

# Aerobatic Club of Alberta

## Introduction to an Aerobatic Contest

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## **Objectives**

- 1. Familiarization with what happens at a contest***
- 2. Rules and technical information***
- 3. Flying skills and self assessment***

## What is an Aerobatic Contest

An aerobatic Contest is a friendly skills contest between sport aerobatic pilots.

The IAC club's official Contest Rules were originally written in 1970.

The Aerobatic Club of Alberta, which is Chapter 7 of Aerobatics Canada, follows these rules fairly closely, and in some years have even received IAC sanctioning for our contest. This means that the results are recognized for US competition pilots and time on the Judging Line is credited towards the accreditation of IAC judges.

The Aerobatics Club of Alberta has held one or sometimes two contests in Alberta since the early 1980's. Contests have been held at Springbank, High River, Villeneuve, and of course Rocky Mountain airports.

An Aerobatic Contest consists of 3 things:

1. Airspace in which to hold a competition. This is supplied in the form of an SFOC and designated "box" on the ground.
2. Qualified Pilots and Airplanes. By qualified, we mean capable and legal. More on this later in this presentation.
3. Judges and ground volunteers.

It takes a minimum of about 20 people on the ground to hold a contest. Many of the roles are filled by competition pilots, so there is a lot of multi-tasking of roles and tasks.

A contest weekend consists of an Arrival day, usually a Friday, with practicing allowed that day, and then a Contest Day consisting of flights by the 4 or 5 categories of competitors. Larger contests will have 2 full days of competition, usually a Friday and Saturday. Thursdays would be the practice day.

Depending on the Category, Pilots can expect to fly 3 flights during the contest. Some contests only have 2 flights for the primary and sportsman categories, but we like to give everyone a chance to fly 3 flights.

The Competitors fly sequences of maneuvers in a cubic kilometer, called "the box". The figures in the sequences and the sequences themselves are judged from the ground by a team of minimum 3 judges. At a World's Competition there will be 10 Judges.

Each Judges station will consist of 3 people, so for any one Category's Flight, there will be a minimum of 9 people to do the judging. The judging line is changed out each flight due mainly to the fact that volunteers are usually competition pilots from other categories.

For our contests, there are usually 8 to 14 pilots, so there will be a total of 24 to 42 individual flights. These can comfortably be flown in a single day if there are no exceptional delays. The American contests can have more than 40 competitors, which requires 2 days to fly all of the flights, and can be quite tiring for the volunteers..

## What to expect on the competition day

- **Who is in charge?**

The Contest Director is the General Manager and ultimate authority for the Contest.

The Contest Director must ensure that both the Pilots, as well as the general public, are in control and safe at all times. A SFOC (Special Flight Operating Certificate) is issued to the sponsoring organization and the Contest Director as its representative.

The Contest is first and foremost intended to be a safe event. It is the CD's responsibility to ensure that the commitments made in the SFOC submission are followed and both the pilots and the public are safe.

There will be several key roles that are filled by qualified people, including the Starter. The Starter is much like an Air Boss at an airshow, however, his responsibilities at a contest cover mainly the ground moment of airplanes and the staging of pilots.

It is the pilots responsibility to ensure proper procedures are followed in the air.

- **Practice/Registration Day**

Practice days are intended for arrival of pilots, registration of pilots, as well as practice flights. The SFOC covers this day as well, so the operations of the competitors are under the control of the Contest staff and procedures.

Prior to anyone flying, they must complete their registration, which includes an inspection of the airplane to ensure that it is mechanically safe to fly at our event, as well as all of the legal paperwork is in place for the Pilots. Pilots must sign the SFOC registration sheet, agreeing to obey the rules as set out by SFOC and the Contest Director, before they are allowed to fly in the Aerobatic Box..

Practice flying usually consists of a loosely managed order of flight, such as a signup whiteboard, to ensure that there is only one participant in the box at a time.

Critiquing and Judging feedback is not organized for practicing, but you could arrange this informally with volunteers for your own flights.

Also, the time and location of the Saturday Morning's Mandatory Briefing will be decided and posted.

- **Contest Morning**

Saturday Briefing is usually at 0800 sharp, with occasionally an even earlier pre-brief for the management team - the Chief Judge, the Starter, the computer scorer, the local airfield contact and anyone else who looks sufficiently important. Briefings last up to an hour and are mandatory. (ie. late arrivals get an earful and don't fly without it). Late arrivals may be given the opportunity to receive an individual briefing at the CD's discretion. The briefings are extremely thorough affairs during which the CD and his cohorts explain in detail the relevant parts of the rules for the conduct of the event, local rules and regulations, the likely weather situation, in which order the categories will be flown, whether a 'holding area' will be operated, the direction of flight, the fundamentals of the judging procedures to be operated, the placement of the aerobatic "box", and anything else that might have a bearing on the safety and expeditious operation of the day's flying. The order of flight are usually pre-determined the night before by committee based on the number of registrants, then refined to spread the repeated use of individual airplanes so as to avoid unnecessary pauses in the swift action of the day.

The first category to fly in the day is usually a bit of a gong show on the ground until the volunteers get organized and things start to run smoothly. Flying typically starts at about 10:00am. This is where an experienced group of volunteers can make a lot of difference. They can assist quickly with putting together paperwork for the chief judge, organizing crowd control, and other tasks that need to be done early. This gives the pilots time to get their airplanes out and get ready to fly the first flights.

During the day, it is critical to the timing of the contest that each pilot be aware of their place in the sequence of flight, and that they be at their airplane in time to get ready, suit up, and startup. The starter will ensure that the correct pilot be staged and ready as the order of flight progresses. It is a courtesy to him to ensure that you are not late getting to your airplane.

- **Judges Stations**

Each Judges station consists of 3 people. The Judge, and Assistant who will be reading the sequence, and a recorder. The recorder can be any eager volunteer who can write the scores. The assistant needs to have some Judging training and be experienced enough to be able to quickly and clearly read the sequences to the Judge. The judge typically will not have time to look down at the paperwork and will depend on the assistant to describe what maneuvers are being flown next.

The recorder's primary job is to record the scores given by the judge. If they are able to keep up, they should also try to write any comments that the judge gave that may benefit the pilot, such as why the score was downgraded, but the score is important thing.

