



## FAI/CIAM New Airplane & Helicopter Competition Class Rules

Adopted March 24, 2001

### Technical Rules for Artistic Aerobatics Competitions

#### G.1 Class F-G1 - Airplane Artistic Aerobatics

##### G.1.1 Definition of an Artistic Aerobatics Airplane

An Aeromodel which is aerodynamically manoeuvred by control surface(s) in attitude, direction and altitude by a pilot on the ground using radio control, but not a helicopter.

##### G.1.2 General characteristics of Radio Controlled Artistic Aerobatics Airplanes :

Maximum overall span : 2 m

Maximum overall length : 2 m

Maximum total weight : 5 kg without fuel

Power source limitations : any suitable power source may be utilised except those requiring solid propellants, gaseous or liquefied gaseous fuels. Electric powered airplanes are limited to a maximum of 42 Volts for the propulsion circuit.

Paragraph B.3.1 of Section 4b (Builder of Model) is not applicable to class F-G1.

The maximum permitted noise level will be 94 dB(A) measured at 3 m from the centre line of the airplane with the airplane placed on the ground over concrete or macadam at the flying site. With the motor running at full power, measurements will be taken 90 degrees from the flight path on the right hand side and downwind from the airplane. The microphone will be placed on a stand 30 cm above the ground in line with the motor. No noise reflecting objects shall be nearer than 3 m from the airplane or microphone.

The measurement will be made at the conclusion of any preliminary flight when, in the opinion of any one judge, the Field Marshall, the Contest Director or the FAI Jury, the airplane is deemed too noisy, but at least 20% of the entrants must be checked. If a concrete or macadam surface is not available then the measurement may be taken over bare earth or very short grass, in which case the maximum noise level will be 92 dB(A).

In the event an airplane fails the noise test, no modification or adjustment to the airplane shall be permitted (other than refuelling) and the airplane shall be re-tested by a second noise steward using a second noise meter. In the event that the airplane fails the re-test, the score for the preceding flight shall be zero. If this noise check was made at the conclusion of the first preliminary flight, another noise check shall be made at the conclusion of the second preliminary flight.

The measuring equipment must be calibrated to the dB(A) sound pressure level scale defined in applicable ISO Standards. If the noise measurement criteria cannot be met, the measurements will be advisory only and no competitor can be excluded from the competition.

Radio equipment shall be of the open loop type (i.e. no electronic feedback from the airplane to the ground). Auto-pilot control utilising inertia, gravity or any type of terrestrial reference is prohibited. Automatic control sequencing (pre-programming) or automatic control timing devices are prohibited.

- Example : Permitted :
1. Control rate devices that are manually switched by the pilot.
  2. Any type of button or lever control that is initiated and terminated by the pilot.
  3. Manually operated switches to couple control functions.

- Not permitted :
1. Snap buttons with automatic timing mode.
  2. Pre-programming devices to automatically perform a series of commands.

3. Auto-pilots for automatic wing levelling.
4. Propeller pitch change with automatic timing mode.
5. Any type of voice recognition system.
6. Any type of learning function involving manoeuvre to manoeuvre or flight to flight analysis.

### **G.1.3. Definition and Number of Helpers**

A helper may be a Team Manager, another competitor or an officially registered helper. Each pilot is permitted one helper during the flight. Two helpers may be present during the starting of the motor(s). The second helper may place the airplane for take-off and retrieve the airplane following the landing.

### **G.1.4. Number of flights**

G.1.4.1. The competition consists of preliminary flights and one or several qualifying rounds leading to a final round. A semi-finals round may be added at National, International competitions and World Air Games, but not at local or regional competitions.

G.1.4.2. A preliminary flight round consists of one flight for each competitor. A qualification, semi-finals or finals round consists of one Music Compulsory and one Music Free Style flights for each competitor.

G.1.4.3. All competitors have the right to an equal number of preliminary rounds. Only completed rounds will be taken into account.

G.1.4.4. All pilots flying in at least one preliminary flight are entitled flying the first qualifying round. If there is a second qualification round, it will be open to no more than the top 80 % competitors. The number of competitors accessing the second round shall be determined by the Organiser before the beginning of the competition, and preferably in the preliminary competition information bulletin, according to the number of competitors and the time available.

G.1.4.5. If there is a semi-final round, it shall be open to no more than the top20 or 50 % remaining competitors, whatever is the smallest. The number of competitors accessing the semi-final round shall be determined by the Organiser before the beginning of the competition, and preferably in the preliminary competition information bulletin, according to the number of competitors and the time available.

