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Finnish Aeronautical Association (Parachuting Committee), AOPA Finland, Trafi and Traficom
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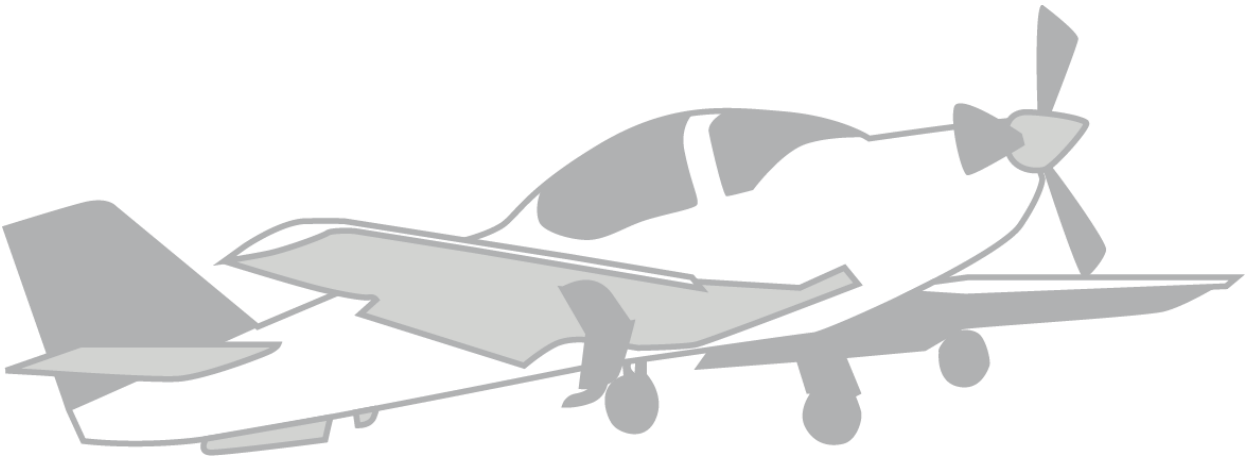

Operations Manual for parachuting flight operations – Guide for skydiving clubs

This document contains a model for a parachuting flight operations guide. Each association must define matters specific to aircraft and engine types, the club, activities and conditions and update the guide accordingly. Version 3.0, 8 November 2019.

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INSTRUCTIONS FOR USE AND BACKGROUND

Instructions for use

This guide uses the term 'club' to refer to the party performing parachuting flights. The guide is written from the perspective of association activities without taking account of or a stand to commercial requirements or other similar aspects. This guide is called ***Operations Manual for parachuting flight operations***, but clubs may name their own guides as they see fit. For example, *Flight Operations Manual* or *Parachuting Flight Manual*, etc.

Square brackets and italics mark sections where club-specific entries are required. For example, [*Club name*] can be replaced with the phrase "*at Oulu Skydive Center*".

This guide uses the term 'pilot' to refer to the pilot of an aircraft.

Curly brackets, italics and bold type mark comments and additional instructions. For example, ***{club-specific designations such as: responsible pilot, responsible flight operator, chief pilot, etc.}***.

Yellow highlighting marks matters that require further consideration, matters currently under consideration (for example, to be completed in the next version or independently by the club, where necessary), comments, etc. In addition, sections that refer to, for example, entries made to skydivers' instructions are marked similarly.

This guide is illustrative in nature and mainly written from the perspective of "medium-sized clubs" and the aircraft type C-182 (the most common type in Finland). An effort has been made to include the special characteristics of larger-scale operations and/or aircraft capable of carrying larger skydiver loads. **However, the responsibility for the preparation of a guide that takes account of the special characteristics of the club and the aircraft used falls with the persons responsible for the club's operation**. **Thus, clubs' existing guides serve as an excellent starting points, but their functionality, timeliness and consideration of issues emphasised in this guide should be reviewed during this season, but no later than the season of 2017.**
{The above consideration was written in the first version of the guide (12 August 2016); any new, updated matters are marked in this version (2.0, 6 May 2018) with green highlighting, and they should be reviewed as soon as possible. Sections highlighted in yellow, green or other colours are intended to be removed from the club's version of this guide.}
{The above consideration was written in the second version of the guide (6 May 2018); in this version (3.0, 8 November 2019), any new, updated matters are marked with blue highlighting. They, too, should be reviewed as soon as possible. Sections highlighted in yellow, green, blue or other colours are intended to be removed from the club's version of this guide.}

The actual model guide for clubs starts on page 12. In other words, the "foreword" of this guide is not required in the club's version. It can be replaced by the club's own foreword. **IT IS NOT NECESSARY TO INCLUDE ALL CONTENT PRESENTED IN THIS GUIDE IN THE CLUB'S VERSION**. **However, a relatively large number of examples and considerations are presented, as it is presumably easier to exclude unnecessary items than to come up with new ones**. Furthermore, the guide's appendices primarily serve the purposes of this guide. It is not necessary (nor advisable) to append all of them to the club's guide. Instead, each club should use any appendices at their discretion **and/or modify the appendices of this guide to meet their needs**. Naturally, clubs may also use their existing guides after making any necessary updates etc.

Background

Every Finnish skydiving club that operated in the last decade has had a guide for parachuting flight operations in place. This has to do with the fact that an earlier version of the Aviation Regulation OPS M6-1 (parachuting activities, 12 June 2003, repealed on 15 July 2010) provided for the following:

*An association engaged in parachuting activities shall have a written guide **concerning the aircraft** in its permanent use. The guide shall cover the following aspects of **parachuting safety and parachuting flights performed with the aircraft**:*

a) loading the aircraft;
b) fuel reserve in parachuting activities;
c) the operation and use of the aircraft's parachuting equipment;
d) flight procedures for parachuting activities;
e) the cooperation of aircraft crew and skydivers on parachuting flights;
f) the most common hazardous and exceptional situations on parachuting flights and operation in such situations; and
g) public safety and operation in the movement area.

In addition, it was stated in this OPS M6-1 that: "*For aircraft used temporarily, the association engaging in parachuting activities shall ensure that the pilots and skydivers have been provided with adequate guidance on the matters presented above. Note: When drawing up the written guide referred to above, any limitations set out in the flight manual or its appendices shall be taken into account.*"

Recreational aviation safety project

The development project on the safety of recreational aviation (Traficom's website on the topic: www.traficom.fi/fi/harrasteilmailun-turvallisuusprojekti) was launched in November 2014 and finished at the end of 2015. The project was based on an extensive risk assessment of recreational aviation commissioned by the Minister of Transport and Municipal Affairs. The project was commissioned as a response to an exceptionally high number of fatalities in recreational aviation during the three years preceding the project.

The project's final report was published on 12 January 2016, and the cooperation continues within the framework of the Operating model for safety work in Finnish general aviation described in the report's outcomes section. Developing the operating model jointly with the aviation community was one of the project's key objectives. The project was carried out in close cooperation with the aviation community, Finavia, the Finnish Meteorological Institute and, in particular, the Finnish Aeronautical Association (SIL) and AOPA Finland (SMLL). A large number of voluntary aviation enthusiasts contributed to producing the results, and they deserve many thanks for the outcome. The website www.traficom.fi/fi/liikenne/ilmailu/turvallisen-toiminnan-malli-ilmailukerhoille contains, for example, content related to the safe operations model for aviation clubs.

Safety content is also available at Traficom's **General aviators website** (https://www.traficom.fi/en/transport/aviation/general-aviators) and further information is provided at the **General aviation training materials and guides website** (www.traficom.fi/fi/yleisilmailun-koulutusmateriaalia-ja-ohjeita) which serves as a platform for sharing information useful for the aviation community and encourages its communal development. Aviators can make use of the content and provide the authors with ideas for further development at their discretion.

15678, Trafi's publications, 15-2014 – Recreational aviation risk survey:

The greatest risks associated with parachuting flight operations are connected to loading the aircraft and the movement of the aircraft's centre of gravity both during climb and, in particular, exit. {*Summary; in addition, as the current situation (5/18 and 10/19) has changed in some respects, a few separate up-to-date observations were added to this excerpt of the Recreational aviation risk survey.}*

Key action groups and themes include:

Increased sense of community: Communality is considered an essential means for distributing tacit knowledge and safety-favouring attitudes and for ensuring the upkeep of the competence of individual recreational aviators. Communality also prevents risk-taking, both conscious and unconscious. Individualist pursuit of these sports instead of traditional club activities requires new ways of promoting communality.

The field of training: Training is a vital background factor in building skills and attitudes. Measures proposed regarding training aim to develop and harmonise the qualitative elements in theory instruction, flight training and teaching materials, learning results and the quality of teaching, lifelong learning and the maintenance of competence, utilising information and materials gained from comparable countries, and addressing identified risk factors in training.

Increased cooperation and harmonisation: There are numerous examples in the recreational aviation community of excellent safety work being done and best practices by clubs, associations and individual aviators. These examples must be made more widely known and employed. This requires increased cooperation and the development of models for information dissemination.

Increasing efficient safety communications: When the structures of the aviation community are reinforced, closer cooperation is pursued and operating practices are harmonised, high-quality safety communications will have a greater impact. Increasing awareness of identified risks and of factors that exacerbate or mitigate them is an efficient way of reducing risks, along with encouraging safety-conscious attitudes. Both the authorities and the aviation community must find new ways for enhancing communications.

Key risks and how to manage them

Flight operational risks in parachuting

Several types of aircraft are used for parachuting in Finland. There are several small Cessna aircraft (accommodating 4–6 jumpers) and some larger aircraft: ~~two Pilatus Porters (10 jumpers) and~~ **{*Pilatus Porters are not currently used for parachuting in Finland*}** two Cessna Caravans (15–18 jumpers). Aircraft operated by both non-commercial clubs and commercial operators are used for parachuting in Finland. ~~Aircraft used for parachuting do not need to have seat belts for all passengers – with the agreement and responsibility of the pilot-in-command and the jumpers – if there are fewer than 10 jumpers. Everyone on board without a seat belt must have a parachute and must have undergone parachute training~~ {***This item has been removed from OPS M6-1 (more information on this later). NCO.SPEC.PAR.110 Seats: The floor of the aircraft can be used as a seat if the task specialists (= skydivers) have the possibility to hold on to something or attach themselves}***. **The Finnish Aeronautical Association** requires the skydiving instructions of parachuting clubs to include **general rules for aircraft loading** and **movement on board**. Because aircraft types are different, the Association has not issued general instructions on flight operations related to parachuting or associated risks for skydivers or pilots.

Aircraft loading and take-off

The principal risk factor during take-off is the aircraft having an incorrect or shifting centre of gravity that may cause loss of control. Preventive measures include correct loading of the aircraft, clearly defined weight

limits and markings to indicate where the jumpers should be positioned on board or what kind of movement is allowed during take-off. In many of the small aircraft used for parachuting, the only relevant factor is observing the weight limit, because the aircraft size precludes passengers from moving around inside it. Some larger aircraft have clear markings indicating that passengers should remain forward of that marking during take-off. In some aircraft, passenger placement is dictated by seats and seat belts.

Exit

When the aircraft is flying on the jump run, there is a risk of incorrect or excessive movement by jumpers in the aircraft, especially towards the rear, causing a shift in the aircraft's centre of gravity at a critical moment and resulting in a stall. Stalling may, at worst, lead to loss of control and multiple casualties. Operators have different instructions as to how to perform an exit and how to maintain the aircraft centre of gravity within permissible limits. Some operators specify how many jumpers may at most be stationed at the aircraft doors waiting to exit, so as to maintain the centre of gravity within permissible limits. No general instructions regarding the risks of parachuting-related flight operations have been issued for skydivers.

Skydivers' awareness of flight operational risks

Skydivers generally perceive parachuting risks to concern the jump itself. Knowledge of flight operations related to parachuting and the risks involved is low. While the threats may be acknowledged, their seriousness or causes are not known well enough, and skydivers may not be familiar with the instructions or follow them readily. Skydivers should be informed about the risks of aircraft loading and the shifting of the centre of gravity when moving around in the aircraft, and how serious these risks are.

Pilot training for parachuting operations

Pilot training for parachuting operations is the responsibility of the club in the case of non-commercial operations and of the company operating the aircraft in the case of commercial operations. Aircraft are different, pilot training varies, and there is no nationally coordinated exchange of information. The Finnish Aeronautical Association has issued no general instructions for pilot training for parachuting operations. The risk survey revealed an occasional lack of coordination between skydivers and pilots.

{***Situation in 5/2018:*** ***General instructions have been issued (first version 12 August 2016). This document is the updated version of the instructions (6 May 2018). In addition, a joint safety weekend for parachuting pilots and skydivers was held in Utti in January 2017 and parachuting flight operations have been discussed in several other training events. Skydiving clubs have been provided with model instructions on parachuting activities, which discuss, for example, issues that skydivers must know about parachuting flight operations and the coordination between the pilot and skydivers. The role of 'chief pilot' was added in the operational instructions for skydivers, the duties of chief safety officer were specified and clubs were urged to establish a safety team that comprises of chief safety officer, chief pilot, the head of training and the club's chairperson, among others. The guide for skydivers includes chapters on general matters concerning the carrying capacity of aircraft and the location of the centre of gravity, stalling, weather minima in flight operations and the duties of the chief pilot and the chief safety officer. In addition, a large number of instructions and model material have been published on the national specialist body Laskuvarjotoimikunta's website. A training programme for parachuting pilots is being developed in cooperation with The Finnish Air Sports Institute.***}

{***Situation in 10/2019:*** ***General instructions have been issued (first version 12 August 2016, second version 6 May 2018). This document is the third version of the instructions (8 November 2019). In addition, after 5/2018, a joint safety weekend for parachuting pilots was held in Utti in January 2019 and parachuting flight operations have been discussed in several other training events. In addition, a large number of instructions and model material have been published on the Parachuting Committee's website (http://laskuvarjotoimikunta.ilmailuliitto.fi/materiaalipankki/hyppylentotoiminta/)***. **The model training programme for parachuting pilots has been completed, and the Finnish Aeronautical Association (Safety**

Committee) has published a model guide on the safety management system for aviation clubs **(so-called Club SMS).}**

Summary and conclusions

Based on the survey, the key risks in parachuting flight operations are connected to loading the aircraft and the movement of the aircraft's centre of gravity both during climb and, in particular, exit. Among skydivers, the risks associated with skydiving are acknowledged, but the severity of the risks and the factors causing them are not sufficiently recognised by everyone. As a result, the degree of compliance with the guides or familiarisation with them may be inadequate.

There are no uniform guides for skydivers and pilots on the risks of parachuting flight operations. Pilot training is managed in a club- and operator-specific manner. There are no uniform national training guides for pilots on parachuting flight operations. The survey revealed the **need to increase the awareness of skydivers and parachuting pilots about each other's activities** and, in particular, about key risks and their reduction.

Working group proposals for further measures

The Finnish Aeronautical Association will issue general training instructions for pilots performing parachuting flight operations. The instructions will be generic and not specific to any aircraft type. **{Note: This guide, however, uses type C-182 aircraft as an example to a large extent and, where possible, also discusses the special characteristics of types C-206 and C-208.}** The instructions will focus pilot training on matters specific to parachuting flight operations (e.g. shifting centre of gravity, slow flight, stalling). This may be based on suitable paragraphs of the Federal Aviation Administration's guide AC 105-2E (8. *Pilot responsibilities, Jump pilot training* Paragraphs 8 b–8 f).

The Finnish Aeronautical Association will issue instructions for skydivers concerning the risks of parachuting flight operations. The instructions will stress the seriousness of risks involved in aircraft loading and moving around on board, and the importance of coordination between the jumpers and the pilot.

Clear markings and instructions on loading and movement on board will be introduced in all aircraft used for parachuting.

19477, Final report of the recreational aviation safety project, 1-2016

The recreational aviation safety project was completed at the end of the year and the final report was published on 12 January 2016. The project involved functional cooperation, in particular with the Finnish Aeronautical Association and AOPA Finland. The cooperation will be continued as jointly agreed. The project's outputs include this guide to support the development of safety at all Finnish skydiving clubs. This guide also implements one of the Safety Investigation Authority's safety recommendations concerning the Jämi accident (investigation report).

Guide for parachuting flight operations

One aspect of the training support material effort is to provide additional guides for skydiving clubs, particularly for parachuting flight operations. The drafting of these materials is led by Mari Lehtonen, Safety Officer of the Parachuting Committee at the SIL. The working group includes skydivers and parachuting pilots from clubs all over Finland. Trafi supports the work of this group. The launch workshop for the parachuting guides was held at Malmi Airport on 27 May 2015. The guides were also discussed at the parachuting safety seminar organised by the SIL at the Aviation Museum in Vantaa on 31 October 2015 and described in a talk at the *Lentoon!* (Take off!) seminar in November 2015.

Providing guides is one of the actions proposed in the Recreational aviation risk survey. This also fulfils safety recommendation no. 2 of the accident investigation report (L2014-02) published by the Safety Investigation Authority concerning the Jämi crash. A **safety bulletin** entitled **Flight safety in parachuting operations** (Appendix 4) was published in April as an aid for the work. The purpose of the bulletin was to remind skydiving clubs to go over their safety procedures before the beginning of the season in 2015. The guides will include in-depth information on, for instance, the themes highlighted in the safety bulletin.

August 2016

It was agreed that matters described in instructions already applied by skydiving clubs should be compiled in this guide so that, for example, the above-mentioned recommendations are taken into account. Clubs already apply very good parachuting instructions which are utilised in this guide. Thus, safety is a common goal in this respect as well. We would like to thank the following people for their comments: *Lasse Lintukangas*, *Sami Wainio*, *Kimmo Paularanta*, *Mari Lehtonen*, *Esa Harju* and *Simo Aro*.

This is a model guide that does not take account of the special characteristics of each jump plane type, organisation or operating site. In addition, the skydiving clubs' existing instructions serve as excellent starting points, but their functionality, up-to-dateness and consideration of issues emphasised in this guide should be reviewed during this season, but no later than the season of 2017. The persons responsible for the club's activities are also responsible for preparing (updating) instructions that take account of the special characteristics of the club and the aircraft type.

May 2018

This version of the guide (2.0, 6 May 2018) is largely based on the original version of 12 August 2016. The most significant changes concern the practices and guides introduced by the NCO (Annex VII (Part-NCO) to Regulation (EU) 965/2012, Section NCO.SPEC, specialised operations, etc.) (see also https://www.traficom.fi/fi/ei-kaupallinen-lentotoiminta). Models and instructions (and other parachuting flight material) are publicly available on the Parachuting Committee's parachuting flight operations website. **This is a model guide that does not take account of the special characteristics of each jump plane type, organisation or operating site. The persons responsible for the club's activities are also responsible for preparing (updating) instructions that take account of the special characteristics of the club and the aircraft type.**

November 2019

This version of the guide (3.0, 8 November 2019) is largely based on the previous version 2.0 which was published on 6 May 2018. Many of the changes involve updated links to Traficom's and the Parachuting Committee's websites (links highlighted in green have also been updated). The guide takes account of the Finnish Aeronautical Association's safety management system for aviation clubs (so-called **Club SMS**). In addition, various good examples, other clarifications and emphases presented in individual clubs' instructions have been included in the guide. The guide's appendices include new model instructions concerning a training programme for parachuting pilots applied by one of the clubs, exemplary tables for calculating aircraft mass and centre of gravity and a phraseology for parachuting operations. **This document STILL remains a model guide that does not take account of the special characteristics of each jump plane type, organisation or operating site. The persons responsible for the club's activities are also responsible for preparing (updating) instructions that take account of the special characteristics of the club and the aircraft type.** We would like to thank Jari Kemppainen for his comments.

We welcome any comments, proposed improvements and user experiences, etc. They enable us to develop both parachuting flight safety and this guide together.

Finnish Aeronautical Association / Parachuting Committee
lt@laskuvarjotoimikunta.fi

THIS GUIDE IS NOT A REGULATION.

LASKUVARJOTOIMIKUNTA

SIL FFF

Trafi

TRAFICOM

SUOMEN MOOTTORILENTÄJIEN LIITTO
AOPA FINLAND

ACRONYMS:
AA = automatic activation, a method of skydiving training
AFF = Accelerated Free Fall, a method of skydiving training
AGL = Above Ground Level
AMC = Acceptable Means of Compliance (see EASA)
C-182 = Cessna-182, aircraft type: 4–5 skydivers and a pilot
CSO = Chief Safety Officer, responsible for the activities of the association's licensed skydivers
Cypres = An electronic device that automatically releases the reserve parachute; refers to a specific make and model
EASA = European Aviation Safety Agency
EU = European Union
EX = Exit (a skydiver's exit from the aircraft on a parachuting flight)
FAA = Federal Aviation Administration
FT = Feet, measure of length, 1 ft = 0.3048 m
FXC = Reserve parachute automatic activation device, mechanical
GM = Guidance Material
HoF = Head of Training, responsible for the organisation's student training
JM = Jumpmaster, parachuting instructor
KT = Knots, unit of speed, 1 kt = 0.5144 m/s
METAR = Standard format for recording and reporting weather observations, current weather
MTOW = Maximum Takeoff Weight
NCO = Non-Commercial Air Operations with Other-than Complex Motor-Powered Aircraft, Annex VII to Regulation (EU) No 965/2012
OPS = Air Operations, norms that regulate flight operations
PC = Parachuting Committee at Finnish Aeronautical Association
RP = Reserve Parachute
QRT = Quarts, unit of volume, 1 qrt = 0.946 l
SERA = Standardised European Rules of the Air
SIL = Finnish Aeronautical Association
SMS = Safety Management System
SPEC = Special requirements, e.g. *NCO.SPEC.105 Checklist*
STC = Standard
TAF = Standard format for recording and reporting weather observations, weather forecast

The model guide's version history:

- First published version 12 August 2016
- Second published version, 2.0, 6 May 2018
- Third published version, 3.0, 8 November 2019

Changes since the previous version of the model guide:

- Updates brought by version 2.0 to the original are highlighted in green.
- Updates brought by version 3.0 to version 2.0 are highlighted in blue.

BASIC INFORMATION

Name of club guide:

Name of club:

Aircraft specifications, STCs, etc.:

Authors of the club's guide for parachuting flight operations:

Version history:

Changes since the previous version:

Notes, club entries, etc.:

1 GENERAL INFORMATION

{This general guide serves as a model based on which clubs can draw up their own corresponding guides. Not all matters discussed in the guide concern each club, and, correspondingly, some clubs may need to include additional aspects in their guides.}

This guide does not replace the technical manual of [*aircraft*] ***{aircraft type and ID}*** which must also be read.

This guide is of advisory nature, and the pilot must primarily comply with valid regulations and orders. Even if certain matters are not discussed in this guide, it does not mean that those matters could be neglected. Ultimately, we all must contribute to the safety of aviation, irrespective of the aviation duties we perform.

1.1 Purpose of the guide

The purpose of this guide is to act as an information package where the parachuting flight practices of [*club*] ***{club name}*** are stated. In addition, the guide aims at unifying the essential aspects of [*club*]'s parachuting pilots' activities and to facilitate the familiarisation of new pilots with the methods applied at [*club*].

It is helpful to review the guide at the start of each season and whenever it feels necessary. This promotes the application of proven, uniform practices.

The guide is intended for the club's parachuting pilots. The guide must be complied with unless flight safety, aviation regulations, the club's directives or airmanship require otherwise.

This guide was approved by the [*club board OR executive committee*] on [*date*].

[*If required, the Guide for parachuting flight operations is updated either with a new version or additional appendices*.] ***{A corresponding remark is required, as the guide must be regularly reviewed and updated if necessary.}***

1.2 Objective of parachuting flight operations

The objective of parachuting flight operations is to enable parachute jumps by taking the jumpers to an agreed altitude and location safely and economically in accordance with the relevant rules and instructions. The pilot's task is to achieve this objective to the best of their abilities and as safely as possible in cooperation with the manifest and load organiser/instructor [and the pilots of any other jump planes] under the supervision of the air traffic control, if any.