After each Category is flown (depending on the number of pilots) the score sheets are collected and passed to the chief judge. After the Chief Judge checks the scores to ensure that the paperwork is in order, it is run into the Computer station. The scores are usually entered into the computer and posted within about 30 minutes of the flight.

Pilots are encouraged to review their score sheets prior to their next flight to see if the judges comments can help them improve their score.

- **Chief Judge**

The Chief judges role, in addition to sometime actually judge, is to ensure that the correct scoring is applied to the flight. Example, if a maneuver is zeroed based on a technicality or significant downgrading, there are rules to ensure that the judging is consistent. It is surprising what the judges will miss sometimes, even though they are looking right at the sequence.

## **Roles for Volunteers**

Several of the positions filled by volunteers will have been arranged well before the contest. The Contest Director of course, as well as the Medical and Safety personnel will have been decided prior to the paperwork having been submitted for the SFOC.

The registrar will be processing all of the pilots registrations, as well as collecting the entry fees. They will coordinate with the Safety Inspector to ensure that all of the paperwork is complete and accounted for. Contest Fees are typically in the \$100-\$120 dollar range. Sometimes there is a discount for entry level competitors as an incentive to give it a try.

The role of Volunteer Coordinator is very important since this person will be organizing the new arrivals and the untrained masses. A good Volunteer Coordinator can make or break a contest.

The role that needs the most volunteers is the Judges lines. We need at least 6 people to act as Recorders. Also, there are always last minute tasks that need some labor to accomplish, such as running errands and backfilling people.

## **Competitors:**

### ***Who can fly as a competitor***

From the IAC rule book, In order to be registered in a contest, each competitor must possess a minimum of a Sport Pilot certificate if flying a qualifying Light-Sport aircraft (LSA), or at least a Recreational Pilot certificate with rating appropriate for the class of aircraft to be flown (power or glider) if flying an aircraft other than a LSA.

A pilot competing with a Sport Pilot certificate must also possess either a valid U.S. driver's license which complies with the restrictions set forth in the applicable sections of the FAR's, or a current FAA medical certificate. All other certified pilots of powered aircraft must possess a current medical certificate. These licenses and certificates must be shown to contest officials on request.

Competitors must either be current members of the IAC or hold a valid FAI Sporting License

The Canadian equivalent is that in order to be registered in a contest, each competitor must possess a minimum of a current Recreational Pilot Permit, and possess a Category 4 Medical Certificate, or Private Pilots License and possess a Category 3 Medical Certificate

The pilot must also be a member of Aerobatics Canada, or if licensed in the US, must conform to the IAC requirements above.

## ***Aircraft requirements***

### **AEROBATICS**

There are two ways to obtain aerobatic approval for your Amateur-Built Aircraft.

1. The Unlimited Aerobatic Authorization requires a structural evaluation and flight testing by a recognized organization that will make a subsequent recommendation to Transport Canada. Amateur- Built Aircraft that have been evaluated and tested are listed below. They are eligible for Unlimited Aerobatic Authorization, with pre-approved operating conditions listed in CAR 507 Appendix D.

- Pitts Special models S-1, S-1C, S-1D, S-2E.
- Steen Skybolt
- Cuby Aero Trainer
- Zenair CH150
- Christen Eagle II
- Acro Zenith CH180

2. A Simplified Aerobatic Procedure permits aerobatics in Amateur-Built Aircraft provided the manoeuvres have been demonstrated and documented in the aircraft logbook. The Simplified Aerobatic Procedure is valid for the specific Aeroplane evaluated and is not a "Type Evaluation" for all aircraft of this type as noted in No. 1 above.

A Flight Permit is required from Transport Canada to demonstrate the intended list of manoeuvres and the person flying the manoeuvres must be qualified to do so.

Dual seat belts with separate attach points and a shoulder harness are mandatory for Advanced and Unlimited power categories. The same equipment is strongly recommended for Primary, Sportsman, and Intermediate power categories but is not mandatory except when IAC Technical Monitors deem them necessary for the sequence being flown in these categories.

## ***Paperwork required***

Stuff you have to bring:

- 1) Certificate of Airworthiness
- 2) Certificate of Registration
- 3) Operating Limitations
- 4) Weight & Balance
- 5) Journey Log
- 6) Certificate of Insurance – minimum \$1,000,000
- 7) Parachute, repacked within the last 180 days
- 8) Functional Radio

## **Safety**

Brief discussion about why training is SO important. Specifically, the risk of "brain lockup" and also responding by reverting to habit.

Anyone flying knows that given a situation where you are put beyond your limits of familiarization, you tend to stop thinking and will always either revert to habits, or if there are no habits to revert to, may just turn into a zombie (or "Brain lockup") and do nothing. Either one can be very dangerous and potentially fatal.

The first hurdle to overcome is the natural urge to Pull the Stick to get upright. If a person is uncomfortable with unfamiliar visual clues, the natural tendency in a panic is to pull. This can result in a significant speed of the airplane, and if there is not sufficient altitude, well you figure it out.

The training that a pilot goes through accomplishes 2 things.

1. Increase your familiarization with unusual attitudes and situations
2. Create new habits to rely on when things go poorly.

At a contest, we want to avoid overloading the pilot with too many new rules. The basic rules of flying at an airport apply. The only additional rule is the entry and exit of the "Holding Area" and the entry and exit of the "Box".

We want a pilot to not feel rushed, and also not to feel pressured into doing something that they are not comfortable doing. There are no dumb questions if you don't know the answer, and no one will try to make you feel bad if you double check an instruction.

An example is if you are in the air and you are not sure if you are supposed to fly into the box. If in doubt, don't. Call on the radio and ask. Don't assume that the garbled message that you just received is your instruction to start. If you are not clear, call and ask.

Sometimes, the judges will ask you to hold in the holding area while they sort out some paperwork or discuss the previous flight.

## **SFOC (Special Flight Operations Certificate)**

The Special Flight Operations Certificate is specific approval from Transport Canada to hold the aviation event, and also explicitly allows the intended flying to occur in accordance with the SFOC application.

Without an SFOC, you cannot fly aerobatics below 2000' and also not in a control zone.