G.1.4.6. The final round shall be open to no more than the top 10 or 50 % remaining competitors, whatever is the smallest, but at least 5. The number of competitors accessing the final round shall be determined by the Organiser before the beginning of the competition, and preferably in the preliminary competition information bulletin, according to the number of competitors and the time available.

G.1.4.7. At the discretion of the Organiser and provided this is specified in the competition preliminary information, the competitors not qualified for a further round may be allowed to participate in further, separate, consolation rounds. Such rounds shall follow the same principle as the main competition rounds and the Organiser may choose how the competitors will be allowed access to the consolation rounds. However, the main competition shall always have precedence if the time available does not allow all scheduled flights to take place and for the use of the best time frame for spectators and media.

G.1.4.8. At the end of the competition, competitors taking part in consolation rounds shall be ranked immediately after the last competitor qualified at the end of the first qualification round.

### **G.1.5. Definition of an attempt**

There is an attempt when the competitor is given permission to start.

**Note :** If the competitor fails to take off within the three minutes allowed, he (she) must immediately make room for the next competitor. If the motor stops after the take-off has begun, but before the airplane is airborne, it may be restarted within the 3-minute starting period.

### **G.1.6. Number of attempts**

Each competitor is entitled one attempt for each official flight

**Note :** An attempt can be repeated at the contest director's discretion only when, for any unforeseen reason outside the control of the competitor, the airplane fails to start (e.g. there is radio interference). Similarly, in a flight that is interrupted by any circumstance beyond the control of the competitor (e.g. sudden rainfall, music airing malfunction, etc.) , the competitor is entitled a re-fly. During the preliminary rounds, only the manoeuvre affected and the un-scored manoeuvres that follow will be judged. During the subsequent rounds, the whole flight shall be re-flown and scored as a whole.

### **G.1.7. Definition of an official flight**

There is an official flight when an attempt is made, whatever the result.

## **G.1.8. Marking**

### **G.1.8.1. Judges**

All flights shall be judged by a panel of at least 3, and preferably 5, judges. The scores of all judges shall be taken into account.

#### G.1.8.1.1. Preliminary rounds

Each manoeuvre may be awarded marks, in half point increments, between 10 and 0 by each of the judges during the flight. These marks are multiplied by a coefficient which varies with the difficulty of the manoeuvre, according to the current FAI Aerobatic Catalogue. The manoeuvre sequence is established by the ad hoc sub-committee on a yearly basis and accepted by the CIAM Plenary Meeting for application during the following year.

Any manoeuvre not completed shall be scored zero (0). Manoeuvres must be performed where they can be clearly seen by the judges. If a judge, for some reason outside the control of the competitor, is not able to follow the airplane through the entire manoeuvre, he may set the "Not Observed" (N.O.) mark. In this case, the judges' mark for that particular manoeuvre will only take into account the other judges' marks. Centre manoeuvres should be performed in the centre of the manoeuvring area while turn around manoeuvres should not extend past a line 60° left and right of centre. Vertical height, as seen from the judges' location, should not exceed 60°. Also, manoeuvres should be performed along a line of flight not more than 150 m in front of the pilot. Infractions of this rule will be cause for downgrading by each judge individually and in proportion to the degree of infraction. The manoeuvring area will be clearly marked with white vertical poles (or a colour contrasting with the surrounding colours), a minimum of 100 mm in diameter and a minimum of 4 m high, placed on centre and 60° each of centre on a line 150 m in front of the pilot. Flags and/or streamers of contrasting colour should be mounted on the poles to improve visibility.. White (or contrasting) lines, originating at the pilot's position and extending outward at least 50 m will also be used to mark the centre and extreme limits (60 degrees left and right of centre) of the manoeuvring zone. Audible and visual signals to indicate violations of the manoeuvring zone are not to be employed.

The judges shall be seated not more than 10 m behind the pilot's position (the apex of the 60-degree lines) and within an area described by the extension of the 60 degree line to the rear of the pilot.

At the conclusion of the flight each judge will independently score the airplane for in-flight noise level, indicating is the airplane is too noisy, average, or very quiet. If a majority of the judges score the airplane too noisy, the flight score will be penalised 1% of the final score (after TBL reduction) for each counting judge. Conversely, if a majority of the judges score the airplane very quiet, the final flight score will receive a 1% bonus for each counting judge.

If an airplane is in the opinion of the judges or the Contest Director, unsafe or being flown in an unsafe manner, they may instruct the pilot to land. In this case, the flight will be deemed complete.

