

ACES Rules 2011

1. R/C Air Combat

1.1 About R/C Air Combat

The game *R/C Air Combat* is designed to recreate the air wars of WW II in a historical perspective, in a enjoyable, safe, scale competition that will be interesting for spectators and challenging for the contestants.

1.2 General rules

All FAI regulations covering the R/C-flier, his plane and equipment, shall apply to this event, except as noted herein. The contestant is solely responsible for airworthiness of A/C used in contest. The arranging group and the main judge, are responsible of frequency control during the event.

1.3 Safety

Safety matters have always highest priority. Any conduct by a contestant deemed by the main judge or contest arranging group to be hazardous will be cause for immediate disqualification of the contestant from the event.

Any contestant that is not known to the arranging group, might be ordered to make a test flight, to prove that he is capable of flying a 1/12 scale warbird.

2. Contest site

2.1 Figure

Fig 1 below shows a typical suggested layout for a large combat competition airfield. A safety line must be used to keep flying aircraft a safe distance from the pilot line. When space allows, the organizing authority should allow the maximum practical distance between the flying area and the safety fencing. Distance guidelines can be seen in the diagram (fig 1) below.

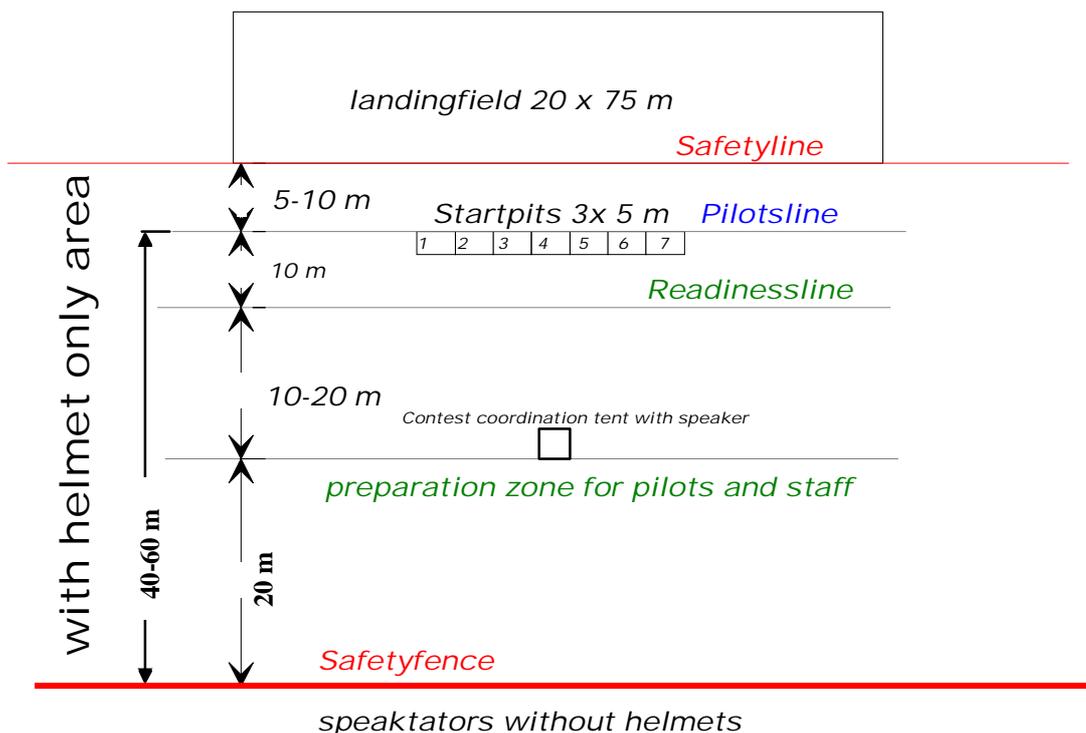


Fig 1.