With the SFOC, along with a NOTAM, qualified pilots can fly down to the altitude of the category that they are qualified for, as well as they can fly aerobatics in the designated "Box", within sight of the judges.

Without an SFOC, this would constitute "an assembly of persons" and be prohibited as well.

The purpose behind the rules are pretty straight forward however. Is the public safe and in control? Are the pilots safe and in control? Are we going to avoid any "incidents"?

If we can prove to TC that the answer is Yes to all three, then we have permission to proceed.

## **Weather constraints**

The weather minimums are specifically laid out in the IAC rule book, but common sense must also prevail. Weather conditions must allow a pilot to climb to 3500' while maintaining a minimum cloud clearance. Also, flight will not be conducted if the wind speed exceeds 20 knots, except at the discretion of the Contest Jury.

The IAC rules allow for a number of scenarios where the pilot decides that the weather is unsuitable to fly the competition sequence. In no case will the pilot be encouraged to fly if they do not feel that it is safe to do so.

## **Introduction of the "Very Primary" category**

### **Sequence.**

The new "Very Primary" sequence is unique to this contest.

There have been various attempts to introduce an "RV" category or an alternative for airplanes that not as overall capable as the traditional trainers and purpose designed aerobatic planes.

The "Very Primary" was designed to conform to the basic IAC primary sequence, but with maneuvers removed.

The idea of creating a "Very Primay" category is to encourage newcomers to the sport to be able to fly a less challenging sequence that is safe, but still conforms to the basic rules of the IAC figures.

Specifically, the 2009 IAC Primary sequence has a reverse half-cuban and a spin, both of which are safe enough in a Citabria or similar airplane, but can be challenging to a non-inverted slippery airplane.

The proposed "Very Primary" sequence therefore will include a 45° line, a Loop, a 180° Turn, and a roll.

See appendix for details.

## **Brief Judges School (What the Judges are looking for)**

The specific judging criteria for each family of maneuvers is well documented in the IAC Rule Book. This should ultimately be used for exact criteria for very specific maneuvers.

The basic concept is that each figure in a sequence is graded individually, assuming a score of 10 for a perfect maneuver, and given a downgrade as imperfections are identified.

Horizontal lines are judged on track of the airplane, while 45° and 90° (Vertical) lines are judged on the Attitude (zero degree lift axis) of the airplane. Wind drift is to be ignored by the judges who must only evaluate the accuracy of the 45° and vertical attitude of the airplane.

Looping maneuvers, or portions thereof are judged on the roundness of the loop and constant radius. The actual radius is not defined and is not a judging criteria. Fast airplane may be able to do larger loops but they may be harder to fly well because the judges have more time to see mistakes.

Rolls are judge for 2 things. One is a constant roll rate, and send for positioning on a line. Rolls should be centered on 45° and 90° lines. Pilots need to compensate for the difference in speed before and after the rolls in order to center them. Tricky business this.

Also, each figure begins and ends with a horizontal line. Beginners tend to move quickly from one maneuver to the next with little of no visible distinct line.

Also remember that in reality, scores are very subjective and a good score can be achieved by smooth flying and crisp transitions. Judges are human and impressed by lots of noise and high G flying, but the scoring criteria does not add point for noise.

## **Brief Pilots Training.**

Pilot training should always begin with dual training. There is an interesting reaction to flying in unusual attitudes that is both predictable and explainable.

When a person is subjected to an unfamiliar visual or dynamic situation, they tend to stop thinking and revert to trained behavior. If the senses are overwhelmed, and they are definitely overwhelmed in a rolling, looping, tumbling, airplane, the instinctive reaction is to revert to habit. In the absence of a habit pattern, the brain just stops and there is either very delayed reactions or sometimes no reaction at all.

The main purpose of training then, is to ensure that there is more familiarity with the unusual attitudes, but more importantly, the development of habits that are instinctive and safe. An example of a habit that must be unlearned is the instinct of a pilot that is not in a comfortable situation to pull the stick back. Normally this is the safe thing to do to increase altitude and to slow the plane down.

Unfortunately, if you are upside-down, this is a very bad thing to do. The instinct should be to roll upright first, and then evaluate whether to pull or not.

The initial training objectives should be:

1. Become more familiar with the individual controls (pitch, yaw, roll). This is intended to break the link created by spending years doing nothing but coordinated turns. You need to feel comfortable with a zero angle of attack, and also full control deflection (at low speeds!).
2. Become familiar with the feel and sounds of the full range of speeds of the airplane. The real test of a pilot's skills are when they can control the plane down to the lowest speeds, not the high end of the scale.
3. Add another tactile instrument to your repertoire, that being the seat of your pants. You need to begin to develop a feel for G's and be comfortable at zero G's. Also, your stomach. You will find that doing maneuvers poorly is much harder on the stomach.

## ***How to fly the maneuvers in 2 different airplanes***

### **Citabria**

My reference for flying the primary and sportsman sequences is a non-inverted Citabria 7ECA. I competed in this plane for 5 or 6 years in sportsman and always had a lot of fun.

The important numbers to remember in any airplane is the Maneuver Speed and the Vne. The Citabria Maneuver speed is 120MPH. This is by coincidence also the airspeed at which you will red-line the engine at full throttle, so it is a good speed to get familiar with the sound and feel.

#### 45° line down

Begin the first maneuver at the top of the box. That is 3300' above the ground. You should be able to position yourself so that you begin the maneuver as soon as you are over the edge of the box. Your airspeed should be about 70MPH or less. Gently pitch the nose forward until you are a 45° attitude. You should probably have a point on the ground that you can aim at that is approximately the other side of the box, or a little further. It will seem very steep, but take a look out the side window and judge for yourself. Count at least 3 bananas while diving, with full power. You should then expect to pull to level at an airspeed of at least 120MPH to 140MPH. Remember that the entry speed for the next maneuver is probably going to be something like 140MPH, so this is your chance to get the speed exactly what you want. Fly level for at least 3 bananas and you are ready to pull into the loop.