1.3 Rules and restrictions

Parachuting activities are subject to Aviation Regulation ***OPS M6-1*** ***19 May 2017***. Parachuting pilots must be familiar with the content of the regulation. The amendments to the regulation (compared to the 2010 regulation) were mainly due to the fact that the transition period for the application of the provisions laid down by the EU's Air Operations Regulation (965/2012) expired in April 2017. Therefore, the new OPS M6-1 does not contain many regulations that concern pilots and aircraft. In addition, EU regulation on parachuting flight operations is, in places, more general in nature and less detailed than the parts to be removed from the national regulation. **BUT:**

- **The removal of detailed requirements places emphasis on the actors' responsibility in implementing the activities in a safe and sensible manner.**
- In the future, some of the sections to be removed can be taken into account in instructions issued by authorities. Actually, this has already been done in part (e.g. guides for parachuting flight operations (such as this guide) drawn up jointly with recreational aviation organisations and Trafi's safety bulletins on parachuting activities 2015 and 2017).
- *However, the Air Operations Regulation and the EASA Regulation 3 (Annex IV, section 1.c)* ***generally emphasise the responsibility of the pilot-in-command for the operation of the aircraft and the safety of the persons on board****.*
- *The familiarisation of parachuting pilots with the activities is emphasised in, for example, Trafi bulletin on flight safety in parachuting activities (14 April 2015).*
- *The determination of aircraft mass and centre of gravity is provided for in sections NCO.POL.100–105 of the Air Operations Regulation.*
- ***The use of the actual weights (masses) of skydivers and the aircraft's actual centre of gravity is emphasised in Trafi's instructions and bulletins.***

As of 13 November 2014, flight operations shall comply with the EU's common rules of the air:

- SERA – *Standardised Rules of the Air*; Commission Implementing Regulation (EU) No 923/2012 of 26 September 2012 laying down the common rules of the air and operational provisions regarding services and procedures in air navigation
- Implementing Regulation (EU) No 2016/1185 amending the common rules of the air
- In addition, Traficom regulations supplementing the common rules of the air shall be taken into account.

OPS M1-1: Rules of the air applicable in Finland.
923/2012: https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1411314857158&uri=CELEX:32012R0923.
2016/1185:https://eur-lex.europa.eu/legalcontent/FI/TXT/?uri=uriserv%3AOJ.L_.2016.196.01.0003.01.ENG
https://www.traficom.fi/en/transport/aviation/national-aviation-regulations

The parachuting flight operations of [*name of club*] comply with the Guide for parachuting flight operations, the aircraft's flight manual, aviation regulations and airmanship. *In addition, the safety management system of [club name] is complied with.* ***{If the club already has an SMS, further information is available at, for example: www.ilmailuliitto.fi/ilmailuliitto/sil/tyoryhmat/turvallisuustoimikunta/kerho-sms/ (and in Appendix 5 of this guide).}***

1.4 Role and responsibility of the pilot in parachuting flight operations

As pilot-in-command, the pilot has undivided responsibility for the aircraft and the safety of the skydivers on board. However, service provision to the skydivers may not lead to non-compliance with the Aviation Act (864/2014), aviation regulations or club-specific instructions. In accordance with the Aviation Act, the pilot-in-command has the right to refuse a passenger's entry on board when necessary for maintaining order and safety or for other imperative reasons.

The pilot is solely responsible for ensuring that the flight is planned and performed in compliance with the rules. The load organiser, the instructors (jumpmasters, free fall instructors) and the independent skydivers are responsible for ensuring that the jump is performed in compliance with the rules and that they act under the authority of the pilot-in-command (pilot) on board the aircraft.

The pilot is also responsible for ensuring that the club's aircraft is handled carefully and appropriately in compliance with the Guide for parachuting flight operations and the aircraft manual to avoid any unnecessary damage.

The pilot shall report any defects, shortcomings or malfunctions observed by them or the load organiser (or other skydivers) to the chief pilot of [club name] **{or other agreed person}**.

Parachuting flight operations are a demanding type of aviation, where the pilot's objective is to serve the skydivers and meet the requirements set by the sport as best they can. The performance of the pilot's duties may involve difficult and possibly quick decisions to ensure compliance with the rules. The pilot should be prepared to make such decisions.

The duties and authority of the pilot-in-command are specified in **NCO**.SPEC.110.

1.5 Required pilot training

Section 3.3 of the ***repealed*** OPS M6-1 of 9.7.2010 ***specified the following***: *The pilot-in-command shall have at least 100 hours of total flight experience, of which at least 75 hours consist of flight experience with aircraft of the relevant category, in this case, aeroplanes.* In addition, they must be familiarised with parachuting and the properties of the aircraft or equipment concerning parachuting flight operations in advance.

Although this section has been removed from the valid version of OPS M6-1 (19 May 2017), and the EU's Air Operations Regulation does not lay down detailed experience requirements, such requirements may be imposed by the terms of insurance. **Furthermore, due to the demanding nature of parachuting flight operations, the club should carefully consider the minimum requirements of admittance to parachuting pilot training**.

Moreover, **as for aeronautical equipment still under national jurisdiction**, the requirements of the right to carry passengers are included in regulation OPS M2-9, and for this purpose, skydivers are considered equal to passengers.

[*Aircraft insurance **{or other club-specific instructions and/or restrictions}** may require a minimum of flight experience with the aircraft type used. To be listed here*.]

The validity of the right to carry passengers shall be checked prior to each parachuting flight. EASA part FCL, Section FCL.060 (Recent experience).

{List of the club's approved pilots and the validity of qualifications, medicals and check flights; cf. head of training's list of approved instructors; updated before the start of the season}

{In addition, licence number, pilot weight, any restrictions and contact information, for example, are likely to be useful to the club.}

{Example table for the club's approved pilots.}

PILOTS APPROVED FOR PARACHUTING FLIGHT OPERATIONS 2016				
PILOT	LICENCE CLASS / VALIDITY OF QUALIFICATION	MEDICAL VALID UNTIL	REFRESHER COURSE / CHECK FLIGHT COMPLETED	OTHER INFORMATION

Gyro Gearloose Address Tel. Email Weight	PPL / CESSNA SET / 18/12/2018	06/06/2018	05/05/2018	Chief pilot, formation flight training completed
Donald Duck Address Tel. Email Weight	CPL / CESSNA SET / 18/02/2017	05/02/2019	05/05/2017	Formation flight training completed
Mickey Mouse Tel. Email Weight	CPL / CESSNA SET / 15/07/2017	07/07/2018	01/01/2018	Flight examiner / flight instructor
Minnie Mouse Tel. Email Weight	PPL / SEP / 18/02/2017	07/07/2018	02/07/2017	Training completed on 05/06/2016

[*Other requirements, such as aircraft-specific difference trainings, qualifications and, for example, spring refresher training prior to the season's first parachuting flight*.]

[*Name of club*] requires that new parachuting pilot trainees meet **{*at least, for example,*}** the following requirements:

- Valid licence and medical
- Qualification to fly the aircraft class in question
- Requirements set by the club
- The club organisation's approval for the training
- Club membership
- Completed parachuting pilot training and signed commitment.

New parachuting pilots of [*name of club*] are trained by a flight instructor familiar with parachuting flight operations (type training). Familiarisation with actual parachuting flight operations is supervised by [*the flight operations manager*] **{*club-specific designation such as: responsible pilot, responsible flight operator, chief pilot, etc.*}** or a person authorised by the executive committee/board of [*name of club*]. All training and induction must comply with aviation regulations and the training programme/training plan approved by the club.

{The training plan states which items are covered by the parachuting pilot training. The plan concerns both theoretical and flight training. The items covered by the training are listed based on learning goals rather than predefined hour quotas. The training plan is appended with conversion trainings such as class rating trainings. Completed items are acknowledged so that the content and date of training can be presented to the authorities if necessary. In other words, the objective is to define and document minimum training requirements and the pilots' qualification to fly the jump plane.}

{Competency maintenance plan / Continuous qualification plan, etc. that specifies the conditions under which a pilot may perform the club's parachuting flights and provides instructions for renewing this authorisation. The plan specifies, for example, the conditions and content of spring refresher flights (see example in Appendix 3) and the longest permissible break from parachuting flight operations.}

{For more information on the model training programme, refer to Appendix 6 which specifies the parachuting pilot's experience and training requirements at a certain club. If an appended training programme is used, the aforementioned matters may be presented in the appendix, and the text of this section can be replaced with: "The experience and training requirements of parachuting pilots are specified in the Parachuting flight training programme of [club name]."}

1.6 Load organiser

Each load must be assigned a load organiser who is responsible for the load's operation. The load organiser of a student load is usually an instructor (such as a jumpmaster or a free fall instructor) and at other times an independent skydiver ***{varies aircraft-specifically}***. If the supervising instructor acts as load organiser and jumps from a lower altitude than the rest of the load, it must be agreed in advance who acts as the load organiser for the remainder of the flight. **Both the pilot and the skydivers must know who acts as load organiser at all times during the flight**. The load organiser's most important tasks are to communicate with the pilot and to provide other skydivers with the necessary instructions.

If the aircraft is equipped with a headset system for communication with the pilot, the load organiser should use them throughout the flight to secure communication between them and the pilot.

Communication and cooperation on parachuting flights should be practised jointly by pilots and load organisers. Particular attention should be paid to exceptional situations.

Instructions on other communication and checks (e.g. the use of seat belts and jump lights) as well as exceptional situations are provided also to skydivers in club-specific skydiving instructions. ***{Naturally, such instructions are also presented in the appropriate section of this guide.}***

Thus, all matters concerning skydivers should be stated in the skydivers' instructions. A model of skydiving instructions that specify the load organiser's duties and extensively present other matters to be discussed in skydivers' instructions (including NCO) is available at the Parachuting Committee's website.

The load organiser or the pilot may deny a load member who fails to comply with parachuting instructions or regulations from jumping.

The load organiser's position on the jump plane should allow for the best possible direct communication with the pilot. The load organiser should be seated [*foremost next to the pilot*]. [*Load organiser(s) should also be recorded in the load list*]. ***{Enter the club's agreed practice}***.

Load organiser's duties (from the parachuting pilot's perspective; there are also other tasks which are stated ***in the skydivers' instructions***) include:

- implementing and supervising the load's compliance with instructions and regulations concerning parachuting activities
- [*if there is no ground person, notifying the pilot about the matter*]
- [*informs the pilot of the skydivers' masses and provides the pilot with a total mass calculation which can be, for example, the load list*]
- [*completing the electronic load list before entering the aircraft*]
    - [*the system allows the pilot to see the total mass and the centre of gravity*]
- determining the jump order
- [*ensuring that the propeller danger zone is clear during engine start and communicating this to the pilot by saying "PROPELLER CLEAR" (the pilot is responsible for safety)*]

- providing the pilot with instructions or a jump plan before and during the flight [*as agreed, for example, audibly and/or using hand signals or via the intercom*]
    - [*for example, reporting students, the number of jump runs, high deployments, tandems and parachute handling practice jumps and wingsuits*]
- [*determining the exit point and reporting it to the pilot*]
- taking responsibility for the load's operation during loading and the parachuting flight
- informing the load of the location [enter here] of the checklists concerning other skydivers on board (NCO)
- reporting (to the pilot) any defects, shortcomings or malfunctions observed by them or by other skydivers that may affect the airworthiness or safety of the aircraft and any incidents that compromise or may compromise the safety of the operation
- **in exceptional or dangerous situations, communicating with the pilot and leading the skydivers**
- [seat belts fastened, helmets on, movement on board, **{*any other club-specific matters*}**]
- [*monitoring the jumps and landings of other skydivers unless there is a ground person (note: student loads must have a ground person who has a communication line with the jump plane pilot)*]

Comment: If a load list (or other document containing the load information) is provided to the pilot, it must be prepared from the pilot's perspective. For example, metres should be converted to feet and flight altitudes to flight levels. In addition, it is advisable to include information on, for example, high deployments (e.g. tandems and parachute handling practice jumps) and the use of wingsuits. ***These should be stated in the skydivers' instructions, and an NCO checklist should be prepared (see Chapter 6).***

Comment: The pilot must be allowed to concentrate on their demanding flight performance, particularly during climb and when entering the exit altitude, etc. This is even more important if the pilot is inexperienced. In addition, any surprising changes, such as additional exit altitudes, etc., consume the pilot's capacity. ***Such matters should be stated in the skydivers' instructions.***

{Further information: NCO.SPEC.120 Task specialist's, i.e. ~~load organiser's~~ skydiver's duties. Note: When the first version of this guide (2016) was drawn up, it was assumed that the task specialist would be the load organiser. However, this is not the case. Instead, task specialist refers to all skydivers.}

1.7 Pilot's capacity and rest periods

Special attention must be paid to the pilot's capacity already when planning flight shifts. All-day shifts must be avoided, and it must be ensured that the pilot has adequate breaks and gets sufficient amounts of food and drink during their shift.

The following matters must be agreed on by the club's organisation and brought to the attention of skydivers in particular. In other words, these matters should be stated in the skydivers' instructions as far as the skydivers are concerned.

- *The parachuting activities are planned in accordance with the number of skydivers and the aircraft's refuelling and inspections.*
- *At the start of the day, each pilot informs the manifest, the director of jumping activities, the ground person or other responsible person of their need for breaks.*
- *In order to maintain the safety of parachuting flight operations, the pilot must be provided with sufficient rest periods. The significance of rest is emphasised if the pilot is not experienced in parachuting flight operations, at the start of the season and when operating in unfamiliar conditions.*
- *To ensure that the pilot receives sufficient rest, refuelling should be performed by, for example, skydivers or designated refuelling personnel. This ensures that the pilot's break is not used up by refuelling the aircraft so that they get to eat, drink and rest.*

- *If more than one of the club's pilots are present, it is advisable to stagger the activities so that one pilot does not perform all flights.*
- *When operating in camp conditions, it must be ensured that the pilot gets sufficient rest between parachuting days.*
- *Having an on-call substitute pilot is beneficial in situations where the need to change pilot arises unexpectedly.*

1.8 Right attitude and its significance

The pilot must understand their responsibility for the safety of their passengers and assume an appropriate attitude. Parachuting flight operations may not be carried out just to accumulate flight time. The most common hazardous attitudes listed by the FAA:

- Anti-authority ("Don't tell me.")
- Impulsivity ("Do it quickly.")
- Invulnerability ("It won't happen to me.")
- Macho: "I can do it!"
- Resignation: "What's the use?"

1.9 Adequate capacity to perform parachuting flights

Adequate capacity to perform parachuting flights, a safety-oriented attitude and good aircraft control and handling skills ensure safe and successful performance.

1.10 Other information [*insert items if required*]

To be included in the next version of the guide if required (naturally, clubs may record any considerations immediately and submit comments and suggestions to the Parachuting Committee):

All matters concerning skydivers should be stated in the skydivers' instructions.

2 FLIGHT PREPARATIONS

2.1 Weather

The pilot is responsible for ensuring that the flight is performed in compliance with the rules. Correspondingly, the load organiser (instructor or independent jumper) is responsible for ensuring that jumps are performed in compliance with the rules.

Meteorology for general aviators
Within the framework of the recreational aviation safety project, the Finnish transport authority (formerly known as Trafi) commissioned a meteorological training package and additional learning material for general aviators from the Finnish Meteorological Institute. The package and additional material were published on 19 November 2015. The purpose of the meteorological training material is to provide as practical information as possible on weather and its impact on recreational aviation, taking account of the typical features of Finland's climate and weather conditions. Meteorology and anticipation of weather conditions for aviators:

- Meteorology for general aviators IX 2015
- Additional material for meteorology for general aviators IX 2015

The weather minima for parachuting flight operations are presented in the Rules of the Air, Section ***SERA.5001***. Note that in controlled airspace, the minimum vertical distance to clouds is always 1,000 feet (excluding special VFR in the vicinity).

Climbing above the cloud layer is permissible if a distance compliant with the minima can be maintained. See SERA.5001, VMC visibility and distance from cloud minima:

5 JAKSO

Näkösääolosuhteet, näkölentosäännöt, erityis-VFR- ja mittarilentosäännöt

SERA.5001 Näkyvyyttä ja etäisyyttä pilvestä koskevat VMC-minimit

Näkyvyyttä ja etäisyyttä pilvestä koskevat VMC-minimit esitetään taulukossa S5-1.

Taulukko S5-1 (*)

Korkeus	Ilmatilaluokka	Lentonäkyvyys	Etäisyys pilvestä
3 050 m (10 000 ft) AMSL ja sen yläpuolella	A (**) B C D E F G	8 km	1 500 m vaakasuoraan 300 m (1 000 ft) pystysuoraan
Alle 3 050 m (10 000 ft) AMSL ja yli 900 m (3 000 ft) AMSL tai yli 300 m (1 000 ft) maastosta, sen mukaan kumpi näistä on ylempi	A (**) B C D E F G	5 km	1 500 m vaakasuoraan 300 m (1 000 ft) pystysuoraan
Enintään 900 m (3 000 ft) AMSL tai 300 m (1 000 ft) maastosta, sen mukaan kumpi näistä on ylempi	A (**) B C D E	5 km	1 500 m vaakasuoraan 300 m (1 000 ft) pystysuoraan
	F G	5 km (***)	Selvästi erossa pilvestä ja maan tai veden pinta näkyvissä

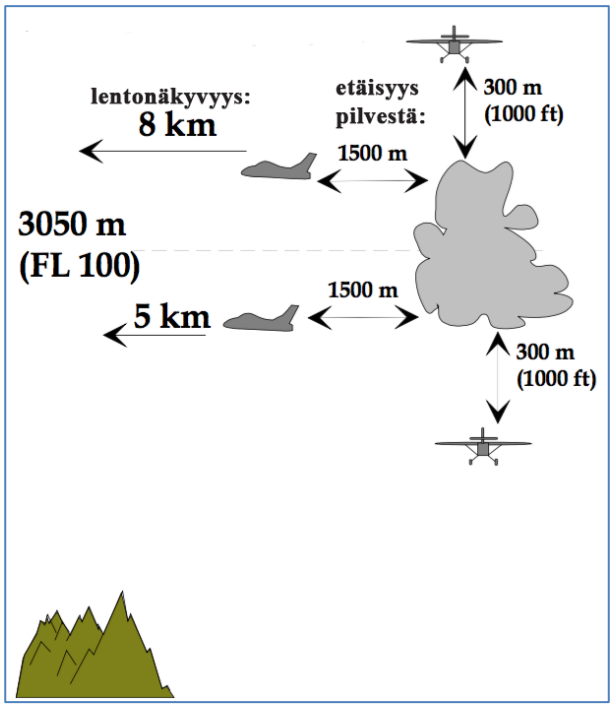
(*) Kun siirtokorkeus on alle 3 050 metriä (10 000 jalkaa) keskimääräisestä merenpinnasta (AMSL), 10 000 jalan sijasta on käytettävä lentopintaa 100.

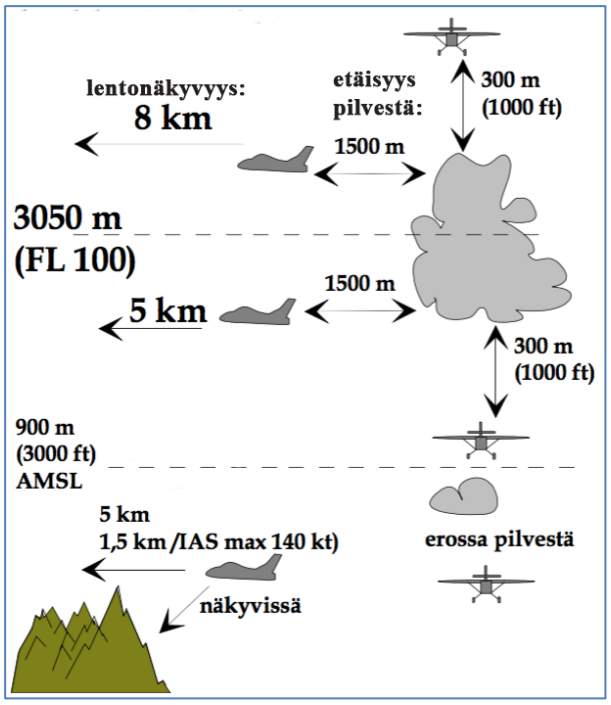
(**) Ilmatilaluokan A VMC-minimit on otettu mukaan taulukkoon opastukseksi ohjaajille, mutta tämä ei tarkoita VFR-lentojen olevan sallittuja ilmatilaluokassa A.

(***) Kun toimivaltainen viranomainen niin määrää,

a) vähintään 1 500 metriin alennetut lentonäkyvyydet voidaan sallia lennoille, jotka suoritetaan:
   1) enintään 140 solmun mittarinopeudella (IAS), jotta ohjaajalla on riittävä mahdollisuus tarkkailla muuta liikennettä ja esteitä ajoissa yhteentörmäyksen välttämiseksi; tai
   2) olosuhteissa, joissa muun liikenteen kohtaamisen mahdollisuus on yleensä vähäinen, esim. vähäisen liikenteen alueilla ja lentotyössä matalalla lentokorkeudella.

b) HELIKOPTERIEN voidaan sallia liikennöivän *alle 1 500 metrin* mutta vähintään 800 metrin lentonäkyvyydessä, jos niitä lennetään sellaisella nopeudella, jolla muuta liikennettä tai esteitä on mahdollista tarkkailla riittävän ajoissa yhteentörmäyksen välttämiseksi. Alle 800 metrin lentonäkyvyydet voidaan sallia erityistapauksissa, kuten lääkintälennoilla, etsintä- ja pelastustoiminnassa ja palontorjunnassa.





Controlled airspace **uncontrolled airspace**

OPS M6-1, Section 3.2: *At the time of the exit, the skydiver must see the landing area or the exit point. An exception may be made to this requirement if the entire parachute jump takes place in a controlled airspace and/or Radio Mandatory Zone (RMZ), the cloud height is at least 3,000 ft and the aircraft is equipped to locate its position with sufficient accuracy. The exception may not be applied unless all parachute jumpers are at least independent skydivers (Section 4.1). It is not permissible to perform a parachute jump through clouds in other category G airspaces than the RMZ.*

{There may be airfield-specific additional restrictions. For example, when the EFOU CTR/TMA ATS unit is open, only VMC parachuting operations.}

In the exit situation, the safety of the skydiver and their fall line in relation to the clouds must be taken into account. A parachute jump may not be performed if, on the basis of aeronautical communications, it is obvious that performing the jump could endanger flight safety.

Wind speed may often limit parachuting activities. Wind-related requirements are presented in SIL's ***Functional instructions and eligibility requirements for skydivers***:

The ground wind speed limits for parachute jumps are as follows:

Qualification	Wind m/s	Wind kt
Student	Max. 8	15
Licence A	Max. 8	15
Licence B, C or D	Max. 11	21
Tandem student	Max. 11	21
Round-type parachute as main or reserve parachute	Max. 8	15

Before take-off, the parachuting pilot must ensure that the maximum wind speed (gusts) does not exceed the situational values above. If necessary, the speed of gusts must be asked from [*air traffic control*]. If the wind limits are exceeded, the load organiser [*and manifest, ground person, skydiving club or another corresponding party*] must be notified immediately.

2.2. Aircraft inspection

2.2.1 Documentation

The airworthiness of the aircraft must be ensured first. When inspecting the documentation, it must be ensured that [*at least*] the following documents are included:

- Certificate of airworthiness, valid.
- Airworthiness review certificate, valid, records.
- Weighing record, valid, less than 5 years old.
- Journey log book, no unacknowledged fault entries, time for maintenance.
- Registration certificate.
- Radio licence, valid.
- Insurance certificate, valid.

- [*Season ticket, valid*].

2.2.2 External inspection

The daily aircraft inspection is carried out in accordance with the instructions in the aircraft manual. However, particular attention should be paid to inspecting parts subject to heavy wear in parachuting activities. These include:

- landing gear
- wing strut
- jump door
- interior
- [*automatic activation cord mounting bracket and threshold strips*]
- jump door side of the rear airframe
- wing flaps
- horizontal stabilizer and elevator
- aileron and rudder mass balances

The inspection is carried out in accordance with the daily check list.