ACES Rules 2011

2.2.1 Flight area

The flight area is always in front of the safety line. Any model that ends up in front of the landing zone may not be fetched during the fight, or while other models are airborne.

2.2.2 Landing zone

A landing zone should be clearly defined by the contest organizers. Only aircraft landing inside the landing zone are allowed to be retrieved and allowed to attempt a restart.

Resp. § 4.6 Restarts

2.2.3 Safetyline

The safety line runs parallel to and is situated 5 – 10 meters in front of the pilot line. Aircraft are not permitted to fly closer to the pilots than this line allows. Any aircraft crossing this safety line will be subject to the penalty and disqualification rules that are in effect from the time the competition is officially opened until the competition is officially closed by the organizing authority. This includes all flights of aircraft for any reason. (See Fig 1)

2.3 Start pits and readiness area

The start pit area should allow a distance of 3 – 5 meters spacing between pilots. The readiness line should run parallel to and situated 10 meters behind the start pits. All pilots and helpers should start behind this line. At smaller venues it is possible to use the safety line as the readiness line. (See Fig 1)

2.4 Audience

The audience should be kept at a safe distance (at least 40-60m) behind the safety line, or be protected by protective devices, such as nets, etc. The area protected by safety nets is defined as an area starting from the point where the net ends, and to a distance equal to the net height. This means that for a 3m vertical net, the safe area is measured from behind the net and 3 meters back. In addition, the first meter behind the net should be considered as unsafe. All other areas within 60 meters from the safety line should be fenced off, for people not wearing hard-hats.

2.5 First Aid

On the contest site, a spot should be marked up as the first aid spot. At this spot, basic first aid equipment should be available for instant use, in case of an accident.

3 Equipment

3.1 The model

The model must be a scale or semi scale A/C of a warbird built between 1935 and 1945. The original A/C engine must have a take off power of at least 500hp.

The scale is 1:12 and the wing span and fuselage length may not deviate more than +/- 5% from scale.

The fuselage length is measured in-between the leading edge and the rear edge of the fuselage, or the backside of the propeller(s), if any.

The wing thickness must be 10% or more, measured at the thickest point of the chord.

No protruding devices may exist on the front leading edge of the wing, stabilizer and fin.

All other measures may not deviate more than 2cm from scale.

Front view of wing: If the original aircraft, drawn in 1/12 scale, had a deviation/crank which leaves the datum line by more than 20mm the model aircraft must be manufactured to look like the original by using a suitable angle change.

ACES Rules 2011

Top view of wing: If the original aircraft wing outline, drawn in 1/12 scale, had a deviation or angle change which leaves the datum line by more than 20mm the model aircraft must be manufactured to look like the original by using a suitable angle change at the leading and/or trailing edges. The wing outline must remain within the 20mm allowed deviation from scale. [Resp. appendix 3.1 model measurements with examples](#)

The A/C must look similar to the original A/C, including painting and decorations.

The competitor should bring a published 3 view drawing of the original aircraft, of at least 1:72 scale, to the competition to show that his A/C is accurate according to measures.

The contestant does not have to be the builder of the model.

3.2 Engine

All engines must use a muffler. No header or tuned pipes are allowed to be used.

The muffler must sit directly against the cylinder head without using a connecting pipe.

The only exceptions are factory supplied, inline mufflers, for the .15 and .21 MVVS engines only. Extension parts may be used to get the muffler exit outside of the fuselage.

The contestant must be able to shut-off the engine in the air, whatever the attitude of the A/C. Engines that are used in ducted-fans, may use tuned-pipes, others may not.

3.3 Engine size

If the original A/C had a span of at least 12 meters and the model has a span of at least 1 meter, the model may use a .21 2- stroke engine or a 4-stroke engine up to .30.

If the original A/C had a span of at least 12 meters with a wing area of at least 25 m², and the model has a span of at least 1 meter, the model may use a .25 2-stroke engine.

Other models may use a .15 engines. They may use a 4-stroke engine up to .30 engine as well.