#### Loop

The entry speed for a loop however is 140MPH, so you have to dive for speed to enter a loop. To enter a loop, you dip the nose slightly, while throttling back to maintain red-line, and at 140MPH, pull. You push full throttle and pull to achieve about 3 to 3 1/2 G's until you are

vertical. As you hit vertical, relax the back-pressure. Don't push the stick though, just relax. You should notice that the speed has dropped significantly and you must focus on a zero angle of attack while letting the nose of the plane gradually fall. You should be able to fly a zero G float for the top 1/3 of the loop. A common mistake made by new aerobatic pilots is to pinch the top of the loop. This is because if you don't "float" the plane over the top, your angular rotation will be constant, (and it will feel right) but you are forgetting that you are traveling at a much slower airspeed. Once the nose is visibly low, start pulling again. Not too hard at first because you are at risk of pinching the 3rd quarter of the loop. The 4th Quarter is a harder pull and this is where you absolutely need to pull 4G's. If you successfully do pull 4 G's, you will notice that your airspeed will not climb above 120MPH. An interesting phenomena of induced drag.

### 180° Turn

An Aerobatic Turn is an interesting thing. You need to unlearn a coordinated turn. By definition, an Aerobatic Turn is a minimum of 60° of bank. You should also be away that you should not begin your turn until this angle is achieved. In other words, you briskly roll the airplane to 60° first, then pull to 2G's to hold your altitude and hang there for 180°. Once you are on heading you briskly roll out level and there you are. You will notice that you will be dropping your airspeed through the turn, again due to induced drag, and you may want to cheat a bit to have enough airspeed for the next maneuver. You can let the nose drop a little and lose a little altitude, but don't let the judges see it. If you are gentle they may not notice. They will see every one of your corrections though. Keep the bank angle steady and your turn rate smooth.

### Roll

The non-inverted Citabria is not very happy being upside-down. In order to do a good roll, you must plan to barrel it slightly in order to keep positive G's, as well and compensate for the nose dropping through the maneuver. The tactic is start at 120MPH and to pitch the nose up about 30° and then simultaneously pushing forward on the stick enough to unload the wings (zero angle of attack) and apply full aileron, usually to the left. You will be losing airspeed through this maneuver initially from a nose high attitude, but also from induced drag of the ailerons. You will find that you will run out of rotation at about 3/4 of the way around and you will need to push a little rudder to assist the roll with dihedral. If you have done this perfectly you should end in a 30° nose down attitude. You should also expect a score of about 7.5 or so. There is not way to improve that score without an inverted system and more airspeed.

## **RV (Non inverted system)**

To be added...

## **Rules**

Non-Contest Aerobatics

### **Aerobatics Regulation Summary:**

#### **Who:**

You can fly aerobatics (in an aerobatic aircraft) if:

- 1) You are above 2000', outside a control zone.
- 2) You are below 2000' and/or inside a control zone, if you have a Special Flight Operations Certificate (SFOC) which allows you to do this.
- 3) Flight visibility is at least 3 miles.
- 4) You are not over a built-up area or an open-air assembly of persons.
- 5) You are not carrying a passenger.
- 6) You are carrying a passenger, but you have at least 10 hours of dual aerobatics instruction or 20 hours conducting maneuvers by yourself, and at least 1 hour of aerobatics in the proceeding 6 months.

**What:**

The type of aircraft you can fly aerobatics in is:

- 1) A certified aircraft which allows aerobatic maneuvers
- 2) An amateur-built aircraft of the following types:
  - (a) Pitts Special aircraft models S-1, S-1C, S-1 D, S-2E;
  - (b) Steen Skybolt;
  - (c) Cuby Acro Trainer;
  - (d) Zenair CH 150;
  - (e) Acro Zenith CH 180; and
  - (f) Christen Eagle II.
- 3) An amateur-built aircraft which has undergone a **one-off flight test** to demonstrate to TC that it is capable of aerobatic Maneuvers.

**Note that in all cases, you must adhere to the limitations imposed by the operating limitations for your particular aircraft.**

## Appendix

### Definitions

- ◆ CAR 101.01 (1) - "aerobatic manoeuvre" - means a manoeuvre where a change in the attitude of an aircraft results in a bank angle greater than 60 degrees, an abnormal attitude or an abnormal acceleration not incidental to normal flying;
- ◆ 623.00 - Chapter One - Air Shows - "air show aerobatic manoeuvre" - means a manoeuvre where a change in the attitude of an aircraft results in a bank angle greater than 75 degrees or in a pitch attitude greater than 60 degrees above or below the horizon, including a roll, loop, spin, hammerhead turn, tail slide, and a lomcevak;

#### 523.3 Aeroplane Categories

- (a) The **normal** category is, and intended for, non-aerobatic operation. Non-aerobatic operation includes:
  - (1) Any manoeuvre incident to normal flying;
  - (2) Stalls (except whip stalls); and
  - (3) Lazy eights, chandelles, and steep turns, in which the angle of bank is not more than 60°.
- (b) The **utility** category is limited to aeroplanes, and intended for limited aerobatic operation. .... Limited aerobatic operation includes:
  - (1) Spins (if approved for the particular type of aeroplane); and
  - (2) Lazy eights, chandelles, and steep turns, or similar manoeuvres, in which the angle of bank is more than 60 degrees but not more than 90 degrees.
- c) The aerobatic category is, and intended for, use without restrictions, other than those shown to be necessary as a result of required flight tests.

### IAC Rulebook

<http://members.iac.org/contests/rulebook.html>

### Canadian Air Regulations:

<http://www.tc.gc.ca/CivilAviation/Regserv/Affairs/cars/PART6/Standards/Standard623.htm>

## CHAPTER THREE - AEROBATIC COMPETITIONS

(amended 1999/09/01; [previous version](#))

### Foreword

These Special Flight Operations Standards and Procedures - Special Aviation Events - Aerobatic Competitions are the standards and procedures that must be met for the issue and continuing validity of a Special Flight Operations Certificate - Aerobatic Competition as provided for in the *Canadian Aviation Regulations*, [Part VI, Subpart 3, Division I](#), and the related guidance material.