The purity of [*petrol, diesel, jet fuel*] should be checked in accordance with the manual before moving the aircraft. There are [*four*] points for checking the fuel for water [*two under the wings, one under the engine and one under the cockpit*] **{*general instructions for Cessnas*}**. The fuel sample is not poured to the ground but into a dedicated container.

2.3 Refuelling

2.3.1 Fuel

{*Compare to Section 2.6.1 Fuel; the same information does not have to be stated twice*.}
The consumption of the club's aircraft [*ID*] in parachuting operations is approximately **[*xx l/h or x l/min*] {*e.g. 60 l/h or one litre per minute*}**. In normal operation, the aircraft is refuelled to ***[x]*** litres, which is usually enables flying ***[x]*** parachuting loads.
{*The refuelling volumes are specific to aircraft, situation and club, but they should be defined with sufficient accuracy*.}

The fuel level is checked at least every time the aircraft is refuelled. The measurement takes place **{*write down the club's procedure and note that fuel dipsticks, for example, are aircraft-specific*}**. However, at the start and during each flight, the pilot must be aware of the operating time and the amount of fuel currently available.

[*If refuelling from a tank with no water separator or from canisters, a funnel and a chamois filter or a funnel intended for this purpose must be used. In addition, it must be ensured that the funnel and the canister/fuel gun are earthed*.]

When flying with relatively low amounts of fuel, as is often the case on parachuting flights, fuel supply to the engine may be prevented when side-slipping even a little. [*To minimise this situation, the fuel cock is always kept in the BOTH position*.]

According to NCO.OP.125, the minimum fuel reserve is 10 minutes if the flight is performed in compliance with the VFR Rules of the Air in daytime, the take-off and landing take place at the same aerodrome and the aircraft remains at a constant visual distance from that aerodrome/landing site. {***It is recommended, however, that a fuel reserve of half an hour is kept in the tank when returning from a parachuting flight, as fuel volume measurement is never completely accurate and weather conditions, for example, may cause unpredictable waiting times on local flights. On the other hand, excess fuel adds unnecessary weight to the aircraft. Thus, the transport of unnecessary fuel should be minimised.***}

{*The following is ONLY A CASE EXAMPLE (C-182, petrol)*}

The consumption of the club's aircraft in parachuting operations is approximately 55 l/h, that is, less than one litre per minute. The aircraft type is Cessna 182P. In parachuting operations, the minimum fuel reserve is 30 litres. In that case, the tanks have a total of 49 litres of fuel which means that the amount of fuel left unused is 19 litres. When flying with relatively low amounts of fuel, fuel supply to the engine may be prevented when side-slipping even a little. To minimise this situation, the fuel cock is always kept in the BOTH position.

The fuel level is checked at least every time the aircraft is refuelled. The measurement is carried out using the aircraft's own fuel dipstick. The dipstick's readings from 30 to 70 mean litres of fuel in the tank. Note that the measured readings are significantly affected by the aircraft's position. If the dipstick does not get wet, all you can know is that there is less than 30 litres of fuel in the tank. A good method of recording the fuel quantity for each new load is to subtract flight consumption, that is, the number of flight minutes, from the fuel quantity at the start of the previous flight.

Flight	*Fuel/l*	*Flight time/min*	*Consumption/l*	*Fuel remaining/l*	*Refuelling/l*
1st	*100*	*35*	*35*	*65*	*-*
2nd	*65*	*15*	*15*	*50*	*50*
3rd	*100*	*45*	*45*	*55*	*45*
	100				

Excess fuel adds unnecessary weight to the aircraft. Thus, the transport of unnecessary fuel should be minimised.

If refuelling from a tank with no water separator or from canisters, a funnel and a chamois filter or a funnel intended for this purpose must be used. In addition, it must be ensured that the funnel and the canister/fuel gun are earthed.

The refuelling must be recorded in the aircraft's journey log book for the flight date in question, e.g. 35+50+45L.

Fuel quantity and remaining parachuting flight time.

Measurement (L)	*Kg*	*Parachuting flight time remaining*
50	*36.1*	*0*
60	*43.3*	*10 min*
80	*57.7*	*30 min*
90	*64.9*	*40 min*
100	*72.1*	*50 min*

2.3.2 Oil

The oil level is measured as part of the morning inspection when the engine is cold and, based on the inspection, oil is added as required.

{*More specific instructions are aircraft- and club-specific matters*.}

{*The following is ONLY A CASE EXAMPLE (C-182, petrol). Check aircraft-specific procedures from the flight manual.*}

The oil level must remain between 9 and 10.5 QRT. There is no need for volumes higher than 10 QRT and flying is prohibited with volumes lower than 9 QRT.

For example, if a volume of 9.5 QRT is measured in the morning inspection, 1 QRT should be added after a few hours of flight. Oil is always added as whole 1QRT containers.

According to the engine manufacturer's manual, oil supply to the engine ceases when the oil level falls to 6 QRT or lower and the nose position is 15° upward or downward.

If the oil level is checked during refuelling or otherwise during the flight day, it should be kept in mind that part of the oil is still in the engine outside the oil sump which means that the oil dipstick shows a reading lower than the actual volume. The dipstick reading changes when turning the dipstick loop 180° (i.e. loop facing upward). The difference is caused by the curvature of the dipstick tube and the tube's position in relation to the oil level.

Therefore, more attention should be paid to possible oil spills in such inspections. Leaks may occur, for example, at the crankshaft journal behind the propeller, that is, the crankshaft lip seal may leak. The leak may be caused by overpressure in the crankcase which may be caused by a blocked breather line. If the lip seal has bulged out of its place, the oil loss is significant and the aircraft must be serviced before the next parachuting flight. In addition, the seals of push rod protection pipes may harden and cause oil leakage.

If oil is observed in the windshield during the parachuting flight, the flight must be interrupted. Reduce throttle to 17" and set propeller blade angles to the lowest value (propeller lever to forward position). Agree with the load organiser whether an emergency jump is required because landing is easier with a smaller mass. If you have plenty of altitude, you should take the skydivers all the way to the aerodrome. ➔ Refer to Chapter 5 ***EMERGENCY LANDING, EMERGENCY JUMP AND HAZARDOUS SITUATIONS****.*

15–50W oil is used in the club's aircraft [ID]. The use or addition of other types of oil is prohibited. Always use a funnel when adding oil and check the funnel's cleanness before use.]

{The following is ONLY A CASE EXAMPLE (C-182, SMA Diesel)}

Oil level in C-182 aircraft equipped with an SMA engine (minor club-specific differences).

The SMA engine has minimum and maximum limits between which the oil level should be kept in parachuting flight operations. If the oil level falls below the minimum, the engine may overheat as the oil not only lubricates the engine but also dissipates engine heat. The maximum limit must not be exceeded, as it is common for SMA engines in parachuting flight operations that the oil is discharged from the engine at a high rate, but the discharge ends at the maximum limit and continues as normal oil consumption.

The minimum and maximum limits are 5.5 and 6.0 litres. According to the manufacturer, normal oil consumption is approx. 0.3 litres per flight hour in parachuting flight operations. It is a good practice to fill the tank with an hour's worth of fuel + the reserve and to add oil to the maximum.

After an hour of parachuting flight operations, the engine is cooled down according to the instructions and turned off. The aircraft is first refuelled after which the fuel level is checked using the dipstick. Only then can the oil level be checked. This allows the oil to settle to the oil sump from where the measurement is taken. If there is no need to refuel the aircraft, a sufficient break should be taken before the measurement and possible addition of oil. Oil is added as required without exceeding the maximum limit.

It should also be noted that in warm weather, oil consumption may increase due to increased oil temperature. Consequently, the rate of climb should be increased and temperatures should be monitored. The manufacturer recommends to inspect the aircraft for oil leaks if oil consumption increases by more than 0.5 litres per hour.

{The following is ONLY A CASE EXAMPLE (C-182, SMA Diesel)}

Oil level in C-182 aircraft equipped with the SMA SR305-230-E on engine. (Model E)

The SMA model E engine has minimum and maximum limits for oil (5.0 and 8.0 litres as indicated by the manufacturer) between which the oil level should be kept in parachuting flight operations. If the oil level falls below the minimum, the engine may overheat as the oil not only lubricates the engine but also dissipates engine heat. The maximum limit must not be exceeded, as it is common for SMA engines in parachuting flight operations that the oil is discharged from the engine at a high rate, but the discharge ends at the maximum limit set for the parachuting flight and continues as normal oil consumption.

***In parachuting flight operations, the minimum and maximum limits are 7.0 and 7.5 litres**. According to the manufacturer, normal oil consumption is approx. **0.1–0.3 litres** per flight hour in parachuting flight operations. It is a good practice to fill the tank with two hour's worth of fuel including the reserve and to add oil to the maximum (7.5 litres).*

After an hour of parachuting flight operations, the engine is cooled down according to the instructions and turned off. The aircraft is first refuelled after which the fuel level is checked using the dipstick (see Section 2.6.1 Fuel). Only then can the oil level be checked. This allows the oil to settle to the oil sump from where the measurement is taken. If there is no need to refuel the aircraft, a sufficient break should be taken before the measurement and possible addition of oil. Oil is added as required without exceeding the maximum limit. (7.5 litres).

It should also be noted that in warm weather, oil consumption may increase due to increased oil temperature. Consequently, the rate of climb should be increased and temperatures should be monitored. The manufacturer recommends to inspect the aircraft for oil leaks if oil consumption increases by more than 0.5 litres per hour. The aircraft should be inspected for oil leaks during refuelling.

If excessive amounts of oil is observed in the windshield during the parachuting flight, the flight must be interrupted. Reduce throttle to 70. Agree with the load organiser whether an emergency jump is required because landing is easier with a smaller mass. If you have plenty of altitude, you should take the skydivers all the way to the aerodrome. ➔ *Refer to Chapter 5* ***EMERGENCY LANDING, EMERGENCY JUMP AND HAZARDOUS SITUATIONS****.*

Aero Shell Ultra *oil is used in the club's aircraft [ID]. The use or addition of other types of oil is prohibited.*

Always use a funnel when adding oil and check the funnel's cleanness before use.

2.4 Flight planning

The pilot must make preparations for the day's flight operations by completing the following steps. **{*The steps are subject to remarkable club-specific variation. It is possible that some club-specific matters are not mentioned here. Such matters must be taken into account and recorded in the club's Guide for parachuting flight operations.*}**

{*The summary may follow the following model, for example:*}

The pilot must complete the following steps to prepare the day's operations.

- *Checking the weather for the entire duration of the parachuting flight operations. NOTAMs.*
- *Notifying the air traffic control or the area control centre about the commencement of parachuting flight operations prior to the first parachuting flight. Call the air traffic control by phone or submit a flight plan to the area control centre online or by phone. Pay attention to the start and end times, the upper limit of the airspace and remember to close the flight plan. If the pilot is changed, the pilot of the day's last parachuting flight must be made aware of the change.*
- *Inspecting and preparing the aircraft for parachuting operations.*
- *There are members of the skydiving club present to open the gate.*

Provisions on flight preparations are laid down in SERA.2010. More detailed club-specific instructions must be recorded in the club's Guide for parachuting flight operations in accordance with the rules.

2.4.1 Acquiring weather information

Check flight weather observations and forecasts, METAR (AWS-METAR) and TAF as well as the regional LLF. (Note: GAFOR has been replaced by *low-level forecast* (LLF), the use of which is instructed in the guide: https://ilmailusaa.fi/pdf/LLF_manual_FI.pdf)

Note that TAFs are prepared for the purposes of commercial flight operations and do not present all weather changes that may affect parachuting activities.

METAR does not contain maximum wind information, unless gusts are at least 10 knots faster than the mean wind. Ask [*air traffic control*] for the maximum wind value if there is reason to believe that it can affect the parachuting activities.

It is advisable to check the FMI's Aviation Weather 3-day surface wind and cloud cover forecast as well as the precipitation forecast. Wind forecasts for different altitudes are provided by *www.windy.com*, a site used by skydivers. **{*Mention any additional aids used by the club here*.}**

2.4.2 Check bulletins/NOTAM

Check the bulletins for any deviations expected for the flight day. For example, the airfield may be closed or only periodically open.

2.4.3 Prepare a written flight plan

A flight plan must be made for parachuting activities taking place in a controlled airspace or within an aerodrome flight information service (AFIS) zone during the service's opening hours. **{*From the perspective of aviation rules, an AFIS airspace (e.g. Seinäjoki, within whose airspace the Alavus Aviation Club operates) is an uncontrolled airspace, but a flight plan is required when operating there during the opening hours of the AFIS unit.*}**

{*More detailed provisions on the content of the flight plan may be provided in Finavia's guides or other corresponding documents.*}

2.4.4 Daily inspection and preparing the aircraft

Perform the daily inspection in compliance with the instructions in Section [*2.2.2*], the flight manual and the club's instructions.

[*2.4.5 Other activities*]

[*Notify the air traffic control about the parachuting activities and find out which other activities take place at the airfield during the day (e.g. scheduled inbound and outbound flights). If the air traffic control is closed at the start of operations or throughout the operation, prepare a flight plan.*]

2.5 Equipment

{The following information is aircraft-specific.}
[*The club's aircraft [ID] should always be equipped with the equipment required for parachuting activities. If the aircraft is used for other flight operations, the plane must be equipped for parachuting afterwards. The jump door may only be used in parachuting activities*.] **{*List the desired aircraft equipment for different situations*.}**

[*When performing parachuting operations, the pilot of the aircraft [ID] must be equipped with an emergency parachute*.]

2.6 Loading

2.6.1 Fuel

{Compare to Section 2.3 Refuelling; the same information does not have to be stated twice.}

Excess fuel adds unnecessary weight to the aircraft. Thus, the transport of unnecessary fuel should be minimised.

{Enter characteristics specific to the club, airfield and aircraft; pay attention to safety-related aspects. It is advisable to add illustrative images where possible.}

If refuelling from a tank with no water separator or from canisters, a funnel and a chamois filter or a funnel intended for this purpose must be used. In addition, it must be ensured that the funnel and the canister/fuel gun are earthed.

[*Example table on the relation of aviation petrol volume, weight and parachuting flight time (C-182, petrol)*]

Measurement (L)	Kg	Parachuting flight time remaining
40	29	0
60	43	20 min
80	58	40 min
100	**72**	**60 min**
120	86	1 h 20 min

***EXAMPLE*: Fuel quantities for C-182 aircraft equipped with the SMA engine.**

Measurement (litres)	*kg (0.8kg/litre, +15°C)*	*Parachuting flight time (min)*
10+10	*16*	*0*
30+30	*48*	*60*
80	*64*	*90*
100 (not recommended)	*80*	*120*

Fuel reserve not taken into account. 15 min = 10 litres
100 litres + reserve is not recommended due to the possibility of oil level falling below the minimum.

{Club-specific instructions for recording fuel uplift in, for example, the journey log book and/or other systems should also be entered here.}

2.6.2 Skydivers and their positions in the aircraft

In addition to fuel and the basic weight, other transported mass consists of the pilot and the skydivers.

The aircraft load is generally restricted by the transported mass rather than the number of passengers (skydivers).

{*Example:* C-182, petrol, EASA STC 10026913, mechanical supercharger, MTOW: 1,406 kg}

[Maximum mass 1,406 kg
Empty weight 812 kg
Loading limit 594 kg

When equipped for parachuting operations, the load mass available for the pilot, fuel and skydivers is, in this example: 1,406 kg – 812 kg = 594 kg.

Example table: C-182, petrol, EASA STC 10026913, mechanical supercharger, MTOW: 1,406 kg

Hyppääjän maksimi keskipaino kun hyppääjiä 5 tai 4

5 / 4 hyppääjää		Pilotti + varjo				
Bensaa	Kg	70	80	90	100	110
120	86	88/109	86/107	84/104	82/102	80/99
100	72	90/113	88/111	86/108	84/106	82/103
80	58	93/117	91/114	89/112	87/109	85/107
60	43	96/120	94/118	92/115	90/113	88/110

C-182 does not become tail-heavy easily. Thus, when adhering to normal loading principles – heavy objects in the front and, if necessary, compressed seating at the start – the aircraft should not become tail-heavy. The maximum weight at the cargo door is 54 kg.]

The aircraft is loaded [*at the general aviation ramp, at the refuelling site, etc.*].

The actual mass of skydivers (and pilot) must be used for calculating the aircraft load. The actual mass is measured by weighing so that all equipment used is taken into account (i.e. the so-called exit weight).

{Optimally, the manifest programme sums up the skydivers' weights and takes account of the fuel mass and the pilot's weight. The total weight is stated in the load list. This makes operation easier. The program does not allow overloading which happened in Utti, for example.} {*Refer to Appendix 10 for further information.*}

Calculating the centre of gravity (balance calculation, centre of gravity) is a **crucial**, aircraft-specific **matter**. The information required for the calculation is provided in the flight manual of the aircraft. It is often justifiable to use a computer program, a spreadsheet or an appropriate form to make the calculation easier and faster. **{*Refer to Appendix 10 for further information.*}**

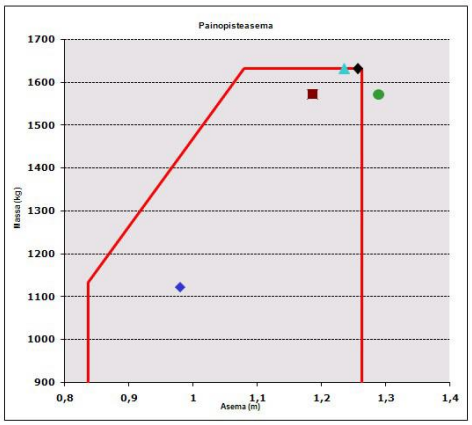
{*Example*: *The Tampere Skydiving Club's (Tamlk) load chart, centre of gravity, C-206*, *source material: Tamlk, Flight Operations Manual and Tamlk, Guide for skydivers*}

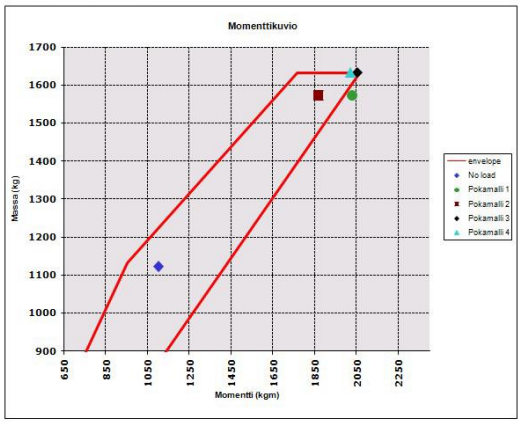
Refer to the flight manual for instructions on loading the aircraft. The actual mass of the aircraft is stated in the mass and balance statement kept inside the pilot log book. The skydivers' centre of gravity positions for parachuting flight operations are presented roughly in the following table:

Skydiver	*Position (cm)*
1	*230*
2	*270*
3	*220*
4	*165*
5	*145*
6	*90*
Pilot	*90*

The figure below presents a few examples of loading in parachuting flight operations with the aircraft OH-CMT.

		No load		Pokamalli 1		Pokamalli 2		Pokamalli 3		Pokamalli 4									
	Asema	Massa	Mom	Massa	Mom	Massa	Mom	Massa	Mom	Massa	Mom	Massa	Mom	Massa	Mom	Massa	Mom	Massa	Mom
OH-CMT	0,96	928	891	928	891	928	891	928	891	928	891	928	891	928	891	928	891	928	891
FUEL	1,22	110	134	110	134	110	134	110	134	110	134								
Pilotti	0,90	85	77	85	77	85	77	85	77	85	77								
Hyp 1	2,30		0	90	207	90	207	85	196	70	161								
Hyp 2	2,70		0	90	243		0	85	230	70	189								
Hyp 3	2,20		0	90	198	90	198	85	187	90	198								
Hyp 4	1,65		0	90	149	90	149	85	140	90	149								
Hyp 5	1,45		0	90	131	90	131	85	123	90	131								
Hyp 6	0,90		0		0	90	81	85	77	100	90								
Poka yht		0		450		450		510		510									
Yht	0,98	1123	1101	1573	2028	1573	1866	1633	2053	1633	2018								





The impact of the centre of gravity is examined by determining the distance of the skydivers' seating positions and exit points from the wing front edge line (indicated by the manufacturer) and by calculating the resulting moment based on the skydiver's weight (mass). For OH-CMT, the examination has been carried out with the Excel tool shown in the figure (below). The tool allows changing the skydivers' weights and examining various seating arrangements and exit formations. The necessary distance measurements have been made using the aircraft's dimensional drawings and by examining the correct seating positions in the aircraft. The tool has the mathematical formulas required for calculating the centre of gravity position.

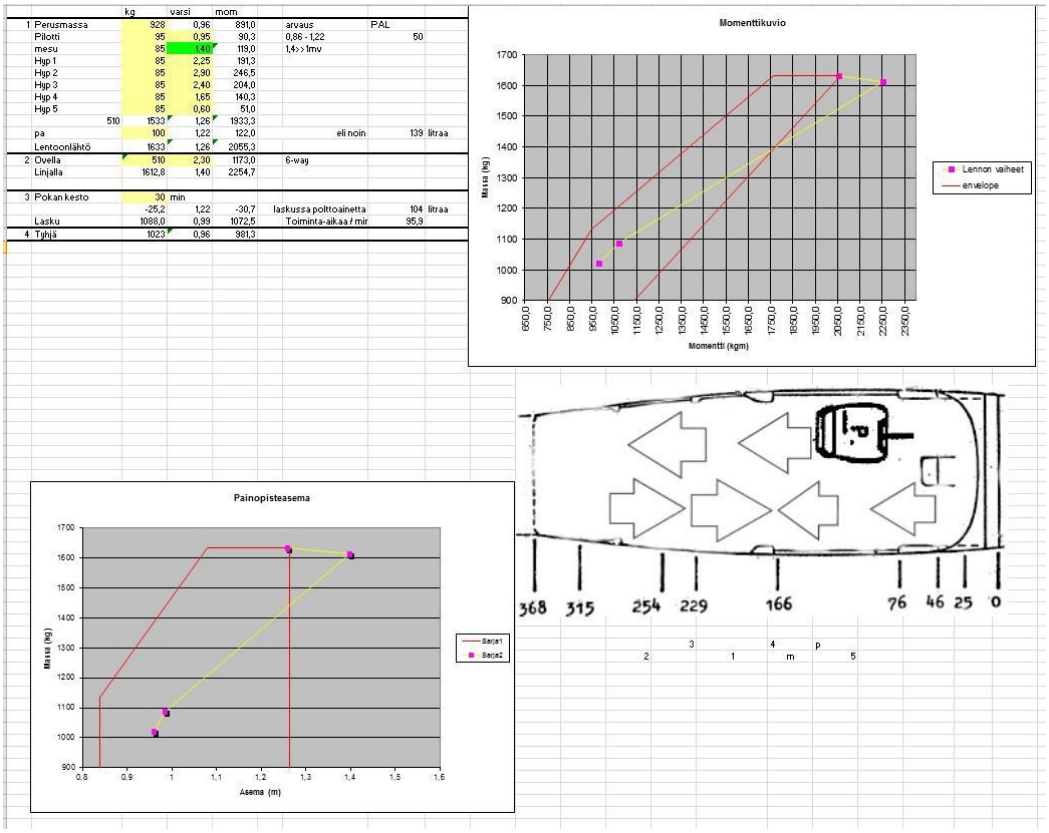


Figure: Tool for the examination of OH-CMT's load and centre of gravity.

{Second example: Vaasa Skydiving Club.** Source material: **Vaasa Skydiving Club, Guide for parachuting flight operations}

Refer to the flight manual for instructions on loading the aircraft. The actual mass of the aircraft is stated in the mass and balance statement kept inside the pilot log book. The skydivers' centre of gravity positions for parachuting flight operations are presented roughly below.

The impact of the centre of gravity is examined by determining the distance of the skydivers' seating positions and exit points from the wing front edge line (indicated by the manufacturer) and by calculating the resulting moment based on the skydiver's weight (mass). For OH-WTF, the examination has been carried out as shown in the figure below. The necessary distance measurements have been made using the aircraft's dimensional drawings and by examining the correct seating positions in the aircraft.