The raw score given by each judge for each competitor shall be made public immediately at the end of each preliminary flight.

#### G.1.8.1.2. Qualification, semi-finals and finals flights

Each flight may be awarded marks, in half point increments, between 10 and 0 by each of the judges and for each judging criteria. Judging shall be done on :

- a) Technique (difficulty and precision of the individual manoeuvres) ;
- b) Artistic quality (originality, harmony & rhythm, composition and versatility of the entire flight sequence, adhesion to the music) ;
- c) Overall appearance (use of the flight space, positioning of the manoeuvres and general impression).

Thus each judge may award a maximum of 30 points to each competitor.

## **G.1.9. Classification**

G.1.9.1. Each competitor will have the right to two preliminary flights, the best one only is taken into account and determines the preliminary ranking.

G.1.9.2. All competitors are entitled competing in the first qualification round. The starting order is established according to the reverse preliminary ranking, i.e. the competitor ranked last in the preliminaries start first in both flights of the first qualification round and the competitor ranked first starts last.

For each flight, all scores will be normalised to 1000 points as described below :

$$\text{Points}_x = \frac{S_x}{S_w} \times 1000$$

Points<sub>x</sub> = point awarded to competitor X

$S_x$  = score of competitor X

$S_w$  = score of winner of the flight

G.1.9.3. The score at the conclusion of the preliminary rounds is the score of the best Preliminary flight.

G.1.9.2. The score of a qualification, semi-final or final round is the sum of the two flight scores of that round.

G.1.9.3. The intermediate score at any stage of the competition is the sum of the preliminary score and the scores of all complete qualification and semi-final flight(s).

G.1.9.4. The flight starting order at the beginning of any round after the preliminary round is in reverse order of the intermediate classification at the end of the preceding round.

G.1.9.5. The final score is the sum of the preliminary score and the scores of all complete qualification, semi-final and final rounds.

## **G.1.10 Tasks**

### **G.1.10.1. Preliminary round flights**

During the preliminary round flights the competitors must fly a compulsory sequence of aerobatics manoeuvres judged for smoothness and precision.

Individual manoeuvres shall be taken from the FAI Aerobatic Catalogue ; all manoeuvres difficulty coefficients and pertinent rules (including judging rules) shall apply.

The manoeuvres sequence shall be prepared in such a way that manoeuvres are of essentially increasing difficulty. The sequence shall be composed so as to enable completion of the judged part of the flight in approximately 120 seconds.

There shall be no time limit for completing a flight, except that the competitor must begin the compulsory sequence within 30 seconds from the moment the airplane begins its take-off roll and landing touch down must occur within 30 seconds after the last manoeuvre in the sequence has been completed.

Scoring shall be done using the Tarassov-Bauer-Long (TBL) system or a derivative of such system, as approved by the CIAM, except at small competitions where flights are scored by less than 5 judges.

### **G.1.10.2. Music compulsory flights**

These are flights where each competitor must compose his (her) own sequence of manoeuvres to suit a compulsory music. Any manoeuvre may be flown, provided safety is ensured. Unsafe flying, in the opinion of the judges, shall result in a zero score.

The flights shall be judged for technique (precision and difficulty of the individual manoeuvres), artistic quality (composition of the complete sequence, variety of the manoeuvres, rhythm and adherence to the music) and overall appearance. Excessive noise detracts from the overall appearance and shall accordingly induce downgrading. A judging guide shall define the judging criteria and their relative weights.

The music to be used will be chosen and prepared by the ad hoc sub-committee on an annual basis and adopted by the CIAM Plenary meeting for application during the following year.

For qualification flights, the duration of the compulsory music shall be between 100 and 140 seconds.

For semi-finals, when applicable, the duration of the compulsory music shall be between 150 and 210 seconds.

For finals, the duration of the compulsory music shall be between 220 and 260 seconds.

### **G.1.10.3. Music free-style flights**

These are flights where each competitor must compose his (her) own sequence of manoeuvres to suit a music of his (her) own choice. Any manoeuvre can be flown, provided safety is ensured. Unsafe flying, in the opinion of the judges, shall result in a zero score.

The flights shall be judged for technique, artistic quality and overall appearance as detailed in G.1.8.2. Excessive noise detracts from the overall appearance and shall accordingly induce downgrading. A judging guide may define the judging criteria and their relative weights.

The music shall be chosen by each competitor according to his (her) own taste. The competitor must provide the organiser with a record of the chosen music on CD, tape or any other suitable.