Multi-engined A/C may use .15 engines, and the model must have the same number of engines as the original A/C. Single engine ducted fan models may use a .25 engine.

If the original aircraft has more than one propeller in different locations, then the model must have the same number of engines and propellers.

Electrical engines may be used, but in accordance to 3.4. E

3.4 IC-engine (Internal Combustion engine) performance , propeller and weight

The following table applies for maximum engine performance, propeller [and weight used](#).

The maximum propeller to be used is found by adding the propeller diameter and pitch (inches).

Engine class	IC-Engine rpm	propsum		min. (dry) weight (without fuel)	max. weight
- .10				500g	1500g
- .15	17.000	12		700g	1500g
- .21	15.500	14		1000g	1500g
- .25	15.500	14		1000g	1500g
- .25	single ducted fan			700g	1500g
-.30 4-stroke	13.000	15		1000g	1500g
Multi-engine models				1200g	1700g

3.4 E-engine performance , propeller and weight

Electric power engines can be used to replace the IC engines previously described.

For any electric powered model used in competition, the accumulator (battery) must be able to be disconnected quickly from the ESC without the use of tools or major disassembly of the model, in the event of an emergency.

ACES Rules 2011

All E-setups must be suitable for a minimum flight time of 450sec with full throttle in combat. (The pilot gets a penalty of 0 positive points for this round if he is found to be using too much power.) The input energy is limited by the Wh (Watt per hour).

All E-power systems will be limited by the maximum rpm and the pitch of the propeller.

This "prop-stream-sum" (PSS) will help limit the maximum speed of the model. The "prop-stream-sum" is calculated by multiplying the maximum RPM by the pitch of the propeller in inches.

Engine class	max Wh	max. prop Diameter	PSS	min weight	max weight
- .10	28 Wh	9 inch	72.000	500g	1500g
- .15	38 Wh	9 inch	72.000	700g	1500g
- .21	50 Wh	10 inch	72.000	1000g	1500g
- .25	67 Wh	11 inch	72.000	1200g	1500g
- .25	Single ducted fan			700g	1500g
Twin with two .10 E-engine setups	2x 28 Wh	9 inch	72.000	1000g	1700g
Twin with two .15 E-engine setups	2x 38 Wh	9 inch	72.000	1400g	1700g
all other Multi-engine models	67 Wh	11 inch	72.000	1200g	1700g

3.4.1 Engine speed. RPM measurement.

Rpm measurements can be checked at the discretion of the organizing authority or judges. Any RPM measurement should be taken before the heat is started during the preparation or readiness time.

The RPM is measured at full throttle, and with the needle setting used in contest. The measuring party should have full access to both the engine/model and the controlling transmitter. It is the contestant's responsibility to ensure that the engine is within the limits using the RPM meter(s) used by the arranging group.

3.4.2 Engine over rpm limit

The pilot must ensure his aircraft, when ready to fly, does not exceed the maximum rpm measurement allowed for his model engine.

If the model exceeds the maximum permitted rpm limit by 100rpm or more, he will be awarded a single -50 points written into his non engagement box on his score sheet. Adjustments must be made to the engine to reduce the rpm to below the maximum permitted level before starting. Once the rpm level has been checked the pilot is not allowed to alter the engine settings without a judge's consent.

3.4.3 Propeller homologation

Only propellers that are commercially available in the country the contest is being held may be used. "Commercially available" means the propeller can be purchased in normal hobby-shops. All propellers used on the model aircraft must be of a safe design for its proposed use. (The use of electric or slow fly propellers with an IC engine is prohibited.)

3.6 Streamer

The streamer is 12 +/- 0,5 meters long one piece. It shall be 10-15mm wide. Material shall be suitable for proper indication of cuts, e.g. withstand moisture.

The streamer is marked on both ends for about 0,5 meters respectively.

The streamer marking at the model must be seen at the A/C tail unit end.

