



# Radio Control Scale Helicopters

2018



RULES GOVERNING MODEL AVIATION COMPETITION IN THE UNITED STATES

# Amendment Listing

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Amendment Topic	Publication Date	Description
Original Issue	1/1/2017	Publication of Competition Regulations
Rules Rewrite	4/12/2017	Rewrite of Competition Regulations

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## **RADIO CONTROL SCALE HELICOPTER, GENERAL**

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### **1. Applicability**

In addition to the following General Radio Control rules and the specific rules for each radio control event, radio control model aircraft construction, flying, and competition are also governed by the rules of the following sections: Sanctioned Competition, Records, and General. Although the following general and specific rules primarily govern competitive activity in AMA events, it is strongly recommended that in the interest of safety and consistency they be followed in all radio control activity.

### **2. Safety Declaration**

At all sanctioned contests, each contestant shall sign an AMA Flight Safety Declaration (perhaps as part of an entry form), attesting to the fact that he/she has previously and is now capable of confidently performing the maneuvers comprising his competitive event. Furthermore, the contestant shall also similarly declare that any and all aircraft he/she uses in said competition have been test flown at least to the extent that they have performed the same competitive maneuvers and are therefore qualified to be flown in the contest and in the presence of fellow contestants, contest officials, and all others who may be in the flight area during the competition period.

## **RADIO CONTROL SCALE HELICOPTER (518, TEAM SCALE, SPORT SCALE)**

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### **3. General**

- 3.1. All pertinent AMA Regulations (see sections entitled Sanctioned Competitions, Records, Selections of Champions, General and Scale General) shall be applicable except as specified herein.
- 3.2. A transmitter impound is required for those radio systems utilizing non-spread spectrum transmission. Transmitters operating on spread spectrum are not required to be impounded.

### **4. Judging**

- 4.1. It is recommended that a panel of five (5) judges is appointed for each round. The final score of each flight is obtained after discarding the highest and lowest scores for each maneuver. When less than five (5) judges are used the scores given by all judges shall be used. The minimum number of judges to be used is three (3).
- 4.2. It is highly recommended that the judges are given a 20 minute break every two hours. The Contest Director (CD) should take this into account when scheduling flights rounds and notification of the break point should be made known to the judges and contestants. (NOTE: Breaks can only be taken between completed rounds.)

## **5. Mechanic/Caller**

- 5.1. Each contestant may have one (1) mechanic caller. The caller may not act as coach; they may only announce the start and finish of each maneuver.

## **6. Model Requirements**

- 6.1. There shall be no limits to the types of equipment that can be fitted to the helicopter. Metal main or tail rotor blades are allowed when following AMA Safety Document 555.
- 6.2. Each contestant shall be permitted one (1) model entry.

## **7. Builder of the Model**

- 7.1. The builder and flyer of the model helicopter shall be one and the same person. There are no team entries.
- 7.2. The Contest Director (CD) shall make every reasonable effort to assure that each contestant “constructed” the model used in competition. “Constructed” shall be interpreted as the action required to complete a model with no more fabrication than the usual helicopter kit.
- 7.3. Helicopter kits containing a large amount of prefabrication are permissible as long as the contestant completes all of the final assembly.
- 7.4. The contestant must be the original owner and the one who prepared the helicopter for flight, regardless of the scope of the work required to finish the helicopter.
- 7.5. The contestant will include in a declaration statement that he/she completed the final assembly of the subject aircraft, including and not limited to: preparing the fuselage for the mechanics, building of the mechanics, installing the radio equipment, and test flying the aircraft. The contestant shall also list which items or construction steps that he/she did not complete or fabricate.