Additional information on the organisation or administration of Special Aviation Events may be obtained by contacting your local Regional General Aviation Office of Transport Canada, Civil Aviation, or by writing to the :

Chief, Recreational Aviation and Special Flight Operations  
Transport Canada Aviation Building  
Place de Ville  
Ottawa, Ontario  
K1A 0N8

### **623.00 Interpretation**

In these Standards,

"aerobatic competition box" means a block of airspace whose dimensions and location are specified in the certificate issued for the event; (zone de compétition d'acrobaties aériennes)

#### **Information Note :**

*The International Aerobatic Club and the FAA define the "Aerobatic Contest Box" as a block of airspace 3,300 feet long, 3,300 feet wide with an upper limit of 3,500 feet AGL for powered aircraft and 4,000 feet AGL for gliders. The lower limit of the competition box for powered aircraft is 1,500 feet AGL for Basic and Sportsman Categories, 1,200 feet AGL for Intermediate Category, 800 feet AGL for the Advanced Category and 328 feet AGL for the Unlimited Category. For gliders, the lower limit of the competition box is 1,500 feet AGL for the Sportsman Category, 1,200 feet AGL for Intermediate Category and 600 feet AGL for the Unlimited Category. (see diagrams Aerobatic #1 and #2)*

"designated spectator area" or "crowd" means the area identified on the site diagram submitted to Transport Canada with a sponsor's application to conduct a special aviation event as the area in which an invited assembly of persons will be positioned; (zone réservée aux spectateurs)ou (foule)

"invited assembly of persons" means, pursuant to section 101.01 of the *Canadian Aviation Regulations*, any number of persons who have been invited, by any means, to attend a special aviation event. The term excludes competition judges, the holder of a special flight operations certificate, members of a certificate holder's staff and members of a participant's support team; (*rassemblement de personnes invitées*)  
(amended 2006/06/30; [previous version](#))

"participant" means any individual directly involved in or participating in the competition. Participants include, but are not limited to, pilots, competition starters, judges, flight line crews, recorders or other persons designated by the Contest Director to perform duties associated with the competition; (participant)

"sponsor" means the person or agency responsible for the organisation and conduct of a special aviation event; (organisateur)

"technical inspection" means an inspection carried out by the Chief Technical Monitor as outlined in section 2.3 of the Aircraft and Equipment Entrance Requirements published in the International Aerobatic Club Official Contest Rules (inspection technique)

"unofficial spectator area" means an area adjacent to the flying display area where persons have congregated to observe a special aviation event. This includes, but is not limited to, private property or property not under control of the sponsor, public roads and rights of way. (zone non officielle de spectateurs)

### **623.02 Issuance of a Special Flight Operations Certificate - Special Aviation Event - Aerobatic Competitions**

(1) An application to conduct a Special Aviation Event - Aerobatic Competition shall include :

(a) the name, location and date of the event;

(b) when persons have been invited, the expected number of spectators, fly-in aircraft and public vehicles;

**Information Note :**

*Transport Canada recognises that the public is generally not invited to aerobatic competitions. In cases where they have been invited, only an estimate of the number of persons expected and any associated aircraft and vehicles is required.*

(c) the name, address, telephone number and, where applicable, the facsimile number of the Sponsor of the event;

(d) the names, addresses, telephone numbers, and where applicable, the facsimile numbers of the key management personnel of the event (e.g. Contest Director, Chief Judge, Chief Technical Monitor, Safety Director

(e) the name of the country of registration (Canada or Foreign Civil) of the proposed participating aircraft; and

(f) a diagram of the event site which shall be on a 1:24,000 topographic chart or a similar scale aerial photograph, and shall clearly indicate as a minimum the following :

- (i) the dimensions and the location of the boundaries of the aerobatic competition box;
- (ii) the location and type of fencing around the designated spectator area including gates, if applicable;
- (iii) the location of emergency access routes to and from the event site;
- (iv) aircraft movement areas;
- (v) the visiting aircraft parking area; and
- (vi) the refuelling area.

(2) The application shall be received by the appropriate Regional General Aviation office at least sixty (60) days prior to the proposed date of the event, or by the date mutually agreed upon between Transport Canada and the sponsor.

**623.05 Event Management**

**(1) Management Organisation**

(a) The sponsor of a Special Aviation Event shall be an individual or an organisation incorporated under the laws of Canada or a province.

(b) The sponsor of a Special Aviation Event has the overall responsibility for the conduct of the event in a safe manner and in accordance with the conditions contained in the Special Flight Operations Certificate issued for the competition.

(c) The sponsor may delegate to other persons the authority to organise and control particular aspects of the competition on his or her behalf.

(d) A sponsor shall have a management organisation capable of supervising and maintaining operational control over the competition. While other position titles are acceptable, the management team shall collectively assume all of the responsibilities listed for the following sample positions :

- (i) the Sponsor is responsible for :
  - (A) appointing the management organisation for the competition to co-ordinate the various air, ground, safety and administrative activities at the competition;
  - (B) establishing liaison with airport management and concerned local agencies;

(C)preparing a draft plan for the safe handling of spectators, aircraft, automobiles and other vehicles;  
and

(D)making application to the appropriate Regional Transport Canada General Aviation office for a Special Flight Operations Certificate for the competition;

(ii) the Contest Director shall act as the general manager of the competition and is responsible for the overall co-ordination of activities at the competition including :

(A)ensuring that all staff members are properly informed of their duties and responsibilities in detail;

(B)cancelling or postponing the competition in the event of an accident, bad weather, or any other circumstances relating to the safety of the spectators or participants; and

(C)the conduct of the flight operations at the competition including;

(I) ensuring all participants are in possession of the appropriate pilot licences, medical certificates and aircraft documentation;

(II) ensuring participants are qualified, competent and have sufficient knowledge of these standards to compete in the competition in accordance with the conditions of the Special Flight Operations Certificate issued for the competition;

(III) authorising a person to participate in the competition;

(IV) ensuring each pilot participant signs the Participant's Statement appended as [Appendix A](#) and submitting a legible copy of the statement to the appropriate regional office the first working day following the competition; and

(V) providing a briefing and operations area of adequate size to accommodate the persons being briefed in accordance with [section 623.09](#) of these standards; and conducting a participant's briefing in accordance with [section 623.09](#), and ensuring that pilots who have not been briefed in accordance with that section do not participate in the contest on that day;

(iii) the Safety Director is responsible for flight line control and ground safety at the competition;

(iv) the Chief Technical Monitor is responsible for performing a technical inspection of each aircraft competing in the competition.

