircraft handling considerations should be taken into account during a static-line or instructor assisted deployment?

a) Multiple run-ins may be required if more than one student exit is planned
b) Awareness that parachutes are immediately opening after exit
c) Greater risk of premature deployment in the aircraft or on the step
d) All of the above

27. Which of the following aircraft handling considerations should be taken into account during exits for all parachutists:

a) Airspeed must be correct to ensure no conflict between a parachutist and the tail
b) The combined weight of parachutists outside the aircraft can cause 'drag' causing the aircraft to 'drift' off the correct run-in track
c) Aircraft should be established on the jump run a minute prior to the planned exit point
d) All of the above

28. Why must extra caution and vigilance be taken whilst dropping parachutists involved in Canopy Relative Work (CRW)?

a) The static line has the potential to hang-up
b) CReW jumpers are irrational and unpredictable
c) The large distance they may travel whilst in freefall
d) The high opening altitude may be a hazard for both yourself and other aircraft

29. If a parachutist on-board a load you are flying acts recklessly, you should:

a) Immediately report it to the DZSO upon landing
b) Leave it to the more experienced parachutists/jumpmaster on-board to address
c) Speak to the parachutist on the side
d) Do nothing as you are only responsible for flying the aircraft

30. Jump Pilot emergency parachutes are required to be inspected and repacked every:

a) Year
b) 6 weeks
c) 6 months
d) 24 months

31. Which of the following statements are <u>True</u>? A Jump Pilot Emergency Parachute (Pilot Rig):

a) that complies with APF equipment standards, must be made available to jump pilots
b) is a mandatory requirement for all jump pilots and must be worn when conducting parachuting operations
c) is only required for pilots who can't see over the dash

32. Which of the following describes the correct method of operating a Pilot Emergency Parachute:

a) Exit the aircraft with arms spread wide for stability, once stable reach for the ripcord and pull to full arm's length. After opening reach up and grasp steering wheel
b) Pull the ripcord to full arm's length as you exit; after opening reach up and grasp steering toggles
c) Grasp ripcord prior to exit. Once clear of the aircraft immediately pull ripcord to full arm's length; after opening reach up and grasp steering toggles/lines

33. Which of the following best describes the correct method for landing a pilot emergency round parachute?

a) Land the parachute by facing into wind with arms up on full drive until approximately 10 – 15ft above the ground. Flare the parachute by pulling all the way down on both toggles as this will achieve the slowest possible landing speed
b) Land the parachute by facing into wind with arms up, elbows tucked in, and conducting a parachute landing roll
c) Land the parachute by facing into wind with arms in a half brake position, ensuring you remain on your feet as this is the best way not to hurt yourself.

34. Premature deployment of a parachute on-board the aircraft or during climb-out is a potentially life threatening situation for both the parachutists on-board and the pilot. Which of the following may cause this situation?

a) Excessive movement by the parachutist resulting in dislodgement of the pin that holds their pack closed
b) Poor gear maintenance resulting in accidental breakage of the loop that holds the pin in place
c) Poor climb-out procedures of parachutist resulting in snagging of their own equipment or another parachutists equipment
d) All of the above

35. Select two correct answers from the following list of actions the pilot should take in the event that a parachute deploys inside the aircraft:

a) Communicate with the Loadmaster and do not allow the door to be opened
b) If there is an experienced parachutist on-board who can ensure the canopy remains contained, the remaining parachutists can continue with the planned exit
c) Do not allow anyone to exit and immediately bring the load down
d) Continue as usual as the parachutists are responsible for their equipment and your job is to fly the aircraft

36. In the event that a parachute deploys whilst the parachutist is on the step or in the open doorway, what <u>immediate</u> action would you take?

a) Alert the Loadmaster who will manage the situation and give instructions to those involved
b) Apply maximum rudder to swing the tail clear of the opening parachute
c) Radio the ground that there has been a problem

37. In the event that a pilot chute comes clear of the parachutist's equipment and escapes out the doorway, what <u>immediate</u> action would you take?

a) Apply full rudder as applicable and ensure the parachutist gets out the door as quickly as possible
b) Alert the parachutist who should immediately exit the aircraft
c) Alert the Loadmaster who will manage the situation
d) Radio the ground that there has been a problem

38. Having a sharp knife in the jump aircraft, accessible to both the pilot and the loadmaster:

a) Is a mandatory requirement as defined in the APF Operational Regulations
b) Is necessary in order to deal with a parachutist who may have 'snagged' any part of their equipment or clothing on the aircraft and are unable to free themselves
c) Has proven to be an invaluable tool in emergency situations
d) All of the above

39. What direction should the aircraft be pointed when hot loading?

a) Into the wind
b) So that the pilots door is closest to the parachutists
c) So that the propeller is furthest from the parachutists
d) The direction the aircraft is about to taxi in