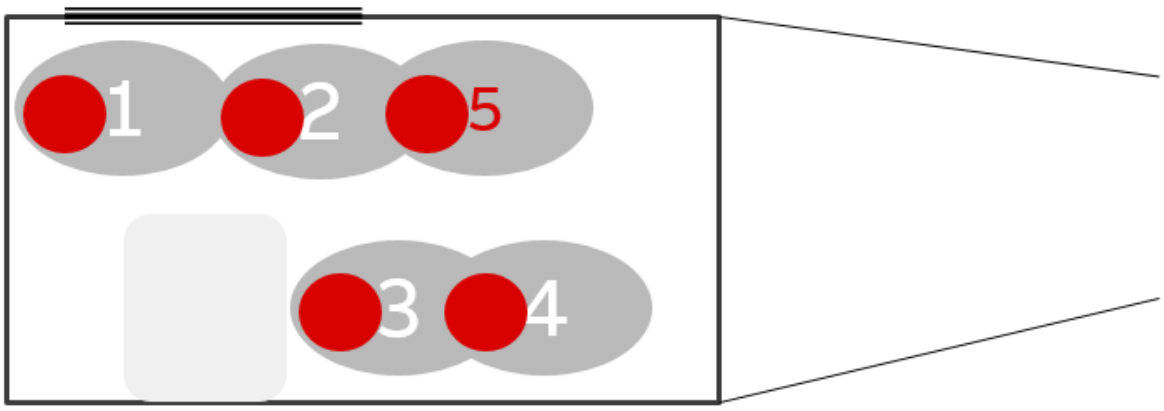


Figure. Positions in Vaasa Skydiving Club's aircraft.

All matters concerning skydivers should be stated also in the skydivers' instructions.

2.6.3 Markings and instructions inside the aircraft concerning loading and movement

Adequate, clear markings must be placed inside the aircraft. The need for markings is evident in aircraft in which the jump door is located behind the wing. However, even though this is not the case with C-182-type aircraft, the skydiving load may not be positioned at the back of the aircraft. **This is even more vital in high altitudes where the air is thinner and the control response is weaker.**

Skydivers' movement for the exit, during exit and possibly to return to their seating must take place within calculated limits. Different types of parachuting disciplines and their requirements/special features affect both movement and exit.

{*Example*: *Vaasa Skydiving Club*. *Source material:* ***Vaasa Skydiving Club, Guide for parachuting flight operations*****}**

One skydiver must always be seated next to the pilot. The next position is in front of the skydiver next to the pilot (the skydivers and the pilot face opposite directions). The next position is behind the pilot's seat and the next one in front of the skydiver behind the seat. If enabled by the aircraft's load and centre of gravity, 5 skydivers may board the aircraft (taken into account in the insurance).

The skydivers' movement for the exit, during exit and possibly to return to their seating must take place within calculated limits. Different types of parachuting disciplines and their requirements/special features affect both movement and exit.

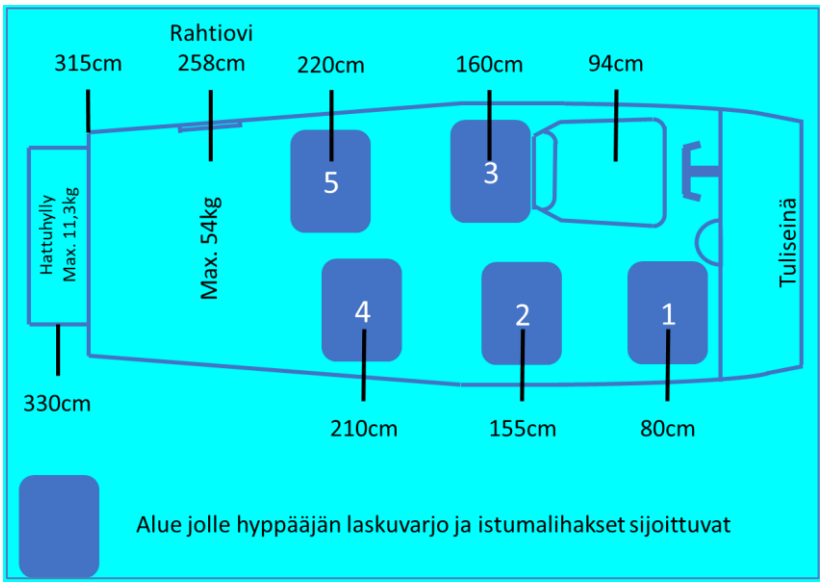
{*Example: Oulu Skydive Center.* *Source material: Guide for parachuting flight operations, Oulu Skydive Center (OSC)***}**

The manifest program used by the OSC calculates the total weight of the skydivers and the pilot and adds the weight of the fuel load if the pilot has entered the fuel load for the next skydiving load via the pilot interface. If the fuel load is not entered, the program assumes that the fuel load is 100 l. The skydiving load weight calculation, including the centre of gravity, is displayed in the pilot's interface after the load organiser has entered the necessary information in the manifest.

C-182 does not become tail-heavy easily. With certain loadings, the centre of gravity of the aircraft OH-CVE is at the front limit or exceeds it if the pilot and skydivers in positions 1 and 2 are heavy. The pilot should familiarise him/herself with this by using the weight calculation table. The practice of compressed seating at take-off should no longer be adhered to.

One skydiver must always be seated next to the pilot, and the aircraft is filled from the front to the rear. Thus, the next position is in front of the skydiver next to the pilot (the skydivers and the pilot face opposite directions). The next position is behind the pilot's seat and so on. See the figure below.

The skydiver's buttocks and parachute pack must be placed in the dark area. These areas are marked on the aircraft floor.



The skydivers' movement for the exit, during exit and possibly to return to their seating must take place within calculated limits. The maximum weight at the cargo door is 54 kg.

All matters concerning skydivers MUST be stated also in the skydivers' instructions and an NCO checklist must be prepared (see Chapter 6).

{This can be combined with Chapter 2.6.2 Skydivers and their positions in the aircraft.}

2.7 Other information [*insert items as required*]

Pressures set by the parachuting community (quickly assembled loads, rushed centre of gravity calculations, sufficient communication with the load organiser before take-off, etc.).

3 FLIGHT

Before each flight, the load organiser [*provides, explains, etc.*] the jump plan to the pilot. The plan must state each drop altitude and the number of students/independent skydivers exiting at each altitude. It is also necessary to mention any special features, such as the use of wingsuits, high deployments, etc. If several skydivers exit at the same altitude, the number of skydivers and the number of circuits at that altitude should also be mentioned.
{*The purpose is to ensure reasonable provision of information and club-specific details to the pilot; cf. Section 1.6 Load organiser*.}

[*The pilot should record the plan in their notebook thoroughly to avoid any confusion. The operational time must also be acknowledged so that it can be reported upon request.*]

3.1 Engine start

Ensure that the propeller danger zone is clear before starting the engine. [*The load organiser/ground person helps the pilot to ensure this*.] In addition, make sure that the ground under the propeller is free of any rocks/sand or loose debris that can damage the propeller. Perform engine warm-up according to the instructions, taking note of the season, outdoor temperature and preheating procedures.

{*Engine start involves matters specific to the club, airfield and aircraft. If required, such matters should be stated in the club's Guide for parachuting flight operations and, insofar as skydivers are concerned, in the skydivers' instructions. For example, The ELT must be turned ON (where to find the ignition switch) if the engine does not start automatically.*}

The engine start is performed in accordance with the flight manual.

{*C-208 loading support and other similar club- and aircraft-specific characteristics should also be taken into account.*}

3.2 Taxiing

{*Taxiing involves matters specific to the club, airfield and aircraft (see flight manual) which should be stated in the club's Guide for parachuting flight operations, where necessary*.}

[E.g. *C-208: Taxiing may not be started before the pilot has seen that the loading support and stairs have been removed*.]

The pre-take-off engine test run and inspections must be carried out in accordance with the flight manual checklist [*at the holding position*]. If possible, perform the test run at a clean area in the runway or taxiway.

3.3 Take-off

{*Take-off involves matters specific to the club, airfield and aircraft (see flight manual). If required, such matters should be stated in the club's Guide for parachuting flight operations and, insofar as skydivers are concerned, in the skydivers' instructions*.}

Take-off must be performed in accordance with the aircraft's flight manual.

Rejected take-off and related operational instructions, especially for skydivers.

All matters concerning skydivers should also be stated in the skydivers' instructions.

3.4 Climb

{*Climb involves matters specific to the club, airfield and aircraft (see flight manual). If required, such matters should be stated in the club's Guide for parachuting flight operations and, insofar as skydivers are concerned, in the skydivers' instructions*.}

Examples of matters that, in addition to speed, require particular attention during climbing:

- *Correct amount of throttle when pressure density decreases as altitude increases*
- *Intensified airspace monitoring due to poor visibility to the front sector*
- *Any agreed clearways.*

Examples of matters to be considered when deciding on the climbing route:

- *Clearance, sector(s)*
- *Safety in the event of engine failure*
- *Line direction*
- *Drop altitude*
- *Other air transport*
- *Aircraft noise*
- *Weather, especially clouds.*

Note the possibility of engine failure when climbing. At lower altitudes, it is advisable to stay closer to the airfield so that it emergency landing at the airfield is possible.

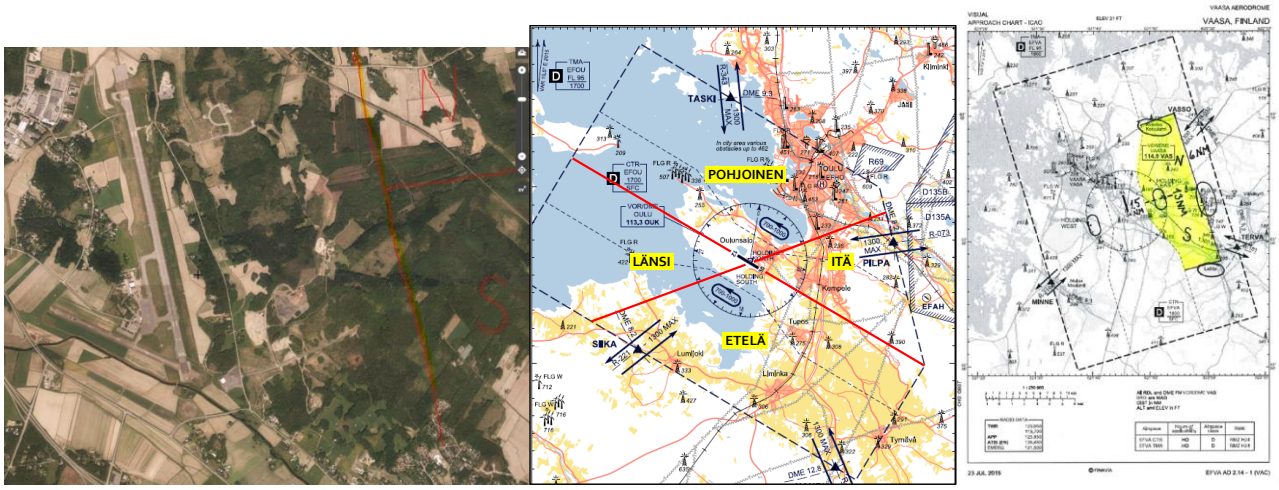
Skydivers typically sit "still" and with seatbelts fastened (if any) up to the altitude of 300 m. After reaching this altitude, some movement will occur (hopefully as agreed).

{Example table, C-182, SMA}

Rule of thumb for climbing:

Altitude (ft)	*Airspeed*	*Throttle*	*TIT*	*Note*
0–1,000	*75–80 knots*	*Full*	*Not above 700 °C*	*Full throttle*
1,001–3,500	*75 knots*	*Full (max. 85 inchHG)*	*Not above 700 °C*	*Do not exceed 85*
3,501–10,000	*75 knots*	*Full (max. 85 inchHG)*	*Max. 730 °C*	*Do not exceed 85*
10,000–14,000	***72 knots***	***Reduce to 84 inchHG***	*Max. 730 °C*	*Reduce by one line spacing*

{Example images; it is advisable to add similar images to the club's guide.}



Example images.

3.5 Determination of exit point

{The determination of exit point involves matters specific to the club, airfield and aircraft (see flight manual). If required, such matters should be stated in the club's Guide for parachuting flight operations and, insofar as skydivers are concerned, in the skydivers' instructions.}

{Example: Vaasa Skydiving Club's instructions:}

It is advisable to keep an aerial photograph of the airfield and the landing site in the aircraft. This should be the same photograph as the one to which the skydivers' exit point and movement sector are marked and updated at the club. Attention must be paid to skydivers using wingsuits. The instructor or load organiser uses this map to inform the pilot of the line direction and the exit point.

When the aircraft is climbing at an altitude of, for example, 1,000 m, and the aircraft is equipped with a GPS locator, a slow 360° turn can be made and the airspeed indicator reading can be compared to the ground speed indicated by the GPS. The pilot can report the "headwind direction and speed" to the load organiser/instructor at 1,000 m. The pilot does not determine the exit point unless the air traffic control determines it via the pilot. This does not concern exceptional situations, such as situations where there is a cloud at the exit point and altitude. In that case, the pilot discusses possible jump run cancellation, jump run relocation or altitude change with the load organiser/instructor.

The pilot informs the air traffic control of the following matters during the day's first climb:

- *Jump run (from the club – direction [e.g., direction 250° or Pori highway intersection)*
- *A deviant exit point requested by the skydivers (e.g. wingsuit jumpers)*
- *Exit point (for example, Pori highway intersection (so-called 4 barns), Sulva road intersection, the holding position at alpha level, above the tower, above the hall)*

Any changes to the jump run and/or exit point are reported to the air traffic controller.

3.6 Flying to and on the jump run

{Flying to and on the jump run involves matters specific to the club, airfield and aircraft (see flight manual). If required, such matters should be stated in the club's Guide for parachuting flight operations and, insofar as skydivers are concerned, in the skydivers' instructions.}

The movement of skydivers on and off the aircraft should be monitored to ensure that the loading does not become tail-heavy and that any resulting damage to parachutes is noticed. In particular, tandem parachute packs are vulnerable to defects caused by "bruises" due to their large size.

When the skydivers climb outside the aircraft, the speed tends to drop and the rate of descent to increase. If this happens, the flight speed should be kept constant at the expense of altitude. In that case, the loss of altitude must be taken into account when selecting the target altitude. In addition, the aircraft tends to tilt and turn to the jump door side. This must be prevented by coordinated use of the controls.

When dropping wingsuit jumpers, the aircraft must be on a level or descending line of flight during exit. Wingsuit jumpers may not exit on an ascending line of flight. Throttle XXX, for example.

As wingsuits pose risks during exit (risk of collision if on an ascending line or in case of incorrect exit; slow flight as the airspeed at the jump run is slower when using flaps), particular attention should be paid when using them.

Insofar as skydivers are concerned, matters related to exit and movement on board MUST be stated in the skydivers' instructions (taking account of students and independent skydivers).

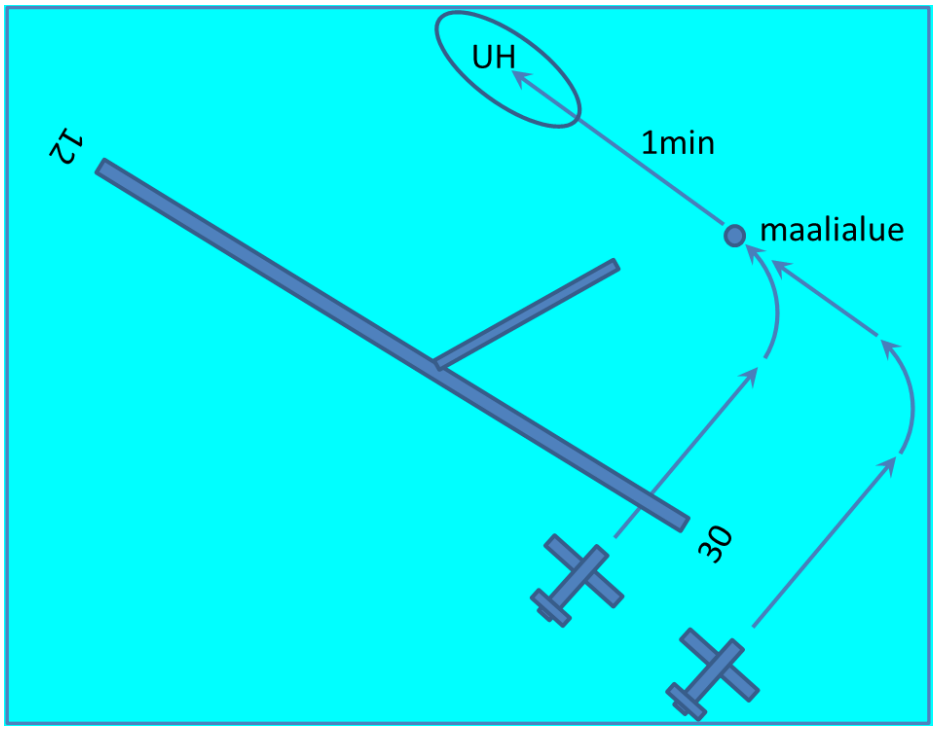
Flying to and on the jump run {*Example operating model: C-182, Oulu Skydive Center*}

A clearance must always be requested for moving from the take-off climb surface to the jump run. A jump permit must be requested from the air traffic control 2 minutes before the estimated exit.

Throughout the climb, the aim is to reach the desired altitude at the exit point. In general, the jump run is flown over the landing area towards the exit point. The load organiser is notified about reaching the jump run by saying "On the jump run". On the jump run, the load organiser may check the flight direction by peeking out the door. The load organiser must request permission for opening the door from the pilot: "May I open the door?" – "Yes/No". The pilot changes the flight direction in accordance with the load organiser's instructions, taking flight safety into account. The load organiser gives the direction change in degrees, for example "5 right". The direction is changed using the rudder as the aircraft may not be tilted.

The jump door may not be opened and the aircraft may not fly with an open door at speeds higher than 110 MPH.

The temporal length of the jump run is approx. 1 minute and it ends at the exit point. Jump run starting point is determined based on ground speed. When measured in metres, the jump run is longer in still air than when flying against the wind. A jump run longer than one minute (approx. 1.5 min.) is usually required for students' first jumps, tandem jumps, and always when requested by the load organiser. The jump run is flown with GPS assistance or based on landmarks or using both methods. When using landmarks, it is easier to home in on the jump run by turning left as this enables seeing the landing area through the side window during the turn. The jump run direction is maintained using a directional gyro.



The altimeter and rate-of-climb indicator may be used for timing the jump clearance request and for homing in on the jump run. The jump clearance should be requested if the altitude is 1,000 ft below the drop altitude and the aircraft climbs at 500 ft/min, provided that the exit point can be reached in 2 minutes and during the 1,000 ft climb.

When the skydivers prepare to exit the aircraft, the aircraft OH-CVE's boost pressure is adjusted to 15–18 inches, the speed of 90 MHP is maintained and the cowl flaps are closed. The aircraft may be flown at 80 MPH on students' first jumps to facilitate access to the wing strut.

The movement of skydivers on and off the aircraft should be monitored to ensure that the loading does not become tail-heavy and that any resulting damage to parachutes is noticed. In particular, tandem parachute packs are vulnerable to defects caused by "bruises" due to their large size.

When the skydivers climb outside the aircraft, the speed tends to drop and the rate of descent to increase. If this happens, the flight speed should be kept constant at the expense of altitude. In that case, the loss of altitude must be taken into account when selecting the target altitude. In addition, the aircraft tends to tilt and turn to the jump door side. This must be prevented by coordinated use of the controls.

When dropping wingsuit jumpers, the aircraft must be on a level or descending line of flight during exit. Wingsuit jumpers may not exit on an ascending line of flight.

As wingsuits pose risks during exit (risk of collision if on an ascending line or in case of incorrect exit; slow flight as the airspeed at the jump run is slower when using flaps), particular attention should be paid when using them.

Example: Rule of thumb for jump run approach – All skydivers exit on a single jump run. (C-182, SMA diesel)

Time to exit point	*Throttle*	*TIT*	*Note*
2 min	*84 inchHG*	*Max. 730 °C*	*Approx. 1,000–1,500 ft before EX altitude*
1 min, jump run start	*Reduce slightly*	*Starts to decrease*	*Approx. 500–700 ft before EX altitude CLOSE THE COWL FLAP*
Door open	*Reduce slightly*	*Continues to decrease*	*Note jump run speed 70–80 kn*
Skydivers climb	*55–60 inchHG*	*Stable*	*Speed control at altitude*

All skydivers exit	*55 inchHG*	*Stable*	*Door closed. NOTE MAX. speed when door open*
Door closed	*55 inchHG*	*Stable*	*Push and trim 150–157 kn*
Altitude reduction	*45 inchHG*	*Decreases*	*Ball in the middle*
5,000 ft and downward	*45 inchHG*	*Decreases*	*Reduce with throttle and keep 45 inchHG*
2,500 ft and downward	*45 inchHG*	*Decreases*	*Reduce with throttle, speed 140 kn*
1,000 ft and downward	*45 inchHG*	*Stabilises*	*Reduce with throttle, speed 120 kn max. 10 deg. flaps*
Basic/end section	*40–45 inchHG*	*Stable*	*Reduce with throttle, speed 80 kn, flap settings for landing*

***Example*: Rule of thumb for jump run approach – Some of the skydivers exit on the jump run, climb after drop.**

Time to exit point	*Throttle*		*TIT*	*Note*
2 min	*84 inchHG*		*Max. 730 °C*	*Approx. 1,000–1,500 ft before EX altitude*
1 min, jump run start	*Reduce slightly*		*Starts to decrease*	*Approx. 500–700 ft before EX altitude*
Door open	*Reduce slightly*		*Continues to decrease*	*Note jump run speed 70–80 kn*
Skydivers climb	*70 inchHG*		*Stable*	*Speed control at altitude*
Skydivers exit	*84 inchHG*		*Max. 730 °C*	*Close the door before increasing throttle*
Continue climb	*84 inchHG*		*Max. 730 °C*	*Instructions for 'all on a single jump run' or 'some exit'*

Operation in class G airspace (uncontrolled airspace) {*Example operation model C-182, Vaasa Skydinving Club*}

The pilot makes the normal radio reports to explain their intentions and to coordinate them with other traffic. If it is possible for other traffic to cross the jump run, the pilot must, in good time before reaching the jump run (2–3 minutes), inform other traffic that the jump plane will home in on the jump run in x minutes. The pilot also reports the altitude, the number of skydivers and whether they will land after the drop or continue to climb. It is advisable for the pilot to make another report after reaching the jump run. Any outbound and inbound traffic as well as aircraft preparing for take-off should be kept aware of the parachuting activities.

In a controlled airspace, the air traffic control is primarily responsible for coordinating other traffic with the parachuting activities. However, notifying the ATC about readiness to home in on the jump run in x minutes is a good practice and gives the ATC time to coordinate the traffic.

The pilot should also notify the skydivers a few minutes before homing in on the jump run. This enables them to know the pilot's intentions and to start preparing for the jump. It also enables the pilot to know when the skydivers start to move inside the plane and prepare for it. ***A clearance must always be requested for moving from the take-off climb surface to the jump run.***

Cancelling the jump run and taking a new one {*for example, operating model C-182, Vaasa Skydiving Club*}

If the jump run is cancelled, the skydivers are not outside the aircraft and the door is still closed, the skydivers must return to their seating positions. Flying the new jump run takes 1–3 minutes, depending on its length.

If the door is open, it must be closed before increasing throttle. The maximum open-door flight speed has been specified for each aircraft. When closing the door, attention must be paid to keeping hands and feet clear from the door.

If a skydiver is already outside when the jump run is cancelled, the skydiver must jump, but the next one may not be allowed to climb. Climbing back into the aircraft may pose a greater risk to those on board than jumping. However, common sense should be used.