**Information Note :**

*The person appointed Chief Technical Monitor should hold an AME licence; but the position may be filled by a person deemed "best qualified" by the Contest Director.*

*It is not the intent of these standards to confine sponsors to any mandatory management organisation. The management organisation (position titles) outlined in sub-paragraphs(d)(i) to (iv) has served as an adequate model. Competition organisers may or may not wish to use these position titles, but must, under [CAR 603.05](#), ensure whatever structure they select is capable of maintaining supervision and operational control over the competition and that all responsibilities listed in sub-paragraphs (d)(i) to (iv) are clearly assigned to responsible persons.*

**(2) Crowd Control**

(a) A sponsor shall ensure that sufficient clearly identified crowd control personnel are available and briefed on crowd control and emergency procedures.

(b) The designated spectator area shall be positioned so that no spectator is closer than the minimum distance from aircraft in flight, taking off, landing, or performing as specified in [section 623.07](#) of these standards.

(c) The sponsor shall ensure continuous separation between non-participants (spectators) and the aerobatic competition box, aircraft movement areas and access routes for emergency vehicles during the competition.

**Information Note :**

*There are no specific requirements regarding the type of fence used, but the sponsor should ensure that if, for example, a rope barrier is used, sufficient crowd control personnel are on duty to ensure that the spectators remain behind it. Snow fencing has been used successfully as a temporary crowd restraining barrier. It is relatively easy to erect and remove, and requires fewer personnel to monitor than a rope fence. Snow fencing is often available on a loan or rental basis from the airport authority or from Provincial Highways Departments.*

**(3) Emergency Facilities**

(a) A sponsor shall ensure that procedures, facilities, equipment and personnel are in place to respond to anticipated emergencies, including aircraft accident or medical emergency involving the spectators.

**Information Note :**

*Local police and hospitals should be aware of the competition dates and the expected size of the crowd.*

*Many airports have complete crash/fire/rescue equipment and personnel on the site and available on request. At other localities, the local Fire Department may be willing to provide equipment and personnel. For very small competitions, a jeep or other vehicle carrying fire fighting equipment may suffice. Appropriate medical facilities and personnel should be provided at all Special Aviation Events. At large air competitions, full medical aid facilities should be provided on site, including doctor, nurse, ambulance and medical centre. At small competitions, facilities should be provided for the treatment of minor injuries. The local St. John Ambulance Association may provide this assistance by prior arrangement. Arrangements should be made to have a local doctor on call.*

*A station wagon, van or light truck, suitably identified, may be used where full ambulance service is not available.*

(b) The sponsor shall ensure that emergency entrances, access lanes and exits are available to and from the competition site and procedures are in place to keep them clear in an emergency situation.

(c) Emergency entrances, access lanes and exits shall be clearly identified on the site diagram submitted in support of the application to conduct the Special Aviation Event.

**(4) Air Traffic Control**

(a) At Special Aviation Events where Air Traffic Control or advisory service is provided :

(i) the sponsor shall ensure that Air Traffic Procedures are developed to conform with procedures established by agencies responsible for the competition site and airspace; and

(ii) a method of communication shall be established between Air Traffic Control staff and the person designated the responsibility for the conduct of the flight operations at the competition.

(b) At Special Aviation Events where Air Traffic Control or advisory service is not provided, the sponsor shall ensure that communication between the person responsible for flight operations and aircraft participating in the competition is provided.

**623.06 Participant and Aircraft Eligibility**

**(1) Participant Eligibility**

(a) To be eligible to operate an aircraft in an aerobatic competition, a person shall :

(i) hold a pilot licence and medical certificate appropriate to the aircraft to be operated in the special aviation competition; and

(ii) be authorised by the sponsor.

(b) Prior to authorising a person to operate an aircraft in an aerobatic competition, the sponsor shall confirm that :

(i) the person meets the requirements of subparagraph (a)(i); and

(ii) the aircraft to be operated meets the eligibility requirements of subsection (2).

(c) Passengers shall not be carried on board the aircraft, except that during competition flights in Basic or Sportsman, safety pilots may be carried.

(d) Each pilot participating in the competition shall sign the Participant's Statement attached to the Special Flight Operations Certificate issued for the competition.

## (2) Aircraft Eligibility

To be eligible to be operated in a Canadian Special Aviation Event - Aerobatic Competition, an aircraft shall:

(a) be registered in Canada or in a contracting state;

(b) have a flight authority;

### **Information Note :**

*The flight authority may be in the form of a Certificate of Airworthiness issued in accordance with Annex 8 of the ICAO Convention of Civil Aviation by the country of registration or a Canadian validation of a foreign non-standard flight authority issued by the country of registration. (e.g. Special Certificate of Airworthiness, Flight Permit, Laissez-passer Exceptionnel, etc.);*

*Under [CAR 507.05](#), operators of foreign civil aircraft with non-standard flight authorities must obtain a Canadian validation of a Foreign Flight Authority prior to entering Canadian airspace. A Canadian validation may be obtained by providing the following information to Transport Canada Aviation at least 10 working days in advance of the event :*

- *a clear and legible copy of the aircraft's Certificate of Registration;*
- *a clear and legible copy of the aircraft's flight authority including all operating conditions/limitations; and*
- *the planned itinerary for the aircraft while in Canada, including dates and point of entry and departure from Canadian airspace and all Special Aviation Events in which the aircraft intends to participate.*

(c) undergo a technical inspection; and

(d) be authorised by the Sponsor.

## **623.07 Minimum Safety Distances and Altitudes from Spectators, Built-up Areas and Occupied Buildings**

(1) The aerobatic competition box shall be positioned in a manner that aircraft operating in the aerobatic competition box can adhere to the provisions of [section 602.14](#) of the CARs, except that :

(a) where the public has been invited to view the competition, a designated spectator area shall be positioned on one side only of the aerobatic competition box; and

(b) the designated spectator area shall be positioned no closer than 500 feet from the outer edge of the competition box.

(2) Aircraft shall take-off or land on a runway or an area no closer than a distance of 200 feet from any spectators.