40. Taking into account that there are parachutists onboard, what is the first action you would take in the event that you experienced a partial engine failure climbing through 500 feet:

a) Tell the parachutists to exit immediately
b) Make a "Mayday Mayday Mayday" radio call
c) Have the parachutist assume emergency positions
d) Maintain control of the aircraft with airspeed

41. What would you consider to be the most important checks of the oxygen system onboard the aircraft?

a) Oxygen quantity
b) Bottle and mask accessible to pilot inflight
c) Oxygen flow to mask
d) All of the above

42. What initial actions would you take in the event that you experienced an engine failure on jump-run at an altitude of 10,000 feet AGL:

a) Abort the parachute drop and immediately begin your descent whilst radioing your intention to land the aircraft
b) Maintain control of the aircraft with airspeed, allow parachutists to promptly exit, and continue descent towards a suitable landing area
c) Only allow experienced parachutists to exit, and start engine failure checks

43. Aircraft emergency procedures are taught to all student parachutists with standardised guidelines in place at each training organisation. They are adapted to suit each training organisation depending on local terrain, equipment types in use, etc.. Giving consideration to these factors, which of the following statements is true?

a) Student parachutists are taught that whilst the pilot is ultimately in command and responsible in the aircraft, students must take instruction from their instructor, who works with the pilot, to achieve the safest possible outcome
b) The pilot is in command in the aircraft and all parachutists, including students, should take instruction only from the pilot
c) The chief instructor is always in command in an emergency

44. What is the most effective method of decreasing engine temperatures in a piston engine during climb?

a) Richer mixture
b) Increase airspeed
c) Put the wing flaps out
d) Decrease power

45. In what class or classes of airspace do you need a clearance to drop? (AIP ENR 5.5-2.2.1)

a) A, C & D
b) C, D & E
c) C & E
d) C

46. When climbing through 10,000 feet, what is an important procedural factor to consider?

a) Visibity and cloud seperation changes
b) The QNH setting
c) The outside air temperature
d) The fuel remaining

47. Who is ultimately responsible for weight and balance and load security (restraints) in the aircraft?

a) Senior Pilot
b) Pilot in Command
c) Drop Zone Safety Officer
d) Chief Instructor.

48. What is the first consideration in the event of an engine failure at any altitude

a) Power setting
b) Skid ball centred
c) Tracking
d) Airspeed

49. What is the radio frequency assigned for parachuting operations?

a) 126.7 MHz
b) 121.5 MHz
c) 119.2 MHz
d) 119.6 MHz

50. In what publication(s) will you find requirements for Radio Broadcasts associated with dropping parachutists:

a) ERSA
b) AIP
c) An Instrument under CAR 209
d) A & B
e) B & C

Part Two - Oral and Practical Assessment

DETAIL	COMMENTS
Local Knowledge: Familiar with local requirements, noise, airspace, freq etc.	
Aircraft Knowledge: Performance, Limitations, checklists Location of emergency equipment.	
Pre-Flight: Aircraft preparation, Oxygen System, SPR's, knife, airspace issues/steps, weather brief, aircraft documents, Fuel/Oil requirements.	
Pre-Take-off: Loading, weight and balance, Takeoff safety brief	
Radio Procedures: Taxi, climb, drop & descent. Frequencies selection and use. Demonstrate courtesy and professionalism.	
Aircraft Management: Airspeed control, situational awareness Engine management on climb, run-in and descent. Stable approach & Landing technique	
Navigation: GPS – setting up various jump runs Identify emergency landing areas Run-in and exit point flown to acceptable accuracy consistently. Operate to CJPM when required (if approved).	
Student Operations: Follow Loadmaster/Spotter commands. Communicate with ground as per local procedures	
Other Parachute Ops: Jumps through Cloud, CRW, RW, head down, Wingsuit requirements, understanding etc.	
Aircraft Emergencies: Local landing area options, Aborted take-off. Engine failure after take-off. Engine failure at low level/high level. Best Glide speed (Vbg) for various weights Flap failure, Go arounds,	
Parachutist Safety: Can command parachutist to follow instructions. Climb and descent away from the live area of the DZ. Ensure communications with the ground appropriately.	
Other: Securing the aircraft. Attend to MR & run sheet. Understand requirements for reports to ATSB and/or APF Report any aircraft operational issues as required.	

APPENDIX E: JPA ONGOING TRAINING AND ASSESSMENT PROGRAM

This training and assessment program is designed to re-enforce and improve the jump pilot's understanding and handling of inflight emergencies. Poor handling of emergencies by pilots is a contributing factor in a high proportion of accidents that result in fatalities. For example, a power loss during takeoff can unnecessarily result in a loss of airspeed and then an unrecoverable stall.

The Assessor for this program can be an APF-approved senior pilot, JPE or another pilot approved by the APF NAO.

