

# Rules for Triangle Flight with scale Gliders

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F3  
RCS-  
GPS

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Author: R. Mäder

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## **1. Definition of Triangle Flight with scale gliders**

### **1.1. Purpose and goals**

This kind of contest means a new challenge for pilots of scale gliders. After an aero-tow to any flight level, the task consists of attending not more than 500 m above ground and then soaring as many times and as fast as possible around a virtual triangle having an extent of 2.4 km within a time limit of 30 minutes. The basic ideas of the contest are:

- A high degree of activities (aero-tow, landings, many gliders in the air at the same time)
- Each pilot should spend much time „in the air“ during a contest
- Attractive flying (speedy flights over target line)
- A broad range of tactical decisions to take
- Good teamwork of pilot and navigator
- Development of flying skills as well as performance of the gliders
- clear and simple rules of competition
- simple competition organization with only very few aids

### **1.2. General regulations**

For the execution of the competition the technology of the satellite navigation with data communication from the model to the pilot is used.

Thus and using a datalogger the position of the glider can be determined and verified at any time. This simplifies both the flying operations and the evaluation of the flight.

Every pilot uses an equipment compatible to the commercially available system „Skynavigator Version 2“. Per model only one navigation/telemetry system is allowed, the additional use of variometers such as Piccolario or Skymelody is prohibited.

## **2. Glider model and technical equipment**

### **2.1. Definition of the scale glider**

For this kind of competition each scale glider being in accordance to the specifications in 2.2 may be used.

### **2.2. Specification of the scale glider**

Principle: the original airplane must be clearly recognizable.

Each pilot determines the scale factor of his model, this factor must not be bigger than 1:3 .

The following values are computed in relation to the scale factor indicated by the pilot; they must be true to scale within the indicated bandwidth:

<b>Value</b>	<b>Max deviation in mm on model</b>	<b>Remark</b>
Fuselage width	30 mm In year 2008: 15 mm	Measured at the thickest point of the fuselage
Fuselage height	30 mm In year 2008: 15 mm	Measured at the highest point of the fuselage
Wing chord	30 mm In year 2008: 15 mm	Measured at the wing fearing, drawing an imaginary line from the trailing edge of the wing to the fuselage
Wing span	100 mm	The number of trapezoids of the wing must correspond to the original airplane

Although there is no building evaluation during the contest, each pilot must be able to prove that his model is in accordance to the above specifications. For this a 3-view drawing with measure indications of height and width of the fuselage, wing span and wing chord is sufficient.

### 2.3. Number of model gliders per pilot

During a contest each pilot may use not more than two gliders.

Replacing, adding or removing of wing parts between the different flights of a contest is not allowed. Adding weight to the plane is permitted, water ballast may be dropped during a flight.