### **623.08 Weather Conditions**

The minimum weather conditions for the conduct of a Special Aviation Event - Aerobatic Competition shall be a ground visibility of 3 miles and a ceiling 500 feet above the upper limits of the competition box for the category of competition.

#### **Information Note :**

*As an example, the minimum ceiling for Basic and Sportsman powered aircraft is 4,000 feet AGL.*

### **623.09 Participant's Briefing**

#### **Information Note:**

*The importance of the Participant's Briefing to the safe and successful conduct of a Special Aviation Event cannot be overemphasised. It is a safety briefing at which all aspects of the flying, ground, and emergency procedures of the proposed competition should be reviewed. The briefing should be conducted in such a way, that every pilot participant and competition personnel in charge of the air, ground and emergency operations leaves the briefing with a clear understanding of their responsibilities and of procedures to be followed in normal or emergency situations that may occur during the course of the competition.*

#### **(1) General**

(a) A participant's briefing shall be conducted prior to the competition at a time as close to the start of the competition as practicable.

(b) The briefing shall be carried out in an area as free of noise and other distractions as possible and attendance shall be limited to pilots participating in the competition and key competition personnel responsible for the air, ground, safety and emergency operations for the competition.

(c) Each pilot participant's attendance at the briefing shall be verified by roll call or otherwise and a record retained for a minimum of sixty (60) days.

(d) Pilot participants who did not attend the briefing shall not be permitted to participate in the competition on that day.

#### **(2) Briefing Content**

The briefing shall cover the following basic actions, as a minimum :

(a) introduction of the key competition personnel and description of the means of communication with them;

(b) provision of a weather briefing covering aspects of weather that are relevant to the conduct of the competition, including cloud cover (ceiling), visibility, winds and temperature, density altitude and other current weather data, and forecast for the period of the competition;

(c) ensuring that the weather briefing referred to in (b) above is given by a Flight Service Station Specialist if one is available, otherwise by an experienced pilot;

(d) description of the aerodrome air traffic zone details, i.e. position, dimensions, height above MSL, and details of the *NOTAM* issued for the competition, including local obstructions, warnings and other pertinent information, such as bird activity and nearby aerial activity;

(e) description of the method of co-ordinating air traffic, including type of co-ordination such as positive control by ATS, advisory by FSS or other type of co-ordination, as well as, if necessary, a description of frequencies and assignment of radio call signs;

(f) description of the methods of suspending the performance or recalling a pilot participant by both radio and visual signals;

(g) description of the fire fighting and emergency services equipment available, including their location and the access routes to be kept clear; and

(h) any other basic action deemed necessary.

**Information Note :**

*Examples of topics that have been included in briefings are medical factors affecting pilot performance, e.g. over the counter medication, pilot fatigue, heat stress and factors affecting orientation of flight over water demonstrations or unusual terrain.*

**(3) Participant's Statement**

Personnel designated by the sponsor shall ensure that :

(a) each pilot participant reads the Special Flight Operations Certificate issued for the competition;

(b) each pilot participant has signed the Participant's Statement reproduced in this Chapter as Appendix A ;

(c) each pilot participant who has not complied with subparagraphs (a) and (b) is not allowed to participate in the competition; and

(d) at the end of a briefing, a copy of the Statement is given to the monitoring Civil Aviation Inspector or, if one is not on site, that a copy of the Statement is forwarded to Transport Canada Aviation, General Aviation, on the first working day following the competition.

**Appendix A - Participant's Statement**

## Part VI - General Operating and Flight Rules

Canadian Aviation Regulations 2008-2

### Standard 623 Appendix A - Participant's Statement

Content last revised: 2004/12/01

(amended 2004/12/01; [previous version](#))

DATE: \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_

This is to certify that I have read and thoroughly understand and will comply with all the Conditions of Authorization contained in the Special Flight Operations Certificate - Special Aviation Event issued for \_\_\_\_\_ (Name of Special Event)

Participant's Name	Participant's Signature
1.	
2.	
3.	
4.	
5.	
6.	
7.	
10.	
11.	
12.	
13.	
14.	
15.	

## ***CARS, Subpart 2 – Operating and Flight Rules***

### **Aerobic Manoeuvres - Prohibited Areas and Flight Conditions**

**602.27** No person operating an aircraft shall conduct aerobic manoeuvres

- (a) over a built-up area or an open-air assembly of persons;
- (b) in controlled airspace, except in accordance with a special flight operations certificate issued pursuant to [section 603.67](#);
- (c) when flight visibility is less than three miles; or
- (d) below 2,000 feet AGL, except in accordance with a special flight operations certificate issued pursuant to [section 603.02](#) or [603.67](#).

### **Aerobic Manoeuvres with Passengers**

**602.28** No person operating an aircraft with a passenger on board shall conduct an aerobic manoeuvre unless the pilot-in-command of the aircraft has engaged in

- (a) at least 10 hours dual flight instruction in the conducting of aerobic manoeuvres or 20 hours conducting aerobic manoeuvres; and
- (b) at least one hour of conducting aerobic manoeuvres in the preceding six months.

## ***CARS, Part V, Standard 507 Appendix D – Standardised Operating Conditions and Limitations***

### **5. Standard Operating Conditions - Aerobic Flight Certification**

In the case of the following amateur-built aircraft, once the first 25 hours of flight have been completed, the Regional Director Airworthiness can approve the deletion of the aircraft operating condition "aerobic flight is prohibited" from a Special C of A:

- (a) Pitts Special aircraft models S-1, S-1C, S-1 D, S-2E;
- (b) Steen Skybolt;
- (c) Cuby Acro Trainer;
- (d) Zenair CH 150;
- (e) Acro Zenith CH 180; and
- (f) Christen Eagle 11.

### **6. Standard Operating Conditions**

When aerobic flight is approved for the following aircraft, the pertinent standardised aircraft operating conditions are:

#### **(a) Pitts Special**

The **aerobic** flight manoeuvres are restricted by:

- (i) the stall boundaries of the aircraft;
- (ii) a positive manoeuvring limit load factor of 6.0 (plus 6G);
- (iii) a negative manoeuvring limit load factor of -3.0 (minus 3G); and
- (iv) VNE 217 MPH.