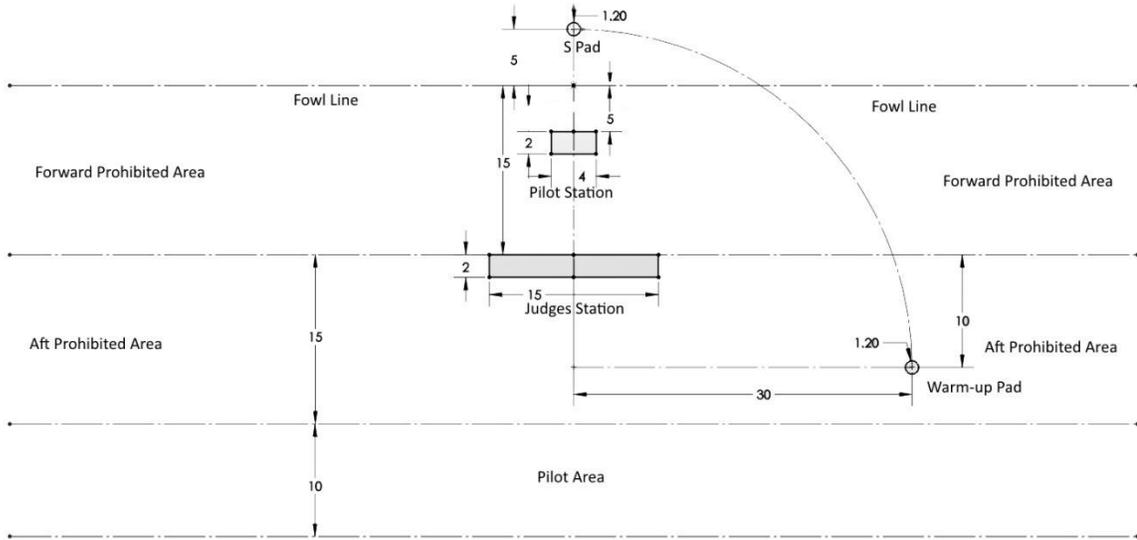
## **8. Proof of Scale**

- 8.1. Proof of scale contestants shall present the following materials with the helicopter for static judging:
  - 8.1.1. A published three-view or more drawings
  - 8.1.2. Pictures, published or otherwise, pertaining to color, markings, and details

## **9. Range**

- 9.1. The contest layout area is as shown below in Figure 1. NOTE. This is the same outline as AMA helicopter contests 431,432 and 433 but does not show all the unnecessary outlines for the 518 event with the exception of the size of the circles.
- 9.2. All contest flights shall commence and end at the S helipad.
- 9.3. The pilot shall stand in the Pilot Station which is located 10 meters from the center of the S helipad.
- 9.4. The pilot is not allowed to move to, or stand outside the pilot station from the beginning of the first maneuver being called, to the end of the flight.
- 9.5. Range layout and clarification:
  - 9.5.1. S Pad: Flight begin and end location.
  - 9.5.2. Foul Line: A barrier line that extends parallel to the flight range. This line considers any area in front of the line flying area and any area behind the prohibited area and extends to infinity.
  - 9.5.3. Pilot Station: The area the pilot stand from the beginning of the contest flight to the finish.
  - 9.5.4. Judges Station: Judge perching area.
  - 9.5.5. Forward Prohibited area: This area MUST remain open for judge viewing. This line also extends to infinity.
  - 9.5.6. Aft Prohibited area: This area MUST remain open during a contest fight as a safety buffer and extends to infinity.
  - 9.5.7. Start Pad: Sometimes called the start box, or warm-up pad, is a pre-start and engine warm up area.

Figure 1 (all dimensions in meters)



## **10. Flight Guidelines**

- 10.1. Call pilot to ready at least 5 minutes before he or she is required to enter the starting pad.
- 10.2. Preparation time 5 minutes.
- 10.3. Flight time 10 minutes.
- 10.4. Freestyle time (2 to 8 minutes, within the 10 minute total flight time).
- 10.5. Start time: When the timekeeper, with the permission of the flight line director, gives the signal to start the engine, the contestant is given five (5) minutes to start the engine and make last minute adjustments. The contestant may continue with the preparation beyond the five (5) minute period; however when this occurs the flight time will begin when the five (5) minute preparation time ends.
- 10.6. Flight time: The total time aloft after the start of the flight shall not exceed ten (10) minutes.
- 10.7. Other:
  - 10.7.1.1. All models shall be carried from the start pad to the S pad.
  - 10.7.1.2. Models shall not be flown from the S pad to the pit area.
  - 10.7.1.3. All contestants shall be permitted to fly as many equal rounds as time allows or as directed by the Contest Director (CD).

## **11. Official Flight**

- 11.1. There is an official flight when the pilot is officially called to fly. Whatever the result, the flight may be repeated at the contest director's discretion when for any unforeseen reason outside the control of the contestant; the helicopter fails to make a start, such as:
  - 11.1.1. The takeoff cannot be made within the allowed time limit due to safety reasons.
  - 11.1.2. The contestant can prove that the takeoff was hindered by interference from the outside.
  - 11.1.3. Judging was impossible for reasons outside the control of the contestant (helicopter, engine or radio failure is not considered outside the control of the contestant).