For qualification flights, the music shall be of 120 seconds duration. When several qualification rounds are scheduled, the competitor may elect flying a different music and/or manoeuvre sequence for any one of such flights.

For semi-finals, when applicable, the music shall be of 180 seconds duration.

For finals, the music shall be of 240 seconds duration.

The scored part of the flight begins at the moment the music starts or, at the latest, 30 seconds after the moment the airplane started moving under its own power for take-off. It ends at the moment the scheduled duration comes to an end.

### **G.1.11. Timing procedures**

G.1.11.1. Before each flight, a competitor is entitled to 180 seconds preparation time after he (she) has been given his (her) transmitter(s).

G.1.11.2. At the end of the preparation time, or earlier if the competitor agrees to and the flight line is free, and with permission from the Field Marshall, the competitor or his (her) helper may start his (her) engine(s). The start of the take-off roll (the moment the airplane moves under its own power) shall occur no later than 180 seconds after the moment permission has been given to start the engine(s).

G.1.11.3. During preliminary flights, a competitor must begin the scored portion no later than 30 seconds after the start of the take off roll.

G.1.11.4. During Music Compulsory and Music Free-Style flights, the competitor may elect to start his (her) scored sequence (start of the music) at any time from the moment of the start of the take off roll and 30 seconds after this moment. He (she) must express his (her) choice to the Judges and timekeeper before the beginning of his (her) flight and signal to the Steward the moment he (she) wants the music to start. If he (she) fails to signal this moment, the Steward will start the music 30 seconds after the start of the take off roll.

G.1.11.5. During Music Compulsory flights, scoring by the judges ceases, at the choice of the competitor, at landing or in flight. If at landing, the flight is deemed complete at the moment the airplane first touches the ground on the designated landing area. If in flight, scoring stops at the moment the music stops.

G.1.11.6. During Music Free-Style flights, scoring by the judges ceases at the moment the prescribed music duration comes to an end. At the choice of the competitor, this may occur at landing or in flight. If at landing, the flight is deemed complete, and scoring stops, at the moment the airplane first touches the ground on the designated landing area.

G.1.11.7. If the competitor elects ending his (her) scored sequence while in flight, he (she) must land his (her) airplane (the moment the airplane first touches the ground on the designated landing area) within 30 seconds of the end of the scored sequence.

### **G.1.12. Time penalties**

G.1.12.1. If the competitor fails to take off within the time allowed, the flight is scored 0 (zero).

G.1.12.2. If the competitor fails to begin the scored sequence within the time allowed, the flight is scored 0 (zero).

G.1.12.3. If the competitor fails to land within the time allowed after the end of the scored sequence, the flight is scored 0 (zero).

G.1.12.4. If, for any reason, the airplane comes in contact with the ground before the end of the scored sequence (end of the music), the competitor will receive a penalty equal to 1 % of the total score awarded by the judges for each missing second, but no more than 100 %.

G.1.12.5. The end of the scored compulsory sequence must take place within  $\pm 5$  seconds of the moment the compulsory music stops. For any time deviation over this limit, the competitor will receive a penalty equal to 1 % of the total score awarded by the judges (after TBL computation) for each second additional deviation, but no more than 100 %.

G.1.12.6. The end of the scored free-style sequence must take place within  $\pm 5$  seconds of the moment the prescribed scored flight duration comes to an end. For any time deviation over this limit, the competitor will receive a penalty equal to 1 % of the total score awarded by the judges (after TBL computation) for each second additional deviation, but no more than 100 %.

### **G.1.13. Junior and National Team participation**

G.1.13.1. When at least 5 Junior competitors are competing, there shall be a separate Junior classification. Whenever possible, the Organiser should try organising separate flight groups for them.

#### **G.1.13.2. National teams**

G.1.13.2.1. National Teams, when applicable, shall consist of up to eight (8) competitors from the same Nation.

G.1.13.2.2. A National Teams classification shall be established, taking into account the scores of the three (3) top ranking competitors from each Nation.

G.1.13.2.3. National Junior Teams, when applicable, shall consist of up to five (5) competitors from the same Nation.

G.1.13.2.4. A National Junior Teams classification shall be established, taking into account the scores of the three (3) top ranking Junior competitors from each Nation.

G.1.13.2.5. The scores to be taken into account for Team classification shall be the final score of the competitors.

G.1.13.2.6. Results of Consolation Rounds shall not be taken into account for National Team classification.