Accelerated jump run approach (*Example: operating model C-182, Vaasa Skydiving Club*)

Accelerated jump run approach is carried out similarly to normal homing in on the jump run, but the jump run direction may change depending on the direction of approach. However, the exit point remains unchanged. This means that the aircraft is aligned with the jump run direction just before the exit point.

This leaves the skydivers with very little time for visual positioning and preparation. It is a good practice for the pilot to notify "x minutes to exit point".

An accelerated jump run approach may be required, for example, due to the coordination of outbound or inbound traffic with the parachuting activities. In that case, accelerated jump run approach is requested by, for example, the air traffic control. The predefined altitude may not be reached when the approach is accelerated. Spare the engine.

Jump run cancellation, landing with the load {*Example: operating model C-208, Skydive Finland ry*}

The red light is turned on. The jump door is closed and the load returns to their take-off positions. If all members of the load are no longer on board, the remaining members distribute their weight in a balanced manner. The altitude may not be reduced too quickly because of the parachutes' automatic activation devices.

Jump run cancellation, landing with the load {*Example: operating model C-182, Vaasa Skydiving Club*}

The decision on jump run cancellation and landing is made either by the load organiser/instructor or the pilot. The decision is made by the load organiser/instructor if a skydiver(s) is prevented from jumping and jumping would put safety at risk or violate the regulations. In that case, the load organiser/instructor informs the pilot that the jump is cancelled and the aircraft should be landed.

The pilot may cancel the jump if any flight-related matters may endanger the safety of the skydivers and the pilot. Such matters include, for example, an anticipated change of weather or a detected fault in the aircraft.

Notification to the air traffic control/traffic about cancelling the jump. The skydivers return to their seating positions. The pilot may not descend at a rate faster than 1,000 ft/min to prevent unintentional activation of the parachutes' pressure triggers that may not have been turned off.

Exit in different situations.

Slow flight, stall.

{The operating models for the above-mentioned situations differ depending on the aircraft type.}

Insofar as skydivers are concerned, matters related to exit and movement on board MUST be stated in the skydivers' instructions (taking account of students and independent skydivers).

3.7 Altitude reduction, approach and landing

{*Altitude reduction, approach and landing involve matters specific to the club, airfield and aircraft (see flight manual) which should be stated in the club's Guide for parachuting flight operations, where necessary*.}

[*Altitude is reduced outside the jump area to avoid the risk of collision*.] Particular attention should be paid to tandem jumpers, as tandem parachutes are deployed already at an altitude of 1,600 m and the jumpers may remain in the air for up to 8 min. Wingsuit jumpers, too, remain in the air for a longer time and fly in a wide area around the landing area. In addition, they may intentionally deploy the parachute at a high altitude (e.g. dome formation jumps and parachute handling practice jumps). However, it should be ensured that landing on the runway is possible even in the event of engine failure.

3.8 Taxiing

{*Taxiing involves matters specific to the club, airfield and aircraft (see flight manual) which should be stated in the club's Guide for parachuting flight operations, where necessary*.}

3.9 Collecting another load without turning off the engine

{*Collecting another load without turning off the engine involves matters specific to the club, airfield and aircraft (see flight manual). If required, such matters should be stated in the club's Guide for parachuting flight operations and, insofar as skydivers are concerned, in the skydivers' instructions.*}

{*Example: operating model C-182, Vaasa Skydiving Club*}

When the next load is waiting at the loading location after the previous drop, the aircraft must be taxied to a location where it is safe for the skydivers to approach it obliquely from behind. Keep the engine rpm at the minimum throughout the skydivers' approach and until everyone is on board and the door is closed. Ensure before loading that the aircraft does not have to be refuelled.

3.10 Turning off the aircraft engine

{*Engine turn off involves matters specific to the club, airfield and aircraft (see flight manual) which should be stated in the club's Guide for parachuting flight operations, where necessary.*}

3.11 Other information [*insert items as required*]

Jump run approach pattern. {*Example: operating model C-182, Vaasa Skydiving Club*}

These instructions help new pilots learn how to approach the jump run.

Calculate the altitude increase within 2 minutes by observing the rate-of-climb indicator. For example, 1,000 ft (500 ft/min).

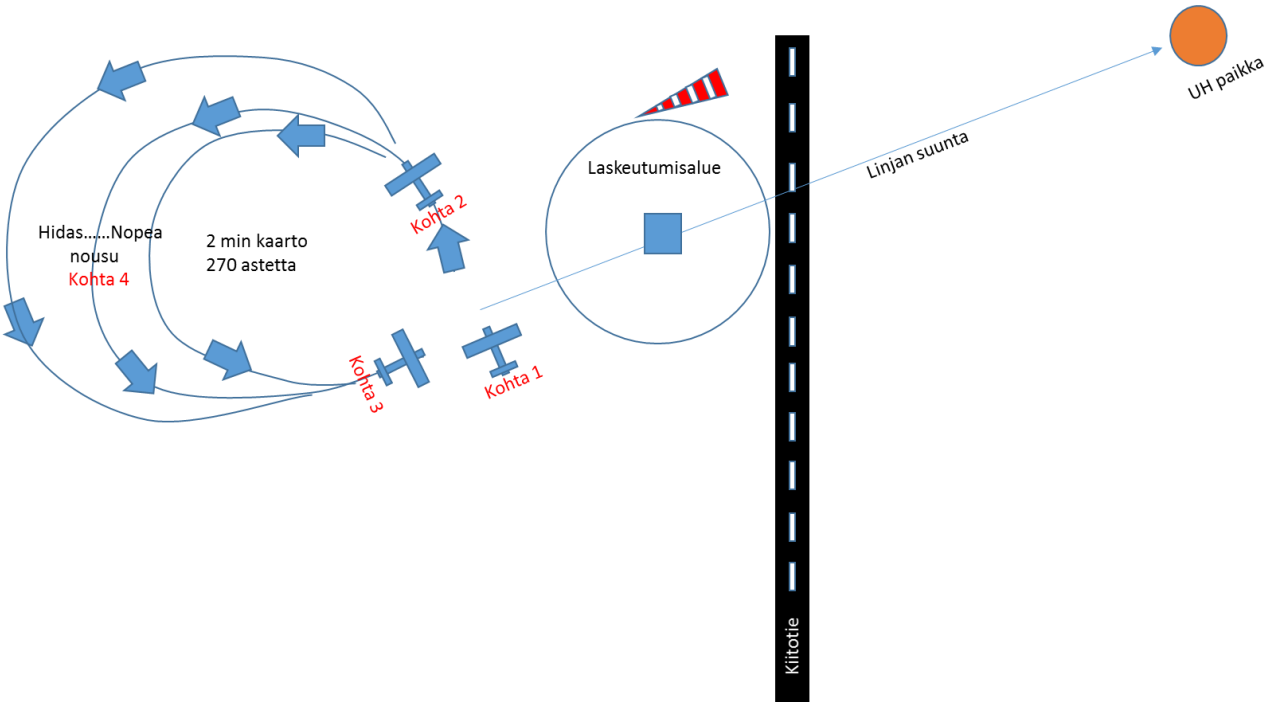
If the intention is to drop the skydivers from flight level 95 (9,500 ft), the start of the jump run should be approached at a 90° angle at an altitude of approx. 8,500 ft (see the figure below, Step 1).

Notify the air traffic control and other traffic: "2 minutes to jump run, flight level 95, number of skydivers x". Wait for clearance or listen to responses/intentions from other traffic. Notify the skydivers: "2 minutes to jump run".

Start a 2 minute turn away from the line (see figure, step 2). Turn 270° to home in on the start of the jump run (see figure, step 3).

By adjusting the turn and observing the rate of climb, you can time the arrival at the start of the jump run in relation to the altitude (see figure, step 4). At this point, it is necessary to get the air traffic control's clearance for the jump or for homing in on the jump run. Notify the skydivers: "On the jump run". If the air traffic control has provided clearance for the drop: "On the jump run, clearance for drop."

Start preparing the engine for altitude reduction well in advance on the jump run. (Close the cowl flap, reduce throttle, check speed, direction, centre of gravity change, secure throttle/mixture control.)



{*Examples of possibly required chapters*:}

Radio-telephony phraseology and Radio-telephony phraseology in English.

Further information on the latter is available at the Parachuting Committee's website on parachuting flight operations:

- Parachuting Committee's bulletin 12 January 2018: Ministry of Transport and Communications decision on the use English above flight level 95 and the resulting impacts on skydiving clubs.
- Radio-telephony phraseology for parachute operations in Finland, version 1.1, published on 8 November 2019.
    - The document is also available as Appendix 11 of this guide.

Other traffic at the airfield

All necessary matters concerning skydivers should be stated in the skydivers' instructions.

4 AFTER THE FLIGHT

4.1 Loading location

{Loading location involves matters specific to the club, airfield and aircraft (see flight manual). If required, such matters should be stated in the club's Guide for parachuting flight operations and, insofar as skydivers are concerned, in the skydivers' instructions.}

4.2 Parking the aircraft

{Aircraft parking involves matters specific to the club, airfield and aircraft (see flight manual) which should be stated in the club's Guide for parachuting flight operations, where necessary.}

4.3 Markings and notifications

{Markings and notifications involve matters specific to the club, airfield and aircraft (see flight manual). If required, such matters should be stated in the club's Guide for parachuting flight operations and, insofar as skydivers are concerned, in the skydivers' instructions.}

4.4 Other information [*insert items as required*]

5 EMERGENCY LANDING, EMERGENCY JUMP AND HAZARDOUS SITUATIONS

5.1 Emergency jump

In the event emergency landing, an emergency jump is performed at the pilot's command "**EMERGENCY JUMP**" if the altitude is sufficient, i.e. 1,000 ft (300 m) AGL or more. The pilot commands the load organiser and ensures that they heard the order. The load organiser ensures that all students and licenced skydivers exit the aircraft after which the load organiser exits too. The pilot exits [*last*] if the plane is no longer controllable or they consider it appropriate. The pilot must interrupt the emergency jump after the flight altitude decreases below 1,000 ft AGL with the command "**STOP – EMERGENCY LANDING**", after which the emergency landing procedure is adhered to.

{Emergency jump involves matters specific to the club, parachuting equipment and aircraft. If required, such matters should be stated in the club's Guide for parachuting flight operations and, insofar as skydivers are concerned, in the skydivers' instructions.

Exiting the aircraft ***{example procedure C-182, AA students possible}***:

- *The first skydivers moves to the door at the command "**TO THE EXIT**".*
- *At the command "**GO**", the skydiver moves outside the door.*
- *[As soon as the student is out (feet on the footboard and hands on the wing strut), they must jump backwards and bend strongly.] Those who can do a direct exit should exit the aircraft as they see fit.*
- *The next skydiver moves to the door as soon as the load organiser commands "**TO THE EXIT**", and at the command "**GO**", they act as explained above.*

In emergency jumps performed at an altitude under 2,000 ft (600 m), independent jumpers use the reserve parachute rather than the main parachute. For self-deployment students, the limit for using the main parachute is 1,000 m (3,300 ft), below which they should resort directly to the reserve parachute.

If the altitude is below 300 metres, it is usually safer to remain on board for emergency landing, if possible.

The document "***Emergency Rescue Access and Fire Fighting Procedures***" published by the aircraft manufacturer must be delivered to the fire station closest to the airfield for emergency landing situations. For example, the documents for C-182 and C-206/C-208 can be downloaded here (registration required). The same document must also be kept at the club in a visible location in the immediate vicinity of rescue equipment.

The operating model is different for clubs that perform accelerated free falls. There are many variations as accelerated free fall training jumps are performed with all aircraft types (C-182, C-206 and C-208).

{Operating model C-206, different types of students}

{Operating model C-208, different types of students}

All matters that concern skydivers MUST be stated in the skydivers' instructions (with consideration to both students and independent skydivers) and an NCO checklist must be prepared (see Chapter 6). In addition, the pilot should also be aware of the skydivers' activities.

5.2 Emergency landing with load on board

The emergency landing is performed with the load on board when the altitude is not sufficient for an emergency jump (below 300 m). The pilot orders the load organiser to prepare for emergency landing with the command "**EMERGENCY LANDING**".

{*Emergency landing involves matters specific to the club, parachuting equipment and aircraft (see flight manual). If required, such matters should be stated in the club's Guide for parachuting flight operations and, insofar as skydivers are concerned, in the skydivers' instructions*.}

Attention must be paid to automatic activation devices if, for example, FXCs are used. For example: [*The load organiser ensures that the students' FXCs are turned OFF. This prevents the possibility of FXC activation and parachute deployment inside the aircraft when descending*.]

There are also other automatic activation devices whose student versions may be triggered at the same speeds as the FXC. The adjustment unit may be placed on the back of the parachute pack, so it may be difficult to turn them off. Cypress is armed when climbing above 1,500 ft AGL. When descending, the rate of descent must be below 1,500 ft/min in altitudes lower than 1,500 ft AGL. This prevents the possibility of Cypress activation and parachute deployment inside the aircraft when the skydivers land on board the plane.

{*Operating model C-182*}
The load organiser ensures that the skydivers lean towards the flight direction (minimising free movement) and grasp for support if possible. Those sitting behind the seat keep their backs straight and are positioned tightly behind the pilot's seat. Those on their knees take the take-off position, i.e. lean tightly against the load organiser with their backs straight.

In addition, the skydivers grasp the person in front of them and hook arms with the person next to them, if possible. If there is enough time, the jump door is opened before contact with the ground.

The pilot should keep in mind that in an emergency landing, the aircraft is often loaded close to the maximum permissible mass and that the skydivers do not have safety belts.

After an emergency landing, the skydivers and the pilot help others when exiting, taking account of the conditions (fire, AA cords, landing location, injured persons).

{*Operating model C-206*}

{*Operating model C-208*}
Seatbelts are fastened and if there is enough time, the jump door is opened before contact with the ground.

All matters that concern skydivers MUST be stated in the skydivers' instructions (with consideration to both students and independent skydivers) and an NCO checklist must be prepared (see Chapter 6). In addition, the pilot should also be aware of the skydivers' activities.

5.3 Hazards caused by parachuting equipment

{*Hazards caused by parachuting equipment involve matters specific to the club, equipment and aircraft. If required, such matters should be stated in the club's Guide for parachuting flight operations and, insofar as skydivers are concerned, in the skydivers' instructions*.}

If a skydiver's backpack is opened inside the aircraft, or the reserve parachute comes out of its pocket, [*the load organiser, closest jumper*] ensures that the deployment of the parachute is prevented and the door is

kept closed [*secured by hand*] until the aircraft has landed and stopped. If the door is open, it must be closed immediately [*and the entire load lands on board the aircraft*].

If a skydiver gets caught in the aircraft by the reserve or main parachute, they must release the main parachute and open the reserve parachute after detaching him/herself from the aircraft.

[*If a student gets caught in the aircraft by the AA cord, the instructor cuts the cord, after which the student performs the reserve parachute procedures.*]

If a skydiver gets caught in the aircraft by the reserve parachute, the aircraft may be tilted and/or swayed in order to release the skydiver. In that case, it is very important to discuss the action with the pilot, the control tower and the load organiser. The situation is extremely dangerous because reserve parachutes do not have a release system.

The aircraft is equipped with knives [*attached to the side panels next to the pilot and the load organiser*] that may, if necessary, be used to cut the AA cord, parachute cords, jumpsuit legs or anything else by which a skydiver may get caught in the aircraft.

If part of a reserve and/or main parachute and its cords have ended up outside the aircraft, the pilot may facilitate recovering them by moving to slow flight with flaps in a 10–20° position. Unnecessary use of engine power should be avoided to minimise the propeller slipstream.

[*If a skydiver using automatic activation is too afraid to let go of the wing strut to jump, they may not be allowed to return to the aircraft. In addition, the load organiser may not climb to the wing strut. The pilot must drop the student by swaying the aircraft. This is done by first lifting the right wing up and then quickly moving it down and up, forcing the student to let go of the wing strut. A tilt of approx. 30–40° is sufficient. The pilot must ensure that the student drops within the exit point*.]

A fire in the passenger compartment is extinguished using the aircraft's fire extinguisher which is kept in [*the aircraft-specific location*]. The [*load organiser*] is primarily responsible for fire suppression.

{*Operating model for beginner-level students, etc.*}

{*Operating model C-206*}

{*Operating model C-208*}

All matters that concern skydivers MUST be stated in the skydivers' instructions (with consideration to both students and independent skydivers) and an NCO checklist must be prepared (see Chapter 6). In addition, the pilot should also be aware of the skydivers' activities.

5.4 Landing with the load – C-182 with an STC for additional mass

When landing with skydivers on board, it should be borne in mind that the aircraft's maximum take-off mass of 1,406 kg exceeds the maximum landing mass by 68 kg. The approach and landing must be performed at a slightly higher speed than normal and as smoothly as possible as a power stall landing. This is due to the fact that the wing always stalls at the same angle of attack, whereas the stall speed depends on the flight configuration and aircraft mass (weight).

5.5 Other information [*insert items as required*]

Training for hazardous situations. For example:

- Rejected take-off with high mass.
- Landing with maximum mass.
- Engine failure/loss of power during climb on a parachuting flight.
- Actions of skydivers/the pilot below a flight altitude of 300 m.
- Actions of skydivers/the pilot at flight altitudes higher than 300 m.

Instructor falls from the aircraft {*Example: operating model C-182, Vaasa Skydiving Club*}

If the instructor falls from the aircraft when, for example, determining the jump run or helping a student exit, the pilot must cancel other skydivers' jumps and close the door if only students remain on board. In case of a training situation where the students are independent skydivers, they may exit at the actual exit point.

The air traffic control/other traffic must be informed that a skydiver has jumped before reaching the actual exit point and may drift outside the jump sector.

Search using aircraft {*Example: operating model C-182, Vaasa Skydiving Club*}

A search may be carried out with the jump plane if, for some reason, a skydiver drifts away from the jump sector and landing area when under canopy. Other reasons may include main parachute search as a result of reserve parachute measures or a special mission requested by the air traffic control. The search must be authorised by the air traffic control or reported to other traffic in the normal manner.

The search is normally performed at a low speed. Therefore, it is preferable not to perform the search at maximum aircraft weight, but after taking the majority of skydivers to the exit point. However, it is advisable to leave a lookout on board so that the pilot does not have to focus on two things at the same time. The search is carried out immediately only if there is good reason to believe that the skydiver is seriously injured, for example. As the search is often carried out at altitudes from which normal jumps are impossible, the door must be closed to prevent the lookout from falling from the aircraft.

It is advisable to make use of the aircraft's map, which is normally used for determining the jump run and exit point, when flying the search lines. A 100 x 100 m raster map can be used for locating the search and to support informing air traffic control or authorities about the search.

Pay attention to the amount of fuel remaining and ensure that the aircraft does not side-slip. Due to the low amount of fuel, side-slipping may prevent fuel supply to the engine.

Reports such as flight safety reports, occurrence reports and incident notifications in skydiving (system for skydivers).

Medical attacks (pilot, trainer).

Good practices such as refresher training, pilot meetings (club/national meetings), cooperation with air traffic control and other actors in the airfield. Common safety days (including pilots).

{*Operating model for beginner-level students, etc.*}

{*Operating model C-206*}

{Operating model C-208}

All matters concerning skydivers should be stated in the skydivers' instructions

6 NCO CHECKLISTS

6.1 Examples concerning skydivers

Examples of NCO checklists that concern task specialists, i.e. skydivers, are available at the Parachuting Committee website (Parachuting flight operations). Corresponding information must also be provided in the instructions on parachuting activities or another corresponding document, and pilots must also be aware of the operating methods (joint preparation of the lists). To ensure the flow of information, the lists should be appended to the club's version of this guide.

The lists are placed in the jump plane so that they are easily accessible to skydivers (for example, they can be compiled to a couple of laminated A4 sheets that can be read inside the aircraft).

- Using the jump door – an example NCO checklist (docx).
- Duties of the load organiser and skydivers – an example NCO checklist (docx).
- Parachute opens inside the aircraft – an example NCO checklist (docx).
- Parachute opens inside the aircraft: parachute caught in the airflow – an example NCO checklist (docx).
- Exit instructions – an example NCO checklist (docx).
- Emergency jump – an example NCO checklist (docx).
- Emergency landing – an example NCO checklist (docx).

6.2 Pilot's list – example

Based on the risk assessment (see Appendix 5 NCO Risk register – model), a checklist is also drawn up for pilots. The checklist must be easily accessible during the flight.

An example of such checklist is available at the Parachuting Committee website (Parachuting flight operations). Corresponding information must also be provided in the Guide for parachuting flight operations or another corresponding document, and pilots must be aware of the operating methods (joint preparation of the lists). The list can also be appended to the club's version of this guide.

- NCO Parachuting flight operations checklist – model (docx)

{In addition, there are aircraft-, engine- and club-specific checklists for normal flight operations. It is not necessary to present examples from them, but they may be appended to the club's version of this guide in addition to equipping the aircraft with laminated versions of them for operative use.}

An example of a checklist for determining the need for supplemental oxygen is available at the Parachuting Committee website (Parachuting flight operations).

- NCO Hypoxia checklist (xlsx).

Determining supplemental oxygen

Ref: AMC1 NCO.SPEC.110(f)

	Date		
	Commander		
	Planned flight level		
Pre-flight checklist		OK	NO
	Awareness about hypoxia and risks		
	Taking in to consideration the following factors		
	Flight level		
	Flight duration		
	Other operational matters		
	Taking in to consideration the personal variables		
	Domicile elevation		
	Smoking		
	Experience in high altitude flights		
	Illnesses and other medical issues		
	Age		
	Injuries		
	Other		
	Need for supplemental oxygen		
During flight			
	Follow the symptoms for possible hypoxia		
	If hypoxic symptoms observed - land		

6.4 Part-NCO Obstacle course

A summary on the topic is available at the Parachuting Committee website (Parachuting flight operations).

- Part-NCO Obstacle course (pdf).

Appendix 1: References and links

Guide for parachuting flight operations 12 August 2016

Guide for parachuting flight operations 6 May 2018

Air Operations Regulation (EU) No 965/2012:

- Up-to-date legislation (EUR-Lex): https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1499960916767&uri=CELEX:02012R0965-20170322
- Easy Access Rules: https://www.easa.europa.eu/document-library/general-publications/easy-access-rules-air-operations
- **NCO** = Annex VII to Air Operations Regulation (EU) No 965/2012

SERA rules of the air:https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1411314857158&uri=CELEX:32012R0923 and the Implementing Regulation (EU) 2016/1185 amending them: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2016.196.01.0003.01.ENG. In addition, the **Easy Access Rules** that contain the up-to-date legislation (the original regulation + amendments), and also the EASA Acceptable Means of Compliance (AMC) and Guidance Material (GM): https://www.easa.europa.eu/document-library/general-publications/easy-access-rules-standardised-european-rules-air-sera

National legislation, aviation regulations and orders: https://www.traficom.fi/fi/liikenne/ilmailu/ilmailun-saadokset-ja-maaraykset

OPS M1-1 Rules of the air applicable in Finland

OPS M1-17 Radio Mandatory Zones

OPS M1-31 Transponder Mandatory Zones

OPS M6-1 Parachuting activities
Explanatory report

Finnish Aeronautical Association, Functional instructions and eligibility requirements for skydivers 22 February 2018

Finnish Aeronautical Association, Functional instructions and eligibility requirements for skydivers 8 February 2019

Oulu Skydive Center, Parachuting instructions 2016 and 2018

Oulu Skydive Center, Parachuting instructions 2019

Oulu Skydive Center, Parachuting pilot's manual 2016 (version 11 April 2015)

Oulu Skydive Center, Guide for parachuting flight operations 2019

Skydive Häme, Pilot's parachuting manual (version 2.3)

Tampere Skydiving Club, Flight Operations Manual (2009)

Tampere Skydiving Club, Guide for skydivers, OH-CMT (7 April 2015)

15678-Trafi_publications_15-2014_-_Recreational aviation_risk_survey

17290-Trafi_bulletin_04_2015_Flight_safety_in_parachuting_activities

19477-Improving_the_safety_of_general_aviation_Project_final_report_1_2016

Trafi: Safety of general aviation

International organisations' parachuting flight guides, etc:

- USPA Flight Operations Handbook and Jump Pilot Training Syllabus
- FAA's instructions for pilots: FAA - Flying for Skydive Operations
- BPA (UK) (search here)
- APF (Australia) basic instructions and manual (60 pages).