11.1.4. In such cases, takeoff may be repeated immediately after the attempt, or after reporting to the Contest Director (CD) during the same round, or with the approval of the Contest Director (CD) after the round is complete.

11.2. Each contestant is entitled to two (2) official flights.

## **12. Static Judging**

12.1. Static judging is to be done at the flying site when possible.

12.2. The model shall be placed on an elevated table. This table may be rotational in design but is not required.

12.3. The judges are allowed to approach the model but are not allowed to touch it.

12.4. Judging shall be done at close proximity

12.5. The contestant shall be the only person to move or touch the model

12.6. The contestant shall have up to 5 minutes to introduce and demonstrate to the judges any special features of the model such as lights or other special static or working detail of the model. NOTE: Any operational features requiring the helicopter to be "powered up" must be done without power being able to be applied to the motor/controller.

12.7. Contestants shall fly the same equipment that which was static judged. Should part of the aircraft be damaged so as to be replaced, that portion of the helicopter shall be re-judged.

## **13. Static Judging Guidelines**

13.1. Entries shall be judged regarding the following criteria:

13.1.1. Fuselage outline and surface detail: Fuselage outline, panel lines and rivets shall be judged against three-view outline and documentation.

13.1.2. Cockpit: Seats, seat belts, controls, instruments, consoles, map pockets, flooring, interior paint, etc. shall all be judged against the documentation.

13.1.3. Landing Gear: Scale like landing gear (skids or retractable landing gear) shall be judged against the documentation.

13.1.4. Finish and Markings: Paint scheme should reflect actual paint used. Nomenclature could include registration numbers or maintenance and armament markings shall be judged against the documentation.

- 13.1.5. Craftsmanship: Items added or modifications made to enhance the scale appearance of the helicopter. These items may be handmade, or obtained separately and could include; lighting systems, aerials and antennas, non-skid surfaces, latches, handles, opening doors and hatches, interior detail, tie downs, etc. shall be judged against the documentation.
- 13.1.6. Tail Rotor: The tail rotor shall be judged against the documentation.
- 13.1.7. Main Rotor: The main rotor shall be judged against the documentation.

#### **14. Static Scoring**

- 14.1. Fuselage outline and surface detail (50 Points maximum)
- 14.2. Cockpit: (50 points maximum)
- 14.3. Landing Gear (50 points maximum)
- 14.4. Finish and Markings (50 points maximum)
- 14.5. Craftsmanship: (50 points maximum)
- 14.6. Tail Rotor: (10 points maximum)
- 14.7. \*Main Rotor (40 points maximum) \* Helicopters using a main rotor system that features a “fly-bar” to enhance stability will receive a maximum of fifteen (15) points unless the system replicates that of the full scale helicopter.
- 14.8. Static Scoring Note: Contestants shall fly the same equipment which was static judged. Should any part of the aircraft be damaged and require replacing or repair, that area of the aircraft shall be re-judged.

## **15. Flight Judging**

- 15.1. A flight shall be considered official attempt once the contestant or his/her caller has indicated the flight has begun. All contestants must have at least two (2) official attempts to have their static score counted.
- 15.2. Once the contestant or his/her caller has announced the start of his flight he/she is not allowed to make any adjustments to the helicopter. Engine restarts after the flight has commenced are not allowed.
- 15.3. The maneuvers shall be flown in the proper sequence and away from the spectators. The maximum flying time is ten (10) minutes beginning when the first maneuver is announced. If the flight time expires before a maneuver is completed, that maneuver and any remaining maneuvers will be scored zero (0) and the pilot is required to land as soon as possible. An audible or visual signal will be given to the pilot if the flight time expires.
- 15.4. The name of each maneuver and the start and finish of each maneuver must be announced by the pilot or his/her helper. Unannounced maneuvers will be scored zero (0). The contestant may make only one (1) attempt to execute each maneuver during a flight.
- 15.5. A new score sheet is issued for each contestant for each round.
- 15.6. All maneuvers shall be executed in the order described. Any maneuver executed out of order shall be scored a zero (0) including the freestyle maneuvers.

## **16. Prohibited Area**

- 16.1. There shall be an official that can observe any flight over the prohibited area (See Figure 1). An audible or visual signal shall be given to indicate such over flight. When the pilot is signaled as having overflowed this area, the current flight maneuver, and any remaining maneuvers are scored a zero (0) and the model must be landed as soon as possible.