## **G.2 Class F-G2 - Helicopter Artistic Aerobatics**

### **G.2.1 Definition of an Artistic Aerobatics Helicopter**

An R/C helicopter is a heavier-than-air aeromodel that derives all of its lift and horizontal propulsion from a power driven rotor system(s) rotating about a nominally vertical axis (or axes). Fixed horizontal supporting surfaces up to 4 percent of the swept area of the lifting rotor(s) are permitted. A fixed or controllable horizontal stabiliser of up to 2% of the swept area of the lifting rotor(s) is permitted. Ground effect machines (hovercraft), convertiplanes or aircraft that hover by means of propeller slipstream(s) deflected downward are not considered to be helicopters.

### **G.2.2. Builder of the helicopter**

Paragraph B.3.1 of Section 4b (Builder of the model) is not applicable to class F-G2.

### **G.2.3. General characteristics**

AREA : The swept area of the lifting rotor cannot exceed 300 dm<sup>2</sup>. For helicopters with multiple rotors whose rotor shafts are more than one rotor diameter apart the total swept area of both rotors cannot exceed 300 dm<sup>2</sup>. For helicopters with multiple rotors whose rotor shafts are less than one rotor diameter apart the swept area of both rotors (counting the area of superposition only once) cannot exceed 300 dm<sup>2</sup>.

- a) WEIGHT : The weight of the helicopter (without fuel) must not exceed 6 kg.
- b) MOTOR : Power source limitations : any suitable power source may be utilised except those requiring solid propellants, gaseous or liquefied gaseous fuels. Electric powered helicopters are limited to a maximum of 42 Volts for the propulsion circuit.
- c) GYROS : An electronic rate gyro is permitted on the yaw axis only.
- d) ROTOR BLADES : All-metal main or tail rotor blades are prohibited.
- e) Noise Limit

The noise level must be measured at a distance of 3 metres while the helicopter is hovering at eye level over the centre of a 2 metre diameter circle. During the measurement the helicopter must be rotated through 360 degrees to determine the maximum noise level. The sound pressure level must not exceed 90 dB(A) over a soft (grass) surface and 92 dB(A) over a hard (asphalt, concrete, etc.) surface.

The measurement will be made at the conclusion of any preliminary flight <when, in the opinion of any one judge, the Field Marshall, the Contest Director or the FAI Jury, the helicopter is deemed too noisy, but at least 20 % of the entrants must be checked.

In the event an helicopter fails the noise test, no modification or adjustment to the helicopter shall be permitted (other than refuelling) and the helicopter shall be re-tested by a second noise steward using a second noise meter. In the event that the helicopter fails the re-test, the score for the preceding flight shall be zero. If this noise check was made at the conclusion of the first preliminary flight, another noise check shall be made at the conclusion of the second preliminary flight.

The measuring equipment must be calibrated to the dB(A) sound pressure level scale defined in applicable ISO Standards. If the noise measurement criteria cannot be met, the measurements will be advisory only and no competitor can be excluded from the competition.

### **G.2.3. Definition and Number of Helpers**

A helper may be a Team Manager, another competitor or an officially registered helper. Each pilot is permitted one helper during the flight. Two helpers may be present during the starting of the motor(s). The second helper may place the helicopter for take-off and retrieve the helicopter following the landing.

### **G.2.4. Number of flights**

G.2.4.1. The competition consists of preliminary flights and one or several qualifying rounds leading to a final round. A semi-final round may be added at National, International competitions and World Air Games, but not at local or regional competitions.

G.2.4.2. A preliminary flight round consists of one flight for each competitor. A qualification, semi-finals or finals round consists of one Music Compulsory and one Music Free Style flights for each competitor.

G.2.4.3. All competitors have the right to an equal number of preliminary rounds. Only completed rounds will be taken into account.

G.2.4.4. All pilots flying in at least one preliminary flight are entitled flying the first qualifying round. If there is a second qualification round, it will be open to no more than the top 80 % of the competitors. The number of competitors

accessing the second round shall be determined by the Organiser before the beginning of the competition, and preferably in the preliminary competition information bulletin, according to the number of competitors and the time available.

G.2.4.5. If there is a semi-final round, it shall be open to no more than the top 20 or 50 % remaining competitors, whatever is the smallest. The number of competitors accessing the semi-final round shall be determined by the Organiser before the beginning of the competition, and preferably in the preliminary competition information bulletin, according to the number of competitors and the time available.