The Assessor will confirm the validity of the jump pilot's JPA. This therefore requires confirmation in advance of the assessment that the jump pilot's APF membership, JPA, medical and last IPC/BFR are all valid.

Part 1 covers a review and assessment of a jump pilot's emergency procedures. This is intended to be conducted in the aircraft while shutdown on the ground. The concept is to use the aircraft as a "fixed base" simulator for the demonstration of procedures, and particular reference to be made to the AFM/POH for appropriate drills/checklists.

Part 2 covers a review and assessment of a jump pilot's handling of a normal parachuting flight, focusing on adherence to the AFM/POH, AIPs, LOA and company procedures. This must be demonstrated to the Assessor in flight.

The jump pilot should endeavour to demonstrate a sound knowledge of required emergency drills and brief a logical process for dealing with the overall emergency scenarios.

Each jump pilot's most recent re-assessment must be recorded in the jump pilot's log and in the training organisation must keep records of the assessment for APF auditing purposes.

Pilot Name: JPA: Date:

Assessor Name:

Part 1: Evaluation Checklist for Emergency Procedures

Item	Result		
	Satisfactory	Unsatisfactory	N/A
Pilot rig checks demonstrated and emergency use verbalised	☐	☐	☐
Take-off safety brief conducted for chosen runway	☐	☐	☐
Engine/aircraft fire on ground drills reviewed	☐	☐	☐
Engine failures shortly after takeoff at various stages, with drills demonstrated and discussed	☐	☐	☐
Forced landing with jumpers onboard, drills demonstrated and discussed	☐	☐	☐
Engine failure at higher altitude with drills demonstrated and evacuation discussed	☐	☐	☐
Radio failure procedures (CTA and OCTA)	☐	☐	☐
Effects and recognition of hypoxia discussed	☐	☐	☐
Fuel control unit failure recognition and drills (PT6A)	☐	☐	☐
Jumper suspended under aircraft during exit, discuss implications and procedures	☐	☐	☐

Part 2: Evaluation Checklist for Normal Procedures

Item	Result		
	Satisfactory	Unsatisfactory	N/A
Weather conditions and expected jump run determined, load master/ DZSO briefed	☐	☐	☐
Aircraft pre-flight conducted in accordance with AFM and parachute ops requirements	☐	☐	☐
Oxygen checked for sufficient quantity and inflight usability	☐	☐	☐
Maintenance release reviewed and signed	☐	☐	☐
Appropriate fuel/endurance determined and uplift crosschecked with previous fuel data	☐	☐	☐
Load and balance system utilised correctly and checked for accuracy	☐	☐	☐
Voltage checked within start limits prior to engine start	☐	☐	☐
Take-off safety brief logical and communicated to Assessor	☐	☐	☐
Airways clearance obtained at an appropriate time or as per LOA	☐	☐	☐
Noise sensitive areas considered during flight	☐	☐	☐
Aircraft flown within operational limits defined by AFM and within ATC clearance tolerances	☐	☐	☐
Radio calls minimum required, clear and as per AIPs and LOA	☐	☐	☐
"Clearance to Drop" communicated to load master as required	☐	☐	☐
Jump run flown accurately for ATC and Jumpers	☐	☐	☐
Engine management without exceedance	☐	☐	☐
Post flight inspection carried out	☐	☐	☐

STATEMENT BY ASSESSOR *(Initial each statement if applicable and correct, and sign below)*

Assessor *(Print name)* .....

A. I have conducted this training and assessment in accordance with APF standard procedures. .....

Any items considered to be "unsatisfactory" have been discussed and demonstrated and/or understood to a satisfactory level. I am satisfied with the Jump Pilot's ability to continue to act as a Jump Pilot. .....

OR

B. The Jump Pilot requires re-training and another evaluation prior to exercising the privileges of their JPA. .....

Signature …… Date ……/……/……..

Jump Pilot *(Print name)* .....

Signature …… Date ……/……/……..

APPENDIX F: HOT REFUELLING TURBINE POWERED AIRCRAFT

The following procedure is generic, each aircraft operator should adapt these procedures according to the refuelling facilities available and the aircraft type being used. However, the fundamental procedures outlined must be adhered to. Safety regulations pertaining to the normal refuelling of aircraft (such as emergency and safety equipment availability, fuel testing, and mobile phone use etc.) must still be followed.