## **17. Flight Judging Guidelines**

17.1. Entries shall be judged using the following flight criteria:

- 17.1.1. 10 Second Hover With Clearing Turns: Lift off smoothly with the tail towards the pilot and hover stationary at skids eye level over the pad for a minimum of ten (10) seconds followed by a 90 degree Clearing Turn either to the left or right, hover for five (5) seconds, followed by a 180-degree turn in the opposite direction, hover for five (5) seconds. Subtract points for; incorrect hover altitude, hovering less than the minimum time, non-completion of clearing turns, erratic movements.
- 17.1.2. 45 Degree Climb out: Following the final clearing turn the model shall perform a 45-degree climb out to a minimum of 8 meters. The pilot should perform the climb out so that the Judges have a good view of the model's angle of climb and altitude. Subtract points for; wrong degree of climb out, wrong altitude, erratic movements.
- 17.1.3. Translational Landing: Following the climb out and at a minimum altitude of eight (8) meters the helicopter will begin a translational straight-line descent to a soft landing on the helipad. Maximum score is achieved when the touchdown is preceded by a minimum duration/altitude hover. Subtract for incorrect starting altitude, erratic movements, rough landing, or missing the helipad.
- 17.1.4. Should the contestant wish to end his/her flight with an autorotation for a possible point bonus, his /her caller must alert the judges to his/hers intentions prior to starting the auto rotation. The maneuver must be started from a height of 8 meters and the engine must be switched off or in throttle hold/idle at the start of the maneuver. Reduced score for incorrect starting altitude, erratic decent, rough landing or missing the landing (S) pad.

17.1.5. Scale Freestyle: Scale Freestyle flight shall commence at the scale (S) helipad. The main objective is to demonstrate the flight capabilities & functions of the actual full-size helicopter, and all maneuvers should replicate the type of helicopter being flown. The pilot shall provide each judge with a description of his maneuvers. The flight duration shall be a minimum of two (2) minutes, not to exceed eight (8) minutes. Scoring will be based on smoothness, precision, realistic speed, and judges' impression of the overall presentation. Subtract for erratic movements, non-scale maneuvers, non-scale speed, falling outside time constraints. The judges will award 50 points for technical merit in performing the maneuvers and 20 points for artistic merit for presenting a sequence of maneuvers which flows nicely and makes for a pleasing demonstration of the models performance.

### **18. Flight Scoring**

- 18.1. 10 second hover with clearing turns (15 points maximum).
- 18.2. 45 degree climb-out (5 points maximum).
- 18.3. Translational landing (10 points maximum).
- 18.4. Scale Free Style: 50 points for technical merit and 20 points for artistic merit (70 Points Maximum).
- 18.5. Bonus Option: Auto rotation 0-15 points per judge).
- 18.6. Each maneuver may be awarded points between zero (0) and ten (10) including one-tenth (1/10) points by each judge.
- 18.7. Any maneuver not called by name (i.e. "translational landing") prior to calling "start" or "begin" will not be scored.
- 18.8. Any maneuver not called "start", or "begin" will not be scored.
- 18.9. Any maneuver not called "end", or "complete" will not be scored.
- 18.10. Each rounds flight score shall be the sum of the scores from the three judges. Maximum 100 points per judge totals 300 possible points per flying round plus any auto rotation or multi-blade/fly-bar-less bonuses.
- 18.11. Fly-bar-less Bonus: Helicopters flying with a multi blade main or fly-bar-less rotor head that is "scale to their particular subject" will receive a fifty (50) point bonus added to each flight round score. Clarification: "scale to their subject" shall be interpreted as a rotor head that matches the number of blades and fly-bar arrangement (if any) fitting to the full scale prototype.

## 19. Determining the Winner

### 19.1. Raw Score

- 19.1.1. A raw score is generated from the static score and from each individual flight rounds.
- 19.1.2. It is recommended that raw scores be posted as soon as possible during and or after each round.