G.2.4.6 The final round shall be open to no more than the top 10 or 50 % remaining competitors, whatever is the smallest, but at least 5. The number of competitors accessing the final round shall be determined by the Organiser before the beginning of the competition, and preferably in the preliminary competition information bulletin, according to the number of competitors and the time available.

G.2.4.7. At the discretion of the Organiser and provided this is specified in the competition preliminary information, the competitors not qualified for a further round may be allowed to participate in further, separate consolation rounds. Such rounds shall follow the same principle as the main competition rounds and the Organiser may choose how the competitors will be allowed access to the consolation rounds. However, the main competition shall always have precedence if the time available does not allow all scheduled flights to take place and for the use of the best time frame for spectators and media.

G.2.4.8. At the end of the competition, competitors taking part in consolation rounds shall be ranked immediately after the last competitor qualified at the end of the first qualification round.

## **G.2.5. Definition of an attempt**

There is an attempt when the competitor is given permission to start.

**Note :** If the competitor fails to take off within the three minutes allowed, he (she) must immediately make room for the next competitor. If the motor stops before the helicopter is airborne, it may be restarted within the 3-minute starting period.

## **G.2.6. Number of attempts**

Each competitor is entitled one attempt for each official flight

**Note :** An attempt can be repeated at the contest director's discretion only when, for any unforeseen reason outside the control of the competitor, the helicopter fails to start (e.g. there is radio interference). Similarly, in a flight that is interrupted by any circumstance beyond the control of the competitor (e.g. sudden rainfall, music airing malfunction, etc.) , the competitor is entitled a re-fly. During the preliminary rounds, only the manoeuvre affected and the un-scored manoeuvres that follow will be judged. During the subsequent rounds, the whole flight shall be re-flown and scored as a whole.

## **G.2.7. Definition of an official flight**

There is an official flight when an attempt is made, whatever the result.

## **G.2.8. Marking**

### **G.2.8.1. Judges**

All flights shall be judged by a panel of at least 3, and preferably 5, judges. The scores of all judges shall be taken into account.

#### **G.2.8.1.1. Preliminary rounds**

Each manoeuvre may be awarded marks, in half point increments, between 10 and 0 by each of the judges during the flight. These marks are multiplied by a coefficient which varies with the difficulty of the manoeuvre. The manoeuvre sequence and the difficulty coefficients are established by the ad hoc sub-committee on a yearly basis and accepted by the CIAM Plenary Meeting.

Any manoeuvre not completed shall be scored zero (0). Manoeuvres must be performed where they can be seen clearly by the judges. If a judge, for some reason outside the control of the competitor, is not able to follow the helicopter through the entire manoeuvre, he may set the "Not Observed" (N.O.) mark. In this case, the judges' mark for that particular manoeuvre will only take into account the other judges' marks. Centre manoeuvres should be performed in the centre of the manoeuvring area while turn around manoeuvres should not extend past a line 60° left and right of centre. Vertical height, as seen from the judges' location, should not exceed 60°. Also, manoeuvres should be performed along a line of flight not more than 150 m in front of the pilot. Infractions of this rule will be cause for downgrading by each judge individually and in proportion to the degree of infraction. The manoeuvring area will be clearly marked with white vertical poles (or a colour contrasting with the surrounding colours), a minimum of 100 mm in diameter and a minimum of 4 m high, placed on centre and 60° each of centre on a line 150 m in front of the pilot. Flags and/or streamers of contrasting colour should be mounted on the poles to improve visibility.. White (or contrasting) lines, originating at the pilot's position and extending outward at least 50 m will also be used to mark the centre and extreme limits (60 degrees left and right of centre) of the manoeuvring zone. Audible and visual signals to indicate violations of the manoeuvring zone are not to be employed.

The judges shall be seated not more than 10 m behind the pilot's position (the apex of the 60 degree lines) and within an area described by the extension of the 60 degree line to the rear of the pilot.

At the conclusion of the flight each judge will independently score the helicopter for in-flight noise level, indicating if the helicopter is too noisy, average, or very quiet. If a majority of the judges score the helicopter too noisy, the flight score will be penalised 1% of the final score (after TBL reduction) for each counting judge. Conversely, if a majority of the judges score the helicopter very quiet, the final flight score will receive a 1% bonus for each counting judge;

If an helicopter is in the opinion of the judges unsafe or being flown in an unsafe manner, they may instruct the pilot to land. In this case, the flight will be deemed complete.

The raw score given by each judge for each competitor shall be made public immediately at the end of each preliminary flight.