ACES Rules 2011

3.7 Helmet

A *helmet* must be used by any person that is in front of the audience line. The helmet should cover the upper part of the head and put up with a direct hit of an A/C.

3.8 Radio equipment

Every contestants radio equipment should be range checked before the contest. The contestant is responsible for proper operation of the radio equipment.

4 The contest

4.1 Structure

Each *fight* consists of at least two and at most seven pilots that fly against each other. When all pilots have flown exactly one fight, this is called a *round*. The next round, flight-lists are changed to make it possible for as many pilots as possible to meet each other in different fights. The number of rounds flown at a contest is decided by the arranging group, and must be told in the contest-invitation. The number of rounds is recommended to be 3. A contest also has a *final* which is flown after the rounds. In the final, the seven pilots with the highest scores meet. The pilot who has most points after the final wins the contest.

4.2 Fights

A fight is divided into three parts: The *preparation, readiness and flight part*.

4.2.1 The preparation part

The length of the preparation part may be set by the arranging group, but is recommended to be 7 minutes at smaller contests. It is marked by the main judge blowing three signals in his whistle and calling out "Seven minutes to readiness". During the preparation-part test flights may be performed. 30 seconds before the preparation-part ends, the main judge blows two signals in his whistle and calls out "30 seconds to readiness".

It is normal for rpm measurements (resp. § 3.4) to be taken during this time.

4.2.2 The readiness part

Readiness follows immediately after the preparation part, and is marked by the main judge calling out "Readiness". During readiness all pilots and helpers shall be behind the readiness line. All equipment must remain in the start pits, and engines may not be running. Readiness may vary in length, upon the main judge's decision.

4.2.3 The flight part

The flight part starts when the main judge blows one long signal in his whistle. Pilots and helpers may now run to their A/C, and get them airborne. The flight-part ends when the main judge blows one long signal in his whistle. The pilots may now fly freely in front of the safety line, and land at their own discretion. As soon as all A/C has landed, the next preparation part may start.

4.3 Helpers

Every contestant may have a helper. Only one helper and pilot per aircraft are allowed to stay at the pilot line during the flight.

ACES Rules 2011

4.4 Take off

Take offs are only allowed in the area between the pilot line and the safety line. If the streamer is not intact at the take off moment, no point is counting. The AC must land and pick up a new streamer.

4.5 Flight time points

Maximum flight-time is seven minutes. One point per three seconds airborne, is given. Flight time points start with the first second of flight time. Flight time points are awarded up to a maximum score of 138 (6:54 min). [Resp. appendix 4.5](#)

4.6 Restarts

An unlimited number of restarts are allowed during a fight. When a pilot attempts to fetch his plane from the landing zone (resp. § 2.2.2), (during a heat) he must get a permission from the main judge. The main judge then gives an alarm and ensures that all the pilots are aware of the situation. A restart must be made from the same place the first start was made. Restarts are only allowed if the model ends up in the landing zone, after landing. Restarts shall be conducted solely between the start pit allocated to the individual pilot and the safety line.

4.7 Change of A/C

The same A/C must be used throughout one fight. A new A/C may be used the next fight. The model is defined as main parts of fuselage and wing.

4.8 Crossing of lines

A crossing is made either the A/C is airborne or is moving on the ground. When airborne the A/C must be clearly over the line. On the ground, the engine counts. If a model has several engines, any engine crossing the line counts.

4.9 Safety line crossing

The first time a pilot crosses the safety line with a model during a contest, the pilot receives a minus point penalty. The second time a pilot crosses the safety line with a model, the pilot is immediately disqualified from the contest, and ordered to land immediately if airborne. He keeps his positive and negative points awarded up to the time of his second SL crossing.

4.10 Lost streamer

It is the contestant's responsibility to get airborne with a streamer of appropriate and full stretched length attached to his A/C. After landing, missing or entangled streamer counts as lost (no +50p given), except if the streamer was lost during landing, which must be proved by finding the missing streamer. To gain the intact streamer bonus, the model and streamer must have been airborne during the fight at least 10 seconds.