General requirements

1) Hot refuelling of a turbine powered aeroplane may take place with its propeller or propellers rotating.
2) Hot refuelling must be authorised by the owner of the aircraft.
3) Hot refuelling must be authorised by the operator of the aerodrome or the owner or operator of the place used as an aerodrome.
4) All concerned parties must be satisfied that hot refuelling can be carried out safely.
5) Serviceable firefighting equipment must be readily accessible in the event of an emergency.
6) Communication between the pilot and refueller must be able to be maintained by means of electronic inter communications system or by visual contact and an agreed system of signals.
7) The pilot in command must ensure the doors on the refuelling side remain closed and the doors on the non-refuelling side remain open.
8) The aircraft evacuation path is clear of obstacles.
9) The quantity of fuel to be loaded must be agreed prior to commencement of hot refuelling.
10) Fuel must be able to be shutoff at the point of entry into the aircraft.
11) Radio communications must be minimised, and the HF radio and radar system turned off while hot refuelling.
12) A system must be in place to monitor the quality of fuel supplied to the aircraft.

Hot refuelling has inherent risks which must be understood and managed. The primary safety risk is a rotating propeller. This risk is compounded by the need for refuellers to move around aircraft in a noisy environment. The key to maintaining safety is to stay focused on the task, adhere to the correct procedures and avoid distractions. The pilot is to remain seated in the pilot seat to be able to monitor the refuellers movements and must be prepared to cut off the fuel to the engine immediately if required.

All pilots and refuellers are required to be trained in these procedures. Training must include (but is not limited to) reviewing the hot refuelling procedure and demonstrating their understanding to the senior pilot. The training and evidence of understanding will be recorded in the group members internal documentation.

During the hot refuelling process, only refuelling personnel may be within proximity of the aircraft and refuelling equipment. At least one pilot will be seated at the controls and continuously monitoring the overall process.

Movement towards and away from the aircraft must be by approaching/departing via the wing tip and along the leading or trailing edge. Most refuelling points on jump aircraft are over the wing and may require the use of a ladder (for example a DHC-2 or C208). Should a ladder be required, it must be a platform type, on a stable footing, and positioned so that if the ladder tips over it cannot fall towards the running engine.

Due to the noise associated with the running engine and the PPE being worn, maintaining visual contact and utilising hand signals is necessary. The following hand signals are to be used throughout the procedure;

OK – Clear to Approach the Aircraft

Thumbs Up – Clear to start refuelling process / Fuel Quantity Correct

Hand across Throat – Cut Engine / Cease Refuelling Operation

Raise Palm – Stop Immediately / Do Not Move

Ailerons up and down - Attention refueler !

The hot refuelling procedure commences at the time the pilot signals to the refueller that it is safe to commence refuelling. The hot re-fuelling procedure ceases when the refueller signals to the pilot that refuelling is complete and the equipment is clear.

The pilots procedure to commence hot refuelling;

1) At the appropriate position set the engine to idle/feather as appropriate for the type, apply the aircraft brakes and ensure the beacon remains on.
2) Visually confirm there is no personnel approaching the danger area of the aircraft.
3) Signal to the refueller to commence refuelling
4) Monitor the safety of the operation

The re-fuellers responsibilities on receipt of the signal from the pilot to commence refuelling;

1) Chock the wheel
2) Connect the earthing wire
3) Position ladder if required
4) Commence refuelling

Once fuelling is complete, the refueller will re-secure the fuel cap and remove the associated equipment, then signal to the pilot that all equipment is clear by holding up the chocks.

Emergency Procedures.

If any person observes a potential hazardous situation occurring, the phrase “STOP STOP STOP!” will be used. The concept is that if anyone hears this phrase, they will immediately cease what they are doing and look to identify the hazardous situation. For example, if the refueller observes a person moving toward the aircraft or specifically the danger area near the running engine, they will stop re-fuelling and shout “STOP STOP STOP” to the person. Likewise, if the pilot observes a safety threat, including fuel vapour detected in the aircraft, they will cut off the fuel to the engine and call out the phrase.

Should the refueller observe a hazardous situation such as a fuel spill or fire, they will stop refuelling and signal to the pilot with the “hand across throat” and shout “STOP STOP STOP”, then move to a safe location. The pilot will cut off the fuel and power to the aircraft and evacuate to a safe location.

Be alert for SKYDIVERS

Parachutists jump from up to 14,000ft and can freefall at 200km per hour.

They generally open canopies between 4,000ft and 2,000ft, and descend at 1,000ft per minute.

Always heed:

Warning radio calls

- 2 minutes before the drop
- On appropriate class E, class G and CTAF frequencies

Weather requirements

- Generally VMC
- Can jump through cloud at approved locations
  - Planned opening must be clear of cloud

Regular operations

- Indicated by the parachute symbol on charts

- Listed in ERSA
- Always a warning radio call

Occasional jumps

- Can occur anywhere
- No parachute symbol on charts
- Sometimes notified by NOTAM
- Always a warning radio call

Right of way

- Parachutists must not exit aircraft if there is potentially conflicting traffic
- Aircraft must give way to parachutists under canopy

Photography, Diane Sparkes

AUSTRALIAN PARACHUTE FEDERATION

Australian Government
Civil Aviation Safety Authority

For further information see the APF website: www.apf.com.au