Appendix 2: Regulatory environment

General information

Parachuting flight operations are regulated both nationally and, to an increasing degree, by EU legislation. Regulations and requirements on parachuting flight operations include general regulations on flight operations (e.g. regulations on pilot licences and aircraft maintenance) as well as specific rules on parachuting activities (e.g. equipment required on parachuting flights).

In general, aviation regulations are very detailed in comparison to regulations on many other activities. For instance, the maintenance of aircraft used for parachuting operations is considerably more regulated than, for example, the maintenance of cars.

National regulations

In Finland, aviation is regulated by the Aviation Act (864/2014) and regulations issued by the Finnish Transport and Communications Agency Traficom. However, the national flight operations regulations have largely been replaced by the EU's common aviation requirements.

The Finnish Transport and Communications Agency Traficom publishes official regulations on aviation within the framework of its competence.

Currently, parachuting flight operations are regulated by, for example, the following national aviation regulations:

- OPS M6-1 Parachuting activities
- OPS M1-33 National provisions supplementing the Air Operations Regulation (EU) No 965/2012.
  - Definitions for terms such as *marginal activity*.
- OPS M2-11 Flight operations with aircraft subject to national regulation

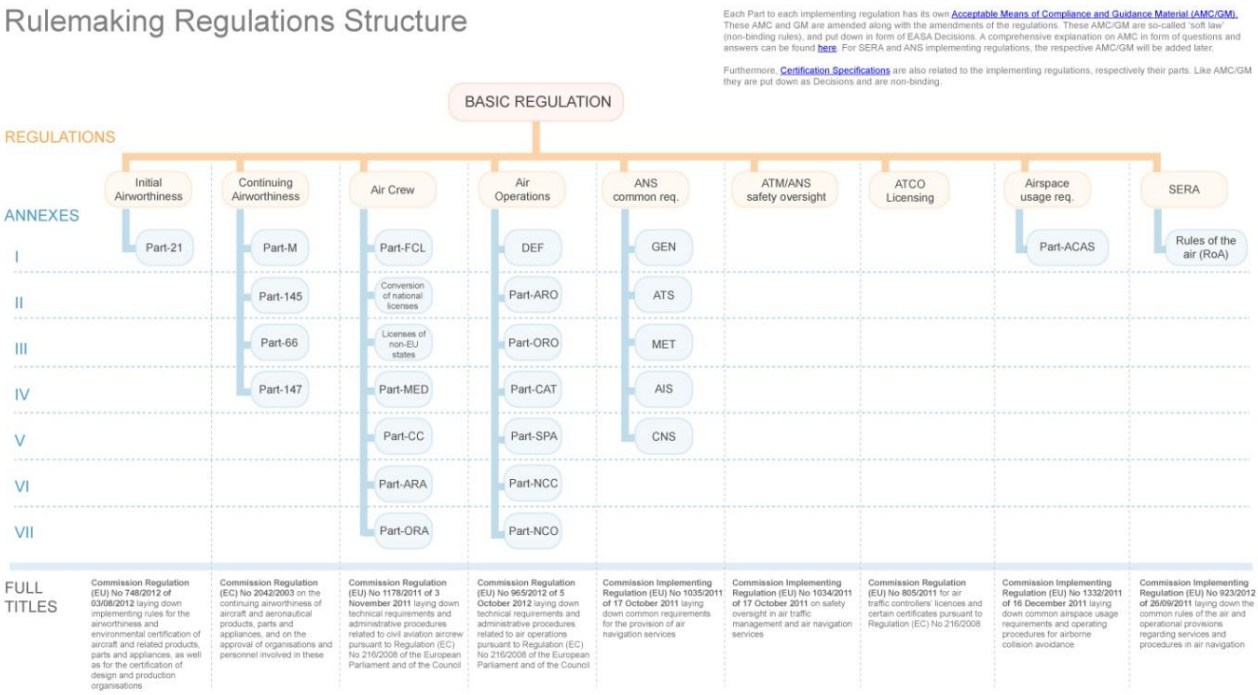
EU legislation

In general, the regulation of flight operations is becoming increasingly pan-European. In practice, this means that the requirements of flight operations are published as part of EU legislation and that they enter into force simultaneously in all Member States. When writing this guide (the original version of September 2015), the EU requirements on pilot licences and aircraft airworthiness, maintenance and repair, for example, have already been effective for some time. Thus, a significant change is taking place, affecting the architecture and source of the regulations. However, the actual standards will not change remarkably due to EU regulation.

The EU publishes its own flight operations requirements mainly as Commission regulations. The regulations enter into force as such in all Member States. General information on EU legislation is available at the Europe Information website, for example. EU legislation can be accessed via the EUR-Lex website.

In addition to the EU regulations that contain the actual provisions, the European Aviation Safety Agency, EASA, publishes Acceptable Means of Compliance (AMC) and Guidance Material (GM) documents that support the regulations. These materials provide background information on methods and procedures that enable meeting specific requirements. EASA publishes the AMC materials on its website.

The structure of the EU regulation environment on aviation is illustrated by the following figure published by EASA.



Appendix 3: A model for spring refresher flights (Oulu Skydive Center, version 1.0)

Oulun Laskuvarjokerho ry **KEVÄTKERTAUSLENTO 2016** Versio 0.7 **Pvm:** _____

Lentäjä: _____ **Tarkkailija:** _____

OHJEET:
- Lennon tarkoituksena on kerrata lentokäsikirjan, tarkistuslistojen jne. mukainen toiminta.
- Kevätkertauslento suoritetaan laskuvarjohyppylennon (LAS) yhteydessä, jos mahdollista.
- Lento ei ole lentokoe eikä koululento. Ilma-aluksen päällikkönä toimii konetta ohjaava lentäjä.
- Tarkkailija kirjaa lennon aikana tehdyt ja tekemättä jääneet toimenpiteet (Kyllä/Ei).
- Lomakkeelle on valittu n. 50 eri toimenpidettä, joiden toteutumista erityisesti halutaan seurata.
- Lento on oppimistilanne ja sen aikana voidaan keskustella (pl. lennon kriittiset vaiheet).

OSA-ALUE	TOIMENPIDE	KYLLÄ	EI	HUOMIOITA
Koneen tarkastus	Vesibensan tarkastus 4 kpl			
	Öljymäärän tarkastus			
	Polttoainemäärän tarkastus			
Lennonsuunnittelu	Sääolosuhteiden tarkastus			
	NOTAMien tarkastus			
	Ilmoitus lennonjohtoon hyppytoiminnan aloittamisesta			
	Massalaskelman teko			
	Vaikuttavan IFR-liikenteen huomiointi			
Moottorin käynnistys	Kidukset auki			
	Potkurialue vapaa -tarkastus			
	Ryypytys, jos kylmä moottori			
	Starttimoottorin pyöritys n. 2 sek käynnistymisen jälkeen			
	Öljynpaineen tarkastus			
Rullaus	ATIS kuuntelu			
	Korkeusmittarin QNH asetus			
	Pokatietojen ilmoitus lennonjohdolle			
	Sauva vedettynä täysin taakse rullatessa			
	Laihennus rullatessa			
	Vasen/oikea vapaa -tarkastus risteyksessä			
Ennen lentoonlähtöä	Polttoainepumppujen testaus			
	Molemmat polttoainepumput päälle			
	Magneettojen tarkastus			
	Potkurisäädön tarkastus			
	Ahtimen ohituskytkimen tarkastus			
	Transponderin asetus			
	Suuntahyrrän asetus			
Lentoonlähtö	Seos rikkaalla			
	Kaasu max 28”			
	Kevitys 60 mph			
	Nousunopeus 90 mph			
	Kaasu 23” kun turvallisella korkeudella			
	Kierrokset 2400 rpm			
	Yksi polttoainepumppu pois päältä			
Pudotus	Ovi auki kun ilmanopeus max 110 mph			
	Oikea rengasjarru pohjassa			
Liuku	Kidukset kiinni			
	Kierrokset 2300 rpm			
	Cold-Moodi valittu EDM:ssä			
	Jäähtyminen (EDM Cold) max. 40 F			
	Nopeus max 160 mph			
Lasku	Molemmat polttoainepumput päälle ennen laskua			
	Max nopeus 110 mph kun 20 astetta laippoja			
Laskun jälkeen	Max 1 polttoainepumppu päällä rullatessa			
	Sauva vedettynä täysin taakse rullatessa			
	Laihennus rullatessa			
Ennen moottorin sammutusta	Radiot pois päältä			
	Transponderi pois päältä			
	Molemmat polttoainepumput pois päältä			
Koko lento	Tarkastuslistojen käyttö			

Appendix 4: Trafi bulletin 14 April 2015, Flight safety in parachuting activities

Link to the bulletin on Traficom's website.

Turvallisuustiedote

Trafi

Turvallisuustiedote Ilmailu 14.4.2015

Lentoturvallisuudesta laskuvarjohyppytoiminnassa

Syksyllä 2014 julkaistussa harrasteilmailun riskikartoituksessa tunnistettiin riskejä, joihin sekä hyppääjien että lentäjien on syytä kiinnittää huomiota laskuvarjohyppäämiseen liittyvässä lentotoiminnassa. Turvallisuus on ollut vahvasti esillä talven seminaareissa, ja monet hyppykerhot ovat myös itse lähteneet aktiivisesti tekemään uutta ohjemateriaalia. Tässä yhteydessä Trafi esittää kiitokset riskikartoitustyöhön osallistuneille vapaaehtoisille.

Tiedotteen tarkoitus

Tämän tiedotteen tarkoitus on kiinnittää laskuvarjokerhojen huomio turvallisuusasioiden kertaamiseen kauden alkaessa. Suurin osa tarvittavasta tiedosta löytyy jo kerhoista hyppääjiltä ja hyppylentäjiltä.

Keskeiset turvallisuusriskit tulisi käydä yhdessä keskustellen läpi, ja turvalliset toimintatavat kouluttaa ja ohjeistaa kaikissa laskuvarjokerhoissa heti kauden alussa.

Kerhojen oman turvallisuustyön tueksi on Harrasteilmailun turvallisuusprojektin yhtenä toimenpiteenä koottu työryhmä kehittämään kaikkien hyppykerhojen käyttöön tarkoitettua lisäohjeistusta erityisesti hyppylentotoimintaan. Ohjetyö tehdään yhdessä laskuvarjoyhteisön vapaaehtoisten kanssa. Ohjeeseen on tulossa syventävää tietoa mm. tässä tiedotteessa esille nostetuista teemoista.

Esimerkkejä riskeistä hyppylennoilla

Laskuvarjohyppylentoja suorittavien kerhojen ja operaattoreiden on syytä kiinnittää huomiota koulutuksessaan ja ohjeissaan hyppääjien tietämyksen parantamiseen hyppäämiseen liittyvän lentotoiminnan riskeistä, niiden vakavuudesta sekä siitä, mitä virheellinen toiminta voi käytännössä aiheuttaa. Koulutus tulisi suorittaa yhteistyössä hyppääjien ja lentäjien kesken.

Hyppääjien tietämystä olisi syytä lisätä:

- Lennon eri vaiheista
- Sakkauksesta ja siihen vaikuttavista tekijöistä hyppylennolla
- Lentokoneen kuormaamisesta
- Painopisteen merkityksestä
- Hyppääjien liikkumisesta ja sijoittumisesta lentokoneessa

Lentäjien tietämystä olisi syytä lisätä:

- Yleisesti eri hyppylajien, kuten liitopukuhyppääminen, tuomista erikoistilanteista
- Varjon tahattoman aukeamisen riskeistä

Tärkeitä ovat hyppylennon kokonaisuuden ymmärtäminen, hyppääjien ja hyppylentäjän yhteistyö sekä sovitut menettelyt lennon jokaisen vaiheen osalta, kuten:

- Toiminta normaalitilanteessa
- Poikkeava toiminta ja rajoitukset
- Toiminta hätätilanteissa
- Koneen päällikön, hyppymestarin ja pokanvanhimman vastuut

Hyppääjille tärkeää tietoa

Lennon eri vaiheet

Koko lentotapahtuma eri vaiheineen tulisi käydä etukäteen hyppääjien kanssa läpi. Koulutuksessa tulisi kiinnittää huomiota riskeihin, niiden vakavuuteen ja turvallisista toimintamalleista sopimiseen ja niiden kouluttamiseen. Koulutuksen tulee kattaa kaikki lennon vaiheet ja erityisesti kaikki normaalista poikkeava toiminta.

Liikenteen turvallisuusvirasto Trafi www.trafi.fi
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Esimerkiksi lentoonlähtö, nousuvaihe ennen ja jälkeen hätähyppykorkeuden, uloshyppylinjalle hakeutuminen, hidaslento, uloshyppy, uloshyppylinjalta siirtyminen takaisin nousuun tai uudelle uloshyppylinjalle, keskeytetty uloshyppylinja, laskeutuminen kuormattuna, pakkolasku, hätähyppy ovat kaikki tilanteita joissa toimitaan ja sijoitutaan eri tavalla ja näihin jokaiseen on oltava turvalliset ja sovitut toiminta-ohjeet sekä -rajoitukset.

Kaikkien hyppääjien tulee ymmärtää miksi näitä ohjeita ja rajoituksia tulee noudattaa.

Parhaillaan käynnistyvässä ohjetyössä on tarkoitus tehdä kerhojen tueksi materiaalia mm. edellä kuvattujen asioiden kouluttamiseen.

Sakkaus ja siihen vaikuttavat tekijät

Hyppääjien on tärkeä ymmärtää sakkauksen perusperiaatteet ja mitkä tekijät vaikuttavat eri lennon vaiheessa sakkaukseen. Hyppääjien on tiedostettava kuinka oma toiminta voi vaikuttaa sakkauksen syntymiseen.

Lentokoneen kuormaaminen

Lentokoneen kuormaamisessa tulee käyttää todellisia painoja ja todellista painopistettä. Hyppy-yhteisö ei saa synnyttää lentäjille suorituspaineita nopeasta pokan käännöstä, vaan lennonvalmistelu on aina suoritettava vaatimusten mukaisesti. Käytössä olevat tai kehitettävät työkalut todellisen painopisteen laskemiseen auttavat turvallisen ja tehokkaan toiminnan yhteensovittamisessa.

Painopisteen merkitys

Kaikkien hyppääjien tulisi ymmärtää mitä tarkoittaa lentokoneen painopiste ja miten heidän sijaintinsa ja liikkumisensa koneessa vaikuttaa painopisteeseen, koneen ohjattavuuteen ja sitä kautta lennon turvallisuuteen. Hyppääjien liikkumisen ja painopisteen siirtymisen vaikutukset, rajoitukset ja turvalliset toimintamallit tulisi kouluttaa kaikkiin lennon eri vaiheisiin.

Hyppääjien liikkuminen ja sijoittuminen lentokoneessa

Hyppääjien liikkumisen lentokoneessa tulisi olla ennalta sovittujen toimintamallien mukaista ja selkeästi kaikille lennon eri vaiheissa viestittyä.

Eri tilanteissa, kuten keskeytetty uloshyppylinja ja siitä uudelle linjalle hakeutuminen, hidaslento sekä laskeutuminen täydellä kuormalla hyppääjien tulisi tietää ja ymmärtää mihin pitää sijoittua, jotta painopiste pysyy turvallisissa rajoissa.

Hyppylentäjille tärkeää tietoa

Lentäjien koulutus hyppylentotoimintaan tulisi järjestää kyseiseen konetyyppiin- ja yksilöön. Organisaation olisi varmistuttava, että uusi ohjaaja omaa riittävät kyvyt ja taidot kyseiseen toimintaan ja varmistaa tämä riittävällä määrällä perehdytys- ja koulutuslentoja kokeneempien lentäjien valvonnassa.

Koulutuksessa tulisi huomioida hyppylentämisen erikoispiirteet kuten hidaslento uloshyppylinjalla, sakkaus ja sen tunnistaminen hyppääjien ollessa koneessa sekä tähystys laskeutumisen aikana. Erityisesti huomiota tulisi kiinnittää poikkeaviin tilanteisiin kuten keskeytetty ja uusi uloshyppylinja, täydellä kuormalla laskeutuminen, automaattilaukaisimen oikean käytön huomioiminen hyppääjien ollessa koneessa laskussa, hätähyppy sekä pakkolasku.

Kaikille lentäjille tulisi järjestää kertauskoulutus kauden alussa ja pitkän tauon jälkeen.

Lentokoneen kuormaamisessa tulisi käyttää hyppääjien todellisia painoja, hyppääjien todellista sijaintia ja tästä saatavaa todellista painopistettä. Lentäjän tulisi tietää hyppääjien lentokoneessa liikkumisen rajoitukset ja toimintamallit kussakin tilanteessa.

Hyppylentäjien on hyvä käyttää pelastusvarjoa kaikilla hyppylennoilla.

Lentäjien ja hyppääjien yhdessä sopimat toimintatavat ja kommunikaatio

Koneen päällikkö vastaa siitä, että lento suoritetaan määräysten mukaisesti. Hyppääjien on tärkeää tiedostaa, että hyppylentoa koskevat monet yleiset lentotoiminnan velvoitteet, jotka voivat rajoittaa myös hyppytoimintaa. Viime kädessä lentäjän vastuulla ovat mm. lennonvalmisteluun liittyvät seikat kuten säätilan ja ilmaaluksen lentokelpoisuuden arviointi, massa- ja massakeskiölaskelmat ja tankkaus. Lentäjä vas-

taa myös siitä, että hyppylento suoritetaan lentosääntöjä sekä valvotussa ilmatilassa lennonjohtoselvityksiä noudattaen.

Kaiken hyppylentotoiminnan tulisi olla ennalta sovittujen toimintamallien mukaista. Lentäjän ja hyppääjien ymmärrys toisen osapuolen toiminnasta yleisellä tasolla ja pokakohtaisesti on turvallisen toiminnan kannalta tärkeää.

Turvallisen toiminnan keskeinen tekijä on riittävä kommunikaatio ennen hyppylentoa sekä lennon aikana normaalitoiminnassa. Yllättävissä ja poikkeavissa tilanteissa kommunikaation merkitys entisestään korostuu.

Poikkeavia tilanteita ovat mm. keskeytetty uloshyppylinja, uudelle uloshyppylinjalle hakeutuminen, laskeutuminen kuormattuna, automaattilaukaisimen huomiointi tultaessa lentokoneella hyppääjien kanssa laskuun, liitopukuhyppääjien poikkeva lentoprofiili ja korkeat aukaisut.

Lentokoneen päällikön, hyppymestarin ja pokanvanhimman vastuut

Roolien, vastuiden ja päällikkyyden on oltava selkeä ja kaikille selvä jokaisessa lennon vaiheessa.

Oppilaiden ja vähemmän kokeneiden hyppääjien ollessa lentokoneessa korostuu hyppymestarin ja pokanvanhimman vastuu koordinaatiosta ja ohjeistuksesta.

Lentokoneen päälliköllä on käskyvalta ja vastuu hyppääjistä kunnes hyppääjä poistuu koneesta. Käskyvalta ja ohjeistus kattavat erityistilanteet kuten hätähypyn, pakkolaskun ja evakuoinnin.

Merkinnät ja ohjeet koneessa liikkumisesta ja sijoittumisesta

Toimintaohjeiden hyppääjien sijoittumisesta ja liikkumisesta lentokoneessa lennon eri vaiheissa tulisi olla selkeästi näkyvillä. Yksinkertaistettujen ohjeiden ja rajoitusten olisi hyvä olla näkyvissä sekä itse lentokoneessa että tiloissa joissa hyppyä suunnitellaan ja koulutetaan.
Silloin, kun lentokoneessa on tarpeen ja kyetään määrittelemään oikean painopisteen ylläpitämiseksi rajoja hyppääjien sijoittumiselle tai liikkumiselle koneessa lennon eri vaiheissa on tärkeää, että nämä rajat on käyty läpi koulutuksessa ja ohjeissa sekä merkitty selkeästi myös itse koneessa.

Kaupallinen ja ei-kaupallinen toiminta

Lopuksi muistutetaan vielä siitä, että harrasteilmailua koskevat vaatimukset ovat kevyemmät kuin kaupallisen toiminnan vaatimukset. Harrastetoiminnassa on ensiarvoisen tärkeä muistaa, että kevyemmät vaatimukset on tarkoitettu sovellettaviksi sellaisiin yhdistyksen jäseniin, jotka tuntevat toimintaa koskevat vaatimukset ja riskit ja jotka omalla toiminnallaan voivat vaikuttaa yhdistyksessä noudatettavaan turvallisuuskulttuuriin.

Harrasteilmailun turvallisuusprojektin eteneminen

Lisätietoa harrasteilmailun turvallisuusprojektin etenemisestä saa projektin nettisivuilta http://www.trafi.fi/ilmailu/harrasteilmailun_turvallisuus.

Turvallista ja elämyksellistä hyppykautta 2015!

Appendix 5: Risk management (Safe operations model for aviation clubs, Risk assessment and Club SMS)

TTM 21, Risk management models

A simple model for small organisations

- The description of the simplest model can be fitted on a single A4 sheet

Can be expanded on a step-by-step basis with additional items

- Severity and probability of events
- Classification of risks
- Selection of the most effective measures
- The included list of documents contains numerous models.

TTM 22, Key risks

Flight operational risks in parachuting

- Loading and climb: the aircraft's incorrect or shifting centre of gravity may cause loss of control.
- Exit: incorrect or excessive movement of skydivers, especially towards the rear of the aircraft
- Skydivers' awareness of flight operational risks
- Pilot training for parachuting operations
- Unintentional parachute deployment during exit

TTM 23, Risk management templates

Templates to support risk management.

NCO Risk register – model (xlsx) (pdf) IMPORTANT!

Risk assessment is one of the most important tasks brought about by the NCO. An example of a risk register drawn up based on the assessment of risks is available at the Parachuting Committee website (Parachuting flight operations). Additional material related to the topic is available among the training materials accessible at the Parachuting Committee website.

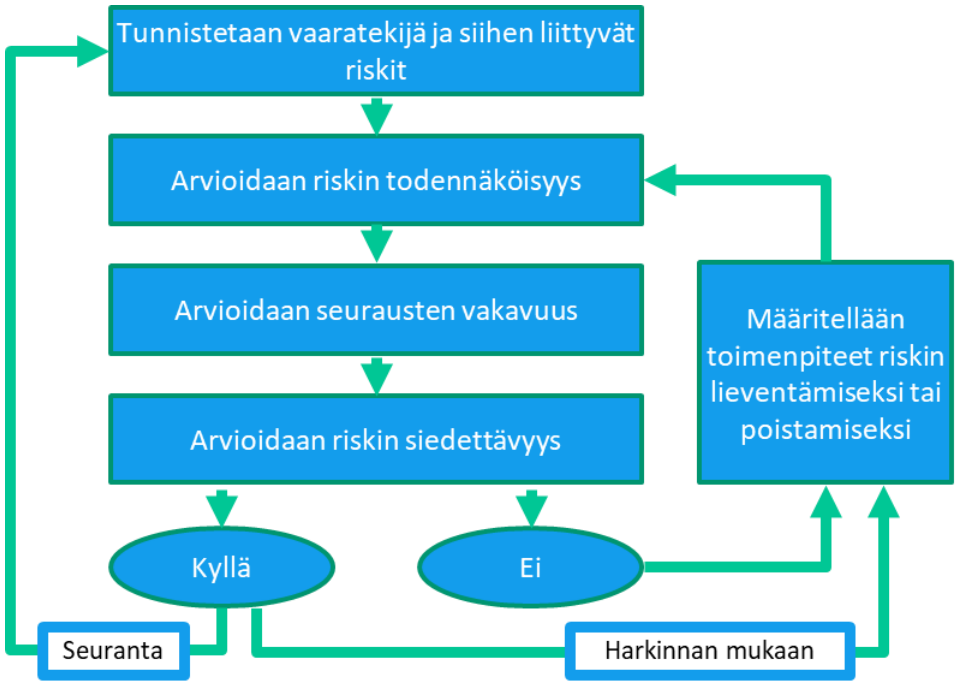
- Training day 22 April 2017 Oulu.
  - Part-NCO Part 1 (recording, password: oulusa22417)
  - NCO Belts MEL (recording, password: oulusa22417)
  - Supplemental oxygen and instructions (recording, password: oulusa22417)
  - NCO Simo Aro (pdf).
- See also: Part-NCO Obstacle course (pdf).