#### **(b) Steen Skybolt**

- (i) the aerobatic flight manoeuvres are restricted by the flight envelope graph, figure 2, (Appendix B), in the EAAC Technical Committee evaluation report EEACT-TER-3 which shall form part of the Special C of A;
- (ii) canopies fitted for ferrying or normal flight shall be replaced with conventional windshields when performing aerobatics;
- (iii) a copy of the flight envelope graph for the Steen Skybolt aircraft shall be attached to each Special C of A issued to a Steen Skybolt for aerobatics;
- (iv) where the Special C of A is endorsed for initial operating conditions, the following additional condition shall be included on the Special C of A:  
"Aerobatic flight is prohibited until after the aircraft has flown a minimum of 10 hours".  
(The condition will not be included on a Special C of A with modified operating conditions).

**(c) Cuby Acro Trainer**

The aerobatic **flight** manoeuvres are restricted by:

- (i) the stall boundaries of the aircraft;
- (ii) a positive manoeuvring limit load factor of 6.0 (plus 6G) at 1,350 lb. gross weight;
- (iii) a negative manoeuvring limit load factor of -3.0 (minus 3G) at 1,350 lb. gross weight;
- and
- (iv) VNE 130 MPH.

**(d) Zenair CH150 Zenith**

The aerobatic flight manoeuvres are restricted by:

- (i) the stall boundaries of the aircraft;
- (ii) fuel to be carried in forward tanks only;
- (iii) positive manoeuvring limit load factor of 6.0 (plus 6G) at 1,150 lb. gross weight;
- (iv) a negative manoeuvring limit load factor of -3.0 (minus 3G) at 1,150 lb. gross weight;
- and
- (v) VNE 195 MPH.

**(e) Acro Zenith CH180**

The aerobatic flight manoeuvres are restricted by:

- (i) the stall boundaries of the aircraft;
- (ii) positive manoeuvring limit load factor of 8.0 (plus 8G) at 1,150 lb. gross weight;
- (iii) negative manoeuvring limit load factor of -8.0 (minus 8G) at 1,150 lb. gross weight;
- and
- (iv) VNE 260 MPH.

**(f) Christen Eagle 11**

The aerobatic flight manoeuvres are restricted by:

- (i) the stall boundaries of the aircraft;
- (ii) a positive manoeuvring limit load factor of 6.0 (plus 6G);
- (iii) a negative manoeuvring limit load factor of -3.0 (minus 3G);
- (iv) VNE of 189 MPH;
- (v) pilot instrument panel to be placarded "minimum fuel for aerobatic flight 6 U.S. gallons";

- (vi) aerobatic C of G range 95.411 to 100.0 inches AFT of datum; and
- (vii) aircraft to be operated in accordance with Christen Eagle 11 Flight Manual. Revision 03-20-80 (or subsequent).

#### **Diagrams**

- [Aerobatic # 1](#) - Aerobatic Competition Box for Powered Aircraft
- [Aerobatic # 2](#) - Aerobatic Competition Box for Gliders

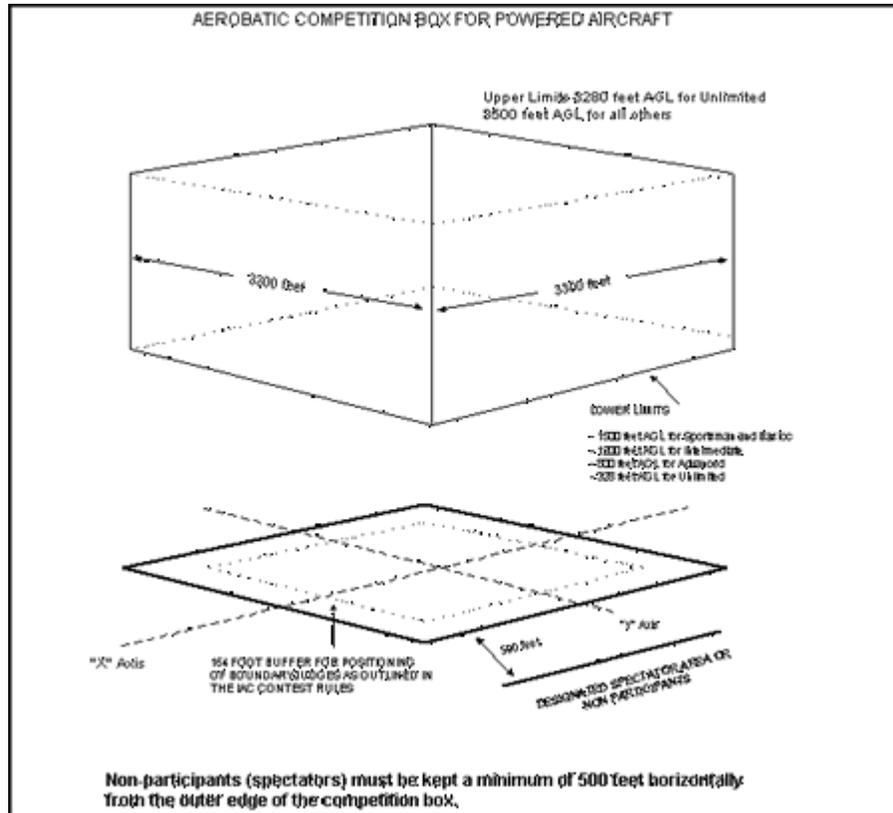
# Part VI - General Operating and Flight Rules

Canadian Aviation Regulations 2008-2

## Standard 623 - Aerobatic # 1 - Aerobatic Competition Box for Powered Aircraft

Content last revised: 2004/12/01

### DIVISION I - SPECIAL AVIATION EVENTS CHAPTER THREE - AEROBATIC COMPETITIONS



Last updated: 2008-01-30

## ***Misc Regulations:***

<http://www.tc.gc.ca/CivilAviation/Regserv/Affairs/cars/PART6/602.htm>

### **Aerobatic Manoeuvres - Prohibited Areas and Flight Conditions**

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(c) when flight visibility is less than three miles; or

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(a) at least 10 hours dual flight instruction in the conducting of aerobatic manoeuvres or 20 hours conducting aerobatic manoeuvres; and

(b) at least one hour of conducting aerobatic manoeuvres in the preceding six months.

## ***Very Primary Sequence***