#### G.2.8.1.2. Qualification, semi-finals and finals flights

Each flight may be awarded marks, in half point increments, between 10 and 0 by each of the judges and for each judging criteria. Judging shall be done on :

Technique (difficulty and precision of the individual manoeuvres) ;

Artistic quality (originality, harmony & rhythm, composition and versatility of the entire flight sequence, adhesion to the music) ;

Overall appearance (use of the flight space, positioning of the manoeuvres and general impression).

Thus each judge may award a maximum of 30 points to each competitor.

### **G.2.9. Classification**

G.2.9.1. Each competitor will have the right to two preliminary flights, the best one only is taken into account and determines the preliminary ranking.

G.2.9.2. All competitors are entitled competing in the first qualification round. The starting order is established according to the reverse preliminary ranking i.e. the competitor ranked last in the preliminaries start first in both flights of the first qualification round and the competitor ranked first starts last.

For each flight, all scores will be normalised to 1000 points as described below :

$$\text{Points}_x = \frac{S_x}{S_w} \times 1000$$

Points<sub>x</sub> = point awarded to competitor X

S<sub>x</sub> = score of competitor X

S<sub>w</sub> = score of winner of the flight

G.2.9.3. The score at the conclusion of the preliminary rounds is the score of the best Preliminary flight.

G.2.9.2. The score of a qualification, semi-final or final round is the sum of the two flight scores of that round.

G.2.9.3. The intermediate score at any stage of the competition is the sum of the preliminary score and the scores of all complete qualification and semi-final flight(s).

G.2.9.4. The flight starting order at the beginning of any round after the preliminary round is in reverse order of the intermediate classification at the end of the preceding round.

G.2.9.5. The final score is the sum of the preliminary score and the scores of all complete qualification, semi-final and final rounds.

### **G.2.10 Tasks**

#### **G.2.10.1. Preliminary round flights**

During the preliminary round flights the competitors must fly a compulsory sequence of aerobatics manoeuvres judged for smoothness and precision.

The manoeuvre sequence and the difficulty coefficients are established by the ad hoc sub-committee on a yearly basis and accepted by the CIAM Plenary Meeting for application during the following year.

The manoeuvres sequence shall be prepared in such a way that manoeuvres are of essentially increasing difficulty. The sequence shall be composed so as to enable completion of the judged part of the flight in approximately 150 seconds. The sequence may include both translational and hovering manoeuvres.



There shall be no time limit for completing a flight, except that the competitor must begin the compulsory sequence within 30 seconds from the moment the helicopter lifts off and landing touch down must occur within 30 seconds after the last manoeuvre in the sequence has been completed.

Scoring shall be done using the Tarassov-Bauer-Long (TBL) system or a derivative of such system, as approved by the CIAM, except at small competitions where flights are scored by less than 5 judges.

### **G.2.10.2. Music compulsory flights**

These are flights where each competitor must compose his (her) own sequence of manoeuvres to suit a compulsory music. Any manoeuvre may be flown, provided safety is ensured. Unsafe flying, in the opinion of the judges, shall result in a zero score.

The flights shall be judged for technique (precision and difficulty of the individual manoeuvres), artistic quality (composition of the complete sequence, variety of the manoeuvres, rhythm and adherence to the music) and overall appearance. Excessive noise detracts from the overall appearance and shall accordingly induce downgrading. A judging guide shall define the judging criteria and their relative weights.

The music to be used will be chosen and prepared by the ad hoc sub-committee or equivalent on an annual basis and adopted by the CIAM Plenary meeting for application during the following year.

For qualification flights, the duration of the compulsory music shall be between 100 and 140 seconds.

For semi-finals, when applicable, the duration of the compulsory music shall be between 150 and 210 seconds.

For finals, the duration of the compulsory music shall be between 220 and 260 seconds.

### **G.2.10.3. Music free-style flights**

These are flights where each competitor must compose his (her) own sequence of manoeuvres to suit a music of his (her) own choice. Any manoeuvre can be flown, provided safety is ensured. Unsafe flying, in the opinion of the judges, shall result in a zero score.

The flights shall be judged for technique, artistic quality and overall appearance as detailed in G.2.8.2. Excessive noise detracts from the overall appearance and shall accordingly induce downgrading. A judging guide may define the judging criteria and their relative weights.

The music shall be chosen by each competitor according to his (her) own taste. The competitor must provide the organiser with a record of the chosen music on CD, tape or any other suitable mean.

For qualification flights, the music shall be of 120 seconds duration. When several qualification rounds are scheduled, the competitor may elect flying a different music and/or manoeuvre sequence for any one of such flights.