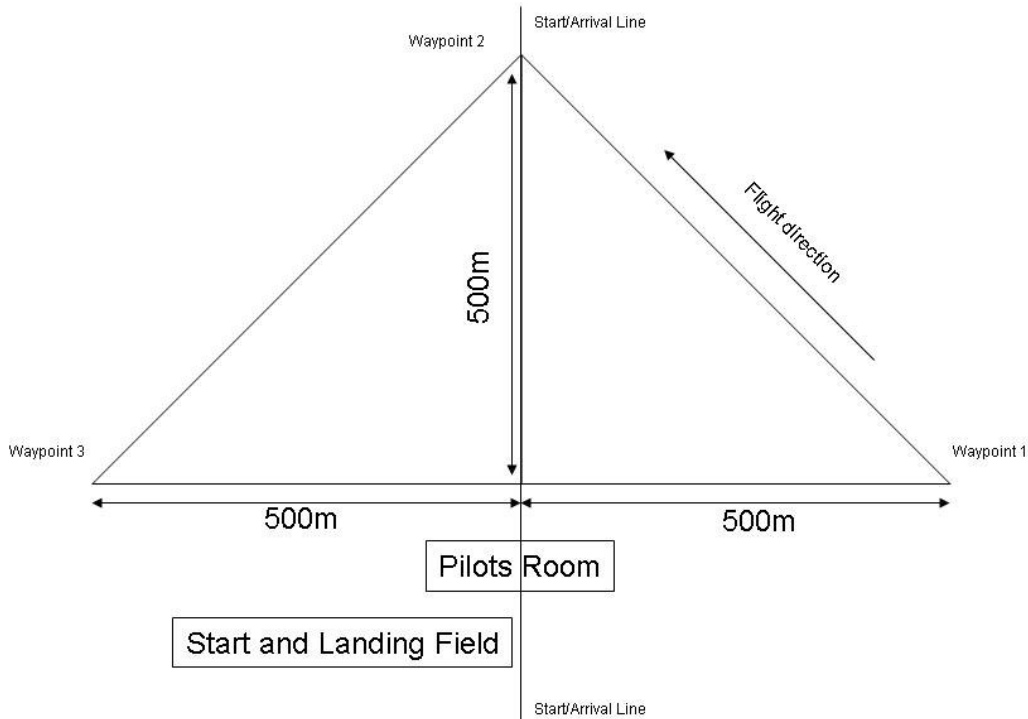
### 2.4. Navigation / Logger

Navigation during a flight is done using a system being compatible to „Skynavigator Version 2“. This system sends GPS-data every second from the model to the pilot or his navigator and fulfills the following additional conditions:

- The performance of a flight (number of triangles, entry height, speed over all triangles) can be determined immediately after landing using the receiver equipment of the navigator
- Additionally there is a logger in each glider being capable of delivering an IGC-compatible file for evaluating the flight
- It is not permitted to couple the GPS-receiving unit with the transmitter of the pilot
- The frequency range of the GPS-transmitter in the glider must be in between 433.875 and 434.650 MHz. It should be selectable in a 25 kHz step in order to avoid disturbance between pilots flying at the same time.

### 3. Flying field

The flying field with the virtual triangle is as follows:



There should be no obstacles within or near the triangle. Starting / arrival line must be on one end of the landing field.

### 4. Organisation of the contest

#### 4.1. General rules

##### 4.1.1. Contest organiser

The contest organiser provides the following personnel:

- Contest director: responsible for the whole contest
- Flight officer: responsible for coordination of departures and landings
- Evaluation officer: responsible for entering the flight results and establishing intermediate and final ranking lists
- Jury: at least one person well knowing this contest rules and being able to decide in cases of doubt or problems. Members of the jury may not participate at the contest, but they may ask experienced pilots for their advice.

#### 4.1.2. Pilot, Navigator, Aid

The participants of a contest are divided in groups as follows:

- Up to 20 competitors: groups of 2
- Up to 30 competitors: groups of 3
- Up to 40 competitors: groups of 4

This will limit the number of gliders being simultaneously in the air to a number of ten.

The following description assumes a total number of competitors smaller than 20, so the participants are divided in groups of two.

Per group one competitor is called pilot „X“, the other is pilot „Y“. Such a group is considered being a “pilot / navigator team”: whenever X is flying, Y is his navigator and vice versa.

For preparing his flight every pilot may use an additional aid. The aid may prepare for the tow until the glider lifts off. From this moment the aid has to leave the takeoff / landing field and he may not stand in the pilots zone.

At any time only the pilot himself is allowed to operate the transmitter.

#### 4.1.3. Radio frequency control

Only frequencies authorized by the local authorities may be used (Switzerland: BAKOM). The contest director is responsible for an appropriate frequency control system und takes care that the steps between channels used by the pilots are bigger than 10 kHz whenever possible. It is also adviced to control the used frequencies with a scanner device.

#### 4.1.4. Navigation system frequency control

The contest director assigns a frequency to be used to each pilot/navigator team. The competitors are responsible of using only this frequency and it is recommended to do this according to a “4-eyes-principle”: pilot X controls the settings of his teampartner pilot Y and vice versa.

### 4.2. Flight process

#### 4.2.1. Definition of the contest

An RCS-GPS contest consists of at least three runs. If there were more than four runs then the worst result of each competitor is not taken into account for the final ranking list.

#### 4.2.2. Definition of a run

A run has as many rounds as the pilot/navigator teams have members.

In each run any of the member of the pilot/navigator team is once flying and once navigating.

The contest director determines at the briefing, in which round of a run which participant flies and which one navigates. This assignment is done in such a way that it differs as much as possible in each run, so that the field of simultaneously flying competitors is always different.