To ensure the flow of information, the risk register should be appended to the club's version of this guide.

Risk assessment is a "constant process" and should be carried out cooperatively (e.g. pilots, head of safety and the club's safety team, if any).

In addition, before commencing parachuting operations, the pilot-in-command must carry out a risk assessment, i.e. identify the hazards and risks involved and the measures for the mitigation of risks.

See also Chapter 6 NCO checklists.



The club's risk register contains identification and assessment of the risks associated with the club's activities. Club members should be thoroughly familiar with the risk register, and the club should take the necessary measures to minimise the identified risks.

{*Each club must draw up a risk register!*}

NCO Hypoxia checklist (xlsx) (pdf)

An example of a checklist for determining the need for oxygen is available at the Parachuting Committee website (Parachuting flight operations). See also Chapter 6.

Safety management system for aviation clubs (so-called *Club-SMS*)

The Safety management system for aviation clubs (so-called ***Club SMS***) drawn up by the Finnish Aeronautical Association is intended as a basic safety management tool and model for those member associations of SIL that do not have a corresponding system required by an ATO or DTO training licence.

A safety management system (SMS) is an organised approach to improving safety. It describes the organisation's structure and objectives from the perspective of safety, identifies the security responsibilities and obligations of key persons and documents the policies and procedures used for the management of safety. A functional SMS enables proactive identification and prioritisation of risks and hazards to the organisation, enabling their management.

The SMS is not implemented simply by recording safety matters in a document. As a functional SMS affects the operating methods and mindsets of the entire organisation, in principle, all members should be informed and trained on matters related to the SMS. The roles and responsibilities of the club – even the organisational structure – may have to be changed if no one has been responsible for safety management earlier.

Appendix 6: Example of a training programme for parachuting pilots – Oulu Skydive Center

{A common training programme is currently under development. The target timeframe for completion is by the end of 2019.}

1 GENERAL INFORMATION

1.1 Purpose

The purpose of this training programme for parachuting pilots is to define and harmonise the training of parachuting pilots at Oulu Skydive Center (OSC).

This guide has been approved by the OSC Board, and it provides instructions for parachuting pilot training. The guide must be complied with unless flight safety, aviation regulations, the club's directives or airmanship require otherwise. The guide is updated as required.

2 OBJECTIVE OF THE TRAINING PROGRAMME FOR PARACHUTING PILOTS

The objective of the programme is to improve the safety of parachuting flight operations by defining the content and methods of the required training as well as for maintaining the qualification. The training methods include theoretical and flight training. Theoretical training comprises independent studies and classroom instruction. These methods are used for providing pilots with the training required for the qualifications of parachuting pilot and unit parachuting pilot and for supervising the maintenance of these qualifications. Training cards are used for defining how the training methods are applied, what is included in the training and how competence is ensured.

This guide does not cover aircraft-related type training.

3 EXPERIENCE AND TRAINING REQUIRED OF PARACHUTING PILOTS

The experience required of parachuting pilots is no longer specified by the aviation regulation OPS M6-1. Instead, the required experience is now determined by the club. The OSC requires a total flight experience of at least 200 hours of PPL/LAPL flight and at least 200 flight hours with the specific aircraft type. For the aircraft OH-EKO rented by the club for seasons 2019, 2020 and 2021, this requirement is at least 200 h and the aircraft owner's approval. These flight hour thresholds are requirements stated in the aircraft's insurance contract.

After completing the parachuting flight training provided by the OSC, the pilot is authorised to perform parachuting flights with the club aircraft. The training of the OSC's new parachuting pilots is carried out by a person authorised by the OSC Board (chief pilot). The pilot providing the instruction must have completed type training for Cessna 182 or Cessna 182 Supercharged. The type training is provided by a flight instructor who is familiar with parachuting flight operations.

The OSC's requirements for new parachuting pilots:

- Valid PPL and medical
- Qualification to fly the aircraft class in question
- Right to carry passengers EASA part FCL, Section FCL.060

- Requirements set by the club
  - Club membership
  - The club organisation's approval for the training
  - Signed commitment
  - Completed waiver
  - Completed parachuting pilot training (type training and induction for parachuting flight operations).

All training and induction must comply with aviation regulations and the training programme approved by the club.

The list of the club's approved pilots and the validity of qualifications is updated prior to the start of each season.

4 MAINTENANCE OF PARACHUTING PILOT QUALIFICATION

The parachuting flight qualification is considered valid if the pilot has flown 20 parachuting flights (= load on board) in the last 16 months. If the number of parachuting flights is lower, the pilot must fly a refresher flight.

Additional requirements:

- OSC membership and paid membership fee
- Valid licence and qualification (PPL, SEP, Medical)
- Valid right to carry passengers EASA part FCL, Section FCL.060
- Updated waiver.

The pilot may also agree on a refresher flight, even if it is not required by this guide.

5 TRAINING METHODS

5.1 Theoretical training

The theoretical training consists of independent studies and an instruction meeting. The Guide for parachuting flight operations is discussed in the theoretical training, and sufficient familiarity with the guide's essential issues is ensured by means of an oral or written examination prior to beginning the parachuting flight training. A pilot-specific training card is drawn up for the theoretical training.

5.2 Flight training

Flight training includes parachuting flight preparations, a parachuting flight and debriefing. The objective of the training is to ensure that the pilot has adopted the theory pertaining to parachuting flight and is able to take it into account in parachuting flight operations. A pilot-specific training card is drawn up for the parachuting flight.

6 UNIT PARACHUTING FLIGHT QUALIFICATION (TBD)

TBD

7 TRAINING CARDS

Training card	
Date:	Instructor:
Pilot:	Duration of training: 1 h
Independent study assignment	Objective
Familiarisation with the Guide for parachuting flight operations	The student knows and understands the content of the guide and identifies the issues which need to be discussed further in the theoretical training.
Items to be taught	Instruction method
• Regulations governing parachuting flight operations • Instructions concerning the local aerodrome • Parachuting flight methods, flight stages, radio traffic and flying in a unit • Aircraft and equipment • Flight preparation • Loading the aircraft, placement and movement of skydivers on board • Fuel quantity management • Method for calculating mass and the centre of gravity and its significance • Stall and its factors in parachuting flight • Cooperation with skydivers and the land organisation • Special jumps and the related special situations (wingsuit) • Exceptional and emergency situations and operation in them • Risk analysis and risk management • The role and responsibilities of the pilot-in-command, jumpmaster, load organiser, director of jumping activities, ground person	Independent study of the Guide for parachuting flight operations
Control questions	
N/A	

Training card	
Date:	Instructor:
Pilot:	Duration of training: 2 h
Study assignment	Objective
Guide for parachuting flight operations	1. The student is familiar with the content of the Guide for parachuting flight operations and is prepared to begin the practical parachuting flight training. 2. The student provides correct answers to the control questions.
Items to be taught	Instruction method
• Regulations governing parachuting flight operations • Instructions concerning the local aerodrome • Parachuting flight methods, flight stages, radio traffic and flying in a unit • Aircraft and equipment • Flight preparation • Loading the aircraft, placement and movement of skydivers on board • Fuel quantity management • Method for calculating mass and the centre of gravity and its significance • Stall and its factors in parachuting flight • Cooperation with skydivers and the land organisation • Special jumps and the related special situations (wingsuit) • Exceptional and emergency situations and operation in them • Risk analysis and risk management • The role and responsibilities of the pilot-in-command, jumpmaster, load organiser, director of jumping activities, ground person	Review of the Guide for parachuting flight operations with the instructor. The instruction is interactive which means that all matters that the student is not familiar with are discussed.
Control questions	
For example: • What is the maximum wind for student jumps? • How to act if the jumpmaster falls off the aircraft before dropping the students? • How to act if the aircraft stalls on the jump run when a skydiver is on the wing strut?	

Training card	
Date:	Instructor:
Pilot:	Duration of training: 4 parachuting flights
Study assignment	Objective
Parachuting flight operations	The student is able to fly parachuting flights independently in compliance with the guide and is prepared to start acting as a parachuting pilot.
Items to be taught	Instruction method
• Risk analysis and risk management • Flight preparation • Fuel quantity management • Loading the aircraft, placement and movement of skydivers on board • Mass and centre of gravity calculation • Aircraft and equipment • Parachuting flight methods, flight stages • Cooperation with skydivers and the land organisation • Special jumps and the related special situations (wingsuit) • Exceptional and emergency situations and operation in them	Induction training for parachuting flight operations is provided by the chief pilot or a person authorised by the OSC Board. The flight is a normal parachuting flight. The simulated flight is carried out on the plane while it is on the ground. The trainee describes the entire course of the flight: what they do at each stage and how would they act on an actual flight. The simulated flight covers normal flight and emergencies. On the first flight, the trainee pilot is a passenger and follows the parachuting flight. On the following flights, the trainee pilot acts as the pilot-in-command. The instructor monitors and guides the pilot during flight preparation and the flight, and records successful performance of the monitored activities. The performance is reviewed with the pilot immediately after the flight. The trainee pilot participates in an adequate number of training flights. During the flight, both the trainee and the instructor must use headphones and wear parachutes.
Control questions	
See procedure list	

Training card	
Date:	Instructor:
Pilot:	Duration of training: 1 parachuting flight
Study assignment	Objective
Refresher flight	The pilot is able to fly parachuting flights in compliance with the guide.
Items to be taught	Instruction method
• Risk analysis and risk management • Flight preparation • Fuel quantity management • Loading the aircraft, placement and movement of skydivers on board • Mass and centre of gravity calculation • Aircraft and equipment • Parachuting flight methods, flight stages • Cooperation with skydivers and the land organisation • Special jumps and the related special situations (wingsuit) Exceptional and emergency situations and operation in them	The instructional event comprises so-called simulated emergencies and a normal parachuting flight. The emergencies are simulated on the plane while it is on the ground. The trainee describes how they would operate in the event of various emergencies. On the parachuting flight, the trainee pilot acts as the pilot-in-command. The instructor monitors and guides the pilot during the flight and records successful performance of the monitored activities. The performance is reviewed with the pilot immediately after the flight. More than one flight can be performed, as required. During the flight, the instructor must use headphones and wear a parachute.
Control questions	
See procedure list	

Procedure list used in parachuting pilot training and on spring refresher flights

Checklist OH-CVE				
AREA	**PROCEDURE**	**YES**	**NO**	**NOTES**
Aircraft inspection	Checking the fuel for water, 4 points			
	Oil level check			
	Fuel level check			
	Inspection of specific items			
Flight planning	Weather check			
	NOTAM check			
	Notifying the ATC about starting the parachuting activities			
	Mass calculation			
	Attention to essential traffic			
Engine start	Opening the cowl flaps			
	Propeller danger zone check			
	Engine choke as required			
	Key in the *Start* position approx. 2 s after engine start			
	Oil pressure check			
Taxiing	Listening to ATIS			
	Setting the altimeter			
	Clearance from the ATC: load information			
	Rearward control stick position during taxiing			
	Leaning			
	Left/right check at crossroads			
Engine run-up	Fuel pump test			
	Both fuel pumps on			
	Ignition magneto check			
	Propeller control check			
	Boost cut-off check			
	Setting the transponder			
	Both fuel pumps on during take-off			
Take-off	Rich mixture			
	Throttle max. 28”			
	Compensation 60 mph			
	Climb speed 90 mph			
	Throttle 23” at 500–1,000 ft			
	RPM 2,400			
	One fuel pump off			
Climb	Speed 90 mph			
	Throttle 23”			
	Increasing altitude in accordance with the clearance			
Drop	Communication with the responsible skydiver			
	Door open when max. air speed is 110 mph			
	Closing the door			

Glide	Closing the cowl flaps			
	RPM 2,300			
	EDM in cold mode			
	Engine cooling CHT max. 40 °F/min & min. 300 °F			
	Max. speed 160 mph – note gusts			
Landing	Both fuel pumps on			
	Max. speed 110 mph when flaps at 20°			
Taxiing	Both fuel pumps on			
	Rearward control stick position			
	Leaning			
Turning off the engine	Radio OFF			
	Transponder OFF			
	Fuel pumps OFF			
The entire flight	The use of checklists			

Checklist OH-EKO

AREA	PROCEDURE	YES	NO	NOTES
Aircraft inspection	Checking the fuel for water, 3 points			
	Oil level check			
	Fuel level check			
	Inspection of specific items			
Flight planning	Weather check			
	NOTAM check			
	Notifying the ATC about starting the parachuting activities			
	Mass calculation			
	Attention to essential traffic			
Engine start	Opening the cowl flaps			
	Propeller danger zone check			
	Engine choke as required			
	Key in the *Start* position approx. 2 s after engine start			
	Oil pressure check			
Taxiing	Listening to ATIS			
	Setting the altimeter			
	Clearance from the ATC: load information			
	Rearward control stick position during taxiing			
	Leaning			
	Left/right check at crossroads			
Engine run-up	Fuel pump test			
	Both fuel pumps on			
	Ignition magneto check			
	Propeller control check			
	Boost cut-off check			
	Setting the transponder			
	Both fuel pumps on during take-off			
Take-off	Rich mixture			
	Throttle max.			
	Compensation 60 mph			
	Climb speed 90 mph			
Climb	Speed 80–90 mph			
	Increasing altitude in accordance with the clearance			
	Leaning to 125 F rich when 23”/5,000 ft			
Drop	Communication with the responsible skydiver			
	Door open when max. air speed is 110 mph			
	Closing the door			

Glide	Closing the cowl flaps			
	RPM 2,300			
	Speed 160 mph – note gusts			
Landing	Max. speed 110 mph when flaps at 20°			
Taxiing	Rearward control stick position			
	Leaning			
Turning off the engine	Radio OFF			
	Transponder OFF			
The entire flight	The use of checklists			

Control question bank

- What is the maximum wind for student jumps?
- How to act if the jumpmaster falls off the aircraft before dropping the students?
- How to act if the aircraft stalls on the jump run when a skydiver is on the wing strut?
- What are the differences in aircraft manoeuvrability between jump run altitudes of 1 km and 4 km?
- What is the maximum speed for opening the jump door?
- What are the minimum and maximum engine oil levels?
- What are the minimum and maximum fuel levels on parachuting flights?
- What are the maximum take-off weight and the maximum landing weight?
- What is the throttle setting on the jump run and during drop?
- What is the airspeed on the jump run?
- What is the minimum airspeed on the jump run?
- Measures in the event of engine power loss.
- Measures in the event of partial parachute deployment while the skydiver is on board.
- Measures in the event of partial parachute deployment while the skydiver is directly outside the aircraft.
- What are the requirements for supplemental oxygen?
- How much snow or ice may be allowed on the wings and the rudder?
- What is the minimum altitude for an emergency jump?
- What is the maximum vertical speed when landing with skydivers on board?
- What requirements do night-time parachuting flights set to the pilot?
- What requirements do night-time parachuting flights set to the skydivers?
- How does smoking affect the need for supplemental oxygen?
- Why is a knife required on board, and where is it kept?
- What are the transfer altitude and the transfer level?
- How are unit take-offs staggered?
- How does wind affect the staggering of unit take-offs?
- How are the aircraft staggered on the jump run?
- What are the risks associated with skydiver movement to the wing strut in the leading aircraft?
- When are the cowl flaps closed?
- What do you do if you have a medical attack and are aware of it?
- …

Version history:

FAA video on parachuting flight operations:
https://www.youtube.com/watch?v=tM04p2XvEfM

Appendix 7: Formation flight instructions for pilots (*Model, Skydiving Finland, C-208*)

The following matters should be considered when performing parachuting flights in a formation of two or more aircraft:

Prepare for the flight thoroughly and well in advance. Agree on procedures with the other pilots.

Organise a common briefing with the skydivers to discuss at least the general course of the flight, light commands and actions in exceptional situations, such as flying a new jump run or what to do when another aircraft interrupts the flight, etc.

On formation flights, in particular, the skydivers must be reminded of the importance of remaining quiet and avoiding movement within the aircraft until the green light is turned on. This will make the pilots' jobs easier.

Only the person opening the door is allowed to move before the light is turned on. When the red light is turned off in the leading aircraft, the door opener checks the airspace below, clouds etc. and may request a new jump run if necessary.

The positions and distances of the aircraft are specified in the formation flight instructions. This means that the positions are taken already at the take-off and kept until the exit. The distance of 45 m stated in the instructions is the maximum distance from which the wingman can relatively easily follow the leading aircraft. 15 m is quite an ideal distance in the air/on the jump run. The closer the wingman is, the easier it is to follow the leading aircraft.

The leading aircraft must fly as smoothly and predictably as possible. It is not advisable to use full throttle, but to give the wingman some leeway. Manual flight and trimming is recommended and provides better results.

When the desired altitude is reached, the leading aircraft stops climbing and sets the speed by steadily reducing throttle – never by "pulling".

Duties of the leading aircraft:

- request clearances and handle radio communication
- deciding on the climb pattern, preferably the left pattern
- provision of commands on the jump run (the word NOW activates the commands):
    - **2 minutes – flap NOW – 1 minute – green NOW – exit**
- The landing order and runway must be agreed on clearly over the radio.

Even if the pilot of the leading aircraft notices that the altitude on the jump run is below 1,000 ft or the requested altitude, it is not advisable to perform additional patterns to increase altitude by, for example, making S-turns. Instead, they should accept the matter and drop the load as normally.

The leading aircraft must always home in on the jump line from the side of the climb pattern. It may not fly to the other side of the jump run to increase the altitude. The aircraft is flown to the jump run as normally and if more altitude is required, altitude is increased by flying a full circle to the left, after which the pilot homes in on the jump run.

A possible new jump run is flown using the current flight configuration. This means that if the flaps are already out, they should be kept out. The jump door is not closed.

The pilot homes in on the new jump run by flying a slowly curving full circle to the left.

Appendix 8: Parachuting activities and flight safety (*Lasse Lintukangas, Skydiving Finland, C-208*)

This article sheds light on a few important matters on aircraft and flight operations from the pilot's point of view. Each skydiver should be aware of these matters and consider them before the start of each season.

It is advisable to state these matters in the skydivers' instructions or to bring them to the attention of skydivers otherwise. This article is intended for skydivers in particular.

Jump planes

The aircraft used for parachuting flight operations may be either type-approved or non-type-approved. Type-approved aircraft are manufactured in compliance with all official regulations and instructions and undergo a flight test programme in which their structures, stability and flight properties are verified to meet the requirements.

Non-type-approved aircraft may be equally compliant with requirements and regulations, but the implementation of a type-approval process has been considered too laborious or costly considering the quantity of aircraft manufactured, and therefore, no approval has been applied for. It is also possible that a factor that prevents meeting the strict requirements has been observed. Such aircraft, which are often constructed from assembly kits, are registered in the experimental class, for example.

Correctly loaded aircraft are some of the most safety-sensitive devices. For example, they strive to correct any erroneous movements, and steering them may not, according to regulations, require abnormal properties from the pilot. However, this applies only as long as the provided parameters and limits are not exceeded.

The service and airworthiness inspections of type-approved aircraft are performed by dedicated, regulation-compliant organisations, or CAMOs (Continuous Airworthiness Monitoring Organisation). No such organisation is required for non-approved aircraft.

This writing does not take a stand on the status required of aircraft for the performance of parachuting flights. However, it is good to be aware of the aforementioned aspect, and it may facilitate examining the matter from the perspective of safety.

Loading

When the aircraft is loaded correctly, the load is within the range permitted in the flight manual. Even non-experts can easily locate the centre of gravity of every aircraft by looking at the point where the wing is attached to the airframe. Broadly speaking, the centre of gravity is under (or above) this point, inside the airframe.

Various types and sizes of aircraft are used for parachuting operations around the world. When using an aircraft with a capacity of only 3–5 skydivers, it is impossible for the skydivers to be positioned far from the centre of gravity due to the lack of available space. The jump door, too, is often located under the wing, that is, at or close to the centre of gravity. When using such small aircraft, such as C-172 or C-182, problems related to the centre of gravity hardly arise. The same also applies when the aircraft is very large. Large

aircraft designed for dropping troops and materials may carry loads of up to dozens of tons. Thus, they are fairly insensitive to skydivers' movement inside the airframe.

On the other hand, when using an aircraft with a capacity of 8–20 skydivers, a long airframe and jump door at the back, we are talking about a whole another risk category. With this type of aircraft, the skydivers may easily cause trouble for the aircraft and themselves by moving the centre of gravity outside the permitted range.

On a parachuting flight, the load of the aircraft can change from neutral (climb) to remarkably tail-heavy (several skydivers at the door) and back to nose-heavy in a matter of seconds. Considering the centre of gravity, the most critical part of a parachuting flight is when the skydivers move to the door for exit. If and when the skydivers' actions cause the centre of gravity to shift beyond acceptable limits, the course of events is likely to be as follows (a quotation of an experienced parachuting pilot who holds an M.Sc. degree in aerodynamics):

"*The centre of gravity shifts clearly beyond the permissible rearward limit. When this happens, the aircraft becomes unstable. This means that each minor disturbance in the airspace – which may be caused by, for example, gusts, the pilot or load movement, for example – tends to intensify itself. When the aircraft is stable, disturbances suppress themselves without the pilot's corrective measures.*

An increased angle of attack caused by, for example, a gust now intensifies itself, and the intensified disturbance keeps intensifying at an increased rate and so on. As a result, the angle of attack becomes suddenly too steep, immediately causing the aircraft to stall. The stall may be horizontal or, more likely, focus on one of the wings.

When the centre of gravity is too far back and the aircraft stalls in an unstable condition, the stall lifts the nose further, deepening the stall. At this point, the pilot is helpless as the effectiveness of the horizontal stabilizer/rudder is insufficient. Thus, the aircraft's nose lifts towards space and its tail falls towards the ground. The skydiving load is pressed against the back wall which shifts the centre of gravity further back. The aircraft starts to fall tail first or possibly in a rotary movement like a leaf. Parachutes are no longer of much use as it may be impossible for the skydivers to exit. Even if some of them manage to exit, there is a high risk of hitting the wing, wing strut or propeller. Spectators then get to collect the pieces of the load and the aircraft after they reach the ground.

All of his can happen very, very quickly in a self-perpetuating manner. There is no way for the pilot to feel the limit after which the aircraft becomes unstable. They cannot avoid exceeding it or warn the load about it.

Therefore, it is of utmost importance to take account of the maximum number of people at the door and during exit. It is truly critical. *Similarly, it is important to load the aircraft in lines, not rows, when flying an incomplete load. Otherwise, the centre of gravity may be too close to the nose during take-off.*"

Stall

It should be noted that the wing always stalls at the same angle of attack regardless of the speed. Many people have the wrong impression that stalling is dependent on speed. If the skydivers' actions make the aircraft so tail-heavy that the situation can no longer be compensated for with the controls, the tail falls, the angle of attack increases and the aircraft stalls even if it was flying at the maximum permissible speed.

When there is a need to maintain the aircraft's altitude while lowering the speed, the angle of attack must be deliberately increased by "pulling" the flight controls. In that case, increasing the angle of attack increases

the wings' aerodynamic lift which was lost while lowering the speed. In this case, too, the aircraft will stall if the angle of attack exceeds the critical point. However, this time, the aircraft is in slow flight.

SPECIAL SITUATIONS

In parachuting, it is of particular importance that risks are identified and prepared for in advance. This also applies to parachuting flight operations. Preparation starts from mere familiarisation with all the instructions and proactive consideration of courses of action for various unexpected situations. People are likely to realise such thought-through patterns in the event of a real emergencies. This is due to the fact that any other courses of action to resort to may be unavailable.