4.11 Streamer cut

A contestant that cuts streamer off an enemy A/C in the air, gains +100p. If having an enemy streamer stuck to the model, the following rules apply:

A cut made to a stuck streamer, counts as a cut on enemy streamer, and the contestant making the cut gains +100p. If having a stuck streamer cut by an opponent, the contestant does not lose his streamer-points. Only cuts made to the streamer actually attached to the contestant's model count. If during one flyby cuts are made to several streamers (own and stuck) or several cuts are made to the same streamer, this only counts as one cut made to

ACES Rules 2011

enemy streamer. If a cut comes along with a kill, more or less at the same time (during one fly by), the cut doesn't count (no cut points awarded).

4.12 Collision

If two or more A/C has been apparently involved into a midair collision, a clear proceeding is applied: The contestant, whose A/C remains flying after a midair collision may decide to continue flying to gain further flight points. No kill points or consolation points will be given. Flight time shall be stopped when the fuselage of the A/C hits the ground.

4.13 Non-engagement rule

If a pilot stays away from combat for more than 30 seconds, he should be warned by the main judge. If the pilot still after this stays away from combat for an additional 30 seconds after the warning, the pilot should receive a non-engagement penalty of -50p. A pilot who after the first warning tells the main judge he has technical problems should immediately try to land his model, in a location and manner safe for the contestants and the audience.

4.14 Tie

If the final points are equal for two pilots, the one with highest points in the final wins. If it is still equal, the pilot with the highest points from one single fight (except from the final) in the contest wins.

4.15 Frequencies

Contestants must be able to change between at least two frequencies. When a frequency collision occurs in the final, the contestant with the lowest total score shall change frequency. This change must be given extra time, so that the preparation part of the final does not start until the change is done. It is the contestant's responsibility to avoid frequency-collisions at changes from the given frequency.

4.16 Complaints

If the weather or other conditions gets bad at a contest or as soon as a participating pilot complains about the weather or other conditions to the arranging group, the arranging group shall take a ballot among the pilots to decide if the contest should be postponed, or cancelled and how the results from the contest should be decided.

4.17 Protest

Any contestant can make a protest against judge's decisions. Protests shall always be decided by taking a ballot among the contestants. This should be done as soon as possible. A protest charge should be taken. If the protest is sustained, the protest charge is returned.

5 Judges

5.1 Main judge

The *main judge* is responsible for the overall timing of the contest. He is also responsible for keeping contestants behind the safety line when A/C are airborne.

Cheating resp. the attempt to cheat shall be avenged with disqualifying the contestant.

The main judge decision shall be based on a pilots voting.

ACES Rules 2011

5.2 Safety judge

The *safety judge* is responsible for the overall safety of the contest. This judge has higher authority than the main judge, when it comes to safety. The safety judge should warn for safety hazards during a fight. He shall position himself in such a kind that he is able to spot safety line crossings clearly. He is also responsible of that there are no people not wearing hard hats outside of any safety net zone(s) or closer to the safety line than 60 meters.

5.3 Pilot judge

The *pilot judge* is obliged to note points for the pilot on a scoreboard, and keep record of the pilots' flight-time. Furthermore he or she is responsible to register safety line crossing together with the safety judge, non engagement and collision and to check the pilot's streamer after the fight as well. The pilot judge shall check the A/C before and immediately after the heat regarding streamers or parts of it sticking to the A/C. This shall take place in accordance with the pilot, confirmed by a signature on the pilot's card. If situation remains obscure after landing, the main judge has to draw a decision immediately.

6 Points

The following points system is used. Note that no decimal points are given.

6.1 Minus/plus points

Crossing safety line (applies all day)	-200
Non-engagement	-50
Engine over rpm limit.	-50
Own streamer uncut during fight	+50
Cutting streamer off enemy A/C	+100
Flight-time, per 3 seconds	+1 up to +138