#### 4.2.3. Definition of round

For the flying pilot a round consists of one or more attempt(s) according to 4.2.4 followed by the official flight.

#### 4.2.4. Definition of an attempt

An attempt starts with the takeoff of the glider. The attempt is completed if the glider is aerotowed up to a height of more than 500 meters over ground level.

#### 4.2.5. Repetition of an attempt

An attempt may be repeated if it could not be completed, this means if the aerotow was interrupted due to any reason in less than 500 meters over ground. There is no limitation about the number of repetitions, but after the first attempt nothing may be modified at the model. This applies to all mechanical and electrical components of the glider and the navigation system.

Pilots wishing to repeat their attempt must announce this 15 seconds after interruption of the aerotow to the flight officer. The glider must land within 4 minutes and must immediately be put into the flight line after landing.

#### 4.2.6. Definition of the official flight

Whenever the attempt is completed, the pilot must start the official flight by crossing the starting line in no more than 500 meters over ground. If the pilot crosses the starting line in more than 500 meters he may accept a penalty or re-cross the starting line in less than 500 meters.

Each pilot can do only one official flight per run.

## 5. Flight task and scoring

### 5.1. Preparation

The contest director assigns a departure time per round and communicates it at the briefing. Five minutes before this starting time all pilots and gliders are ready for takeoff. The gliders are lined up in a flight line all ready for the aerotow. The navigators have initialised and tested their GPS-receivers.

### 5.2. Start

As soon as all gliders of a round are in the flight line, the first glider may take off. The following gliders should take off as soon as possible so that all flying pilots do have similar weather conditions. A towplane with running engine shall leave within one minute with the next glider in the flight line.

### 5.3. Flight task and flight time

The task of an official flight consists of flying around the defined triangle as many times as possible within 30 minutes. The direction is always counter clockwise. The flight time of 30 minutes begins after crossing the starting line. The pilot should land his glider not more than 5 minutes after the end of the flight time.

### 5.4. Scoring

The score is computed following the number of completed triangles and the evaluation of the landing. A penalty resulting from crossing the starting line too high is deducted from the score.

#### 5.4.1 Score per triangle

Every pilot gets 200 points per completed triangle. If there is more than one pilot in a round having the same number of triangles, the points for the last triangle are assigned as follows:

- Only the pilot with the highest speed over all his triangles gets 200 points
- The pilot with the slowest speed over all his triangles gets 100 points
- All other pilots get points between 100 and 200 in accordance to their speed relative to the fastest pilot

#### 5.4.2 Landing score

The pilot gets 300 points for the landing if the following conditions are fulfilled:

- First touching point of the glider is on the designed landing field
- The point where the glider stands still is also on the designed landing field
- The model glider landed like the original: if the original airplane has a landing gear, then the model must land with the landing gear out.

If one of the above conditions is not fulfilled, the pilot is assigned 100 points for the landing. If there is more than one condition not being fulfilled or if the glider is not capable of flying without mechanical repair after landing, the pilot is assigned zero points. If the retractable landing gear fails while landing or if it does not pull out, then the landing is assigned 100 points provided the other 2 conditions are fulfilled

For security reasons the contest director may define rules for the landing approach during the briefing. If a pilot does not follow these rules he may be assigned 100 points for the landing provided all other conditions are fulfilled.

If for security reasons the flight director told a pilot to land his glider outside the landing field, the two conditions regarding touching point and stand-still point are considered as fulfilled.

#### 5.4.3 Penalty

If the glider crosses the starting line in more than 500 meters over ground, the pilot gets a penalty as defined:

- 50 points plus (effective height – 500) \* 2 points

This penalty is deducted from the score of the corresponding flight.

#### 5.4.4 Evaluation of the results

There is a separate evaluation for each round of each run. The evaluation is normalized to 1000, this means:

- The pilot with the maximum number of points per round gets 1000 points
- All other pilots of the same round get points in accordance to their result relative to the winner of the round

$$\text{Score} = (\text{points of competitor} * 1000) / (\text{points of winner of round})$$

#### 5.5. Intermediate score and final ranking list

The contest director establishes an intermediate score list per run.

The final ranking is computed according to the sum of the evaluated points of all runs. If there are more than 4 runs, the lowest result per competitor is not considered.