### 19.2. Normalized Score

Each flight score shall be normalized in the following manner. When all contestants have completed a round in front of a particular set of judges, the highest score shall be awarded 1,000 points. The remaining scores for that round are then normalized to a percentage of the 1,000 points in the ratio of actual raw score over round winner's raw score multiplied by 1,000.

$$\text{Normalized Score} = \frac{\text{pilot's round 1 score}}{\text{highest round1 score}} \times 1000$$

For example: A total of 10 contestants are entered. After all 10 have flown in Round 1 in front of judge set A, the winner of that round has a raw score of 81. He/she will receive 1,000 points. Competitor Y has a raw score of 75.75 divided by 81 multiplied by 1.000 equals 925.9 points which is Y's score.

$$\left(\frac{75.75}{81} \times 1000\right) = 925.9 \text{ points}$$

### 19.3. Final Score

- 19.3.1. The final score will be the total of the two highest normalized round scores from 17.3.2.1 below. Each pilot's normalized static score is then doubled to a maximum possible score of 2000.00. These scores are then added together to make up the final score. This achieves a 50/50 balance of flight score to static score.
- 19.3.2. The normalized final flight score will be the total of the normalized counted round score(s) as determined by the following process:
- 19.3.2.1. Count one normalized flight score when only one (1) round is flown; the highest total of the best two (2) flight scores when two (2) rounds are flown. Your highest two (2) rounds if three (3) or more rounds are flown.

### 19.4. Tied Score

- 19.4.1. In case of ties, the best discarded normalized flight of the contestant shall be used to determine the higher placement. Tied scores only apply to the top three positions. In the unlikely event of a remaining tie, the tie will be decided by a fly-off. The fly-off should occur within one hour of the completion of the flying rounds. In the event the fly off is not possible due to conditions outside of the CDs control then the tie breaker shall be the highest single flying round, raw score, between the contestants.

- 19.5. The scores (raw and normalized) for all rounds must be clearly posted as soon as possible after the completion of the round including the static score.

### 19.6. Zero Score

- 19.6.1. Over-flying of the prohibited area will result in a total flight score of zero (0). If an infringement has been made, affected scores will be zeroed (0) on all flight cards. A total flight score of zero (0) shall be awarded when:
- 19.6.1.1. The contestant does not start the helicopter in the prescribed sequence.
- 19.6.1.2. The contestant's helicopter exceeds eye level during the preparation time.
- 19.6.1.3. The contestant does not release the helicopter at the prescribed take off pad (S Pad).

## **20. Team Scale (Provisional)**

20.1. Two member team (1 pilot + 1 mechanic/caller).

20.2. Builder of the Model rule does not apply.

20.3. All other rules are the same as event 518.

## **21. Sport Scale (Provisional)**

21.1. Scoring is the same as 518, with the exception that the normalized Static Score is not doubled.

21.2. All other rules are the same as event 518.



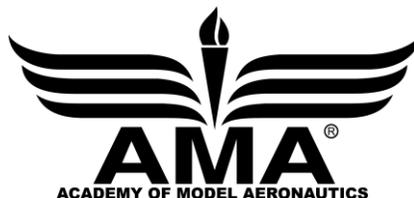
# RC Scale Helicopter Static Score Sheet

## Contestant Information:

Pilot Name: _____	Pilot Number: _____
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## Static Scoring

Category		Score
Fuselage Outline and Surface Detail	(0-50)	
Cockpit	(0-50)	
Landing Gear	(0-50)	
Finish and Markings	(0-50)	
Craftsmanship	(0-50)	
Tail Rotor	(0-10)	
Main Rotor (w/fly-bar max score of 15 unless scale)	(0-40)	
	<b>TOTAL SCORE</b>	
I hereby certify that I am the builder of this aircraft and have followed the <b>Builder-Of-The-Model</b> rules as they apply to the class my helicopter is entered in.  I also certify that this model has been test flown prior to this event.  Signature: _____		



# RC Scale Helicopter Flight Score Sheet

**Contestant Information:**

Pilot Name:	Pilot Number:
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Flight Scoring - Round # \_\_\_\_\_

Flight Plan	(Points)	Score
<b>10 Second Hover w/Clearing Turns</b>	(0-15 points)	
<b>45 Degree Climb Out</b>	(0-5 points)	
<b>Translational Landing</b>	(0-10 points)	
<b>Option:</b>	(0-10 points)	
<b>Bonus Autorotation (per judge)</b>	(0-15 points)	
<b>Artistic Impression</b>	(0-20 points)	
<b>Bonus for Multi-Blade/Flybarless (one judge)</b>	(50 point bonus)	
<b>TOTAL RAW FLIGHT SCORE</b>		