For semi-finals, when applicable, the music shall be of 180 seconds duration.

For finals, the music shall be of 240 seconds duration.

The scored part of the flight begins at the moment the music start or, at the latest, 30 seconds after the moment the helicopter started moving under its own power. It ends at the moment the scheduled duration comes to an end.

## **G.2.11. Timing procedures**

G.2.11.1. Before each flight, a competitor is entitled to 180 seconds preparation time after he (she) has been given his (her) transmitter(s).

G.2.11.2. At the end of the preparation time, or earlier if the competitor agrees to and the flight line is free, and with permission from the Field Marshall, the competitor or his (her) helper may start his (her) engine(s). The lift-off shall occur no later than 180 seconds after the moment permission has been given to start the engine(s)

G.2.11.3. During preliminary flights, a competitor must begin the scored portion no later than 30 seconds after lift-off.

G.2.11.4. During Music Compulsory and Music Free-Style flights, the competitor may elect to start his (her) scored sequence (start of the music) at any time from the moment of lift-off until 30 seconds after this moment. He (she) must express his (her) choice to the Judges and timekeeper before the beginning of his (her) flight and signal to the Steward the moment he (she) wants the music to start. If he (she) fails to signal this moment, the Steward will start the music 30 seconds after the moment of lift-off.

G.2.11.5. During Music Compulsory flights, scoring by the judges ceases, at the choice of the competitor, at landing or in flight. If at landing, the flight is deemed complete at the moment the helicopter first touches the ground on the designated landing area. If in flight, scoring stops at the moment the music stops.

G.2.11.6. During Music Free-Style flights, scoring by the judges ceases at the moment the prescribed music duration comes to an end. At the choice of the competitor, this may occur at landing or in flight. If at landing, the flight is deemed complete, and scoring stops, at the moment the airplane first touches the ground on the designated landing area.

G.2.11.6. During Music Free-Style flights, scoring by the judges ceases at the moment the prescribed music duration comes to an end. At the choice of the competitor, this may occur at landing or in flight. If at landing, the flight is deemed complete, and timing stops, at the moment the helicopter first touches the ground on the designated landing area.

G.2.11.7. If the competitor elects ending his (her) scored sequence while in flight, he (she) must land his (her) helicopter (the moment the helicopter first touches the ground on the designated landing area) within 30 seconds of the end of the scored sequence.

### **G.2.12. Time penalties**

G.2.12.1. If the competitor fails to take off within the time allowed, the flight is scored 0 (zero).

G.2.12.2. If the competitor fails to begin the scored sequence within the time allowed, the flight is scored 0 (zero).

G.2.12.3. If the competitor fails to land within the time allowed after the end of the scored sequence, the flight is scored 0 (zero).

G.2.12.4. If, for any reason, the helicopter comes in contact with the ground before the end of the scored sequence (end of the music), the competitor will receive a penalty equal to 1 % of the total score awarded by the judges for each missing second, but no more than 100 %.

G.2.12.5. The end of the scored compulsory sequence must take place within  $\pm 5$  seconds of the moment the compulsory music stops. For any time deviation over this limit, the competitor will receive a penalty equal to 1 % of the total score awarded by the judges (after TBL computation) for each second additional deviation, but no more than 100 %.

G.2.12.6. The end of the scored free-style sequence must take place within  $\pm 5$  seconds of the moment the prescribed scored flight duration comes to an end. For any time deviation over this limit, the competitor will receive a penalty equal to 1 % of the total score awarded by the judges for each second additional deviation, but no more than 100 %.

### **G.2.13. Junior and National Team participation**

G.2.13.1. When at least 5 Junior competitors are competing, there shall be a separate Junior classification. Whenever possible, the Organiser should try organising separate flight groups for them.

#### **G.2.13.2. National teams**

G.2.13.2.a) National Teams, when applicable, shall consist of up to eight (8) competitors from the same Nation.

G.2.13.2.b) A National Teams classification shall be established, taking into account the scores of the three (3) top ranking competitors from each Nation.

G.2.13.2.c) National Junior Teams, when applicable, shall consist of up to five (5) competitors from the same Nation.

G.2.13.2.d) A National Junior Teams classification shall be established, taking into account the scores of the three (3) top ranking Junior competitors from each Nation.

G.2.13.2.e) The scores to be taken into account for Team classification shall be the final score of the competitors.

G.2.13.2.f) Results of Consolation Rounds shall not be taken into account for National Team classification.

\*\*\*\*\*