Take-off

The most critical part of take-off is the initial climb, but the take-off may have to be interrupted already on the runway due to an unexpected obstacle or, for example, a blown tyre. An obstacle on the runway will probably only result in strong braking and the interruption of take-off. On the other hand, a blown tyre may, at worst, cause the aircraft to skid off the runway and spin. In that case, it is good to be familiar with all the escape routes from the aircraft and to know how to use them.

An engine failure during the initial climb is likely to result in an emergency landing. The skydivers are not allowed to jump unless the pilot orders an emergency jump. This is because the altitude may not be sufficient. However, it is worthwhile to consider whether there is time to open the jump door before landing to facilitate leaving the plane when on the ground. You should also be aware of any other escape routes.

Emergency jump

The pilot may only order an emergency jump if the altitude is sufficient. An emergency jump is carried out if the flight can no longer be safely continued. The emergency jump command is given orally and if there is enough time, also with the jump lights. In that case, the red and green lights are on at the same time. This means that everyone able to jump must leave the aircraft one person at a time as quickly as possible and in order. In this situation you may not, under any circumstances, stop at the door to look down. You simply have to jump. In the worst case, any hesitation at the door may cause the skydivers to pack at the door which shifts the centre of gravity too far back. This causes more problems for the aircraft that is already in trouble, and the pilot may completely lose control of the aircraft. After exiting the aircraft, the skydivers must be careful not to open the parachute too early so that it does not get tangled with the aircraft. Mental rehearsal of the measures and courses of action in the event of an emergency jump is of particular importance. In this situation, too, it is vital that everyone on board is familiar with all emergency exits and know how to use them. It is essential to equip aircraft used for parachuting flight operations with forced-release doors. If required, the forced release of the doors is carried out by the pilot or by their order.

On the jump run

The jump run is a line defined above the airfield according to the daily wind conditions. It is usually approximately as long as the runway and parallel to it. In Utti, the jump plane flies from one end of the jump run to the other in approximately 1 minute and 15 seconds under normal conditions. In this time, all skydivers should be able to exit maintaining adequate safety intervals.

When the aircraft flies in the “jump configuration”, its flaps are open. Throttle and speed are set as low as possible. This enables minimising the propeller slipstream and allows the horizontal stabilizer to be in glide at as high an altitude as possible. This minimises the skydivers’ risk of hitting the elevators. The aircraft glides down at approximately 200–300 ft/min. The green jump light is turned on.

A new jump run must be flown if, for example, clouds prevent the jump or everyone did not have time to exit. When starting to home in on the jump run again, the red jump light is turned on. After this, jumping is strictly forbidden. It is also important that the skydivers return to their positions without delay. If some of the skydivers have already exited, the remaining skydivers distribute their weight as evenly as possible, taking account of the centre of gravity. The aircraft’s flap settings are not changed and the door should not be closed. This minimises the number of changes and enables exiting the aircraft quickly in case something unexpected occurs.

Interrupting the parachuting flight

It may be necessary to interrupt the parachuting flight so that either all or some of the skydivers land on board the aircraft. If no one has jumped, everyone must be seated in the same positions as they were during take-off, and the seat belts must be fastened as quickly as possible. If only a few skydivers remain on board, they must be positioned so that the weight is distributed correctly. For example, when four skydivers remain on board, they should sit in a line on a single bench. The skydivers should remind the pilot that the rate of descent should be kept sufficiently low to prevent automatic activation devices from deploying the parachutes. The skydivers must remain at their positions also after landing and during taxiing. The skydivers may not leave the plane until the pilot gives permission after the turning off the engine.

The centre of gravity shifts to the back. C-208 b D-FROB on the jump run. Pilot: Lasse Lintukangas. EENI 28 August 2010. Photograph by Antti Laukkanen.

Emergency jump. OH-DZF C-208 b drops skydivers. Pilot: Jaakko Laukkanen. EENI 29 August 2010. Photograph by Elina Pitkäaho.

Appendix 9: Trafi bulletin, 12 January 2017, New parachuting ground rules.

Link to the bulletin on Traficom's website.

Turvallisuustiedote

Trafi

Turvallisuustiedote Ilmailu 12.1.2017

Laskuvarjohyppytoiminnan uudet pelisäännöt

Tiedotteen tarkoitus

Tämän tiedotteen tarkoitus on kiinnittää laskuvarjokerhojen huomio turvallisuusasioiden kertaamiseen ennen kauden alkua. Lisäksi muistutetaan 21.4.2017 voimaan tulevista uusista vaatimuksista laskuvarjohyppylentämiseen.

Keskeiset turvallisuusriskit ja muuttuvat vaatimukset tulisi käydä yhdessä keskustellen läpi, ja turvalliset toimintatavat kouluttaa ja ohjeistaa kaikissa laskuvarjokerhoissa hyvissä ajoin ennen kauden alkua.

Kerhoilla on hyviä toimintamalleja ja ohjeita. Yksi sellainen on elokuussa 2016 julkaistu Suomen Ilmailuliitto ry:n (Laskuvarjotoimikunta), Suomen Moottorilentäjien Liitto ry:n ja Trafin yhteistyönä julkaistu Hyppylento-ohje - Malli kerhoille, joka löytyy myös Trafin Yleisilmailijalle – sivustolta.

Kevään 2015 Turvallisuustiedote

Hyppylento-ohjeen lisäksi kertaa turvallisuusasiat keväällä 2015 julkaistusta tiedotteesta Lentoturvallisuudesta laskuvarjohyppytoiminnassa.

Tiedotteessa käsiteltiin ao. teemat:

- Esimerkkejä riskeistä hyppylennoilla
- Hyppääjille tärkeää tietoa
  - Lennon eri vaiheet
  - Sakkaus ja siihen vaikuttavat tekijät
  - Lentokoneen kuormaaminen
  - Painopisteen merkitys
  - Hyppääjien liikkuminen ja sijoittuminen lentokoneessa
- Hyppylentäjille tärkeää tietoa
  - mm. koulutus- ja kuormausasiat sekä pelastusvarjon käyttö
- Lentäjien ja hyppääjien yhdessä sopimat toimintatavat ja kommunikaatio
- Lentokoneen päällikön, hyppymestarin ja pokanvanhimman vastuut
- Merkinnät ja ohjeet koneessa liikkumisesta ja sijoittumisesta

Muuttuvat pelisäännöt

Yleisilmailun uudet lentotoimintavaatimukset (NCO) tulivat voimaan 25.8.2016, ja uudet vaatimukset erityislentotoimintaan (NCO.SPEC) tulevat voimaan 21.4.2017. Trafi on laatinut osan NCO käyttöönottoon liittyen määräyspaketin (Lentotoimintavaatimukset, yleisilmailu), johon on koottu pienkoneiden ei-kaupalliseen lentotoimintaan liittyvät määräykset ja ohjeet. Näin uusien sääntöjen opiskelu helpottuu, kun kaikki tieto on yhdessä paikassa. Ohjeeseen pääset tästä.

NCO-SPEC-osio aukeaa tästä.

Mikä muuttuu harrasteilmailun hyppylentotoiminnassa?

Keskeiset uudet vaatimukset ovat ilma-aluksen päällikön vastuu siitä, että ennen hyppylentotoiminnan aloittamista on tehty toiminnan riskienarviointi, ja sen pohjalta laadittu toimintaa varten tarkistuslista, jonka mukaisesti toiminta suoritetaan. Tarkistuslista on oltava mukana ja käytössä jokaiselle lennolla.

Käytännössä riskienarvioinnin teko ja tarkistuslistan laadinta on järkevää tehdä kerhokohtaisesti hyppylentäjien ja hyppääjien yhteistyönä hyödyntäen olemassa olevia ohjemateriaaleja.

Liikenteen turvallisuusvirasto Trafi www.trafi.fi
PL 320, 00101 Helsinki, puh. 029 534 5000, faksi 029 534 5095 • Y-tunnus 1031715-9

Käyttäjäystävällisiä riskienarvioinnin malleja löytyy mm. Harrasteilmailun turvallisuusprojektin yhteydessä tehdystä Turvallisen toiminnan mallista ilmailukerhoille (TTM).

Vuonna 2017 Trafi kohdentaa myös valvontatoimia laskuvarjohyppylentotoiminnan uusien NCO- vaatimusten noudattamiseen sekä toiminnassa käytettävien ilma-alusten ja toiminnan turvallisuuteen.

Kaupallinen hyppylentotoiminta

Kaupalliseen erityislentotoimintaan (lentotyö) sovelletaan lentotoiminta-asetuksen osaa SPO 21.4.2017 alkaen.

Hyppylentämisen ajankohtaiset turvallisuusteemat

Hyppylentämisessä tavanomainen polttoainesuunnittelu johtaa tyypillisesti siihen, että tankkausten välillä polttoainereservi on hyvin alhainen – marginaalit ovat melko kriittisiä, jos jotain poikkeavaa tapahtuu.

Jokaisen kerhon on syytä ottaa paino- ja painopisteasiat (W&B) asiaan kuuluvalla vakavuudella ja tarkastella painopistetta ”dynaamisena” muuttujana eli miettiä liikkuvan pokan ”worst case” – tilanteita, määritellä turvallisen toiminnan reunaehdot ja tuoda esiin riskialttiit ”pahan päivän” tilanteet.

Hyppytoimintaan optimaalisesti soveltuva kalusto voi nostattaa harrastuksen kustannukset kipurajan yli. Käytettävä kalusto onkin usein optimoitu kustannusten ehdoilla, jolloin marginaalit on jo lähtökohtaisesti syöty. Operointi saattaakin tapahtua jatkuvasti koneen sallitun massan ja massakeskiöaseman äärirajoilla, joten tästä syystä em. asioihin tulisi kiinnittää erityistä huomiota.

Muista raportointivelvoite hyppylentoiminnassa!

Laskuvarjohyppytoiminnassa on jo vuosia ollut vallalla hyvä raportointikulttuuri, jossa poikkeamista ja omista virheistä kerrotaan yhteisölle avoimesti, ja niitä analysoidaan ja hyödynnetään hyppy-yhteisön turvallisuustyössä. Valitettavasti hyppylentotoiminnassa tilanne on toinen. Raportointimäärät ovat hyvin pieniä, ja tieto vakavistakin läheltä piti - tilanteista tulee viranomaiselle liian usein muista lähteistä kuin pakollisen raportointivelvoitteen kautta.

On muistettava, että EU – asetus 376/2014 velvoittaa raportoimaan onnettomuuksista, vaaratilanteista ja poikkeamista Trafille. Poikkeamaraportoinnin tiedot käsitellään luottamuksellisesti, ja niitä käytetään vain lentoturvallisuuden parantamiseen. Vaikka asetuksessa mainittu analyysivelvoite ei suoraan koske harrasteilmailun kerhoja, Trafi kannustaa hyppykerhoja analysoimaan ja toimittamaan analyysejä Trafiin ilmailun turvallisuustyön tueksi. Käytännössä tämä tarkoittaa kerhoissa sitä, että kerhot jakavat myös tunnistetut hyppylentotoiminnan turvallisuushuolet ja opit laajemmin hyödynnettäväksi.
Lentoturvallisuusilmoitukseen pääset tästä linkistä.
Ohjeistusta ja taustatietoa poikkeamaraportoinnista löydät Trafin Arviointipalvelujen sivuilta.
Raportointitietoja hyödynnetään mm. Turvallisuustiedotteissa, jotka löytyvät kootusti Trafin sivuilta.

Yleisilmailijalle - sivusto Trafissa

Trafin yleisilmailijalle-sivuston koulutusmateriaalia ja ohjeita-osassa on julkaistu hyppylentoohje. Tämä dokumentti sisältää malliesimerkin hyppylento-ohjeeksi. Lentokone- ja moottorityyppi-, kerho-, toiminta- sekä olosuhdekohtaiset asiat on jokaisen yhdistyksen huomioitava erikseen ja päivitettävä ohjetta näitä vastaaviksi. Ohje tehtiin osana Harrasteilmailun turvallisuusprojektin koulutuksen kokonaisuus-ryhmän työtä.

Hyppylento-ohjetyöryhmään kuului laskuvarjohyppääjiä ja hyppylentäjiä kerhoista eri puolilta Suomea.

Turvallista ja elämyksellistä hyppykautta 2017!

Appendix 10: Example tools for aircraft mass and centre of gravity calculation

Example table: C-182 OH-CVE

Maximum average jumper weight with 4 or 5 jumpers																	
Fuel quantity		Pilot + parachute / kg															
Litres	kg	60		70		80		90		100		110		120		125	
110	79	110	88	108	86	105	84	103	82	100	80	98	78	95	76	94	75
100	72	112	90	110	88	107	86	105	84	102	82	100	80	97	78	96	77
90	65	114	91	112	89	109	87	107	85	104	83	102	81	99	79	98	78
80	58	116	93	113	91	111	89	108	87	106	85	103	83	101	81	100	80
70	50	118	94	115	92	113	90	110	88	108	86	105	84	103	82	101	81

The average weight of club skydivers and pilots with parachute:

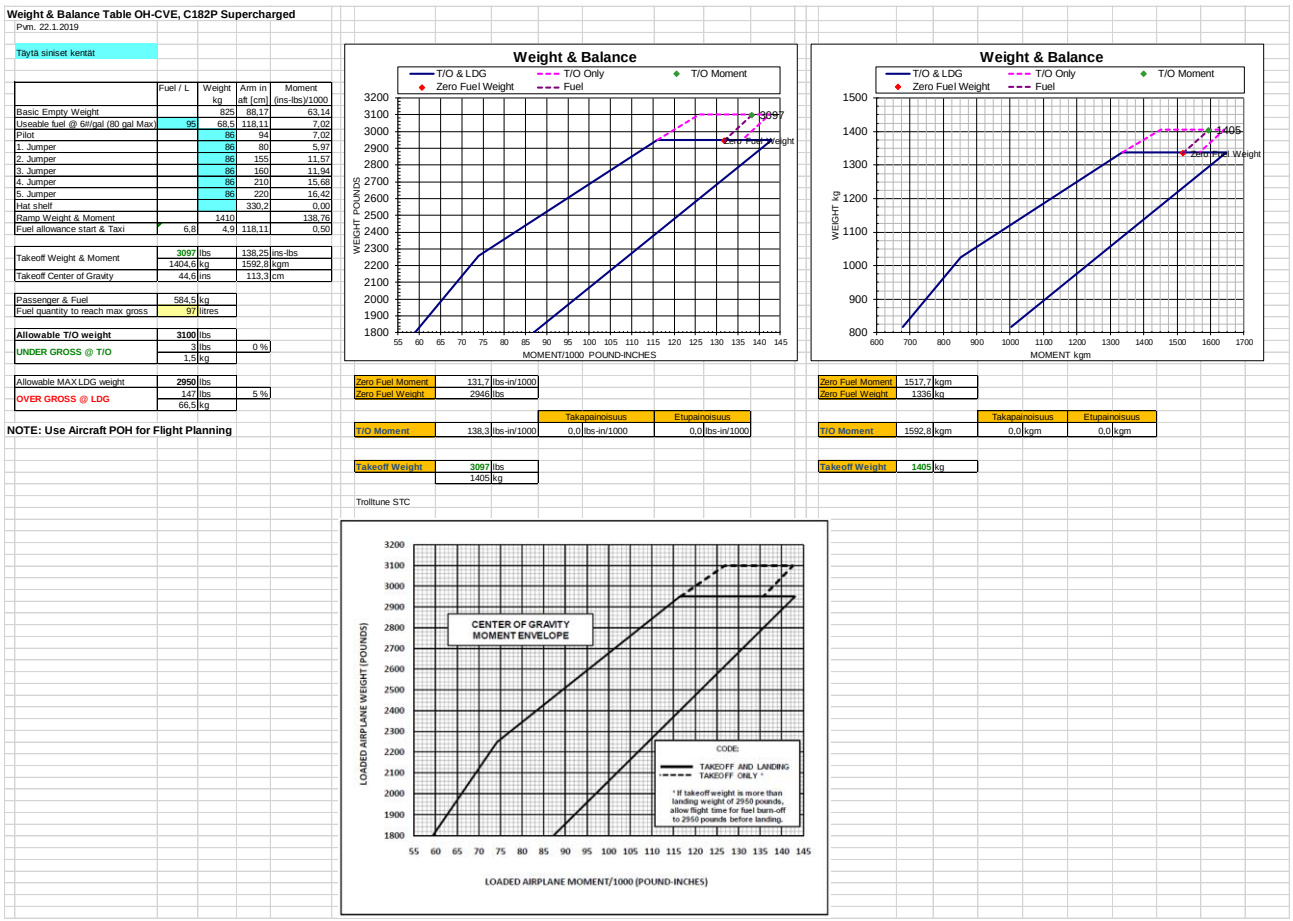
- Licensed skydivers 86 kg
- Instructors 97 kg
- Students 92 kg

Weight calculation table with jumpers' exit weights:

	Licensed, average mass	Licensed, light	Licensed 2, light	Licensed heavy	Student, average	Student, light	Student 2, light
Pilot	86	59	59	125	86	59	59
LO/JM	86	60	74	108	97	77	77
Jumper 2	86	63	74	106	92	75	80
Jumper 3	86	67	75	104	92	75	80
Jumper 4	86	70	75		92	77	80
Jumper 5	86	70	75			79	81
TOW	516	389	432	443	459	442	457
Free capa.	0	127	84	73	57	74	59

The Excel tool presented in the below figure can be used for calculating the centre of gravity of the club aircraft OH-CVE and the rented aircraft OH-EKO.

A corresponding Excel tool (*OH-CVE and OH-EKO Weight Balance Calculation Tool*) is available at https://drive.google.com/open?id=1nU4tqz5LutoiFYssYBRg7eo5UUlSAfuT. Each club can freely apply the tool as required.

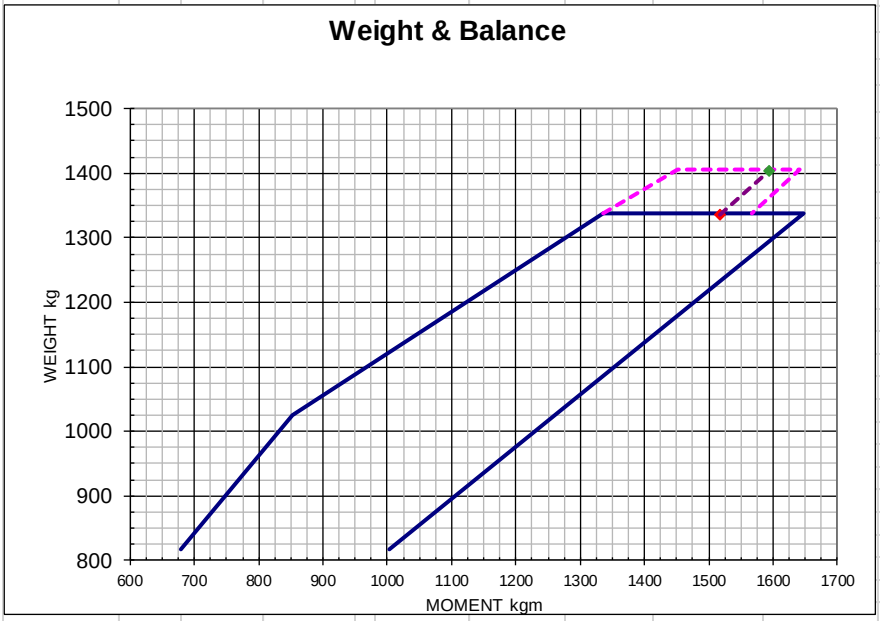


Corresponding printable tool for OH-CVE.

OH-CVE, C182P Supercharged

Massa ja Massakeskiö			
	Massa kg	Varsi m	Momentti kgm
Tyhjäpaino	825	0,88172	727,42
Polttoaine		1,1811	
Pilotti		0,94	
1. Hyppääjä		0,8	
2. Hyppääjä		1,55	
3. Hyppääjä		1,6	
4. Hyppääjä		2,1	
5. Hyppääjä		2,2	
Hattuhylly		3,302	
Yhteensä			

Massa/kg PA/L	Momentti Polttoaine	Momentti Pilotti	Momentti 1. Hyppääjä	Momentti 2. Hyppääjä	Momentti 3. Hyppääjä	Momentti 4. Hyppääjä	Momentti 5. Hyppääjä	Momentti Hattuhylly
50	42,6	47,0	37,6	58,3	93,2	195,8	430,8	1422,5
60	51,1	56,4	45,1	69,9	111,9	235,0	517,0	1707,0
70	59,6	65,8	52,6	81,6	130,5	274,1	603,1	1991,5
80	68,1	75,2	60,2	93,2	149,2	313,3	689,3	2276,0
90	76,6	84,6	67,7	104,9	167,8	352,5	775,5	2560,5
100	85,2	94,0	75,2	116,6	186,5	391,6	861,6	2845,0
110	93,7	103,4	82,7	128,2	205,1	430,8	947,8	3129,5
120	102,2	112,8	90,2	139,9	223,8	470,0	1033,9	3414,0



Appendix 11: Radio-telephony phraseology for parachute operations in Finland

Radio-telephony phraseology for parachute operations in Finland

8 November 2019, version 1.1

Change history

- **8 November 2019 v1.1**
  The new area control centre call sign (Helsinki control) and the new name of the flight information region (Helsinki FIR) updated.
- **20 November 2018 v1.0**
  Publication of the first complete version. ACC clearance "*cleared to drop and descent*" changed to "*drop and descent approved*" as the latter is more frequently used.
- **24 March 2018 Draft #2**
  A note added concerning drop notifications.
- **22 March 2018 Draft # 1**
  First version

General information

- The Ministry of Transport and Communications has decided (LVM/1046/02/2017) that as of 1 January 2018, air traffic services on the radio frequency used by the area control centre will only be provided in English in Finland's flight information region (from 25 April 2019, Helsinki FIR) above flight level 95.
- Reporting in English should also be considered when flying in an uncontrolled airspace and there are foreign pilots/aircraft on the same radio frequency.
- There is no special phraseology for parachuting flight radio communication. Since there is no specified phraseology, expressions from other phraseology and spoken language may be used.
- The same things can be expressed in various ways. The phrases presented here have been selected so that they are best compatible with Finnish air traffic control methods and in line with Finnish parachuting flight phraseology.
- Please submit any questions and comments by email at simo.aro@laskuvarjotoimikunta.fi.

Requesting clearance to drop

- Phraseology:
    - Pilot: **OZF, request parachute drop.**
    - ATC: OZF, parachute drop approved.
    - Pilot: **[Parachute] drop approved, OZF.**
- The word “parachute” may be omitted if there is no risk of confusion.

Advance notification of a drop

- Phraseology:
    - Pilot: **OZF, parachute dropping in two minutes [will drop three parachutes from five thousand feet].**
    - ATC: OZF.
- An estimate/advance notification of a drop is only given if requested by the air traffic control or the operation takes place in an uncontrolled airspace.
- The number jumpers to be dropped and the drop altitude should be reported to other traffic when operating in an uncontrolled airspace.

Cancelling the clearance to drop

- Phraseology:
    - ATC: OZF, parachute drop clearance cancelled.
    - Pilot: **[Parachute] drop clearance cancelled, OZF.**
- The word “parachute” may be omitted if there is no risk of confusion.

After the drop

- Phraseology:
    - Pilot: **OZF, parachute drop complete.**
    - ATC: OZF.
- The practical operating method is not to report drops to the area control centre.

Example

During climb:

- **Helsinki control, OH-DZF.**
- OH-DZF, Helsinki control.
- **OH-DZF passing flight level 55, request climb to flight level 140, parachute drop and descent.**
- OZF, radar contact, continue climb to flight level 140, drop and descent approved.
- **Continue climb to flight level 140, drop and descent approved, OZF.**
- Control.

Example

During glide:

- **OZF, [parachute drop complete], passing flight level 95.**
- OZF.

The practical operating method is not to report drops to the area control centre. However, leaving the controlled airspace (through flight level 95 downwards) should always be reported.